

# Government Response to Oil Price Volatility



Experience of 49  
Developing Countries

*Masami Kojima*



THE WORLD BANK

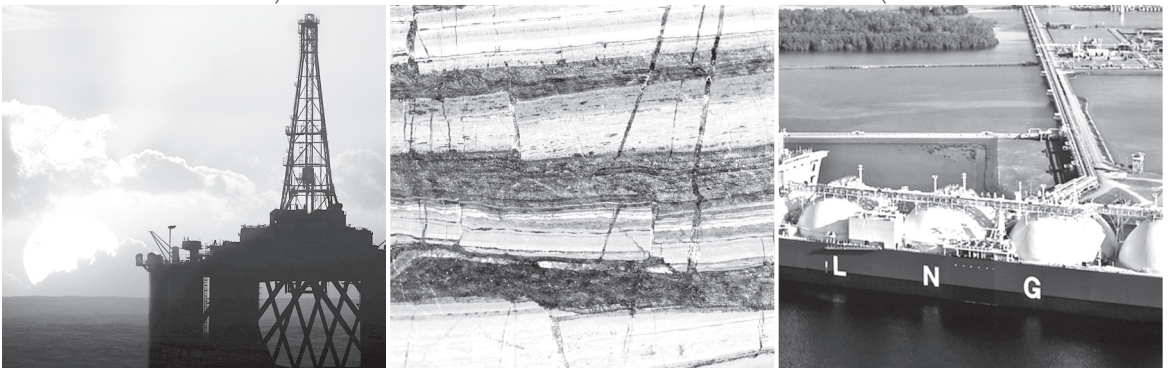
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Cover Photos: Oil rig, hematite-banded ironstone, LNG tanker

# TABLE OF CONTENTS

<b>v</b>	<b>Acknowledgments</b>
<b>vi</b>	<b>Abbreviations</b>
<b>1</b>	<b>Executive Summary</b>
<b>9</b>	<b>Background</b>
<b>12</b>	<b>End-User Price Movements and Fuel Supplies</b>
12	Price Movements
15	Factors Affecting Fuel Supplies
<b>20</b>	<b>Direct and Indirect Government Interventions in Setting Prices</b>
20	Price Control
31	Influencing Prices
37	Consequences of Government Price Control
41	Losses Suffered by Oil Companies
43	Rationing
<b>45</b>	<b>Mitigating High Oil Prices and Price Volatility</b>
45	Compensation for High Oil Prices
49	Energy Conservation
52	Energy Diversification
59	Strategic Reserves
60	Hedging
61	Assistance from Net Oil Exporters

<b>63</b>	<b>Conclusions</b>
<b>68</b>	<b>Appendix A: Sources of Prices</b>
<b>72</b>	<b>Appendix B: Retail Prices of Gasoline, Diesel, Kerosene, and LPG</b>
<b>78</b>	<b>Appendix C: Summary of Topics Covered by Country</b>
<b>82</b>	<b>References</b>

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# ABBREVIATIONS

APNPP	Association des pays africains non producteurs de pétrole (Association of Non-Oil-Producing African Countries)
CFL	compact fluorescent lamps
CNG	compressed natural gas
CPC	Ceylon Petroleum Corporation
EWURA	Energy and Water Utilities Regulatory Authority of Tanzania
GDP	gross domestic product
IEA	International Energy Agency
IOC	Indian Oil Corporation
LPG	liquefied petroleum gas
PTT	Petroleum Authority of Thailand
RON	research octane number
UTM	Unidad Tributaria Mensual (monthly tax unit)

All dollar amounts are U.S. dollars unless otherwise indicated.

Currencies are converted to U.S. dollars using the exchange rates available at the International Monetary Fund's International Financial Statistics online service.



# EXECUTIVE SUMMARY

Oil prices rose from 2004 to historic highs in mid-2008, only to fall precipitously in the last four months of 2008 and lose all the gains of the preceding four and a half years. The steep price increase from January 2007 to July 2008 was challenging for all economies. While the sharp drop in prices since August 2008 has been welcome news for consumers, the cause of it—the global financial crisis—is not. Moreover, currency depreciation against the dollar in many developing countries has meant that, in local currency units, petroleum product prices have not fallen as sharply as in U.S. dollars.

This report examines the policy responses of 49 developing country governments to world oil price movements in the last three years. The sample includes 16 countries in Sub-Saharan Africa, 15 in Asia (Central, East, and South), 10 in Latin America, and 8 in the Middle East and North Africa. The report updates a companion 2006 publication on coping with higher oil prices and builds upon two other publications: one on oil price volatility and another on the degree of pass-through of world oil price increases between January 2004 and August 2008. As with all other publications in this series, this report examines issues related to oil price levels and volatility in the downstream petroleum sector and other sectors where oil is an important input—such as transport, fisheries, and agriculture—from the point of view of consumers. It does not consider macrolevel policies (such as monetary or exchange rate policy) or the impact of oil price changes on the macroeconomic performance of countries, nor does it discuss management of the windfall income by large oil exporters and the long-term economic consequences of revenue management. The report asks the following questions:

- How did domestic petroleum product prices move between August 2008—the last month for which this study series reported domestic prices—and January 2009? How did the large oil price decline beginning in September 2008 affect domestic prices in developing countries?
- What factors have affected domestic petroleum product supplies in recent years?
- Which policies tended to be used more by developing country governments in 2007 and 2008: price based, quantity based, those aimed at reducing the cost of supply, energy conservation, or diversification?

- What were the consequences of these policies?
- What lessons do the experience of these developing countries offer?

A summary of key topics treated in this report by country can be found in appendix C.

## RETAIL PRICE MOVEMENTS

An earlier 2009 report on the extent of pass-through of the rise in world oil prices to the domestic market showed that developing countries did not keep up with price increases between January 2007 and August 2008. Correspondingly, the retail prices in developing countries fell less than in developed countries between August 2008 and January 2009. Countries in the Middle East and North Africa had the smallest price decrease on average for every fuel, reflecting the already low price levels which did not leave much room for price reduction in several countries (table E.1).

TABLE E.1 DIFFERENCE IN RETAIL PRICES BETWEEN AUGUST 2008 AND JANUARY 2009 IN U.S. DOLLARS

Region	Gasoline	Diesel	Kerosene	LPG
Sub-Saharan Africa	0.51	0.51	0.41	0.35
Central, East, and South Asia	0.37	0.33	0.35	0.26
Latin America	0.34	0.32	0.40	0.34
Middle East and North Africa	0.11	0.09	0.12	0.03
Developed countries	0.62	0.54	—	—
World market (free-on-board prices)	0.41	0.49	0.49	0.50

Source: Author's calculations using price information from table A.1.

Note: LPG = liquefied petroleum gas; — = not available. The price differences shown are per liter except LPG which is per kilogram. The difference is calculated by subtracting the price in January 2009 from the price in August 2008. Free-on-board prices are those at the port of shipping including loading costs. There are 49 developing countries and 8 developed countries for gasoline and diesel, 33 developing countries for kerosene, and 26 developing countries for LPG. The prices for Brazil are producer, not retail, prices.

## DIRECT AND INDIRECT GOVERNMENT INTERVENTIONS IN SETTING PRICES

At the peak of high oil prices, nearly all developing countries studied intervened with price-based policies to mitigate the price increase on the world market for at least one fuel.

- The República Bolivariana de Venezuela did not adjust prices at all in 2006–08, nor did the Republic of Yemen except for diesel consumed by large commercial establishments.

- Ethiopia, Ghana, Honduras, Malawi, Morocco, Mozambique, Pakistan, and Sri Lanka froze prices for several months, 22 in the case of Pakistan.
- Mexico has a policy of decoupling domestic prices from world market prices and keeping the former constant in real terms by increasing fuel prices at the same rate as inflation.
- In Brazil, Petrobras has voluntarily kept producer prices stable since September 2005 for gasoline and diesel (except for a 10 percent increase in the price of diesel in May 2008) and since December 2002 for liquefied petroleum gas (LPG) for small consumers.
- Several countries with ad hoc pricing made large upward adjustments: this was done by the Arab Republic of Egypt in July 2006; Indonesia in May 2008; and Bangladesh, China, and Malaysia in June 2008. These price hikes reduced, but did not eliminate, universal price subsidies.

Many governments also made use of targeted subsidies and tax reductions, usually aimed at agriculture, public passenger transport, goods transport (such as for the trucking industry), and fisheries.

The financial toll on the state treasury, oil companies, or both caused by the subsidies in recent years has been large.

- The government of China paid partial compensation to two refiners between 2005 and 2008, with the largest compensation paid in the latter year. The country's biggest refiner, Sinopec, alone was paid \$7.5 billion in 2008, but the two refiners still suffered a combined loss of more than \$20 billion.
- The government of India provided explicit subsidies of about \$6–\$7 billion in each of the last two fiscal years ending in March. These subsidies notwithstanding, the losses suffered by oil companies amounted to \$22 billion in the fiscal year ending March 2009.
- In August 2008, Mexico estimated that its fuel subsidies in 2008 would amount to \$25 billion.
- The fuel price subsidy paid out of the Iranian budget in the fiscal year ending March 2008 is reported to be about \$6.5 billion. The implicit subsidy—forgone income from selling fuels at below economic opportunity costs—is estimated to be \$31.9 billion.
- Indonesia's subsidy in 2008 reached \$13 billion by October.
- The government of Egypt is estimated to have spent \$11 billion on fuel subsidies in the fiscal year ending June 2008.
- The government of Malaysia reported in February 2009 that it had spent \$11.1 billion on fuel price subsidies between 2005 and 2008.

- In August 2008, the energy and mining minister of Colombia reported that fuel subsidies were expected to cost the government \$3 billion in 2008.
- Pakistan spent \$2.8 billion on oil subsidies in the fiscal year ending June 2008.
- The Bangladesh Petroleum Corporation had accrued a total deficit of \$1.5 billion in the fiscal year ending June 2008.
- The government of Nepal provided \$100 million to the Nepal Oil Corporation in the fiscal year ending July 2008 to partially offset price subsidies. As of October 2008, the company's loan liabilities stood at \$200 million.

Policy reversals and postponement of price reform were common—governments that had earlier deregulated fuel prices or adopted automatic price adjustment mechanisms froze and subsidized retail prices, while others that had announced fuel price subsidy removal postponed price reform. Colombia in May 2008 postponed the removal of gasoline and diesel subsidies by a year. Both Jordan and Vietnam were to eliminate subsidies by 2007 but postponed. Several governments have taken steps to move away from universal price subsidies, most of them after world oil prices began to come down.

- Jordan eliminated fuel price subsidies in February 2008 for all fuels except LPG.
- Stating that falling oil prices provided a timely opportunity to move to market-based pricing, Vietnam gave fuel importers the right to set retail prices independently in September 2008.
- Ethiopia eliminated subsidies in October 2008.
- China moved to market-based pricing in December 2008, although in May 2009 the government announced that it would continue to set prices to protect consumers when world oil prices exceed \$80 a barrel.

Price stabilization funds ran up large deficits (as in Cameroon, Ethiopia, Malawi, and Peru) or had to be replenished from other sources (as in Chile). In Malawi, losses in the oil stabilization fund were estimated at 1.5 percent of gross domestic product by 2008. Thailand avoided such losses by limiting the use of its oil fund in 2008 (and therefore the magnitude of price subsidies) after having run a deficit of \$2 billion in 2005; the oil fund balance remained positive throughout 2008, although it was nearly depleted in July.

Rationing subsidized fuels using smart cards is a rarely used technique. The Islamic Republic of Iran began rationing gasoline for all use

beginning in June 2007 using smart cards. The scheme initially reduced gasoline consumption dramatically, but consumption began to rise as car purchases continued unabated, extra quotas were offered to dozens of special categories of consumers, and black markets for the quotas flourished. In March 2009, the parliament voted to decrease the monthly quota for private cars from 120 to 75 liters. Indonesia and Malaysia considered, but did not pursue, economywide rationing of subsidized fuels using smart cards in 2008. The primary reason cited was the administrative burden of setting up such a system.

Holding talks with oil companies, appealing publicly to them to lower prices, and—in the extreme—resorting to legal means were among the approaches used by governments to limit price increases. Several governments began making price information public on a more regular basis in the interest of transparency and to help lower prices. In countries with national oil companies, governments tried to drive prices by exerting influence over the companies.

The adverse effects of the steep rise in world oil prices were often exacerbated by factors that reduced domestic fuel supplies. Power shortages in many developing countries increased demand for fuel for emergency electricity generation, typically diesel, resulting in a tight market and pushing up the price of diesel. To protect roads and enhance traffic safety, China and several African governments restricted loads in trucks, thereby reducing the amount of fuel trucks can haul at a time. Landlocked countries in Africa have been particularly affected by fuel shortages, rationing, and other supply disruptions in the countries from which they import petroleum products. Rwanda rationed fuels immediately in response to crises in its neighboring countries and thereby avoided large price shocks.

Government attempts to control domestic prices have had consequences, not all positive. Most common among these consequences are fuel shortages, black market sales of fuels in short supply, smuggling of subsidized fuels to neighboring countries, and adulteration of less-subsidized (or more highly taxed) fuels with more-subsidized (or less-taxed) fuels. Government control of prices led to fuel shortages in China, India, Iraq, Nepal, Nigeria, Pakistan, Thailand (for LPG), and the Republic of Yemen. Price control prompts consumers and fuel marketers alike to speculate when the next price increase or decrease might be and to adjust purchase patterns accordingly, creating fuel shortages—anticipation of a fuel price increase leads to panic buying and hoarding, while anticipation of a fuel price reduction leads to postponement of purchase not only by consumers but also by retailers which run down their stocks. Market responses to interfuel price differences are large and

quick. In Nepal, for example, equalization of kerosene and diesel prices in November 2008 immediately led to a 40 percent increase in the sale of diesel (priced higher earlier) and a 60 percent decrease in the price of kerosene, strongly suggesting that diesel was adulterated with (lower priced) kerosene earlier. Uncompensated losses suffered by oil companies led two private firms to shut down all their retail outlets in India and have discouraged investment in the downstream petroleum sector in Argentina, the Islamic Republic of Iran, Iraq, Mexico, and Nigeria—all of which are today petroleum product importers despite being net oil exporters.

#### MITIGATING HIGH OIL PRICES AND PRICE VOLATILITY

In the face of high fuel and food prices, many governments introduced assistance schemes. Indonesia launched a second round of targeted cash transfers in 2008, providing \$11 a month to 19 million low-income households for seven months in two tranches. Pakistan similarly launched a scheme to provide \$30 every two months to 3.5 million poor households. Thailand implemented six-point measures in the second half of 2008 which offered, among other items, free electricity and water (up to a ceiling) and free bus and train rides for the poor. Egypt, Jordan, and Syria increased public sector wages.

Other mitigation measures include the following.

- *Energy conservation.* The governments of Chile and the Philippines have mandated energy use reduction with quantitative targets for government agencies. Ghana and Rwanda have distributed compact fluorescent lamps to replace incandescent light bulbs. Argentina is offering financial incentives for reducing electricity consumption. Thailand has offered interest-free loans to 100,000 households purchasing highly efficient appliances, soft loans for renovations of factories and other buildings, and overhaul or replacement of machinery.
- *Diversification.* Efforts at diversifying away from oil intensified when oil prices were rising. Argentina, Colombia, India, Indonesia, Peru, and the Philippines have introduced new biofuel blending mandates. Shifting from gasoline and diesel to natural gas in the transport sector has continued and even accelerated in some countries, including Bangladesh, Colombia, Egypt, the Islamic Republic of Iran, Pakistan, Peru, and Thailand.
- *Strategic petroleum reserves.* China leads the developing world in systematically establishing strategic stocks. The first reserve phase has been completed, and the government took advantage of low oil prices in recent months to fill emergency oil tanks at all four sites in

this phase. India plans to establish reserves at three sites by 2012. Kenya, Rwanda, Tanzania, Uganda, the Republic of Yemen, and Zambia are all pursuing strategic oil stockpiling.

- *Hedging.* Among the sample countries, Sri Lanka is the only one that has pursued hedging on a large scale. Hedging went well until oil prices began to collapse in September 2008, with Sri Lanka incurring very large losses.
- *Assistance from net oil exporters.* Several governments obtained cash assistance from net oil exporters. Others managed to negotiate large discounts, such as Jordan with Iraq. The largest regional deal is managed by the República Bolivariana de Venezuela, which sells oil and oil products under concessionary terms to 18 members of PetroCaribe.

## CONCLUSIONS

Several lessons emerge from the recent oil price episode. One is to prepare for the unexpected. No one anticipated the speed at which oil prices rose in 2008, or the magnitude of this rise. Industry forecasts became outdated quickly, and leading oil industry analysts were revising their price forecasts frequently. Then, against predictions of prices of \$200 a barrel or higher, the price crashed even more suddenly, catching those engaged in hedging unprepared and leading to numerous oil project delays and cancellations. Such price volatility can produce unexpected large losses from hedging and increase the costs of price control. Although diversifying their energy portfolio and taking steps to improve energy efficiency seem less urgent now, governments should continue to pursue measures to equip the economy for future oil price shocks.

Equally important, high and volatile energy prices threaten to deepen energy poverty. Unlike electricity or piped natural gas, there are no good examples of targeted fuel price subsidies for liquid fuels because they are easy to transport and distribute, making it virtually impossible to stop diversion and black market sales. Rationing subsidized fuel using smart cards has had limited success. The long-term goal should be to replace fuel price subsidies with effective social protection programs, but that takes time. A period of low oil prices should be seen as an opportunity to establish these measures properly without feeling the pressure to implement them in a matter of a few months. These social protection measures are useful for protecting the poor against not just the next oil price shock but against all other shocks to which the poor are particularly vulnerable.

Events since 2004 have shown that policy reversal is common. Market-based automatic price adjustment mechanisms depoliticize day-to-day

price determination to a large degree and should be given serious consideration in countries with ad hoc pricing. That said, against the severe price rises of 2007 and 2008, very few governments were able to withstand the pressure to use or increase fiscal measures to lower prices. As a result, some countries that moved to automatic price adjustment mechanisms years ago suspended price adjustment and bore financial losses. These interventions also showed how difficult price control is. When prices were high, consumers complained that the government should be doing more to shield them from the large price swings on the international market. When prices fell but retail prices were not decreased in tandem so as to recover the losses suffered months earlier, consumers complained that they should be benefiting from the oil price collapse immediately. There have even been calls to bring back price control in some deregulated markets. Frequent downward price adjustments by government can lead to substantial financial losses by fuel marketers, as in Jordan.

A useful step under these circumstances is to disclose as much information on prices as possible. In small markets with a slow inventory turnover, illustrating the effect of timing of fuel procurement and sale with a simple example may help consumers understand why domestic prices may not immediately follow international prices. Linking world to domestic prices, showing at least a representative price buildup, making historical prices available, and even comparing prices with those in other countries could help answer questions consumers frequently ask.

One positive consequence of the oil price increase up to July 2008 is that it focused the attention of governments and consumers alike on the importance of improving supply- and demand-side efficiency and conserving energy generally. The challenge is to retain this focus, so as to be better prepared if and when oil prices begin to rise markedly again with global economic recovery.

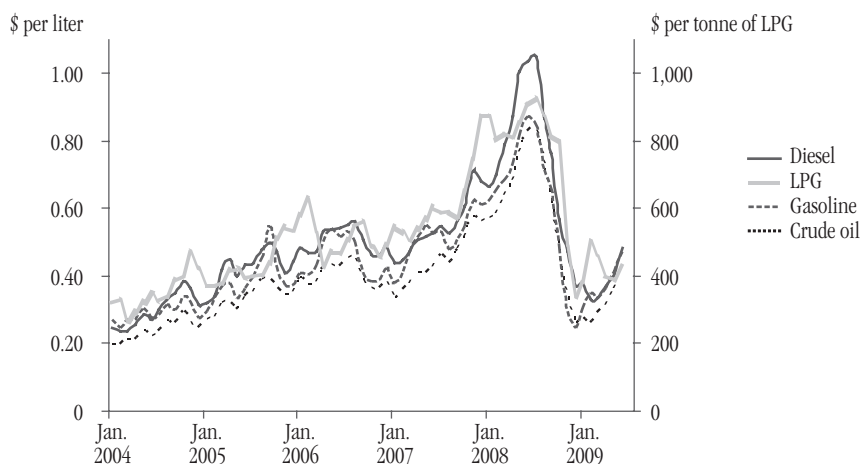


# BACKGROUND

Oil prices have exhibited unprecedented volatility in recent months. Prices rose from 2004 to historic highs in mid-2008, only to fall precipitously in the last four months of 2008 and lose all the gains of the preceding four and a half years. Figure 1 shows the price movements of crude oil, gasoline, diesel, and liquefied petroleum gas (LPG) since 2004. Partly due to power shortages that boosted demand for diesel, prices for diesel increased faster than those for crude oil until mid-2008. A simple linear regression shows that gasoline prices increased between January 2004 and July 2008 at the same rate as crude oil prices, but diesel prices rose 24 percent more on average.

Because fuels are substitutable, price movements on the world oil market are transmitted to the natural gas and internationally traded coal markets, where prices have correspondingly risen and fallen. These fuel price movements in turn have affected the cost of electricity production. Such extreme swings in energy prices are difficult to handle under any

FIGURE 1 MONTHLY PRICES OF CRUDE OIL, GASOLINE, DIESEL, AND LPG



Sources: *Platts Oilgram Price Reports* for crude oil, gasoline, and diesel; Reuters for LPG.

Note: Crude oil is the average of West Texas Intermediate, Brent, and Dubai Fatah. Gasoline is unleaded and has a research octane number rating of 92. Diesel is 0.05 percent sulfur gasoil in Singapore. LPG is the average of Saudi Aramco contract prices for propane and butanes. LPG is the average of Saudi Aramco contract prices for propane and butanes.

circumstances, but these difficulties were compounded by simultaneously soaring food prices; together, these posed significant challenges to all governments, particularly those that have attempted to smooth price fluctuations through price control. The International Energy Agency (IEA) estimates that energy price subsidies in 2007 in the 20 largest countries outside the Organisation for Economic Co-operation and Development amounted to \$310 billion, of which about half—\$150 billion—was for petroleum products. The largest oil subsidies were found (in order of decreasing size after conversion to U.S. dollars) in the Islamic Republic of Iran, China, Saudi Arabia, Indonesia, República Bolivariana de Venezuela, India, and the Arab Republic of Egypt (IEA 2008).

This report is part of a larger study on the impact of high oil prices and price volatility on end users and government policies. Like its companion reports, it does not consider macrolevel policies (such as monetary or exchange rate policy) or the impact of the oil price shock on countries' macroeconomic performance, nor does it discuss management of the windfall income by large oil exporters and the long-term economic consequences of revenue management. Three earlier publications dealt with oil price changes:

- *Coping with Higher Oil Prices* (Bacon and Kojima 2006a) discusses policy options for coping with rising oil prices, categorized into price-based policies, quantity-based policies, policies to reduce the cost of supply, diversification away from petroleum sources, and increasing domestic supply. The report reviews the experience of 38 developing countries with oil price increases as of mid-2006, including policies to win public buy-in of government actions.
- *Coping with Oil Price Volatility* (Bacon and Kojima 2008) reports on a statistical analysis of oil price volatility conducted through the end of 2007 and an ex-post analysis of several policy options, including hedging, security stocks, price smoothing, reducing oil intensity, and diversification.
- *Changes in End-User Petroleum Product Prices: A Comparison of 48 Countries* (Kojima 2009) looks at the extent to which oil price increases were passed on to end users in 48 countries between January 2004 and August 2008. As described in the report, many developing country governments found it difficult to keep up with the rapid increase in world oil prices between January 2007 and August 2008 and shielded consumers to varying degrees through direct and indirect subsidies.

This report builds upon the foregoing publications and, in particular, discusses the policy response dimensions of the analysis carried out by

Kojima (2009). It examines the responses of the developing countries treated in that publication to price movements on the world oil market, focusing primarily on the high price volatility of 2007 and 2008. The report asks the following questions:

- How did domestic petroleum product prices move between August 2008—the last month for which this study series reported domestic prices—and January 2009? How did the large oil price decline beginning in September 2008 affect domestic prices in developing countries?
- What factors have affected domestic petroleum product supplies in recent years?
- Which policies tended to be used more by developing country governments in 2007 and 2008: price based, quantity based, those aimed at reducing the cost of supply, energy conservation, or diversification?
- What were the consequences of these policies?
- What lessons do the experience of these developing countries offer?

The report begins by comparing end-user prices in August 2008 and January 2009. It then reviews the policy responses of the sample country governments.<sup>1</sup>

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<sup>1</sup> This study relies largely on information posted by governments on their websites, the International Monetary Fund, and news articles. For news articles, efforts were made to corroborate the information using two different sources where available, but some inaccuracies in reporting are possible and even likely. The findings here should be interpreted with this limitation in mind.

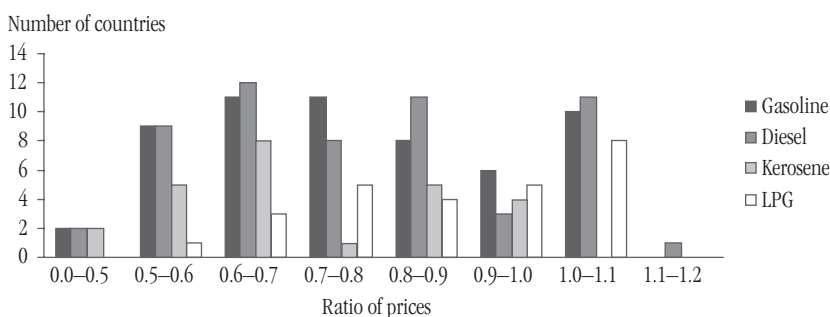
# END-USER PRICE MOVEMENTS AND FUEL SUPPLIES

Bacon and Kojima (2006a) and Kojima (2009) showed that end-user price levels and trajectories over time varied markedly between January 2004 and August 2008 from country to country. The approaches taken by the sample countries ranged from freezing prices for years at a time to letting prices fluctuate on a daily basis. This report takes the same countries examined in Kojima (2009) and examines the policies that drove the price movements in these countries in the last few years and their consequences.

## PRICE MOVEMENTS

Between August 2008 and January 2009, world oil prices fell by about 60 percent. The ratios of the prices of various petroleum products in local currency in January 2009 to those in August 2008 are shown in figure 2. The figure shows that retail prices fell in approximately 80 percent

FIGURE 2 RATIO OF JANUARY 2009 TO AUGUST 2008 RETAIL PRICES IN  
LOCAL CURRENCY



Source: Author's calculations using price information from table A.1.

Note: For each range of ratios A–B, the figure shows the number of countries in which the price ratio is equal to or greater than A and less than B. There are 49 developing countries and 8 developed countries for gasoline and diesel, 33 developing countries for kerosene, and 26 developing countries for LPG.

of the countries. In the remaining cases—all of which, with one exception, are countries where governments controlled prices directly or indirectly and kept them artificially low in mid-2008—the prices remained the same or even increased.

On average, the ratios of gasoline and diesel prices in the eight developed countries (Canada, France, Germany, Italy, Japan, Spain, the United Kingdom, and the United States) were lower than those in the developing countries. The lowest ratios for both fuels were found in the United States (0.47 for gasoline and 0.55 for diesel) among the developed countries and in Jordan (0.44 for gasoline and 0.49 for diesel) among the developing countries. The highest ratio for gasoline was in Germany and for diesel in Spain among the developed countries, and in Mexico for both fuels in the developing countries. Summary statistics are given in table 1.

TABLE 1 RATIO OF JANUARY 2009 TO AUGUST 2008 RETAIL PRICES IN LOCAL CURRENCY

Item	Gasoline	Diesel	Kerosene	LPG
Developing country average	0.79	0.79	0.77	0.87
Developing country minimum	0.44	0.49	0.38	0.59
Developing country maximum	1.03	1.15	1.02	1.06
Developed country average	0.68	0.69	—	—
Developed country minimum	0.47	0.55	—	—
Developed country maximum	0.77	0.80	—	—
Average of all countries	0.77	0.78	1.02	1.06
Free-on-board prices	0.43	0.44	0.44	0.43

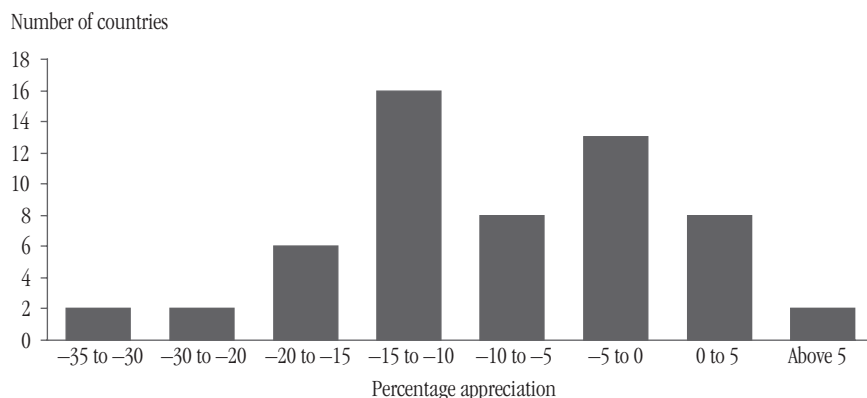
Source: Author's calculations using price information from table A.1.

Note: — = not available. Free-on-board prices are taken from those in figure 1.

Although the fall in international petroleum product prices during this period was dramatic, the price decrease was offset on the domestic market by currency depreciation in 82 percent of the countries in the sample. In four countries, the local currency declined by more than 20 percent (figure 3). Because the world oil market is denominated in U.S. dollars, large changes in exchange rates also affect costs. One reason for the U.S. price ratios being the lowest among the developed countries is that all other developed country currencies, with the exception of the Japanese yen, depreciated against the dollar during the study period.

One indication of varying price changes in different countries taking exchange rate fluctuations into account is to measure the changes in

FIGURE 3 CURRENCY APPRECIATION BETWEEN AUGUST 2008 AND JANUARY 2009



Source: Author's calculations from International Financial Statistics Online.

Note: Each range of A to B denotes the number of countries in which the percentage of currency appreciation is equal to or greater than A and less than B.

U.S. dollars. Summary statistics are shown in table 2. On average, the price decreases for gasoline and diesel in developed countries were markedly larger than in developing countries. The price differences were also larger than the changes in free-on-board prices in developed countries and smaller in developing countries on average. The countries with price reductions of more than \$0.75 per liter are, in order of decreasing size of reductions, Zambia and Mozambique for gasoline; Zambia, Senegal, and South Africa for diesel; and Zambia, Cambodia, and South Africa for kerosene. The price levels in January 2009 in U.S.

TABLE 2 DIFFERENCE IN RETAIL PRICES BETWEEN AUGUST 2008 AND JANUARY 2009 IN U.S. DOLLARS

Item	Gasoline	Diesel	Kerosene	LPG
Developing country average	0.37	0.35	0.34	0.24
Developing country minimum	-0.06	-0.04	-0.04	0.00
Developing country maximum	1.63	1.33	1.21	0.69
Developed country average	0.62	0.54	—	—
Developed country minimum	0.52	0.40	—	—
Developed country maximum	0.71	0.63	—	—
Average of all countries	0.40	0.38	0.34	0.24
Free-on-board prices	0.41	0.49	0.49	0.50

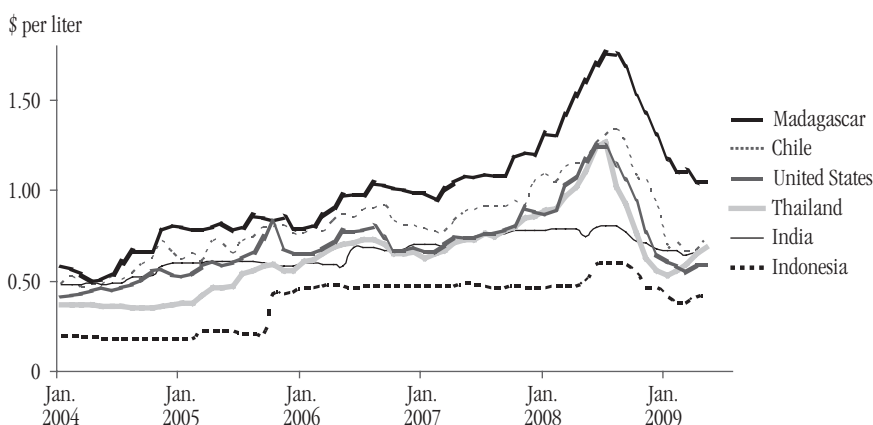
Source: Author's calculations using price information from table A.1.

Note: — = not available. The difference is calculated by subtracting the price in January 2009 from the price in August 2008. Free-on-board prices are taken from those in figure 1.

dollars and the ratio of retail prices converted to U.S. dollars are given in appendix B.

The movements of monthly retail prices of diesel in U.S. dollars in six countries are shown in figure 4 as an illustration. The sample of countries includes the United States, which has the lowest retail prices of the eight developed countries considered in this study. Because the prices are converted to U.S. dollars, small fluctuations appear even when the price in local currency is unchanged, such as between October 2005 and May 2008 in Indonesia. India and Indonesia have smoothed retail prices the most. The smoothing of the price hike in the aftermath of Hurricane Katrina in 2005 in Chile is evident from comparison with U.S. prices. Although Thailand froze diesel prices from November 2003 to February 2005, keeping them markedly lower than U.S. prices, retail prices were comparable to those in the United States by 2007–08. The price difference between Indonesia and Madagascar is considerable, surpassing \$1 a liter for half of 2008.

FIGURE 4 MONTHLY RETAIL PRICES OF DIESEL



Source: Author's calculations using price information from table A.1.

Note: For India, Indonesia, and Madagascar, where prices changed during the month, they are weighted according to the number of days at a given price level.

## FACTORS AFFECTING FUEL SUPPLIES

Events outside the oil sector have affected petroleum fuel demand and supply. Where there were fuel shortages—many developing countries in the sample have experienced supply shortages—the shortfall amplified the effects of the already high prices through mid-2008. In some countries, continuing fuel shortages kept domestic prices high even as

world oil prices collapsed in the latter half of 2008. In addition, expectations of imminent price increases led to hoarding, while expectations of price decreases led to postponement of fuel procurement; both strategies created fuel shortages on occasion.

#### **ELECTRIC POWER SHORTAGES**

Power shortages are common in many developing countries, causing load shedding (engineered power outages) and blackouts. While in many cases, these shortages are due to demand outstripping supply, external factors such as low rainfall and disruptions in natural gas imports have also played a role in recent years. Hydropower shortages in east Africa (Ethiopia, Kenya, Tanzania, Uganda), parts of west Africa (Ghana), Chile, India, Nepal, Peru, and Tajikistan were the result of droughts; shortages in Argentina in the winter of 2007 were caused by exceptionally low temperatures that froze the water. Natural gas shortages in Argentina and Chile resulted in electric power shortages because of lower volumes of gas imports obtained at higher prices.

The costs of such outages are great. One study estimates that reducing power outages and matching the quantity and quality of the power infrastructure in all Sub-Saharan African countries with that in Mauritius—one of the region's better performers—would increase long-term per capita growth rates by 2 percentage points (Eberhard and others 2008).

Power shortages have had two consequences for the domestic oil market. First, many countries with power shortages have had to resort to emergency power generation, typically based on diesel fuel, which is one of the most expensive means of producing electricity. The Uganda energy ministry cites the shift to emergency generation caused by power shortages among the reasons for the doubling of electricity prices in 2006 (Ugandan MoEMD 2009). The amount of diesel used for power generation in Chile rose sharply for a year beginning in mid-2007, reaching half of total diesel consumption in some months (Tokman 2009). Increased demand for diesel has in turn led to diesel shortages in some countries. Diesel consumption in India in mid-2008 rose between 23 and 24 percent a month; combined with growing subsidies carried by the oil companies, this led to diesel fuel shortages (*Global Insight Daily Analysis* 2008e).

Second, power outages have disrupted fuel pipeline and refinery operations, leading to fuel shortages and price spikes imposed on top of world oil price fluctuations. Power blackouts in Kenya have forced the refined product pipeline, on which the neighboring countries rely for product



imports, to shut down; this has caused fuel shortages in Kenya, Rwanda, Uganda, and other countries whose imports originate in Kenya. Disruptions to the operation of the Kipevu refinery in Kenya were sufficiently frequent that the Kenyan energy minister in February 2009 instructed the refinery to generate its own electricity (*Daily Nation* 2009c).

Conversely, countries that are highly reliant on oil for power generation have struggled to cope with rising oil prices, resulting in power shortages for lack of fuel. Nicaragua has seen a wave of blackouts, and power shortages were among the reasons for its joining PetroCaribe, which offers oil products under concessionary terms.

### **TRUCKING REGULATIONS**

Regulations in the transport sector designed to reduce damage to roads and improve safety have had near-term effects on fuel consumption and supply. Road damage is proportional to axle weight raised to the fourth power; thus, the lower the axle weight of heavy-duty vehicles, the less damage to roads. Kenya introduced a three-axle weight limit for trucks in October 2008, constraining fuel tankers to about 35,000 liters of fuel instead of the 42,000 liters previously carried on four-axle trucks. The fuel supply to the neighboring countries was immediately reduced (*All Africa* 2009b). This limit has been imposed across east and southern Africa, starting in South Africa several years ago. A similar 2007 ban on overloading goods vehicles in China contributed significantly to greater sales of heavy-duty trucks, increasing 65 percent year-on-year during the first 10 months and leading to greater diesel consumption (*Automotive World* 2007).

### **OUTSIDE FORCES**

Forces outside the control of a country can also have a substantial effect on fuel supplies and prices. For example, the landlocked countries of East Africa such as Rwanda and Uganda are affected by import logistics and related problems. The 30-year-old Mombasa-Nairobi section of the Kenyan oil pipeline on which they depend has at times operated at only 50 percent of capacity, partly because of erratic power supply (*East African* 2007). Undertaking pipeline repairs has also reduced the volume of fuel shipped. Switching to trucking is not easy because of poor road conditions and slow border clearance.

In the last two months of 2008, even as world oil prices were falling, fuel prices in Uganda rose. Diesel shortages there have forced fuel rationing and disrupted power supply. In May 2007, Uganda's president blamed the Kenya Revenue Authority for causing fuel shortages in his

country that began in March. Technical problems with the Mombasa-Eldoret pipeline in Kenya caused supply disruptions at first. Uganda negotiated for its trains and trucks to load fuel directly in Mombasa, but the Kenya Revenue Authority authorized only five oil companies under this arrangement and required them to pay a refundable deposit before loading fuel to ensure that they do not offload the fuel within Kenya (KBC 2007). The two governments reached a new arrangement shortly thereafter to resolve the fuel crisis (*Global Insight Daily Analysis* 2007a). However, following the fuel shortages caused by the post-election violence in Kenya, fuel prices quadrupled in a matter of days at some filling stations in Uganda in January 2008 (Economist Intelligence Unit 2008c). Work will begin shortly on extending the product pipeline from Eldoret in Kenya to Kampala in Uganda, but this vital project has been delayed for years: the first memorandum of understanding was signed in 1995; an invitation for expressions of interest was issued in May 2004.

Other factors in the region contribute to higher fuel prices as well. Piracy in the Indian Ocean has pushed up insurance premiums. Rising charcoal prices in Uganda have led to higher demand for alternative cooking fuels, resulting in LPG and kerosene shortages in October 2008 which worsened in the subsequent months (*All Africa* 2009d).

Another example of outside forces causing fuel shortages and raising prices occurred in Guinea-Bissau. In April 2008, a severe fuel shortage after Senegal rationed fuels led to surging gasoline and diesel prices in Guinea-Bissau. Prices jumped from CFAF 650 (\$1.56) a liter to about CFAF 5,000 (\$12). On June 5, 2008, electricity production came to a near halt, and filling stations consequently closed for several days, prompting black market fuel sales to soar (*Global Insight Daily Analysis* 2008d, 2008g).

#### **REACTION TO ANTICIPATED FUTURE PRICE LEVELS**

Where prices are not freely floating but announced by governments, anticipatory behavior by consumers and suppliers can add to difficulties related to price fluctuations. In Nepal in August 2006, filling stations, in anticipation of a fuel price increase, began hoarding supplies, thereby creating an artificial shortage. The reversal of the price hike shortly thereafter meant that the filling stations bought high and were forced to sell at a loss.

The rate at which world oil prices fell in the last several months of 2008 created problems in several countries. In Jordan, frequent downward price adjustments in late 2008 led the Gas Station Owners Association to threaten work stoppage unless the government redressed their losses.

To avoid losses, filling stations kept stocks to a minimum, because any inventory carryover meant that fuels purchased at previous higher prices would have to be sold at the new lower prices. For their part, vehicle owners postponed fuel purchase until another price reduction was announced. The combination of low stocks and a sudden surge in fuel purchase immediately following a price reduction announcement led to frequent fuel shortages (*Global Insight Daily Analysis* 2008i).

# DIRECT AND INDIRECT GOVERNMENT INTERVENTIONS IN SETTING PRICES

Unprecedented increases in world oil prices, along with rising food prices, fueled inflation in 2007 and 2008, leading many governments to take a variety of actions to prevent petroleum product prices from rising in line with international prices. Consequently, the governments of nearly all the developing countries examined in this report reduced product taxes, subsidized product prices, or did both for at least one fuel. Several countries that had eliminated universal oil price subsidies reintroduced them. Other means aside from direct price control were also employed to limit petroleum product price increases. These various measures are discussed in this section, along with some of their repercussions.

## PRICE CONTROL

Some governments adjust petroleum product prices infrequently, maintaining the same price levels for years at a time. Of these, Egypt, the Islamic Republic of Iran, the Syrian Arab Republic, the República Bolivariana de Venezuela, and the Republic of Yemen did not make downward price adjustments through early 2009. Other countries in this group made large upward price adjustments in 2007 and 2008 when oil prices rose virtually steadily. The fuel price increase of June 2008 in China was the largest in 10 years; that in Bangladesh, also in June 2008, was the largest in that country's history (Reuters 2008a), as was the increase in Malaysia in June 2008. Egypt raised prices in July 2006 for the first time in 14 years, and again in May 2008. The last two price increases in Indonesia, in October 2005 and May 2008, were both large.

Among those that did not allow automatic alignment of domestic fuel prices with world prices in 2008, the governments of Bangladesh, Cameroon, China, Ethiopia, Ghana, India, Indonesia, Malaysia, Mozambique,

Nepal, Pakistan, Rwanda, Sri Lanka, Tunisia, and Vietnam increased fuel prices at least once in 2008 (Ghana raised its price ceilings) and decreased fuel prices at least once as world oil prices fell. Malaysia lowered fuel prices seven times between August and December. China and India reduced fuel prices for the first time in nearly two years in December 2008.

In some countries with deregulated prices, governments have considered or actually introduced tighter controls on prices. The Energy Regulatory Commission of Kenya circulated for comment draft regulations for setting maximum retail prices in 2008. In Rwanda, when fuel prices rose by a large margin in November 2007, the government set price ceilings (*All Africa* 2007a).

A number of governments froze prices in 2007 and 2008:

- Ethiopia froze fuel prices between August 2006 and January 2008; it had decreased the price of gasoline in February 2007. In October 2008, it eliminated fuel price subsidies, resulting in a price increase of 50 percent for kerosene and 40 percent for diesel.
- India froze gasoline and diesel prices between February 2007 and February 2008; the price of subsidized LPG for household use was frozen between April 2005 and June 2008. The price of subsidized and rationed kerosene has been frozen since April 2002.
- Indonesia froze the prices of subsidized fuels between October 2005 and May 2008.
- Morocco froze diesel prices between January 2007 and July 2008; prior to January 2007, it had reduced diesel prices twice. The price of LPG, a household cooking fuel, has been frozen since September 2000.

Some countries with automatic price adjustment mechanisms in place abandoned these when world oil prices soared in 2007 and 2008:

- Ghana, which liberalized prices in February 2005 and set price ceilings in line with world prices, froze its ceilings between May 26 and November 1, 2008.
- Honduras has detailed procedures by which prices are to be adjusted every two weeks, but froze fuel and electricity prices. Fuel prices did not change for several months in 2007 and 2008. LPG prices were frozen the longest, from April 2007 through May 2008; kerosene prices were frozen from May 2007 to May 2008. Regular gasoline prices did not change between September 2007 and May 2008, and diesel prices between October 2007 and March 2008 (Comisión Administradora del Petróleo 2009). This led to fuel shortages.

- The formula in Malawi requires that fuel prices be adjusted if there is a movement of 5 percent or more resulting from exchange rate or international oil price changes. However, the country's Petroleum Pricing Committee raised fuel prices only in January and June 2008. To recover the losses suffered during this period, Malawi did not lower prices until February 1, 2009.
- Similarly, fuel prices in Mozambique are meant to be adjusted when prices change more than 3 percent (see Bacon and Kojima 2006a), but the government froze prices between January and June 2008. Prices for gasoline and kerosene, but not for diesel, were raised in June 2008.
- Pakistan suspended fortnightly price adjustments and froze prices for 22 months between May 2006 and March 2008. Although world petroleum product prices were about 60 percent higher in April 2006 than in February 2009, the reverse was true for domestic fuel prices in Pakistan. Because unit subsidies given to kerosene and light diesel oil were particularly large, their prices in February 2009 were 55 percent higher than in April 2006.
- The government of Sri Lanka abandoned its formula-based pricing mechanism in 2004. There was an attempt to reintroduce an improved price formula in June 2007, but it was dropped after two months in the face of rising oil prices (*Lanka Business Online* 2008b). In December 2008, the president rejected the price formula submitted to the supreme court, adding that the government aimed to keep prices stable for a year in order to offset losses incurred in the preceding year (*Asia Pulse* 2008c).

One exception to the above pattern is Senegal, which introduced an automatic price formula in April 1998, adjusting prices every four weeks. The government did not interfere with the automatic price adjustment scheme even at the height of soaring oil prices in 2008. LPG for household use, however, is excluded from automatic price adjustment, and the price of LPG sold in 6-kilogram cylinders is heavily subsidized.

To recover the losses suffered by keeping prices artificially low in 2007 and 2008, prices in some countries did not decline in the last four months of 2008. Morocco increased fuel prices once in 2008, in July, and did not lower fuel prices at all that year. Brazil kept prices steady throughout 2008. A prominent example of delinking world and domestic prices is Mexico, which has a policy of keeping fuel prices constant in real terms by increasing prices at the same rate as inflation, independent of world oil prices. As a result, end-user prices continued to rise in small increments in the last few months of 2008 despite a sharp fall in world oil prices. In January 2009, as part of the plan to mitigate the adverse

effects of the global financial crisis, President Calderón announced that the government would freeze gasoline prices for the rest of the year and lower household gas prices by 10 percent and electricity rates for businesses by up to 20 percent (*Petroleum Intelligence Weekly* 2009).

#### UNIVERSAL PRICE SUBSIDIES AND TAX REDUCTIONS

Universal price subsidies and petroleum product tax reduction are the two most commonly used methods of partially offsetting higher oil prices on the international market.<sup>1</sup> They are used in various combinations, and the distinctions between them are not always clear. Some governments do not adjust taxes and provide subsidies; others lower taxes and provide no subsidies. The result may be identical: end users pay lower prices, and government collects lower net revenue from the downstream petroleum sector. However, the effects on the revenues of different levels of government may differ. For example, if (1) the central government levies no tax, (2) state governments levy an excise tax of 30 percent, and (3) the central government provides a price subsidy equal to 20 percent of the end-user price, state government revenues remain the same while the central government suffers a net loss.

In some cases, governments set prices (for example, by imposing a fuel price freeze) but do not provide subsidies directly; instead, these subsidies are carried by fuel marketers. If these marketers are owned by the government, the subsidies do not appear in the budget but can become contingent liabilities for the government. If the marketers are private, their margins are narrowed; in the extreme case, their losses can become so large as to force them to abandon the market.

Subsidies carried by governments in recent years have been large:

- Indonesia's 2008 fuel subsidy allocation of Rp 127 trillion (\$13.7 billion as of January 2008) was based on a subsidized fuel sales quota of about 35.5 billion liters and an average Indonesian crude basket price of \$95 a barrel for the year. The crude basket price averaged \$107 during the first nine months of 2008, and the country's subsidy reached Rp 131 trillion (\$13 billion) by October (*Platts Commodity News* 2008a). The consumption of subsidized fuel in 2008 was 39.4 billion liters, exceeding the quota by more than 3 billion liters (*Global Insight Daily Analysis* 2009).

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<sup>1</sup> Similarly, although not discussed in this report, many governments reduced or removed taxes on food to help their citizens cope with the rising food prices that occurred at the same time.

- The government of Malaysia reported in February 2009 that it had spent RM 40.5 billion (\$11.1 billion) on fuel price subsidies between 2005 and 2008. In 2008, Malaysia restructured the automatic pricing mechanism in force since 1983 to reduce growing subsidies (*New Straits Times* 2009).
- The government of Egypt is estimated to have spent LE 60 billion (\$11 billion) on fuel subsidies in the fiscal year ending June 2008 (IMF 2009a).
- In August 2008, the energy and mining minister of Colombia reported that fuel subsidies were expected to cost the government Col\$5.9 trillion (\$3 billion) in 2008 and Col\$14 trillion until their complete removal in 2012 (*Global Insight Daily Analysis* 2008a).
- The Islamic Republic of Iran's explicit subsidy—that is, the direct subsidy paid out of the national budget—for refined products in the fiscal year ending March 2008 is reported to be about \$6.5 billion (Moj News Agency 2009). The International Monetary Fund (2008b) estimates that the implicit subsidy—which accounts for forgone income from selling fuels at below economic opportunity costs—for the same period was \$31.9 billion. The government raised fuel prices in May 2007; otherwise, these subsidies would have been even larger.
- President Calderón announced in August 2008 that the Mexican government would spend about Mex\$260 billion (\$25 billion) in 2008 on fuel subsidies and that the cost of the subsidy program—which had quadrupled since 2007—was sufficient to build four large-scale refineries (Reuters 2008c).
- Pakistan budgeted PRs 15 billion (\$240 million) for oil subsidies in fiscal 2008 (ending in June), but ended up spending PRs 175 billion (\$2.8 billion) (ADB 2008). The government provided subsidies both directly, through the Price Differential Claim paid to oil marketing companies for kerosene and light diesel oil, and indirectly, by reducing the Petroleum Development Levy to zero for every fuel in June 2008. The total value of the Price Differential Claim between August 2004 and October 2008 was reported to be PRs 290 billion (\$4.7 billion). In February 2009, the government was reported as still owing the oil marketing companies PRs 18 billion (\$230 million) (*Business Recorder* 2009).
- The government of China paid partial compensation to China Petroleum and Chemical Corporation (Sinopec) and to the China National Petroleum Corporation between 2005 and 2008; the largest compensation was paid in the latter year. Nevertheless, these two refiners still suffered a combined loss of more than \$20 billion (see below).
- The Indian government provides relatively small explicit subsidies for petroleum products, which have remained fairly constant over



the past several years and have amounted to a total of \$6–\$7 billion. Additionally, the government has issued special oil bonds to state-owned oil companies to help offset their losses. These bonds were off budget and much larger in size than the explicit subsidies. Kerosene and LPG for household use are the two most subsidized fuels. The plan to phase out their subsidies has been repeatedly postponed, and there is currently no concrete timetable for deregulating their prices.

- The petroleum product subsidies in Tunisia in 2008 are estimated to have run TD 400 million (\$325 million) (IMF 2008e).
- The general manager of the state-run hydrocarbon stabilization fund of Cameroon reported that the fund had spent a total of CFAF 144 billion (\$348 million) between January and August 2008 to stabilize the prices of petroleum products (*Dow Jones International News* 2008a).
- In the fiscal year ending July 2008, the government of Nepal provided Nrs. 6.7 billion (\$100 million) to the Nepal Oil Corporation (BBC 2008a).

The government of Mozambique resorted to aggressive fuel tax reductions in 2008 to limit price increases. Customs duties on kerosene and diesel and value added tax on diesel (kerosene was already exempt from value added tax) were waived from July to December 2008. Although the government of the Lao People's Democratic Republic controls fuel prices, it has been adjusting these generally in line with world oil price movements. Even so, the government in May 2008 placed ceilings on the dutiable price of petroleum imports, effectively providing tax relief on gasoline, diesel, and kerosene in June and July when international prices rose above those in May (IMF 2008d).

The government of Cambodia did not change the tax rates, but it froze the reference prices on which petroleum product taxes are based in 2004, significantly reducing tax collection. The finance minister said in May 2008 that the government expected to lose \$300 million that year in uncollected tax revenue from fuel imports (IMF 2009b; *Phnom Penh Post* 2008c). The government of Vietnam frequently adjusts import tariffs to smooth fluctuations.

Some countries continued to reduce fuel taxes even after the oil price collapse in late 2008. Ghana lowered fuel taxes in March 2009 as part of a pledge to ease the financial burden on its citizens (*Ghana News* 2009). Others have taken advantage of low oil prices in recent months to raise fuel taxes. For example, the government of China in December 2008 announced that it would raise taxes on gasoline and diesel as much as ninefold beginning in 2009. Brazil, Guinea-Bissau, Kazakhstan, the Philippines, and Rwanda also reduced petroleum taxes.

Not every government cut fuel taxes during the period of high oil prices. Tanzania raised taxes on petroleum products effective July 1, 2007. The higher-than-expected average gasoline price increase on July 1 prompted a public inquiry into allegations of collusion (EWURA 2007). Although world oil prices were already low by then, Zambia increased fuel import duties from 5 to 25 percent in December 2008 to increase demand for locally refined petroleum products. At 5 percent, the domestic refinery could not compete with product imports (Dow Jones Newswire 2009).

Efforts to eliminate universal price subsidies have been under way in several countries. Iraq has been steadily increasing petroleum product prices in recent years, and Syria launched a program in May 2008 to phase out fuel subsidies by 2010. The dramatic drop in oil prices in the last five months of 2008 gave countries providing large price subsidies an opportunity to recover the losses they had suffered in the preceding months. But headlines about the collapse of world oil prices put pressure on governments to lower retail prices, thereby perpetuating subsidies. For example, Bangladesh lowered fuel prices in October 2008, even though kerosene and diesel were still subsidized.

Policies to address large universal subsidies have suffered setbacks in recent years until oil prices fell sharply in the last months of 2008:

- In May 2008, Colombia postponed by a year the removal of gasoline and diesel subsidies to 2010 and 2011, respectively (*Oil Daily* 2008).
- The government of Jordan raised fuel prices in July 2005, September 2005, and April 2006, and stated its intention to eliminate fuel subsidies altogether by 2007. The country's largest political opposition group threatened general strikes if fuel prices were raised, and the finance minister—a critic of subsidies—resigned in August 2007 in the wake of the government's decision not to increase fuel prices. Jordan did not raise prices again until February 2008, when subsidies were removed on all fuel prices except for LPG. This price increase was the largest of the four, amounting to 47.5 percent on average; transport tariffs increased an average of 23 percent. King Abdullah intervened in March 2008 to protect the poor and ordered that the LPG subsidy removal be postponed (AP 2008a; *Dow Jones International News* 2007; IMF 2008c; *MENA This Week* 2008).
- Ethiopia increased fuel prices in May and August 2006 and January 2008, and eliminated fuel price subsidies in October 2008. According to a statement issued by the Ministry of Industry and Trade at the time, the government had spent more than Br 7.7 billion (\$794 million) on fuel subsidies in the preceding three years (*Global Insight*

*Daily Analysis* 2008b). The losses in the country's oil stabilization fund were estimated at about 1.5 percent of total gross domestic product (GDP) (IMF 2009c). The council of ministers issued a regulation on October 3 to readjust fuel prices on a monthly basis.

- The government of Vietnam was to move to a market-based mechanism in April 2007 but postponed against the backdrop of rising oil prices. According to statistics from its Ministry of Finance, fuel importers recorded a total loss of about D 14.5 trillion (\$879 million) in the first half of 2008. In 2007, the total loss was reportedly D 22 trillion. In July 2008, the Vietnam National Petroleum Corporation reported that the country's fuel marketers were forecast to lose D 100 billion (\$6 million) a day even after the sharp price increase earlier in the month. The Ministry of Finance announced in September 2008 that it would give fuel importers the right to set retail prices independently, noting that falling oil prices provided a timely opportunity to move to market-based pricing. A newly established committee would monitor oil product prices and approve requests for price changes submitted by importers (*Afx Asia* 2008; Thai News Service 2008h; Vietnam News Service 2008).
- China moved to market-based fuel pricing in December 2008 after years of losses by the national oil companies that provided fuel price subsidies. However, this policy was partially reversed in May 2009.
- The Islamic Republic of Iran has stated its intention to phase out fuel price subsidies by 2012, as stipulated in its Fourth Five-Year Development Plan Law. However, a proposal to double the price of subsidized gasoline for the fiscal year ending March 2010 was rejected by the Iranian parliament in March 2009.
- The government of Tunisia intends to eliminate fuel price subsidies by 2011, as envisaged in its 11th Plan (IMF 2008e).

The political difficulty of phasing out subsidies once government becomes involved in price setting is well known (Bacon and Kojima 2006b). Fuel price increases were among the issues that led to street protests in Cameroon in February 2008, leaving at least 40 dead when the demonstrators clashed with troops (Dow Jones Energy Service 2008). In several countries, large price increases have led to protests. Malaysia's fuel price increases in June 2008—an increase of RM 1 (\$0.24) a liter for diesel and RM 0.78 (\$0.31) for gasoline—following a four-month freeze resulted in widespread street protests and calls on the government to resign. Nepal increased fuel prices in January 2008, but revoked the price hikes for diesel and kerosene after violent protests and threats of transport fare increases. The government had increased fuel prices in August 2006, only to reverse the decision two days later.

## TARGETED PRICE SUBSIDIES AND TAX REDUCTIONS

Agriculture, public and goods transport, and fisheries are among the sectors that have benefited from targeted price interventions in some countries because of the perceived economywide benefits of keeping the prices of their goods and services low. Some examples are given in this section.

The government of Malaysia provides additional fuel price subsidies to fishermen, vessels, and transportation operators with fleet cards. The government of Bangladesh provides diesel fuel subsidies to farmers. Similarly, the government of Kazakhstan allocates diesel fuel for farmers during the harvest season at below-market prices; the allocation was 360,000 tonnes in 2007 and 389,000 tonnes in 2008 (Organisation of Asia-Pacific News Agencies 2008). The government of Rwanda waives taxes on diesel imports for power generation and provides direct subsidies to the fuel cost and to some of the generation capacity (MININFRA 2009). In Thailand, the cabinet approved a policy framework in March 2008 to address rising energy prices and included oil tax reduction; a price subsidy for diesel used in fishing; and promotion of automotive compressed natural gas (CNG), LPG, and biofuels (USDA 2008b). Effective July 25, 2008, excise taxes of several refined products—two containing biofuels—were reduced to zero from 34 or 42 percent, and specific taxes were also reduced (Thai News Service 2008e).

Many targeted schemes are aimed at the transport sector:

- Following a nationwide truckers' strike, the government of Chile in July 2008 implemented a one-year policy whereby the rebate on the diesel excise tax available to trucking companies was raised from 25 to 80 percent. The gasoline excise tax was lowered, successively and on a temporary basis, from 6.0 UTM (Unidad Tributaria Mensual, a unit of tax in Chile which changes monthly) to 4.5 UTM per 1,000 liters in April 2008 and to 3.5 in September 2008 (Economist Intelligence Unit 2008a; Parry and Strand 2009). The combined impact of the fuel subsidy from the price stabilization fund and the lower excise tax was to decrease the end-user price of gasoline markedly, by more than 15 percent in mid-2008 (Tokman 2009).
- In June 2008, the government of Malaysia did not increase automotive LPG and CNG prices and maintained the same subsidized diesel price for transportation operators with fleet cards.
- In Mozambique, riots broke out in Maputo in February 2008 after fares of *chapas* (private minibuses) increased by between 35 and 50 percent (depending on the distance traveled) following a 14 percent increase in the price of diesel in January. The riots left 15 dead

and 68 seriously injured, and spread to other cities in the following two weeks. After lengthy discussions, the fare increase was rescinded, and the government agreed to supply diesel to chapa operators at the old price of Mt 31 (\$1.28) per liter. Many chapa owners, however, were not able to claim the diesel price subsidy because they had not paid taxes for 2007 (*All Africa* 2008c; Economist Intelligence Unit 2008b). The government also took steps to waive the value added tax on diesel and kerosene and to halve other fuel taxes for diesel used in agriculture, fishing, mining, and oil-fired generators in districts not yet connected to the electricity grid (*All Africa* 2008d).

- The government of Nepal tried dual pricing for diesel on an experimental basis in the Kathmandu Valley in August 2008. Pumps were segregated between those for public passenger and goods carriers, which were charged Nrs 70 (\$1.02) a liter; and commercial sales, which were charged Nrs 80 (\$1.16). The dual pricing policy was abandoned by October (*Kathmandu Post* 2008b).
- A crippling 12-day transport strike in Nicaragua early in 2008 led the government to grant a diesel subsidy of \$1.30 a gallon to taxis and buses in May. The agreement did not include truck drivers, and the government did not freeze the price of diesel as requested by the strikers (*Latin American Weekly Report* 2008).

A variation of targeted subsidies is the decision by the government of Yemen in December 2008 to increase the price of diesel from YRls 35 (\$0.17) to YRls 70 (\$0.35) a liter for commercial establishments that consume more than 20,000 liters a day (*Yemen Times* 2008a).

#### **PRICE STABILIZATION FUND**

A price stabilization fund may have an intuitive appeal but does not work well in practice, and all such funds were strained in 2007–08 (see Bacon and Kojima 2008, chapter 7). The idea behind a price stabilization fund is to set domestic prices higher than international prices in times of low world oil prices and save the balance in the fund; when world oil prices exceed a threshold level, money is withdrawn from the fund to subsidize domestic prices. Ideally, such a fund is self-financing, which would be the case if, for example, prices were mean-reverting. However, this approach does not work when oil prices are steadily rising; the near steady rise in the price of oil between January 2004 and August 2008 did not make price smoothing easy. Several countries have price stabilization funds, including Argentina (for LPG and natural gas), Cameroon, Chile, Colombia, Ethiopia, Malawi, Morocco, Peru, and Thailand.

Cameroon's hydrocarbon stabilization fund spent CFAF 204 billion (\$424 million) in 2008 to subsidize fuel prices (Dow Jones Energy

Service 2008). Malawi's price stabilization fund's deficit was one reason the government did not lower fuel prices until February 1, 2009. After the second price increase of the year in June 2008, the government froze prices for seven and a half months to allow the fund to accumulate a surplus. Colombia—which is a net crude oil exporter but imports some refined products—launched a fuel price stabilization fund on January 1, 2009; it simultaneously announced that fuel prices would be frozen for three months at December 2008 levels.

The two fuel price stabilization funds in Chile are described by Bacon and Kojima (2006a). Chile's government in early 2008 added \$200 million to the second oil fund (established in 2005 to mitigate world price increases following Hurricanes Katrina and Rita) to help lower fuel prices. Chile's case is unique in that money from a copper fund was used to establish the second oil fund. In June 2008, the government transferred another \$1 billion and extended the scheme to cover LPG (*International Gas Report* 2008). The payments out of the second stabilization fund offset more than half of the gasoline excise tax and more than 100 percent of the diesel excise tax (Parry and Strand 2009).

Peru set up a fuel price stabilization fund in September 2004. It operates as a classic price-smoothing fund: the price of each fuel is allowed to fluctuate within a price band with a ceiling and a floor; when the market-based price for a fuel is lower than the floor, the difference is deposited into the fund; conversely, when the market-based price is higher, the fund reimburses fuel suppliers. The fund is effective for 180 days at a time, and its operation has been repeatedly extended. Despite falling oil prices in the second half of 2008, the fund ended with a deficit of \$411 million in December 2008. The total subsidy handed out amounted to \$1.5 billion since the fund's inception, more than half of which was offset by transfers from the budget (table 3).

TABLE 3 PERUVIAN FUEL PRICE STABILIZATION FUND AS OF DECEMBER 2008 (MILLION NUEVOS SOLES)

Year	Opening balance	Transfers	Income	Compensation	Closing balance
2004/05	n.a.	n.a.	68.8	-250.6	-181.8
2006	-181.8	181.8	137.8	-102.7	35.1
2007	35.1	190.0	20.1	-1,065.8 <sup>a</sup>	-820.6
2008	-820.6	2150.0	606.5	-3217.0	-1,281.1
Total	n.a.	2,521.8	833.2	-4,636.1	n.a.

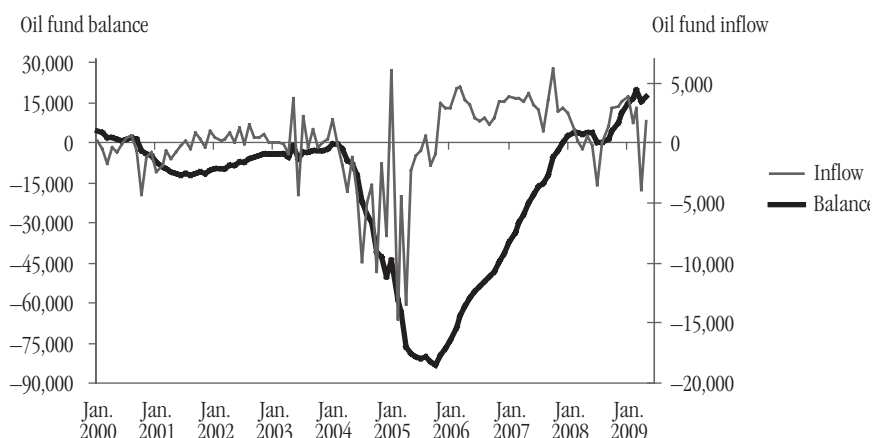
Source: Peruvian Ministry of Energy and Mines 2009.

Note: n.a. = not applicable.

a. Includes S/. 18 million transferred to the LPG fund.

Thailand has an oil fund which was historically used to cross-subsidize LPG. The fund was used to subsidize gasoline and diesel in 2004 and 2005, and non-automotive diesel in 2008. The fund stopped subsidizing LPG in December 2007, and has instead been subsidizing ethanol and biodiesel blends since January 2008. Despite sharp price hikes in 2008, the fund balance managed to stay positive (figure 5) because the government did not opt for large-scale price subsidies in 2008 as it had in 2004 and 2005.

FIGURE 5 THAI OIL FUND FINANCIAL STATUS (MILLION BAHT)



Source: EPPO 2009a.

## INFLUENCING PRICES

In addition to direct interventions, there are other ways by which governments can affect prices. These methods include exercising influence on state-owned oil companies; becoming involved in fuel procurement; negotiating with fuel marketers; using legal force to lower prices; widely disseminating price information; and, in oil-exporting countries, using export bans and taxes.

### INFLUENCING STATE-OWNED OIL COMPANIES

If there is a national oil company or an oil company with some state involvement that is also a price-setter (because it controls a large share of the market), the government may send signals to the company to keep prices low. Petrobras, the national oil company in Brazil, plays such a role. Gasoline producer prices in Brazil remained essentially the



same between September 2005 and June 2009 (the last month for which producer prices were posted on the national petroleum agency's website as of this writing); diesel producer prices also remained stable until May 2009, except for a 10 percent increase in May 2008. LPG prices for small consumers have remained frozen since December 2002. On the other hand, fuel prices were not lowered after August 2008 because Petrobras was still recovering the losses incurred earlier (AE Brazil 2008). In the Philippines, when oil companies raised diesel prices by ₱3 a liter in July 2008, President Arroyo intervened and persuaded Petron—the largest oil company in the country and of which the Philippine National Oil Company owned a 40 percent share until December 2008—to roll back half of the price increase. Other oil companies followed suit (*Philippine Star* 2008).

Various mechanisms by which a state can influence the pricing of its national oil company were demonstrated by Kenya in 2008. Civil society organizations in the country in September 2008 threatened mass action to force the government to intervene over high fuel prices (Xinhua News Agency 2008b). Around the same time, the president appealed to fuel marketers to lower their prices, while the Energy Regulatory Commission made a similar request of the oil companies (*Nation* 2008a). When it appeared that these direct requests had had little impact, the Kenyan energy ministry, in quick succession, stopped buying fuels from dealers other than the National Oil Corporation of Kenya and launched a campaign to compel fuel marketers to lower prices by more than Sh 10 (\$0.13) a liter. In the campaign, the ministry issued alerts on where to purchase cheap fuel and warned consumers which fuel marketers to avoid (*Nation* 2008b). In October 2008, the energy minister said that he was not satisfied with the oil companies' response to the government's request to lower prices, and tabled the possibility of reintroducing price control (Kenyan Ministry of Energy 2008a). In January 2009, with the government still dissatisfied with the oil companies' response, it sought to give a substantial share of the fuel market to the National Oil Corporation by introducing provisions in the supplementary budget to give it the authority to determine fuel prices, thereby increasing the possibility of effective (indirect) price control by the government (*Daily Nation* 2009b).

#### **GOVERNMENT INVOLVEMENT IN FUEL PROCUREMENT**

Some governments have become directly involved in fuel procurement in the hope of lowering costs, through scale economy, reducing profit margins, or both. On at least one occasion, the mere threat of government involvement achieved price reduction: When the government



of Madagascar in November 2008 indicated an intention to import fuels directly, the oil companies responded by lowering prices (Moov 2008).

The government of Honduras issued an international tender in October 2006 for the supply of all of the country's fuel requirements in an attempt to lower fuel import costs. The U.S. oil major ConocoPhillips was selected to supply gasoline and diesel and Gas del Caribe of Mexico to supply LPG. This scheme, however, immediately ran into trouble. Because ConocoPhillips did not own storage facilities in Honduras, the government took over oil terminals belonging to other private companies to enable the supply tender to go forward. Mired in legal and diplomatic trouble, this scheme ultimately foundered.

Since January 2004, the government of Kenya has been centrally coordinating the Open Tender System, under which crude oil is purchased once a month by a single company on the basis of a public tender, transported through one terminal, and shared among all marketing companies in proportions determined by the government. This arrangement is intended to have the dual benefit of ensuring competitive prices (which are made public) and transporting oil so as to minimize import duty evasion. Questions have been raised about the realized benefits of this system of procurement (Bacon and Kojima 2006a). The only selection criterion is price, and any oil marketing company—irrespective of size or experience with oil trade—can win the tender. In December 2008, a scandal broke out over Triton, a four-year-old company that won the October tender for December delivery, when one of the intended purchasers of the cargo expressed concern over the physical presence of the shipment and asked for formal confirmation; confirmation that no oil was available came on December 30 (*Daily Nation* 2009a). The volume of oil imported into Kenya is sufficiently large as to enable, after taking economies of scale into account, at least two more separate purchases a month, which might encourage greater competition and reduce the risk of relying on only one company for a month at a time.

A system of bulk purchase has been required by law since the mid-1990s in Mozambique. The purchase arrangement is different from that in Kenya in that an oil industry consortium imports jointly rather than having the government select an importer for each purchase (Bacon and Kojima 2006a). Total oil consumption in Mozambique is about one-fifth that in Kenya, which also imports oil for re-export to neighboring countries. As such, the case is stronger in Mozambique for using bulk purchase to take advantage of economies of scale.

## **HOLDING TALKS WITH FUEL MARKETERS**

Several governments have held meetings with fuel marketers to argue for price reduction. The prime minister of Cambodia in September 2008 instructed the finance ministry to meet with fuel marketers to lower prices, and called upon oil companies to lower prices on several occasions (*Phnom Penh Post* 2008b). The government had formed a special ministry committee three months earlier to monitor prices with a view to assessing if there might be price gouging (*Phnom Penh Post* 2008a). In Kazakhstan, the Ministry of Energy and Mineral Resources held a series of meetings with fuel suppliers and signed a memorandum to decrease gasoline and diesel oil prices in October 2008 (BBC 2008b). When there were prospects of disruptions to fuel supplies in Kenya in January 2009, Ugandan energy ministry officials held an emergency meeting with fuel marketers to put in place measures that would discourage hoarding (ISI Emerging Markets 2009).

The energy minister in Kenya invited the oil companies to a dialogue to agree on prices in April 2007 (*Nation* 2007). The government has repeatedly issued warnings to the oil companies, asking them to refrain from increasing prices too much in times of rising prices and to lower prices more rapidly when oil prices began to fall in the latter half of 2008. The government on occasion has ordered an immediate reduction in fuel prices.

In Tanzania, the Energy and Water Utilities Regulatory Authority (EWURA) held a meeting in September 2008 with fuel marketers, at which the participants agreed that retail fuel prices needed to come down. The fuel marketers were given until October 29 to adjust their prices. When prices did not come down to the extent EWURA had hoped for, the director stated that the agency might have to start setting actual prices rather than just price ceilings (*All Africa* 2008a).

In the Philippines, the government forged an agreement in 2003 with oil companies to offer a discount on the price of diesel sold to public transport companies. The government does not provide a subsidy for this purpose. The discount program has continued to this day, with the discount varying over time. For example, oil companies agreed to a discount of ₱1 per liter in February 2008 (PIA 2008a).

## **USING LEGAL FORCE TO LOWER PRICES**

Some governments have used existing laws prohibiting unfair market practices in an attempt to lower prices. The government of the Philippines in 2008 announced that a joint task force of the Departments of

Energy and Justice, established by the oil deregulation law of 1998 with the objective of acting upon reports of unreasonable price increases, was investigating whether cases of unfair market practice and overpricing could be filed against the top three oil companies, which together held a combined market share of 83 percent (*Philippine Star* 2008). Calls had been made in the senate to act upon the oil companies' pricing practice. When small oil companies reduced prices but the major oil companies did not immediately follow in the first week of September 2008, both the energy secretary and President Arroyo asked the oil companies for an explanation, with the energy secretary holding a meeting with the parties concerned (Thai News Service 2008c). In January 2009, the task force submitted a report, clearing the oil companies of monopolistic practices and cartelization (*Philippine Daily Inquirer* 2009).

Argentina has on a number of occasions since October 2006 invoked a 1974 law of supply that provides for fines and imprisonment of executives of firms that fail to supply goods—in this case, diesel fuel which would run short during the soy planting season. Petrobras of Brazil and Shell have been repeatedly fined under the law. In fact, the Internal Commerce Secretariat, which is in charge of price control, imposed more than 50 fines in 2007 alone on Shell (Latin American News Digest 2008). The case is not easy to make, however. In October 2008, a court ruled against a fine of Arg\$1 million (\$323,000) imposed on Shell in July 2007, noting that the intention to create a fuel shortage had not been demonstrated.

#### **DISSEMINATING PRICE INFORMATION**

Transparency in pricing helps create a level playing field and can indicate whether prevailing prices are broadly reasonable. At a minimum, governments should promulgate and enforce a regulation requiring all filling stations to post prices on display boards using letter sizes that are clearly visible from the road. Other means of enhancing transparency include conducting price surveys and posting the results, publishing graphs of domestic and international fuel prices for comparison, making historical and current prices public and readily available through the Internet and other media, and disclosing on a regular basis the price buildup for each key petroleum product (including application of rules for price determination where prices are set by the government).

Tanzania offers an example of how a government can approach this information dissemination function. The government liberalized the petroleum sector in 2000; seven years later, legislation was amended to make EWURA the economic regulator of the downstream sector, empowering it to intervene with a view to lowering prices when deemed appropriate. Immediately thereafter, EWURA conducted an inquiry into

the circumstances leading to a July 1, 2007, uniform price increase. The inquiry, which included soliciting comments through the mass media and holding a public hearing, did not find clear evidence of collusion but did find several areas of inefficiency in the supply chain as well as cases of commercial malpractice, including rampant fuel adulteration. One of the recommendations was to require all filling stations to “publish on clearly visible boards prices charged for petroleum products on sale” on their premises. EWURA also announced its intention to start publishing import parity prices and monitoring prices (EWURA 2007). To promote more effective competition, the agency began publishing “indicative” retail prices—prices considered reasonable based on import parity price levels—as well as price ceilings, set 7.5 percent above indicative prices, in different parts of the country. The government on several occasions has hinted at resorting to price control if necessary, but has not done so. EWURA increased the frequency of price publication in January 2009 to once a week in the face of what the agency perceived as continued resistance from fuel marketers to lower their prices (*All Africa* 2007b, 2008a; EWURA 2009).

Several countries post historical fuel prices, price ceilings, or suggested reference prices on their government websites, although coverage varies; these countries include Argentina, Brazil, Chile, Colombia, Ghana, Guatemala, Honduras, Kazakhstan (for paid subscribers), Madagascar, Mexico, Nicaragua, Nigeria, Pakistan, Peru, the Philippines, South Africa, Tanzania, and Thailand. National oil companies in India (Indian Oil Corporation—IOC) and Indonesia (Pertamina) post historical prices, and those in Nepal (Nepal Oil Corporation) and Vietnam (PetroVietnam) post current prices, on their websites. The Energy Regulation Board of Zambia posted import parity prices every month through January 2008, but has not posted since. Historical prices in countries where prices are not controlled require price surveys and are resource-intensive to collect. Argentina, Brazil (for producer prices), Chile, Guatemala, Honduras, Peru, the Philippines, and Thailand conduct price surveys in the capital city or in different parts of the country and make the results available. Thailand’s Energy Policy and Planning Office has been posting prices and price buildup for various fuels in Bangkok on a daily basis since July 2006; Colombia, Mexico, and Pakistan also post these data on a regular basis.

#### **EXPORT TAXES AND BANS**

In countries that are net exporters of crude oil or refined products, large export taxes keep domestic prices low by reducing export parity net-of-tax prices, as do export bans. Argentina first imposed emergency export taxes on crude oil and refined products in early 2002. In December 2006,

the legislature extended presidential authority to levy the export taxes to 2012. The tax rates increase sharply with rising world oil prices: in May 2008, when oil prices were about \$120 a barrel, Argentinean refiners were paying about a third of world oil prices. In January 2008, the government threatened to ban all fuel exports unless domestic prices were lowered to those prevailing at the end of October 2007. All fuel suppliers complied (*Global Insight Daily Analysis* 2008h).

The government of Kazakhstan annually imposes a ban on gasoline and diesel exports during the harvest season. The ban was initially imposed for three months beginning on June 1, 2008, and was later extended to January 1, 2009. These bans adversely affect fuel supplies and fuel prices in Tajikistan and other countries that import from Kazakhstan. The Kazakhstani government also introduced a short-lived export tax on crude oil in June 2008 to lower domestic prices and divert crude to domestic refineries; this tax was reduced to zero effective January 26, 2009.

#### CONSEQUENCES OF GOVERNMENT PRICE CONTROL

Government control of petroleum product prices can have several adverse consequences, some of which are easy to foresee, others not. Keeping prices low in times of high world oil prices can cause financial difficulties for fuel suppliers, create supply shortages, and discourage investment in the petroleum sector. Artificially low prices lead to two problems. First, refineries and fuel importers can face revenues that are lower than expenditures. This imbalance could even lead to refiners and importers stopping fuel procurement. Second, demand is moderated by rising fuel prices because consumers respond to price signals, but in markets with price controls keeping prices low, demand growth is moderated much less, potentially widening the gap between supply and demand. Fuel shortages may be exacerbated by consumers hoarding in times of rising fuel prices and sellers running down inventories in times of falling prices. Keeping prices artificially low also encourages commercial malpractice, including black market sales domestically and the smuggling of fuel to neighboring countries.

Fuel shortages are nearly universal when prices are kept low. China, India, Iraq, Nepal, Nigeria, Pakistan, Thailand (for LPG), and the Republic of Yemen are among those countries that have suffered periods of fuel shortage as a result of government control over fuel prices. The fuel shortage in September 2008 in the Republic of Yemen was so serious, filling stations in the capital and other towns across the country shut down for several days. A source in the oil ministry cited the country's inability to finance diesel fuel imports as the primary reason for the shortage (*Global Insight Daily Analysis* 2008c). The fuel price rise in China

in November 2007—which was the first increase since May 2006—followed increasing fuel shortages, which sparked violent clashes at filling stations and resulted in at least one death (*International Oil Daily* 2007). Diesel and LPG shortages were experienced in India in 2008.

Uncertainties about prompt and full compensation for price subsidies have historically deterred importation of refined petroleum products by private oil companies. Delays in reimbursing fuel suppliers for the subsidies provided to consumers in Nigeria (through the Petroleum Support Fund) and Pakistan (through the Price Differential Claim) have led to fuel shortages.

Nepal has experienced repeated fuel shortages primarily because of the inability of its sole fuel importer, the Nepal Oil Corporation, to pay the Indian Oil Corporation—the sole fuel exporter to Nepal. IOC in November 2006 started cutting fuel supplies by 20 percent on account of unpaid bills amounting to Rs3.4 billion (\$76 million) owed by the Nepal Oil Corporation dating back to April 2005. In January 2007, IOC ratified a decision to cut supplies by up to 30 percent if the Nepal Oil Corporation failed to pay an additional Rs150 million (\$3.4 million) each month. Fuel suppliers have gone on strike to protest against inadequate supplies provided by the Nepal Oil Corporation. In June 2008, the Nepal Petroleum Dealers' Association went on strike against the government's inability to ensure that supplies were delivered to their pumps even after a price increase earlier in the month. In September 2008, the cabinet approved loans amounting to Nrs3 billion (\$41 million) to the Nepal Oil Corporation from financial institutions to finance imports. The company made a profit for the first time in two years in October 2008 (*Asian News International* 2008; *Indian Express* 2007; *Kathmandu Post* 2008a, 2008b).

Rumors that fuel price hikes are imminent can lead to hoarding, causing fuel shortages. Perhaps partly to avoid such a situation, the government of Syria shut down all fueling stations in the country just prior to making the announcement that the per liter price of diesel would be increased from LS 7 (\$0.14) to LS 25 (\$0.49) on May 2, 2008 (BBC 2008d).

Fuel shortages create black markets, especially in rural areas, so that the poor for whom the price subsidies are intended often do not benefit from them. Chronic fuel shortages in Nigeria have pushed up prices on the black market; the Petroleum Products Pricing Regulatory Agency told a senate committee in February 2009 that the actual prices paid were much higher than the official subsidized prices even in Port Harcourt, a major coastal city (*All Africa* 2009c).

Not aligning domestic and world prices and not providing adequate compensation deter investment in the oil sector. In May 2008, following months of static retail prices, oil companies in Honduras threatened to stop investing in the sector altogether unless the government raised fuel price ceilings (*Datamonitor News and Comment* 2008). Keeping retail prices low through political means in Argentina has discouraged investment in the oil sector in recent years, resulting in diesel shortages among other consequences. In response, the government postponed the deadline for lowering sulfur in diesel from 0.15 percent to 0.05 percent by three years to 2012 (*Diesel Fuel News* 2008) a lag of 18 and 16 years, respectively, compared to the United States and the European Union. This delay in turn will adversely affect public health caused by outdoor air pollution.

In India, where private oil companies do not have access to government subsidies for petroleum products, the largest private oil company, Reliance Petroleum, closed down all of its 1,432 filling stations in 2008. Earlier, in 2005, Essar Oil had closed all of its 1,250 filling stations. This circumstance put the burden of supplying fuels previously sold by private companies on the three state-owned oil companies, which struggled to keep up with diesel demand growth, especially in 2008. Diesel fuel shortages resulted and prompted the oil companies to unofficially ration the fuel (*Global Insight Daily Analysis* 2008e). Serious LPG shortages have also occurred. In September 2008, the petroleum ministry reported that IOC alone had a waiting list of 200,000 households for new cylinder connection for subsidized LPG (*Asia Pulse* 2008a). Diversion of subsidized kerosene to the automotive sector and of subsidized LPG to commercial establishments has continued.

Major oil exporters that subsidize petroleum product prices can actually become product importers for lack of investment in the downstream oil sector. The Islamic Republic of Iran, Iraq, and Nigeria are net exporters of crude oil but their refineries have been suffering from years of neglect and underinvestment, caused in large part by price subsidies. The three countries import refined products at world prices and have sold them at a considerable loss on the domestic market in recent years. Mexico is another oil exporter that imports refined products: it imports about 40 percent of its gasoline demand because of refining capacity shortage.

Sophisticated international smuggling rings benefit from subsidies that lead to cross-border price differences. Fuels are smuggled out of the República Bolivariana de Venezuela to Colombia, Vietnam to Cambodia, Malaysia to Singapore and Thailand, the Islamic Republic of Iran



to Pakistan and Turkey, Syria to Lebanon, and Nigeria and Yemen to their neighbors; subsidized LPG from Senegal is smuggled into neighboring countries as well as from Thailand to Cambodia and Myanmar. Yemen Oil Company was reported in mid-2008 as having stated that more than 100,000 tonnes (740,000 barrels) of diesel was smuggled out every month and this had cost the country YRls 180 billion (\$0.9 billion) (*Yemen Times* 2008b). The República Bolivariana de Venezuela in August 2008 promised to send 50,000 barrels of oil a month to Colombia to deter smuggling (AP 2008b).

Large price differences also invite “fuel tourism,” whereby vehicle owners cross the border to purchase cheaper fuels. To minimize the chances of subsidies benefitting foreigners, Malaysia has a three-quarter rule: the fuel tank must be at least three-quarters full upon entering the country. In May 2008, the government further tightened this rule by announcing that foreign-registered vehicles from Singapore and Thailand could not purchase fuels within 50 kilometers of the Malay borders.

Demand is price elastic, and price levels as well as interfuel price differences affect demand for different petroleum products. In Indonesia, the apparent consumption of subsidized gasoline has correlated strongly with the size of the subsidy per liter: data between January 2004 and July 2008 show consumption rising with the gap between domestic and international prices, presumably because of greater out-smuggling and consumers shifting from unsubsidized to subsidized gasoline (IMF 2008a). Following complaints of suspected adulteration of diesel with kerosene, the government of Nepal equalized the prices of diesel and kerosene on November 1, 2008. The effects were immediate and large: the Nepal Oil Corporation reported in January 2009 that diesel sales had increased 40 percent and kerosene decreased by 60 percent in the intervening months (*Kathmandu Post* 2009).

Price differences for fuels that are strongly substitutable lead to adulteration and illegal diversion. In Ghana, premix is gasoline used for fishing boats. It is specially formulated for two-stroke engines, and its price is much lower than that of automotive gasoline. Adulteration of automotive gasoline with premix is reported to be rampant, decreasing the research octane number (RON) to as low as 86 and causing damage to car engines (*Ghana Chronicle* 2006). Cheap LPG for household use has led to illegal conversion of cars to LPG in Syria. Thailand, which keeps LPG prices artificially low—retail prices in Bangkok rose a mere 16 percent between January 2004 and July 2008 (EPPO 2009a) against the tripling of world prices during the same period—was hit by LPG shortages in mid-2008 due to a rising number of cars converting to LPG.



The shortages were so serious taxis were running out of fuel. The government urged private car owners not to convert to LPG, while postponing the introduction of two-tier pricing for the fuel, which would have increased its price for automotive use (*Automotive World* 2008b). The state-owned Petroleum Authority of Thailand (PTT) has called on the government to end subsidies for LPG, arguing that artificially low prices are increasing demand and causing rising imports of LPG (Thai News Service 2008f).

#### LOSSES SUFFERED BY OIL COMPANIES

Oil companies often suffer losses as a result of prices being kept artificially low. Countries in which this problem is particularly serious include Argentina, Bangladesh, China, Honduras, India, the Islamic Republic of Iran, Iraq, Mexico, Nepal, Nigeria, and Sri Lanka. For example, the June 2008 price increase in Bangladesh was driven in part by the end-of-fiscal-year deficit of about \$1.5 billion of the Bangladesh Petroleum Corporation, which is the sole oil importer and distributor in the country and which was struggling to raise financing to maintain uninterrupted imports of refined products (Reuters 2008a).

Chinese refiner Sinopec reported in December 2008 that it had sold gasoline and diesel at prices below the cost of crude oil for 283 days in the year (*Industry Updates* 2008). It received Y 50 billion (\$7.5 billion) from the government in compensation for price subsidies, but still reported an operating loss of Y 102 billion (\$15 billion) at its refining unit in 2008, up from a loss of Y 13.7 billion (\$2 billion) in 2007 (*BMI Daily Oil and Gas Alert* 2009e). For the first 10 months of 2008, China's two largest refiners were reported to have suffered a combined loss of Y 180 billion (\$25 billion) (Xinhua News Agency 2009). In December 2008, the government replaced a guidance band for retail fuel prices with a market-based ceiling that includes the cost of crude oil, taxes, and an "appropriate profit" for refiners. Gasoline and diesel prices are adjusted when global crude oil prices change by more than 4 percent over 22 working days, and Chinese refiners are allowed a profit margin of about 5 percent. Sinopec reported that the new pricing mechanism was expected to end "years of losses" at its refining unit (*BMI Daily Oil and Gas Alert* 2009e). In an apparent partial reversal of this policy, however, the government announced in May 2009 that it would continue to subsidize fuel prices when crude oil prices exceed \$80 a barrel: between \$80 and \$130 a barrel, refiners would no longer make a profit, and above \$130 a barrel, supplies would be guaranteed through tax measures (*BMI Daily Oil and Gas Alert* 2009b).

In India, subsidies are shared by upstream and downstream state-owned oil companies and the government. Although the budgetary burden is large, the government bears a relatively small portion of the total subsidy directly. The budgeted petroleum subsidy was Rs 284 billion (\$7 billion) in fiscal 2008 and Rs288 billion (\$6 billion) in fiscal 2009 ending in March. In comparison, the upstream oil and gas producers paid Rs 257 billion (\$6 billion) and more than Rs 1 trillion (\$22 billion) in fiscal 2008 and 2009, respectively. The government issued oil bonds to three downstream oil marketers worth Rs 759 billion (\$16.5 billion) in fiscal 2009 (*Business Line* 2009; *Business Standard* 2009; India Ministry of Finance 2009). The government granted a provisional exemption to the Oil and Natural Gas Corporation in the first quarter of 2009, but removed the exemption when it ordered it and GAIL (India)—two companies that do not sell petroleum products—to pay local refiners Rs 9.4 billion (\$198 million) in the second quarter of 2009 as part of its fuel subsidization policy. The oil minister said the renewed subsidy burden had been prompted by the rise in oil prices (*BMI Daily Oil and Gas Alert* 2009d). A decline of \$10 a barrel in the oil price reduces the cost of oil subsidies by 0.6 percent of GDP, and lower oil prices are estimated to reduce the 2009/10 subsidy bill by 2 percentage points of GDP (IMF 2009d).

The Nepal Oil Corporation has been suffering from losses for years. As of October 2008, its total outstanding loan liabilities stood at Nrs 16 billion (\$197 million). As a result, domestic prices were not lowered in line with world prices because the company needed to recover its losses (*Kathmandu Post* 2008b).

Nigeria established a Petroleum Support Fund in January 2006 to reimburse the difference between fuel import costs and revenues from selling fuels at subsidized prices. One objective was to create a level playing field whereby private sector companies could also import and participate in the sale of subsidized fuels. Although designed to be funded by the three tiers of government, the fund has in practice been financed since its inception by the federal government budget and the Domestic Excess Revenue Account (a sovereign wealth fund established in 2004 to accrue revenue derived from crude oil sales, petroleum profit tax, and royalties over and above the budgeted benchmark). From its inception through July 2008, the fund paid for subsidizing 33 billion liters of gasoline, kerosene, and diesel (this latter fuel type was covered by the fund in the first six months of 2006) at a total cost of ₦886 billion (\$7.2 billion). The Nigerian National Petroleum Corporation received about 80 percent of the total subsidy (PPPRA 2008).

Delays in reimbursing oil companies have plagued this scheme from the outset. Subsidy reimbursements are supposed to be made on a monthly

basis and paid within 15 days of claim submission, but payments have been as late as 200 days. More recently, foreign exchange losses resulting from rapid depreciation of the naira have exacerbated the problem. In January 2008, the Major Oil Marketers Association of Nigeria issued a statement to the effect that they could no longer participate in the importation of petroleum products because there was a shortfall of \$320 million in compensating private oil companies for the price subsidies carried by imported fuels. The shortfall was a result of the exchange rates used to calculate the compensation in times of rapid currency depreciation and reimbursement delays (*All Africa* 2009a; *Vanguard* 2009). Fearing financial losses, independent fuel distributors—which account for 60 percent of national supply according to President Yar'Adua—decided to stop importing refined products in April 2009, causing significant economic dislocations (*BMI Daily Oil and Gas Alert* 2009a).

## RATIONING

One way of limiting the burden of fuel price subsidies on the budget is to limit the availability of subsidized fuels. To this end, the Islamic Republic of Iran began rationing gasoline in June 2007. The rationing program was initially launched for four months, with a possibility of extension for another six. The monthly quotas were 100 liters for private gasoline-engine cars, 30 liters for cars capable of running on gasoline and CNG, 800 liters for official gasoline-fueled taxis, 600 liters for part-time private drivers, and 300 liters for government vehicles. Purchases outside the quotas were not permitted. The government set up a smart card system, monitoring fuel consumption using individual electronic cards. The program sparked violent protests at first, with several filling stations set on fire. Two months later, the government allowed private cars to purchase an extra 100 liters to accommodate higher fuel consumption during the summer holidays.

The rationing scheme reduced gasoline consumption and halved gasoline imports from 204,000 barrels a day in May 2007 to an average of 94,000 barrels for the rest of the year, but fuel purchase restrictions led to the creation of flourishing black markets. The government responded with a variety of quota increases and exclusions of certain vehicle types from quota restrictions. It increased the monthly quota for private cars from 100 to 120 liters; in March 2008, it began allowing purchases outside of the quota at quadruple the subsidized price. The government further modified rules in 2008 to make all foreign cars with engines larger than 1.3 liters and all domestic cars with engines larger than 2 liters ineligible for subsidized gasoline, as well as all premium gasoline which was now outside the quota. Various government units, individuals with special

needs, and some businesses were given extra quotas. By mid-2008, consumers under 45 different categories were receiving additional gasoline rations. In November 2008, the oil minister reported that some \$4 billion had been saved since the beginning of the scheme. However, the savings appeared to have been largely in the system's early days and have since declined, as 1 million cars were added to the 7 million nationwide. In March 2009, the parliament rejected a budget proposal to double the price of subsidized gasoline and reduced the ration for private cars to 75 liters a month (IMF 2008b; *Iran Daily* 2008; *Oil and Gas Journal* 2008; *PressTV* 2009a, 2009c; Thai News Service 2008b).

Malaysia has been operating a smart card system for fishing vessels and transportation operators, whereby card holders can purchase discounted fuels within set quotas. In 2008, the government considered expanding the scheme to include other fuel consumers as a means of controlling the subsidy bill. One government official suggested in June 2008 that it would take a minimum of six months to set up an "e-petrol" system. With falling world oil prices in the subsequent months, this proposal was not pursued (Edge 2008). Indonesia in 2008 considered rationing subsidized fuels using a smart card system but cited administrative requirements as a significant barrier and did not pursue the idea.

The government of Nepal, which had introduced ration cards for subsidized kerosene in 2003 but abandoned it, announced in November 2008 that it was working on a program to issue ration cards for subsidized kerosene and LPG to students. A monthly budgetary allocation of Nrs 65 million (\$0.8 million) to provide ration cards to 625,000 higher secondary and university-level students was proposed to the Ministry of Finance in February 2009 (*Himalayan Times* 2008; *Kantipur* 2009).

Not all cases of rationing follow a burgeoning subsidy bill. Rwanda, which does not subsidize fuel prices, used fuel rationing effectively in January 2008 in response to supply disruptions following the Kenyan elections. The government limited gasoline sales for small cars to 10 liters and for jeeps to 20 liters a day (BBC 2008c). Fuel rationing was ordered again at year's end, this time because of a regional fuel shortage originating in Kenya. Gasoline sales were limited to RF 15,000 (\$26) per vehicle, equivalent to 20 liters (*All Africa* 2008b). These steps appear to have helped avoid the large price fluctuations observed in neighboring countries.

# MITIGATING HIGH OIL PRICES AND PRICE VOLATILITY

Food and fuel price increases accounted for a large proportion of overall inflation in many countries in 2007 and 2008. Government efforts to mitigate the adverse effects of high domestic fuel prices and future price volatility have included providing direct assistance to the vulnerable, emphasizing energy conservation measures, diversifying away from oil, establishing and expanding strategic reserves, hedging oil purchases, and seeking government-to-government assistance from net oil exporters.

## COMPENSATION FOR HIGH OIL PRICES

In most countries, even where fuel prices were subsidized or fuel taxes slashed, end-user petroleum product price levels were considerably higher in 2007 and 2008 than a few years earlier. Many governments responded by providing relief through targeted cash assistance, raising civil servant or minimum wages, and other means.

Fuel and other price increases effectively reduce household income. For those who are already below the poverty line, this could mean forgoing such essential goods and services as food, housing, primary health care, and education. Effective income reduction could also force some previously nonpoor households into poverty. Cash transfer programs provide assistance in the form of cash and other instruments that operate like cash to transfer resources to the poor and/or those who, in the absence of the transfer, face a probable risk of falling into poverty. Targeted cash transfers and other safety net mechanisms that increase income or reduce expenditures provide immediate relief to the poor from the effects of higher prices. These transfers are the best option for protecting the poor, as they enable consumers to spend the cash where it is most needed. However, targeted cash transfers require that the poor be identified and an effective cash delivery mechanism be established. Many low-income countries do not yet have the administrative capability to meet these prerequisites.

The largest scale cash transfer program in response to higher fuel prices was created in Indonesia. First implemented in 2005–06 in the wake of a very large fuel price increase, an extensive survey of recipients by 56 universities shows that the program, despite some administrative problems, achieved its primary objective of reducing the increase in poverty that followed the rise in fuel prices (Bacon and Kojima 2006a; Widjaja 2009). The three top expenditure items for the use of the cash transferred were rice, kerosene, and debt repayment (Widjaja 2009). The Indonesian government carried out another round of cash transfers in 2008 when fuel prices rose an average of 29 percent, earmarking Rp 14 trillion (\$1.5 billion) to finance a cash transfer program for 70 million of the country's poor and near-poor. About 19 million households received monthly payments of Rp 100,000 (\$11) in two tranches for a total of Rp 700,000. The cash program was stopped in February 2009 when world oil prices were falling (*Antara News* 2009).

To protect the poor from high oil and food costs after lifting its freeze on fuel prices, the government of Pakistan launched in March 2008 the Benazir Income Support Program, under which some 3.5 million poor households would receive PRs 2,000 (\$30) every two months. The government allocated PRs 34 billion (\$0.5 billion) for the first phase of the program, and plans to double the program's size in its second phase (*Baluchistan Times* 2009).

In response to rising LPG prices, the Chinese finance ministry directed local governments to provide financial support to low-income families as well as to public institutions such as schools. In June 2008, the ministry announced that it was allocating another Y 3.78 billion (\$548 million) to help low-income families, with Y 1.85 billion (\$268 million) targeted to urban families and the balance to rural. Low-income urban and rural families were slated to receive an extra Y 15 (\$2.20) and Y 10 (\$1.50) a month, respectively, for each person beginning in July (Xinhua News Agency 2008a).

The Iranian government recently debated a proposal to phase out fuel price subsidies over three years and replace them with cash assistance of Rls 195,000 to Rls 260,000 (\$20 to \$26) per person a year to about 70 percent of the population comprising low- and middle-income households (*Platts Commodity News* 2008b). However, the parliament's rejection of the proposal to raise fuel prices in March 2009 has at least temporarily derailed the cash assistance plan.

Jordan has employed a number of measures to cushion fuel price increases, as summarized in table 4. The compensation measures to offset the price increase in February 2008 amounted to an estimated

3.5 percent of GDP; earlier expenditures on compensation were 1 percent of GDP for the July 2005 and April 2006 price increases. In addition to the measures cited in the table, the government in October 2008 indicated that households with per capita income of less than JD 1,000 (\$1,400) would be eligible for cash assistance in the coming winter to purchase heating and cooking fuels (*Global Insight Daily Analysis* 2008f; IMF 2008c).

TABLE 4 COMPENSATION SCHEMES FOR PRICE INCREASES IN JORDAN

Compensation measure	July 2005	Sept. 2005	Apr. 2006	Feb. 2008
Fuel price increase (%)	27.3	14.4	34.3	47.5
Government employee wage increase	✓	✓		✓
Pension increase	✓	✓		✓
Wage/pension bonus	✓	✓	✓	
Minimum wage increase	✓		✓	
Cash transfers to public and private sectors			✓	✓
Additional allocations to National Aid Fund			✓	✓

Source: IMF 2008c.

Thailand initiated a six-point, six-month B 46 billion (\$1.3 billion) program to help the poor in July 2008. The plan offered free electricity to those consuming less than 80 kilowatt-hours a month (and half the cost for households consuming less than 150 kilowatt-hours), free rides on the 800 ordinary buses operated by the state-run Bangkok Mass Transit Authority and on third-class trains, free water for the first 50 cubic meters, excise exemption on ethanol-gasoline blends and diesel, and a ceiling on LPG prices (MCOT News 2008). In Chile, the government increased the minimum wage by 10.4 percent in June 2008; shortly thereafter, it introduced a \$2.80 monthly subsidy for electricity for the poor, covering the most vulnerable 40 percent of the population. The Philippine government reactivated its Presidential Task Force on Energy Contingency in 2008 and gave it two weeks to come up with a plan to help people cope with soaring oil prices (PIA 2008e). The government consequently launched a one-time electricity subsidy scheme in June 2008 to provide ₱500 to 4 million poor households consuming less than 100 kilowatt-hours a month (PIA 2008c).

Syria increased gasoline and diesel prices by 33 and 240 percent, respectively, in May 2008. To offset the adverse effects of these large price increases, the government raised public sector salaries by 25 percent (BBC 2008d; IMF 2009e) and issued coupons to all households, allowing each to purchase up to 1,000 liters of diesel at only LS 9 per liter against



the new diesel price of LS 25. (A government study had earlier found that 80 percent of Syrian families each consume about 1,000 liters of diesel annually.) The coupons covered about 4.4 million tonnes of diesel, approximately equivalent to local production. However, the cost of the oil subsidy increased due to the sharp rise in international prices during the first eight months of 2008. A secondary market has developed for illegal trading in the coupons; the government is considering moving from these to targeted cash transfers. The government of Egypt similarly announced a 30 percent salary increase for public sector workers in May 2008 against the backdrop of rising food and fuel prices.

Two sectors that are often targeted for cash assistance in response to higher oil prices are public and goods transport and fisheries. Many local governments subsidize transport fares or operators, and fuel price increases have prompted governments to continue and even increase these subsidies. For example, Beijing has provided a fuel subsidy to its taxi drivers since 2005. After the November 2007 fuel price increase, it supplemented this with an additional Y 110 (\$15) a month, which it upped to a temporary monthly subsidy of Y 525 (\$77) following the June 2008 increase, which was the largest jump in fuel prices in a decade. The finance ministry said immediately after the June 2008 price increase that it had allocated funds to subsidize public transport, including taxis, in the rest of the country. Additionally, following the November 2007 price increase, the ministry provided subsidies to fishing and farming industries, road transport operators in rural areas, urban public transport providers, and low-income communities (Xinhua News Agency 2008a).

Following the largest price increase in Malaysia's history in June 2008 and reductions in diesel price subsidies to fishermen and vessel owners, the government implemented a series of compensation measures (Malaysian Ministry of Information 2008):

- Annual cash rebates for vehicle owners amounting to RM 625 (\$192) for private cars with engines up to 2 liters and pickup trucks and jeeps with engines up to 2.5 liters, RM 150 (\$46) for private motorcycles with engines up to 0.25 liters, and lower amounts for vehicles with larger engines
- Cash compensation to offset a portion of the difference between the old and new diesel prices to fishermen and vessel owners in the form of RM 200 (\$61) monthly cash payments to every owner and crew member of Malaysian-owned vessels registered with the Fisheries Department and incentive payments to vessel owners of RM 0.1 (\$0.03) per kilogram of fish landed by approved fishing vessels at fish landing centers in Malaysia



The government of Vietnam announced in March 2008 that fishing vessels would be given cash compensation of D 15–D 24 million (\$833–\$1,413), depending on the vessel's engine capacity, to offset higher fuel prices (*Thanh Nien News* 2009).

## ENERGY CONSERVATION

Reducing nonessential consumption of energy and increasing the efficiency of energy use decrease demand and expenditures. Governments have introduced measures to encourage energy conservation in response to higher fuel prices. Some measures target the oil sector directly, some the transport sector, while others target the energy sector in general. To the extent that oil and other fuels are generally substitutable in the long run and their prices tend to be correlated, all energy conservation measures help cope with high oil price levels and price volatility. Moreover, in countries with serious power shortages where the alternative is diesel-fueled emergency power generation, electricity conservation cuts down diesel fuel consumption.

The government of China—which has a target of reducing energy intensity by 20 percent between 2005 and 2010—revised vehicle taxes effective September 2008 to lower tax rates on small engines and increase them on large engines. The government of Honduras launched a weekly no-drive day in April 2008 in an attempt to reduce fuel consumption and the budgetary burden imposed by fuel subsidies. Under the plan, most private car owners could not drive their vehicle from 8 a.m. to 8 p.m. one day each week. The government thereby looked to take 60,000 vehicles off the road and save about \$80 million. However, the measure proved to be immensely unpopular—one difficulty in switching from private to public transport is that the latter is not safe on account of crime—and the supreme court suspended it after only three days.

In the Philippines, the government has taken a series of steps to reduce its own energy consumption. Under a June 2008 administrative order, all government agencies are to

- reduce transport fuel consumption by 10 percent in volume starting in June,
- turn off air conditioning units at 4:30 p.m., unless the building operates 24 hours a day,
- implement plans to replace all incandescent light bulbs starting in July,
- convert 20 percent of vehicles in major cities to LPG by September 2008,
- adopt other energy-saving technologies.

This order builds on initiatives put in place by three earlier orders dating back to 2004, all aimed at reducing agency energy consumption (Philippine DOE 2008b). The government reported that energy conservation had saved ₱1 billion (\$21 million) between September 2005 and May 2008 (PIA 2008b). President Arroyo cited government reductions of energy and fuel bills by 10 percent as of July 2008 and announced that the government had allocated ₱500 million (\$11 million) to provide compact fluorescent lamps (CFLs) to poor households in the national capital region (Thai News Service 2008d). The Department of Public Works and Highways made particular progress in terms of energy efficiency and conservation; it received a 93 percent energy conservation rating in 2007, achieved through strict compliance with turning off air conditioning units and lights during lunch breaks and replacing incandescent bulbs with 18-watt fluorescent lamps (Philippine DOE 2008a).

The government of Rwanda aims to distribute 800,000 CFLs in four phases between 2007 and 2010, 400,000 to existing customers and the remainder to new customers. The first 50,000 CFLs were distributed free of charge; the remainder for existing customers are being sold at subsidized prices matching those of incandescent light bulbs, the equivalent number of which are exchanged for the CFLs and destroyed.

Ghana distributed 6 million CFLs in 2007 for free in response to a serious power crisis that had led to power outages lasting 12 hours or more every other day at one point (Committee for Joint Action 2007). The Energy Commission of Ghana requires efficiency star labeling (rating from one to five stars) for air conditioning units and CFLs. The commission in June 2008 announced a refrigerator efficiency rebate scheme, in which consumers who bought refrigerators with ratings higher than one star would be given coupons to redeem for cash from selected banks. Consumers could also trade in old, inefficient refrigerators for coupons to enable them to purchase an efficient one (Ghana Standards Board 2008).

Chile turned an expected 6.6 percent increase in electricity consumption to a 1.6 percent decrease and avoided rationing, despite a serious drought and reduced natural gas imports from Argentina. In March 2008, the government issued a decree aimed at reducing power consumption. It required all public institutions to reduce power consumption by at least 5 percent and extended daylight savings by three weeks. The Chilean energy commission and an association of electricity distributors launched a power conservation program called *Ahorra Ahora* (Save Now). They set up a special website ([www.ahorraahora.cl](http://www.ahorraahora.cl)) on how to save electricity and advertised the program on radio, television, and billboards. In 2009, the government started a national light bulb replacement program (Tokman 2009).

Thailand recently announced 11 energy conservation measures intended to realize annual energy savings of B 150 billion (\$4.8 billion). One measure provides interest-free loans of B 10,000 (\$317) each to approximately 100,000 households to enable them to purchase high-energy-efficiency household appliances. For the industrial sector, soft loans will be offered for renovations of factories and other buildings, overhaul or replacement of machinery, and implementation of measures to increase productivity. The measure that would help save the largest amount—an estimated B 90 billion in 2011—is the change in the supervision of energy conservation plans for factories and buildings under the 1997 Controlled Buildings and Factories Act, which requires buildings and factories with power usage capacity of 1 megawatt or more to install an energy conservation system; the new regulations set specific targets with evaluation by third parties. In addition, two oil companies partly owned by the government, PTT and Bangchak Petroleum, offered free car tune-up services at more than 80 filling stations nationwide in a bid to reduce fuel consumption by 1.1 million liters a month (Thai News Service 2008g).

In Argentina, a program to encourage electricity conservation rewards those consumers who reduce power consumption and levies extra charges on those who consume above certain levels. The government in December 2007 voted to introduce daylight savings time.

The government of India established the Bureau of Energy Efficiency under the Ministry of Power in 2002. The bureau in May 2006 launched a standards and labeling program involving a number of appliances and equipment, including refrigerators, television sets, air conditioning units, tubular florescent lamps, pump sets, ceiling fans, distribution transformers, induction motors, and geysers, and using a five-star rating system (BEE 2009). The government is currently examining the introduction of vehicle fuel efficiency standards, and announced in June 2009 that it would soon make efficiency labeling of cars mandatory.

Morocco unveiled a new energy strategy in July 2008, aimed at increasing the efficiency of public sector energy use (such as street lighting and energy used in public buildings) and setting ambitious renewable energy targets to reach 20 percent of power generation and 10 percent of national energy use by 2020. To that end, the government is taking steps to establish a \$1 billion energy development fund, mostly made up of contributions from Saudi Arabia and the United Arab Emirates, to alleviate the impact of the most recent oil price hike.

Tunisia has been a pioneer among developing countries in this regard; it established a National Agency for Energy Conservation in 1985. The agency's mission is to implement government policy for rational energy

use, renewable energy, and energy substitution. The government aims to reduce the economy's energy intensity by 3 percent annually to 2011 and to increase the share of renewable energy to 4 percent of primary energy demand by the same year.

In some countries, government's approach to energy conservation has been exhortatory rather than concrete. For example, an official in the Ministry of Industry and Commerce in the Lao People's Democratic Republic suggested in July 2008 that the best way to curb inflation was to reduce energy consumption (Xinhua News Agency 2008c). The Coordinating Council of the Ministry of Energy in Mozambique recommended in August 2008 that people use public transport or share private cars.

## ENERGY DIVERSIFICATION

Moving to a more diversified portfolio of energy sources can help mitigate oil price volatility, provided that the prices of these other energy sources are not perfectly correlated with those for oil. Liquid biofuels, CNG, and LPG can substitute for gasoline and diesel, and many governments are promoting these alternative fuels to reduce reliance on oil. In the power sector, even though the use of oil is increasingly rare except in small countries (especially island and landlocked economies) and remote areas, power shortages in recent years have increased diesel use as a short-term response in power generation across the developing world. Concerns about high prices of oil and other fossil fuels and emerging scientific evidence on the pace of climate change have prompted several governments to set renewable energy targets.

### LIQUID BIOFUELS

Diversifying away from petroleum fuels in transport is difficult because use of gaseous fuels would mean setting up a new refueling infrastructure and modifying engines. Aside from converting gas or coal to liquids (which is relatively rare), biofuels—such as ethanol from sugarcane (which is by far the most efficient and lowest cost alternative at this time), maize, and starch crops; and biodiesel from oilseeds—offer the only liquid fuel alternative for reducing reliance on petroleum products. Many governments see biofuels as a way of increasing the domestic fuel supply, creating jobs, fostering rural development, and shifting from nonrenewable to renewable energy sources (Kojima and Klytchnikova 2008).

Biofuel consumption mandates in the developing countries studied are given in table 5.<sup>1</sup> Almost all of these mandates are supported by incen-

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<sup>1</sup> The consumption mandates in the table are expressed in terms of bifuel blends of either ethanol and gasoline (these are prefaced with an "E") or biodiesel

TABLE 5 BIOFUEL CONSUMPTION MANDATES

Country	Ethanol	Biodiesel	Comments
Argentina	E5	B5	Both effective in 2010
Brazil	E20–E25 <sup>a</sup>	B2, B3 effective July 2008	Ethanol blending mandated in 1938
China	E10 in 10 provinces	—	Fuel ethanol production began in 2004
Colombia	E10 in large cities	B5 in large cities beginning in 2009	Fuel ethanol production began in late 2005 and palm oil diesel production in Nov. 2007
India	E5 in 20 states and 4 union territories in Nov. 2007	—	Ethanol blending began Jan. 2003
India <sup>a</sup>	E20 by 2017	B20 by 2017	National Biofuel Policy approved Sept. 2008
Indonesia	E1–E5	B1 (transport), B2.5 (industry), and B0.25 (power)	Mandate in effect in 2009
Peru	E2	B2	Mandate in effect in 2009
Philippines	E5	B2	B1 mandated in 2007; E5 and B2 mandates in effect in 2009, but oil companies are selling E10
Thailand	—	B2	Mandate effective Feb. 2008, to be replaced by B5 in 2011

Sources: Kojima, Mitchell, and Ward 2007; USDA 2009.

Note: — = no mandate.

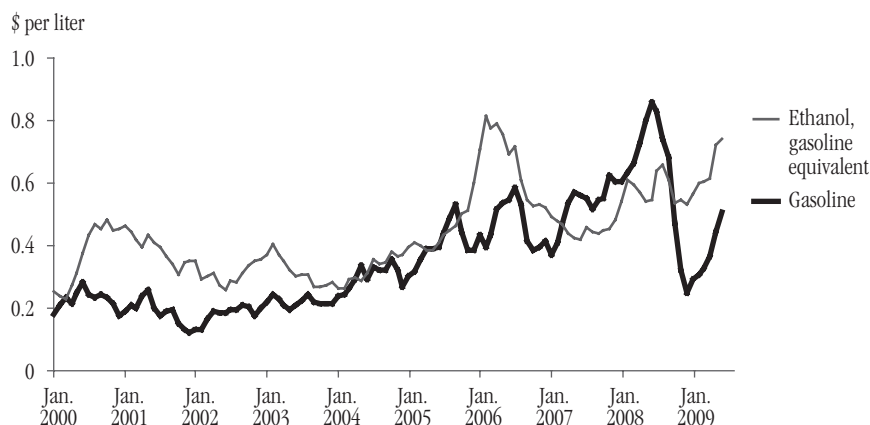
a. Targets.

tives, with tax reduction playing a large role. Such financial incentives are imperative even in the wake of high oil prices, because biofuel feedstock prices have also risen in recent years.

The relative economics of gasoline and its biofuel substitute, bioethanol, are illustrated in figure 6, which shows the economics of ethanol production from sugarcane for a market that is not landlocked (see Kojima, Mitchell, and Ward 2007 for more detail on biofuel economics). In the figure, ethanol is economic where the line for gasoline is above that for the gasoline-equivalent price of ethanol. Of the 113 months between January 2000 and May 2009, there were only 25 months when ethanol was more economic than gasoline. In the remaining months, a subsidy would have been needed to make ethanol competitive with gasoline. Thus, without incentives, farmers would have been better off selling sugarcane to sugar producers than to ethanol manufacturers. Similar trends are observed with biodiesel feedstock prices. In the Philippines,

and petroleum diesel (prefaced with “B”). Thus, E5 is a blend of 5 percent ethanol and 95 percent gasoline; B5 is a blend of 5 percent biodiesel and 95 percent petroleum diesel.

FIGURE 6 COMPARISON OF GASOLINE PRICES AND OPPORTUNITY COSTS OF ETHANOL



Source: World Bank calculations based on premium unleaded gasoline prices in northwest Europe from *Energy Intelligence* 2009 and raw cane sugar prices from the International Sugar Organization.

Note: The opportunity cost of ethanol is calculated based on the following parameters used to compute the equivalency between sugar and ethanol in Brazil: 1.0495 kg of sucrose equivalent to 1 kg of sugar, and 1.8169 kg sucrose equivalent to 1 liter of anhydrous ethanol. Sugar cane is assumed to yield 83 percent sugar and 17 percent molasses. Prices of molasses are assumed to be equal to 25 percent of sugar prices on a weight basis, and the sucrose content of molasses is 55 percent that of sugar. Premium gasoline prices are northwest Europe monthly spot prices, barges, free on board for premium unleaded. Sugar prices are raw, free on board, and stowed at greater Caribbean ports.

when the portion of biodiesel blended into diesel had to be raised from 1 to 2 percent in March 2009, the price of diesel rose by 25 centavos (\$0.005) per liter because biodiesel was more expensive than petroleum diesel (*BusinessWorld* 2009). The need for governments to offer additional financial incentives relative to petroleum fuels raises questions about the promotion of biofuels as a means of reducing fuel price subsidies, a policy pursued by some governments. Nonetheless, and notable among Middle Eastern oil producers, the Iranian oil ministry was reported in April 2009 as pursuing bioethanol production (*PressTV* 2009b). Some examples of biofuel policies are given below.

- Colombia established a policy framework to promote sustainable production of biofuels in March 2008. It preserves tax deductions for biofuel feedstocks for at least 15 more years and guarantees a minimum price to biofuel producers (USDA 2008a). The government plans to increase the land being used to cultivate biofuel feedstock from 0.8 million hectares to 3.0 million hectares in the coming decade, nearly quadrupling biofuel production (*Petroleum Economist* 2009). The government recently ruled that all new vehicles must have flex-fuel technology—that is, be capable of running on varying ratios of gasoline to ethanol—beginning in 2012 (*World Energy* 2009).

- The Thai government has been giving extremely generous incentives to promote gasoline-ethanol blends because of an oversupply of ethanol. In January 2009, a year after E20—gasoline with 95 RON containing 20 percent ethanol—was first launched, its price was only about half of that of the same grade gasoline without ethanol, despite the fact that E20 was more expensive than pure gasoline of the same grade at the refinery gate. This price difference in favor of E20 was achieved through large reductions in fuel taxes and levies and a subsidy financed by the country's Oil Fund. E85—gasoline with 95 RON containing 85 percent ethanol—was launched in August 2008 with an even larger subsidy. In May 2009, for example, the Oil Fund provided a subsidy of B 0.3 (\$0.009) per liter for E20, against B 8 (\$0.23) a liter for E85 (EPPO 2009b); this translates to B 2 per liter of ethanol in E20 and B 9.41 per liter of ethanol in E85, over and above the tax reductions these fuels enjoy.
- South Africa issued a Biofuels Industry Strategy in December 2007 which sets a five-year target for blending biofuels, on a pilot basis, of 2 percent (down from an earlier target of 4.5 percent) and offers fiscal incentives in the form of fuel levy reduction for biodiesel and fuel tax exemption for bioethanol. The strategy excludes maize, which is a staple in the country, from the incentive scheme (DME 2007).

Mandates can guarantee a market to suppliers and make investment decisions easier. Despite mandates and incentives, the financial crisis starting in the second half of 2008, combined with low oil prices, has resulted in delays and cancellations of biofuel projects around the world. Absent an escape clause, mandates are inflexible: if biofuel feedstock prices rise sharply because of poor harvests, biofuel producers have no choice but to purchase feedstock at high prices—and, if subsidies offered are inadequate, face the risk of large losses. Although many countries see biofuels as reducing import dependence, poor harvests may also mean importing biofuels; even Brazil at times has imported ethanol. If a consumption mandate precedes establishment of full domestic manufacturing capacity, imports will be needed initially. Colombia authorized ethanol imports in May 2008 (*Oil Daily* 2008). The Philippines is importing the bulk of ethanol needed to meet its consumption mandate in 2009 because domestic capacity is inadequate. Domestically produced ethanol also cannot compete with imports on price, leading to calls to impose import taxes (*Platts Oilgram News* 2009).

In July 2006, a group of 15 countries in Africa formed the Association of Non-Oil-Producing African Countries (Association des pays africains non producteurs de pétrole—APNPP), as a means of working together to ameliorate the adverse effects of high oil prices through energy

conservation measures, energy diversification, and intensified efforts at exploration and production of hydrocarbons. Dubbed “green OPEC,” one of APNPP’s objectives is to develop and adopt a common regional policy in the production and use of biofuels (UEMOA 2006). Of the countries included in this study, Ghana, Guinea-Bissau, Madagascar, Morocco, Senegal, Togo, and Zambia are APNPP members. No concrete action on biofuels appears to have been taken by APNPP to date.

## OTHER ENERGY DIVERSIFICATION MEASURES

Several countries are actively engaged in switching from gasoline and diesel to CNG. Top-ranking countries for CNG vehicles are shown in table 6. These countries have historically pursued automotive CNG for a variety of reasons. Argentina, which is endowed with both natural gas and crude oil, launched the Liquid Fuels Substitution Program in 1984 to free up more oil for exports. In the 1990s and early 2000s, many cities—notably those in India—pursued CNG primarily to address urban air pollution. The promotion of CNG as a means of reducing reliance on oil has gained traction in the last few years. Because CNG vehicles are more expensive than gasoline- and diesel-fueled vehicles, they are economic only if the fuel price is significantly below the prices of their petroleum counterparts (Gwilliam, Kojima, and Johnson 2004). For this reason, countries with large CNG markets provide tax incentives to make CNG much cheaper than its liquid fuel substitutes.

TABLE 6 NUMBER OF CNG VEHICLES AND REFUELING STATIONS IN 2008

Country	Natural gas vehicles	Refueling stations
Pakistan	2,000,000	2,600
Argentina	1,745,677	1,801
Brazil	1,588,331	1,688
Iran, Islamic Rep. of <sup>a</sup>	1,000,000	500
India	586,000	463
China	400,000	1,000
Colombia	280,340	401
Bangladesh	150,253	337
Thailand	127,735	303
Egypt, Arab Rep. of	101,078	118
Peru	54,829	56

Source: IANGV 2009.

Note: Data received between June and December 2008.

a. Estimate.



- The government of Bangladesh has called for acceleration of fuel switching from diesel to CNG. Bangladesh imports oil but has indigenous supplies of natural gas.
- Conversion to CNG accelerated in Egypt after the May 2008 petroleum product price increase; about 70 percent of those who converted their vehicles are taxi drivers (Reuters 2008b).
- Pakistan now has the largest CNG vehicle market in the world, surpassing the 2 million mark in January 2009. Conversion of gasoline-fueled vehicles to CNG dominates this market, but in its fiscal 2008/09 budget, the Pakistani government cut the import duty on CNG buses from 15 percent to zero to promote fuel switching from diesel.
- Demand for CNG vehicles in Peru has been soaring because of the fuel's low cost and rapid expansion of refueling stations. The government of Peru has exempted natural gas, LPG, and biodiesel from selective consumption tax.
- In the Philippines, President Arroyo in March 2008 ordered the Department of Transportation and Communications to allocate ₱1 billion from the Special Vehicle Control Fund for environmentally sustainable transport-related projects, including conversion to LPG and CNG engines, adding that LPG was much cheaper than diesel (PIA 2008d).
- Tanzania is promoting bifuel CNG-gasoline vehicles.

The Thai cabinet in December 2008 extended import duty exemptions for CNG vehicles and components to December 2011 (*NGV Global* 2008a). The state-owned PTT, which is the sole supplier of CNG, eased loan conditions for truck engine conversion to CNG in August 2008 (*NGV Global* 2008b). In October 2008, PTT opened the world's largest CNG refueling stations in Bangkok (*NGV Global* 2008c). In late 2008, PTT posted cumulative losses over the preceding three years of B 6.4 billion (\$183 million) in its automotive CNG business, but committed to expanding its CNG filling stations to 450 over the next year from 355 (*Automotive World* 2008a).

CNG is also being promoted among net oil exporters as a way of tackling gasoline price subsidies. The Islamic Republic of Iran is aggressively pursuing fuel switching from gasoline—some of which is imported at world prices and sold at a loss—to CNG. In June 2008, the cabinet issued a statement to the effect that 60 percent of vehicles manufactured would have bifuel (capable of running on gasoline or CNG) or dedicated CNG engines (*Automotive World* 2008c). However, to curb rampant growth in domestic demand for natural gas, which the government hopes to export on a large scale in the future, the government

doubled the price of CNG in November 2008 (Thai News Service 2008a). Similarly, the government of the República Bolivariana de Venezuela in March 2009 announced that legislation calling for an increased market share of bifuel vehicles running on CNG and gasoline would come into force on April 2. The target share is 30 percent of sales by the end of 2009, 40 percent in 2010, and 50 percent in 2011 (Agencia Bolivariana de Noticia 2009).

One exception to the global trend is Argentina where, because of serious natural gas shortages, the government has been encouraging diversification away from natural gas to liquid fuels in a reversal of a policy pursued since 1984. The Total Energy program, which took effect in July 2007, permits registered factories and power plants to buy fuel oil, gasoil, and LPG at the same price as natural gas. Although CNG prices are low, oil companies offered to price gasoline at the same level as CNG for certain users.

The government of Indonesia in 2006 embarked on a program to completely replace household use of kerosene—by far the most subsidized fuel—with LPG by 2012. In January 2008, 3-kilogram LPG cylinders were introduced; these were intended for the poor and subsidized by the government. Since July 2008, the unit price of LPG sold in 3-kilogram cylinders has been 19 percent lower than that sold in 12-kilogram cylinders, despite the higher costs of selling LPG in small cylinders. The kerosene-to-LPG conversion program has encountered LPG shortages and kerosene consumption in 2008 exceeded the target, but the government forecasts subsidized kerosene consumption to fall in 2009 and 2010.

In the power sector, many governments are diversifying away from fossil fuels. Geothermal energy already provides 27 percent of total electricity generation in the Philippines; Indonesia is pursuing expansion of its use of geothermal energy, as is the government of Kenya. In the fiscal year ending June 2009, Kenya has allocated K Sh 4 billion to fast-track the development of geothermal power to address high fuel costs for power generation (Kenyan Ministry of Energy 2008b). India is the world's fifth largest producer of wind power; in 2008, 6.7 percent of new installed capacity was wind, ranking third globally (WWEA 2009). In March 2009, South Africa introduced the first feed-in tariffs for wind and concentrated solar energy in Africa (NERSA 2009). In Uganda, the 2008 Atomic Energy Act established a nuclear energy unit under the Ministry of Energy and Mineral Development to promote nuclear energy for power generation and other civilian applications. This follows a renewable energy policy issued in 2007.

## STRATEGIC RESERVES

Strategic reserves can be used to help reduce the magnitude of sharp price spikes due to physical disruptions to supply. For example, the U.S. government released 21 million barrels of emergency oil in 1990–91 during the first Persian Gulf War and 11 million barrels in the aftermath of Hurricane Katrina in 2005. Bacon and Kojima (2008, chapter 6) provide an ex-post analysis of virtual and physical security stock schemes. Among the countries studied in this report, China has made the most progress to date in setting up strategic reserves. Several other governments are seriously considering or actually planning strategic reserves, but progress on implementation remains to be seen.

China has finished the first phase of its strategic reserve construction. Taking advantage of low world oil prices in late 2008 and early 2009, it has filled emergency oil tanks at all four sites, amounting to 100 million barrels (16 billion liters). The Chinese government has approved plans to build a second phase of strategic crude reserves, with construction due to start in 2009. This phase will add another 170 million barrels (27 billion liters), bringing total storage up to nearly 33 days' worth of 2009 demand. The National Energy Administration has confirmed that China plans to build enough stocks to cover 90 days of demand in due course (*BMI Daily Oil and Gas Alert* 2009c).

India is building strategic crude oil storage facilities to contain a total of 5 million metric tonnes (about 35 million barrels, equivalent to 12 days of 2008 consumption) at three locations. Indian Strategic Petroleum Reserves Limited was established for this purpose; it is owned by the Oil Industry Development Board of the Ministry of Petroleum and Natural Gas. Underground rock caverns will be used for the storage, and the plan is to complete the three sites by 2012 (ISPRL 2009).

The government of Rwanda announced in January 2009 that 7 million liters of gasoline and 5 million liters of diesel had been ordered to supplement strategic reserves containing 1.3 million liters at the time, and that construction of additional fuel storage tanks were under way (BBC 2009).

The government of Uganda recently announced a plan to build a fuel depot in Kampala with a capacity of 150 million liters. It started building strategic fuel reserves at four locations in the 1970s, but only the fuel depot in Jinja was completed. Restocking this depot has encountered financing difficulties. In 2008, for example, the energy ministry attempted several times, unsuccessfully, to refill the reserves in Jinja. The government recently handed the depot over to a private firm as part of the Kenya-Uganda pipeline project (*New Vision* 2009).

In Zambia, the Ministry of Energy and Water Development has been tasked with establishing national petroleum strategic reserves. The ministry issued a tender to rehabilitate government-owned depots at three locations; four more locations will be rehabilitated in 2009, and a 40-million-liter storage facility will be constructed in Ndola to store strategic diesel stocks. Thus, before the end of 2009, the country should have strategic reserves equivalent to 30 days of consumption (Zambian Parliament 2008). The Energy Regulation Board, through its licensing system, requires fuel suppliers to maintain a 15-day stock. Full compliance had not been achieved as of end-2008 because of the high costs of holding stocks.

The National Oil Corporation of Kenya was charged in April 2008 with maintaining strategic stocks equivalent to 30 days of consumption and eventually to reach 90 days over the coming years (*East African Standard* 2008). The Tanzanian minister for energy and minerals stated in 2007 that the government would establish strategic petroleum reserves, but little progress appears to have been made. In light of frequent fuel shortages, the government of Yemen said in mid-2008 that it had decided to establish strategic reserves to cover two months of consumption (*Yemen Times* 2008a).

## HEDGING

Hedging is a strategy intended to reduce the risk of large, rapid, and unpredictable price movements by locking in the price of future consumption (or revenue, in the case of oil sellers). A government of a major oil exporter may wish to hedge future oil revenues; a transport company may consider hedging the purchase of diesel for its fleet. In the futures oil markets, a contract can be entered into at a known price to purchase oil in a given number of months, enabling the purchaser to lock in the future price of oil and eliminate price uncertainty. If the price at the future date turns out to be higher than the futures contract price, the purchaser clearly benefits. If it is lower, however, the purchaser would have been better off not having entered into the contract. A seller of oil participates in the futures markets in the same way, with the impact of the difference between the actual and futures prices reversed. There are variations on this basic futures mechanism of varying degrees of sophistication and costs (see Bacon and Kojima 2008, chapter 5). As oil prices continued to climb in 2008, some governments—including that of Ghana (*Ghana Chronicle* 2008)—considered, but did not pursue, hedging. The Reserve Bank of India started allowing state oil companies to hedge foreign exchange exposure up to a year in October 2007, and permitted them to hedge crude oil and petroleum product imports in June 2008.

Among the countries in this report, the largest scale government use of hedging for purchasing oil is by Sri Lanka. In response to continuing high oil prices and concerns about swelling fuel price subsidies, the state-owned Ceylon Petroleum Corporation entered into a series of contracts to hedge a portion of its oil imports beginning in 2007. Involving three foreign and two local banks, the amount hedged was increased over time to about one-third of oil imports. The other oil marketer in the country, Lanka IOC, also hedged. As long as oil prices were rising, hedging was advantageous. The country's petroleum minister told reporters in April 2008 that the total gain from six hedging contracts to that point amounted to SL Rs 1.1 billion (\$10 million) (*Lanka Business Online* 2008a). However, hedging proved to be extremely costly once oil prices began to crash in the last few months of 2008. By December of that year, Lanka IOC's hedging losses had grown to SL Rs 1.77 billion (\$16 million); losses suffered by Ceylon Petroleum Corporation were reported to have amounted to hundreds of millions of dollars. The perception that the hedging deals were unfairly structured and that the public was being asked to pay for the hedging losses through higher retail prices and not benefiting from falling oil prices rapidly gained wide acceptance, and petitions to that effect were filed. The cabinet appointed a risk management committee to review all hedging contracts and to minimize the losses in November 2008. The supreme court ordered a temporary suspension of the Ceylon Petroleum Corporation chairman and payments to the banks until two petitions, alleging fraud and corruption in the hedging deals, had been dealt with; the court terminated the case in January 2009. The court also ordered an 18 percent reduction in the price of regular gasoline in December 2008; Lanka IOC complied, but the Ceylon Petroleum Corporation did not (*Asia Pulse* 2009; ISI Emerging Markets 2008; *Platts Commodity News* 2009).

#### ASSISTANCE FROM NET OIL EXPORTERS

Several government-to-government assistance schemes have been initiated, all of which entail major net oil exporters providing concessionary terms for oil purchase to importing developing countries. Some programs are regional, such as PetroCaribe (discussed in Bacon and Kojima 2006a, annex 3). Through PetroCaribe, the República Bolivariana de Venezuela provides petroleum products under concessionary terms. Between the initiative's launch in June 2005 and the fifth summit in July 2008, the República Bolivariana de Venezuela supplied 59 million barrels of crude to its PetroCaribe partners, for which they paid 50 percent of its value within 90 days and the rest on credit over 25 years, with a two-year grace period and an interest rate of 1 percent a year. This arrangement saved the recipients \$921 million, according to the Venezuelan

government. At the fifth summit, the República Bolivariana de Venezuela announced that partners would pay only 40 percent within 90 days if the price of Brent crude remains above \$100 a barrel. Members can also pay by providing goods and services: Nicaragua paid a portion of its oil bill with heads of cattle, black beans, and meat in 2008. Of the countries studied here, Nicaragua, Honduras, and Guatemala are PetroCaribe members. Nicaragua joined in August 2006; its supply agreement allows for up to 10 million barrels of oil to be supplied a year on preferential financing terms; it also has an agreement for setting up joint venture companies. Honduras joined in December 2007; its intent was to source all of its bunker fuel (used for power generation) and 30 percent of its gasoline and diesel from PetroCaribe. Guatemala became PetroCaribe's 18th member in July 2008 (*Dow Jones International News* 2008b; *Global Insight Daily Analysis* 2007b; *Noticias Financieras* 2008).

Other countries participate in bilateral assistance programs. Jordan secured an arrangement, effective June 2008 for three years, whereby it can buy Iraqi crude oil at a discount of \$22 a barrel, up from \$18 a barrel previously. The first shipment under the new deal arrived in September 2008. In December 2008, the Islamic Republic of Iran agreed to a deferred payment arrangement with Pakistan whereby the credit facility for payment was extended from 30 to 90 days. The first consignment of crude oil arrived in early January (*Dow Jones International News* 2009). Earlier, in March 2008, Saudi Arabia gave a one-time grant of \$300 million to Pakistan to mitigate economic difficulties caused in part by soaring oil prices (*Platts Oilgram News* 2008). The Ceylon Petroleum Corporation in Sri Lanka arranged interest-free credit from the Islamic Republic of Iran to cover four months of imports in early 2008 when monthly purchases of Iranian oil averaged about \$90–\$100 million. In October 2008, it negotiated to extend credit by a further three months. By November 2008, the credit ran to \$1.1 billion (*Asia Pulse* 2008b).

Morocco received \$500 million from Saudi Arabia and \$300 million from the United Arab Emirates in 2008 to help cope with higher energy prices. The government reported that it would add \$200 million from the Hassan II Fund for Economic and Social Development to the \$800 million received to create a \$1 billion energy development fund to help implement the new energy strategy announced in July 2008.

# CONCLUSIONS

Consistent with the previous studies in this publication series, prices in the Middle East and North Africa declined least between August 2008 and January 2009, reflecting already low prices which did not leave much room for price reduction in several countries (table 7). Although gasoline and diesel prices in the eight developed countries fell more in absolute terms, their price levels in January 2009 were, on average, still about 50 percent higher than those in the 49 developing countries, similar to the situation in August 2008 (Kojima 2009). In January 2009, the maximum prices in these two groups of countries were about the same, but the minimum prices were much higher in the developed countries. The 15 highest gasoline prices were found in eight African countries, one Asian country, and six developed countries. For diesel, the 15 highest prices were in 10 African and 5 developed countries. For both fuels, the highest prices were found in Malawi, followed by the United Kingdom (figure B.1).

TABLE 7 DIFFERENCE IN RETAIL PRICES BETWEEN AUGUST 2008 AND JANUARY 2009 IN U.S. DOLLARS

Region	Gasoline	Diesel	Kerosene	LPG
Sub-Saharan Africa	0.51	0.51	0.41	0.35
Central, East, and South Asia	0.37	0.33	0.35	0.26
Latin America	0.34	0.32	0.40	0.34
Middle East and North Africa	0.11	0.09	0.12	0.03
Developed countries	0.62	0.54	—	—

Source: Author's calculations using price information from table A.1.

Note: — = not available.

Nearly all developing country governments found the sharp price rise in 2008 unacceptably high and felt compelled to take action (see appendix C for a summary by country). The adverse effects were exacerbated by global food price increases which accelerated in 2007 and 2008. The recent large fall in the price of oil—the prices of three benchmark crudes in December 2008 to February 2009 averaged one-third of those in May to July 2008—has given governments some breathing space. However, the financial crisis and low prices are resulting in delays and



cancellations of oil projects, raising the specter of supply shortage once the global economy begins to recover. Underinvestment now could erode spare capacity with economic recovery and the oil supply could begin to tighten again, taking the world oil market into a new cycle. Worse, the high level of interest in energy conservation, which was abetted by high energy prices, may be waning in the face of (relatively) low prices of oil and other fuels. In the United States, recent market research found that consumers ranked fuel efficiency last (at 124th) for their next vehicle purchase (*Automotive World* 2009). Because vehicles last a decade or more, choices made today will affect energy consumption in the coming years, exacerbating the potential imbalance between supply and demand when the world economy recovers; such a growing imbalance in turn will amplify price volatility. In developing countries, lower oil prices have meant that subsidies are becoming more affordable and politically expedient, as evidenced by the end-user price cuts in India, Indonesia, and Malaysia.

Several lessons emerge from the recent oil price episode. One is to prepare for the unexpected. No one anticipated the speed at which oil prices rose in 2008, or the magnitude of this rise. Industry forecasts became outdated quickly, and leading oil industry analysts were revising their price forecasts frequently. Then, against predictions of prices of \$200 a barrel or higher, the price crashed even more suddenly, catching those engaged in hedging unprepared and leading to numerous oil project delays and cancellations. Such price volatility can produce unexpected large losses from hedging and increase the costs of price control. Although diversifying their energy portfolio and taking steps to improve energy efficiency seem less urgent now, governments should continue to pursue measures to equip the economy for future oil price shocks.

Equally important, high and volatile energy prices threaten to deepen energy poverty. Unlike electricity or piped natural gas, there are no good examples of targeted fuel price subsidies for liquid fuels because they are easy to transport and distribute, making it virtually impossible to stop diversion and black market sales. Rationing subsidized fuel using smart cards has had limited success. Only the Islamic Republic of Iran has deployed it on an economywide scale, and, after seeming initial success, the emerging view appears to be that this is not a long-term solution. The administrative requirement for setting up the system in the first place is sufficiently challenging that Malaysia, which has experience with e-diesel and e-gasoline, chose not to expand the scheme outside the fisheries sector and a segment of the transport sector. Any price subsidy or differentiated interfuel taxation between two fuels that are alike tends to result in diversion away from the intended beneficiaries.



Kerosene and diesel are most substitutable in the short run. In nearly two-thirds of the countries in this study for which kerosene prices were available, the retail price of diesel was at least a third higher than that of kerosene (figure B.3). If there is a good targeted cash transfer program or any other suitable pro-poor program in place, there is no need to make kerosene significantly cheaper than diesel for the purpose of protecting the poor who use kerosene for lighting and cooking—or distributing smart cards for rationed subsidized fuels. Setting up effective social protection programs takes time. A period of low oil prices should be seen as an opportunity to establish these measures properly without feeling the pressure to implement them in a matter of a few months. These social protection measures are useful for protecting the poor against not just the next oil price shock but against all other shocks to which the poor are particularly vulnerable.

Events since 2004 have shown that policy reversal is common. Moving from ad hoc pricing to market-based automatic price adjustment mechanisms can be an important step in making the downstream petroleum sector more efficient. The price formulas can be set to apply to any point along the supply chain and to function either as actual prices or price ceilings. Automatic price adjustment has been reasonably robust against modest price changes, and should be given serious consideration in countries with ad hoc pricing. Periods of relatively low oil prices are particularly suitable for switching to automatic pricing.

Against the severe price rises of 2007 and 2008, very few governments were able to withstand the pressure to use or increase fiscal measures to lower prices. As a result, some countries that moved to automatic price adjustment mechanisms years ago suspended these and bore financial losses. In fact, nearly all governments in this study intervened with price-based policies to soften the impact of high oil prices in 2007 and 2008. An interesting case is Thailand, which intervened in both 2004 and 2008, but to a much lesser extent in the latter year despite the much larger oil price rise. The government saw how large a deficit the earlier intervention had created and was careful not to rely excessively on price-based policies in 2008.

These interventions also show how difficult price control is. When prices were high, consumers complained that the government should be doing more to shield them from the large price swings on the international market. When prices fell but retail prices were not decreased in tandem so as to recover the losses suffered months earlier, consumers complained that they should be benefiting from the oil price collapse immediately. Anticipation of an imminent price increase leads to panic

buying, hoarding, and fuel shortages, while anticipation of an imminent price cut leads to postponement of purchase by both consumers and fuel marketers—again leading to fuel shortages. As the experience in Jordan shows, frequent downward price adjustments by government can lead to large financial losses by fuel marketers.

Even in countries where prices are set mostly by market forces, a common refrain from consumers has been that, in the words of a motorcycle taxi driver in Cambodia, fuel prices “increased like the jump of a rabbit but [are falling] like the walk of a turtle” (*Cambodia Daily* 2008). In Uganda, consumers began a boycott campaign in June 2008. Called “Smart Campaign against Fuel Prices,” the campaigners targeted Shell, which they considered a price-setter. Fuel marketers reply that the pace of inventory turnover—gasoline sold today may have been imported weeks or months earlier—needs to be taken into account, as well as exchange rate depreciation where it occurs. Consumers respond that the inventory turnover effect should be broadly symmetrical and does not explain the rapid price rise and slow decline. These arguments have even led to calls to bring back price control in markets that have been deregulated.

A useful step under these circumstances is to disclose as much information on prices as possible. In small markets with a slow inventory turnover, illustrating the effect of timing of fuel procurement and sale with a simple example may help consumers understand why domestic prices may not immediately follow international prices. Linking world to domestic prices, showing at least a representative price buildup, making historical prices available, and even comparing prices with those in other countries could help answer questions consumers frequently ask:

- How much of what we pay is a function of world oil prices versus taxes and other charges?
- How do our prices compare to those in neighboring countries and countries similar in market size, procurement logistics, and fuel quality to ours?<sup>1</sup>
- Is there price gouging or collusion among fuel marketers? In a market where government sets price ceilings, all prices at the ceiling would usually suggest inadequate competition. If net-of-tax prices are similar to those in other comparable markets, price gouging is unlikely.

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<sup>1</sup> Tables comparing prices across Central American countries are readily available on a monthly basis, making such comparison easy.

For government, making such price information available could help address misperceptions about fuel prices:

- Consumers do not necessarily understand that following world oil prices in U.S. dollars is not sufficient. Exchange rate fluctuations affect domestic prices.
- Where efforts are made to smooth prices, showing the balance of a virtual or actual price stabilization fund would help consumers see the benefits they enjoyed earlier and understand why prices cannot be decreased immediately.

Government interventions in the workings of the downstream petroleum market have not been successful. Kenya's Open Tender System has raised many questions. Hedging by the Ceylon Petroleum Corporation became very costly when the world oil price fell rapidly. In a market with only two fuel suppliers, unsuccessful large-scale hedging by one or both would be problematic under all circumstances, but when one is state owned, it is all the more so because these losses increase contingent liabilities for the government.

One positive consequence of the oil price increase up to July 2008 is that it focused the attention of governments and consumers alike on the importance of improving supply- and demand-side efficiency and conserving energy generally. Even in the United States, there was talk of gasoline demand "destruction," as consumers turned away from fuel-inefficient sport utility vehicles and minivans. The challenge is to keep the focus, so as to be better prepared if and when oil prices begin to rise markedly with global economic recovery.

# APPENDIX A:

## SOURCES OF PRICES

Data on retail prices are taken from various sources. Wherever retail prices were posted on a government website, these were used. In countries where fuel prices are liberalized, tabulation of average monthly prices would require extensive spatial and temporal surveys. Where governments report average prices in the capital and several other important cities or districts, but not necessarily for the entire country, capital city prices were used. For all other countries, prices reported in the media or collected by World Bank staff during the month were used.

Gasoline and diesel prices reflect fuel quality. However, this study did not attempt to adjust prices to account for varying octane or cetane numbers, sulfur levels, aromatics contents, and other fuel parameters that affect prices, because there are no precise correlations and doing so would introduce large uncertainties.

In North America and Colombia, an octane index rather than a research octane number is reported. An octane index is the average of research and motor octane numbers, and is usually about 4 to 5 points lower than the RON rating for the same grade of gasoline. For example, regular gasoline with an octane index of 87 would have a RON of about 91 to 92.

The study used regular gasoline prices wherever possible. In some countries, however, the octane number of regular gasoline was markedly lower than that on the international market and in other countries. In those cases, the prices of the higher octane gasoline were selected. For example, Bangladesh has two grades of gasoline: 80 RON regular gasoline and 95 RON premium gasoline. Because 80 RON is exceptionally low, prices for the 95 RON gasoline were used.

Table A.1 summarizes the study's price data sources.

TABLE A.1 DATA SOURCES AND DESCRIPTIONS

Country or region	Source	Notes
Argentina	Secretaría de Energía ( <a href="http://energia.mecon.gov.ar/downstream/DS_Pjur.asp">http://energia.mecon.gov.ar/downstream/DS_Pjur.asp</a> )	Federal capital district prices; 93 RON gasoline
Bangladesh	World Bank office (Dhaka)	95 RON gasoline; LPG in 12.5-kg cylinder
Brazil	Agência Nacional do Petróleo, Gás Natural e Biocombustíveis, Ministério de Minas e Energia ( <a href="http://www.anp.gov.br/petro/precos_de_produtores.asp">www.anp.gov.br/petro/precos_de_produtores.asp</a> )	Producer prices; prices exclude state-level sales tax; gasoline prices are for gasolina A, which is pure gasoline used for blending with ethanol (pure gasoline is not sold in Brazil); LPG in 13-kg cylinder
Cambodia	World Bank office (Phnom Penh)	92 RON gasoline; LPG in 15-kg cylinder
Cameroon	Local newspaper articles	95 RON gasoline
Canada	IEA ( <a href="http://www.iea.org/Textbase/stats/surveys/mps.pdf">www.iea.org/Textbase/stats/surveys/mps.pdf</a> )	Regular unleaded gasoline with an octane index of 87
Chile	Comisión Nacional de Energía ( <a href="http://www.cne.cl/cnewwww/opencms/06_Estadisticas/energia/Hidrocarburos.html">www.cne.cl/cnewwww/opencms/06_Estadisticas/energia/Hidrocarburos.html</a> )	Metropolitan region prices; 93 RON gasoline; LPG in 15-kg cylinder; diesel for truckers is cheaper
China	Beijing Municipal Commission of Development and Reform ( <a href="http://www.bjpc.gov.cn/sy/jg/sy/jg_ggspxxjg/200605/t119702.htm">www.bjpc.gov.cn/sy/jg/sy/jg_ggspxxjg/200605/t119702.htm</a> ); local newspaper articles	Beijing prices; 93 RON gasoline; No. 0 diesel; subsidized LPG in 15-kg cylinder (market-based prices of LPG in 15-kg cylinder are more than double the subsidized price)
Colombia	Sistema de Información de Petróleo y Gas Colombiano ( <a href="http://www.sipg.gov.co/Default.aspx?PageContentID=23&amp;tabid=97">www.sipg.gov.co/Default.aspx?PageContentID=23&amp;tabid=97</a> ); Asociación Colombiana de Ingenieros ( <a href="http://www.aciem.org/bancoconocimiento/i/indicessaucedo2007/indicessaucedo2007.asp">www.aciem.org/bancoconocimiento/i/indicessaucedo2007/indicessaucedo2007.asp</a> )	Bogotá prices; <i>gasolina motor corriente</i> with an octane index of 81 (prices of gasoline with an octane index of 87, which is the same as the reference gasoline on the U.S. Gulf Coast, are not consistently available on the government ministry website); LPG in 20-lb cylinder
Egypt, Arab Rep. of	Local newspaper articles	90 RON gasoline; LPG in 12.5-kg cylinder
Ethiopia	World Bank office (Addis Ababa)	91 RON gasoline; LPG in 12.5-kg cylinder
France	IEA ( <a href="http://www.iea.org/Textbase/stats/surveys/mps.pdf">www.iea.org/Textbase/stats/surveys/mps.pdf</a> )	95 RON unleaded gasoline
Germany	IEA ( <a href="http://www.iea.org/Textbase/stats/surveys/mps.pdf">www.iea.org/Textbase/stats/surveys/mps.pdf</a> )	95 RON unleaded gasoline
Ghana	National Petroleum Authority ( <a href="http://www.npa.gov.gh/petroleum-prices/">www.npa.gov.gh/petroleum-prices/</a> )	Price ceilings; only one grade of gasoline sold
Guatemala	Ministerio de Energía y Minas ( <a href="http://www.mem.gob.gt/">www.mem.gob.gt/</a> ); Secretaría de Integración Económica Centroamericana ( <a href="http://www.sieca.org.gt/site/Enlaces.aspx?ID=007004">www.sieca.org.gt/site/Enlaces.aspx?ID=007004</a> for kerosene)	Guatemala City prices; 88 RON regular gasoline; LPG in 25-lb cylinder
Guinea-Bissau	World Bank office (Bissau)	
Honduras	Comisión Administradora de Petróleo ( <a href="http://www.cap.gob.hn/portal/Precios/">www.cap.gob.hn/portal/Precios/</a> ) <sup>a</sup>	Tegucigalpa prices; 87–88 RON regular gasoline; LPG in 25-lb cylinder

(continued)

TABLE A.1 DATA SOURCES AND DESCRIPTIONS (CONTINUED)

Country or region	Source	Notes
India	Indian Oil Corporation Limited ( <a href="http://www.iocl.com/Products/Indanegas.aspx">www.iocl.com/Products/Indanegas.aspx</a> )	New Delhi prices; 91 RON motor spirit; high-speed diesel; LPG in 14.2-kg cylinder; subsidized kerosene distributed through the Public Distribution System is rationed
Indonesia	Pertamina ( <a href="http://www.pertamina.com/index.php?option=com_content&amp;task=view&amp;id=3968&amp;Itemid=1219">www.pertamina.com/index.php?option=com_content&amp;task=view&amp;id=3968&amp;Itemid=1219</a> )	88 RON gasoline; prices of higher grades of gasoline and diesel and diesel for industrial use are not subsidized
Iran, Islamic Rep. of	Local newspaper articles	Regular gasoline
Iraq	World Bank staff	Regular gasoline; price of higher octane gasoline was liberalized in 2007
Italy	IEA ( <a href="http://www.iea.org/Textbase/stats/surveys/mps.pdf">www.iea.org/Textbase/stats/surveys/mps.pdf</a> )	95 RON gasoline.
Japan	IEA ( <a href="http://www.iea.org/Textbase/stats/surveys/mps.pdf">www.iea.org/Textbase/stats/surveys/mps.pdf</a> )	90 RON gasoline
Jordan	Local newspaper articles	90 RON gasoline; LPG in 12.5-kg cylinder
Kazakhstan	Statistics Agency ( <a href="http://www.stat.kz/Pages/default.aspx">www.stat.kz/Pages/default.aspx</a> )	92 RON gasoline
Kenya	Local newspaper articles	
Lao PDR	World Bank office (Vientiane)	
Madagascar	Office Malgache des Hydrocarbures ( <a href="http://www.omh.mg/index.php?idm=5&amp;CL=pubp">www.omh.mg/index.php?idm=5&amp;CL=pubp</a> ; <a href="http://www.omh.mg/index.php?idm=5&amp;CL=gaz">www.omh.mg/index.php?idm=5&amp;CL=gaz</a> )	91 RON gasoline; LPG in 12.5-kg cylinder
Malawi	Local newspaper articles	
Malaysia	Local newspaper articles	92 RON gasoline
Mexico	Secretaría de Energía ( <a href="http://sie.energia.gob.mx/">http://sie.energia.gob.mx/</a> )	Gasolina Pemex Magna with an octane index of 87; Diesel Pemex
Morocco	Local newspaper articles	Super gasoline; <sup>b</sup> LPG in 3-kg cylinder
Mozambique	Local newspaper articles	
Nepal	World Bank office (Kathmandu)	88 RON gasoline; LPG in 14.2-kg cylinder
Nicaragua	Instituto Nicaragüense de Energía ( <a href="http://www.ine.gob.ni/hidrocarburos.html">www.ine.gob.ni/hidrocarburos.html</a> )	Managua prices; regular gasoline with a minimum RON of 87–88; LPG in 25-lb cylinder
Nigeria	Petroleum Products Pricing Regulatory Agency ( <a href="http://www.pppra-nigeria.org/">www.pppra-nigeria.org/</a> ); World Bank office (Abuja)	Gasoline price deregulated January 23, 2009, and represents the ceiling price; diesel price is the expected price calculated by the Petroleum Products Pricing Regulatory Agency for the week beginning January 21, 2009; LPG in 13.5-kg cylinder; price at the beginning of January 2009 in Abuja
Pakistan	Oil and Gas Regulatory Authority ( <a href="http://www.ogra.org.pk/cats_disp.php?cat=86">www.ogra.org.pk/cats_disp.php?cat=86</a> ); Pakistan State Oil ( <a href="http://www.psopk.com/">www.psopk.com/</a> )	
Peru	Organismo Supervisor de la Inversión en Energía y Minería ( <a href="http://www.osinerg.gob.pe/newweb/pages/Publico/1.htm">www.osinerg.gob.pe/newweb/pages/Publico/1.htm</a> )	Averaged prices in LIMA; 90 RON gasoline; LPG in 10-kg cylinder

(continued)

TABLE A.1 DATA SOURCES AND DESCRIPTIONS (CONTINUED)

Country or region	Source	Notes
Philippines	Department of Energy ( <a href="http://www.doe.gov.ph/OPM/Pumpprices.htm">www.doe.gov.ph/OPM/Pumpprices.htm</a> )	Metro Manila prices; 93 RON gasoline; LPG in 11-kg cylinder
Rwanda	Local newspaper articles	
Senegal	Local newspaper articles	Super unleaded gasoline; LPG in 2.7-kg cylinder
Singapore	Platts Oilgram Price Report, price average supplement	92 RON unleaded gasoline and gasoil with 0.05 percent sulfur
South Africa	Department of Minerals and Energy ( <a href="http://www.dme.gov.za/energy/liquid_prices.stm#3">www.dme.gov.za/energy/liquid_prices.stm#3</a> )	Inland prices; 93 RON unleaded gasoline; LPG in 12.5-kg cylinder
Spain	IEA ( <a href="http://www.iea.org/Textbase/stats/surveys/mps.pdf">www.iea.org/Textbase/stats/surveys/mps.pdf</a> )	95 RON unleaded gasoline
Sri Lanka	Local newspaper articles; for LPG, refill prices at Laugfs ( <a href="http://www.laugfs.lk/lfg/laugfs_gas_product.htm">www.laugfs.lk/lfg/laugfs_gas_product.htm</a> )	90 RON gasoline
Syrian Arab Rep.	Local newspaper articles	
Tajikistan	Local news paper articles; World Bank office (Bishkent)	92 RON gasoline
Tanzania	EWURA ( <a href="http://www.ewura.go.tz/pdf/fuelprices/Prices%20WEF%2013%20Januari%20-%20Swahili.pdf">www.ewura.go.tz/pdf/fuelprices/Prices%20WEF%2013%20Januari%20-%20Swahili.pdf</a> )	Dar es Salaam average monthly retail prices in August 2008; weighted averages of indicative prices and ceilings in Dar es Salaam for the month of January 2009, the price of diesel is for 0.05 percent sulfur diesel
Thailand	Energy Policy and Planning Office ( <a href="http://www.eppo.go.th/info/8prices_stat.htm">www.eppo.go.th/info/8prices_stat.htm</a> )	Bangkok prices; 91 RON gasoline with no ethanol (gasoline containing ethanol and diesel containing biodiesel are heavily discounted)
Togo	World Bank office (Lome)	
Tunisia	Local newspaper articles	95 RON gasoline
Uganda	Local newspaper articles	
United States	Energy Information Administration ( <a href="http://tonto.eia.doe.gov/dnav/pet/pet_pri_gnd_dcus_nus_w.htm">http://tonto.eia.doe.gov/dnav/pet/pet_pri_gnd_dcus_nus_w.htm</a> , retail prices)	Regular conventional gasoline; ultra-low sulfur diesel (below 0.0015 percent)
Venezuela, R. B. de	Local newspaper articles	91 RON gasoline; LPG in 10-kg cylinder
Vietnam	Petrolimex ( <a href="http://www.petrolimex.com.vn/Desktop.aspx/Home-En/">www.petrolimex.com.vn/Desktop.aspx/Home-En/</a> )	92 RON gasoline
Yemen, Rep. of	Local newspaper articles	
Zambia	Energy Regulation Board: <a href="http://www.erb.org.zm/press/statements/septPetroleumPPrices.pdf">www.erb.org.zm/press/statements/septPetroleumPPrices.pdf</a> ; <a href="http://www.erb.org.zm/press/statements/Cost%20Plus%20Price%20Review%20Dec%202008.pdf">www.erb.org.zm/press/statements/Cost%20Plus%20Price%20Review%20Dec%202008.pdf</a>	91 RON gasoline

Source: Author.

Note: lb = pound; 1 lb = 0.454 kg.

a. Website currently not functioning.

b. Regular gasoline phased out in July 2005.

# APPENDIX B:

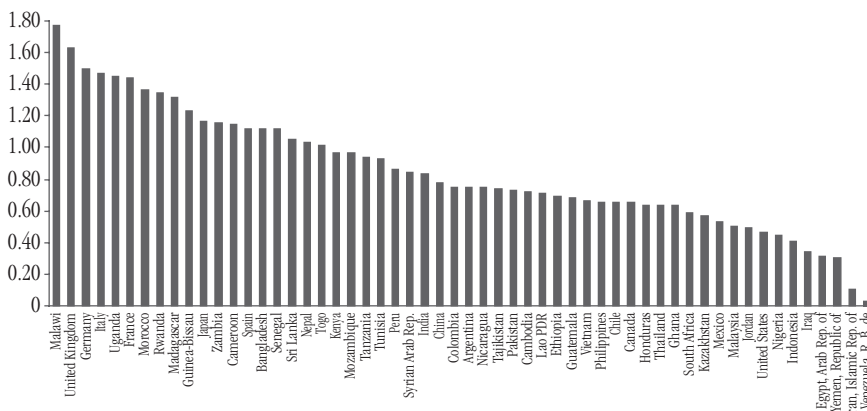
## RETAIL PRICES OF GASOLINE, DIESEL, KEROSENE, AND LPG

This appendix provides retail prices for January 2009 in U.S. dollars for cross-country comparison. Prices of gasoline and diesel in 49 developing and 8 developed countries are shown in figure B.1. Retail prices of kerosene and the ratio of kerosene to diesel prices in 33 developing countries are shown in figures B.2 and B.3, respectively. Retail prices of LPG in 26 developing countries are shown in figure B.4. The ratios of prices between August 2008 and January 2009 after conversion to U.S. dollars are given in figure B.5, and the distribution of ratios in table B.1. Table B.2 shows prices in August 2008 and January 2009 in local currency units.

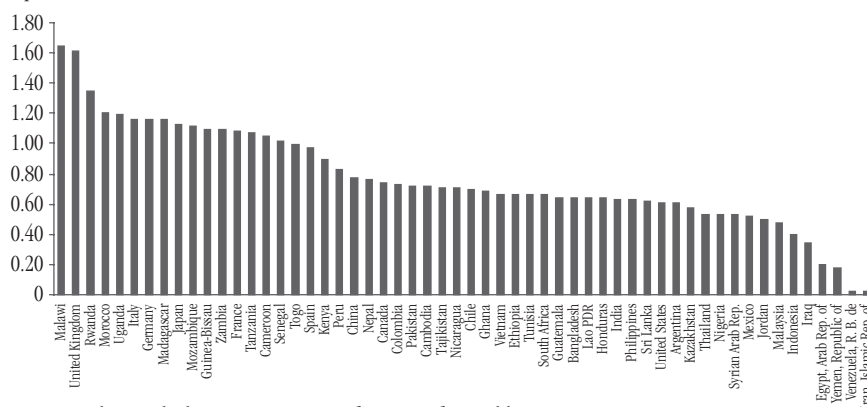


FIGURE B.1 RETAIL PRICES OF GASOLINE AND DIESEL IN JANUARY 2009

\$ per liter of gasoline



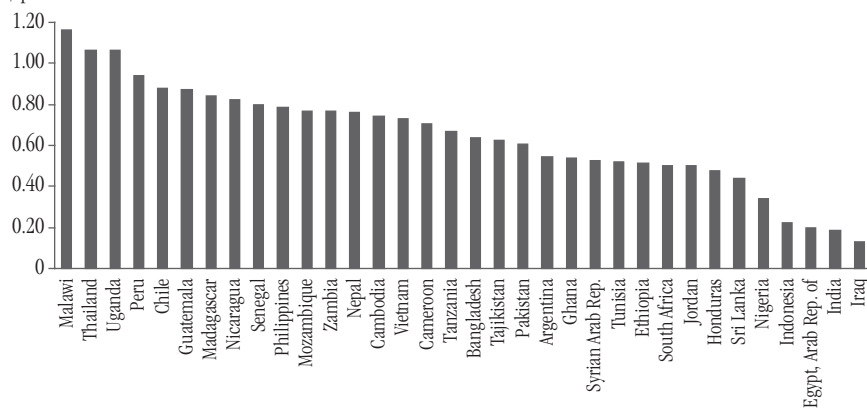
\$ per liter of diesel



Source: Author's calculations using price information from table A.1.

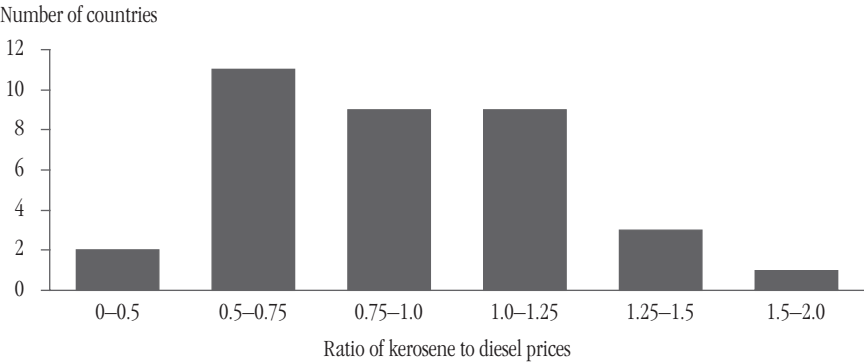
FIGURE B.2 RETAIL PRICES OF KEROSENE IN JANUARY 2009

\$ per liter



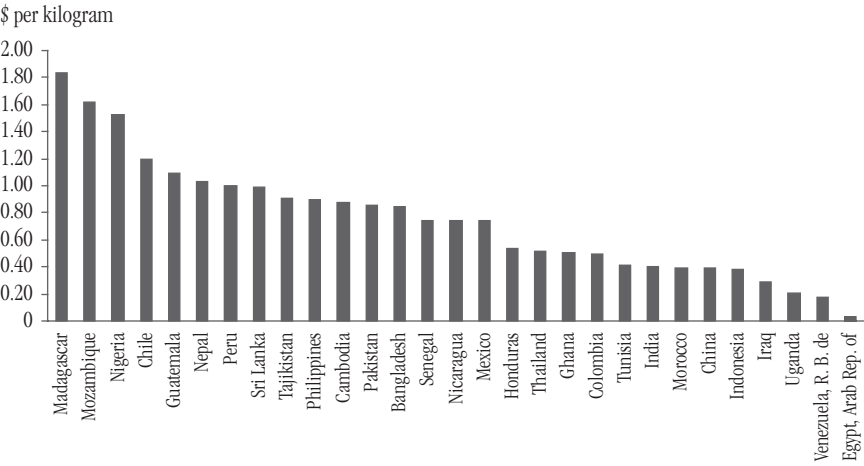
Source: Author's calculations using price information from table A.1.

FIGURE B.3 RATIO OF KEROSENE TO DIESEL PRICES IN JANUARY 2009



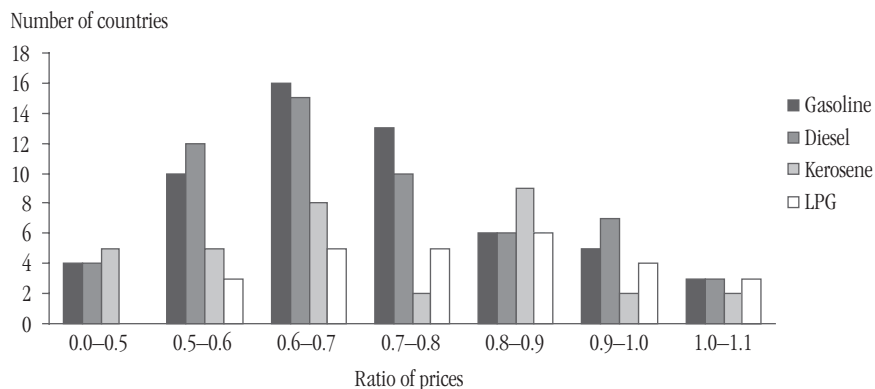
Source: Author's calculations using price information from table A.1.

FIGURE B.4 RETAIL PRICES OF LPG IN JANUARY 2009



Source: Author's calculations using price information from table A.1.

FIGURE B.5 RATIO OF JANUARY 2009 TO AUGUST 2008 RETAIL PRICES  
IN U.S. DOLLARS



Source: Author's calculations using price information from table A.1.

Note: A–B denotes the number of countries in which the price ratio is equal to or greater than A and less than B. There are 49 developing countries and 8 developed countries for gasoline and diesel, 33 developing countries for kerosene, and 26 developing countries for LPG.

TABLE B.1 RATIO OF JANUARY 2009 TO AUGUST 2008 RETAIL PRICES IN  
U.S. DOLLARS

Item	Gasoline	Diesel	Kerosene	LPG
Developing country average	0.72	0.72	0.71	0.79
Developing country minimum	0.42	0.42	0.38	0.53
Developing country maximum	1.08	1.08	1.08	1.02
Developed country average	0.64	0.65	—	—
Developed country minimum	0.47	0.53	—	—
Developed country maximum	0.74	0.77	—	—
Average of all countries	0.71	0.71	0.71	0.79
Free-on-board prices	0.43	0.44	0.44	0.43

Source: Author's calculations using price information from table A.1.

Note: — = not available. Free-on-board prices are taken from those in figure 1.

TABLE B.2 RETAIL PRICES IN LOCAL CURRENCY UNITS

Country	Gasoline		Diesel		Kerosene		LPG	
	Aug. 2008	Jan. 2009	Aug. 2008	Jan. 2009	Aug. 2008	Jan. 2009	Aug. 2008	Jan. 2009
Argentina	2.60	2.59	2.02	2.08	1.87	1.87	—	—
Bangladesh	90	77	55	44	55	44	80	58.62
Cambodia	5,600	2,950	5,850	2,950	8,000	3,050	5,500	3,600
Cameroon	594	569	545	520	375	350	—	—
Chile	648	405.15	691	431.20	666	546.93	973	745
China	6.20	5.33	6.23	5.26	—	—	2.67	2.67
Colombia	1,945	1,711	1,620	1,651	—	—	1,716	1,112
Egypt, Arab Rep. of	1.75	1.75	1.10	1.10	1.10	1.10	0.20	0.20
Ethiopia	9.61	7.47	6.90	7.13	5.72	5.50	17.20	—
Ghana	118.53	82.00	120	89	113.5	70.0	100.44	65.00
Guatemala	34.77	20.18	35.07	19.13	36.50	25.95	11.77	8.57
Guinea-Bissau	801	609	729	542	—	—	—	—
Honduras	21.71	12.04	22.53	12.05	16.51	8.97	12.32	10.07
India	50.56	40.62	34.8	30.86	8.91	9.09	20.76	19.70
Indonesia	6,000	4,500	5,500	4,500	2,500	2,500	5,250	4,250
Iran, Islamic Rep. of	1,000	1,000	165	165	—	—	—	—
Iraq	400	400	400	400	150	150	333	333
Jordan	0.800	0.350	0.730	0.355	0.730	0.355	0.520	—
Kazakhstan	103	69	104	70	—	—	—	—
Kenya	109	76	102	71	90	—	—	—
Lao PDR	10,768	6,054	10,988	5,426	—	—	—	—
Madagascar	2,900	2,500	2,802	2,200	1,949	1,600	3,912	3,498
Malawi	251.20	251.20	234.50	234.50	165.30	165.30	—	—
Malaysia	2.50	1.50	2.50	1.70	—	—	—	—
Mexico	7.29	7.31	6.20	7.13	—	—	9.64	10.26
Morocco	11.25	11.50	10.13	10.15	—	—	3.33	3.33
Mozambique	41.62	24.32	35.35	28.06	29.33	19.47	—	40.93
Nepal	100.00	80.50	70.00	59.50	65.00	59.50	85	81
Nicaragua	24.15	14.89	23.94	14.08	24.10	16.35	25.01	14.82
Nigeria	70	65	150	77.2	50	50	—	222
Pakistan	86.66	57.66	64.64	57.14	58.37	48.00	68	67.80
Peru	3.37	2.73	3.05	2.62	—	2.97	—	3.17
Philippines	55.73	30.69	54.60	29.56	58.53	37.16	57.21	42.60

(continued)

TABLE B.2 RETAIL PRICES IN LOCAL CURRENCY UNITS (CONTINUED)

Country	Gasoline		Diesel		Kerosene		LPG	
	Aug. 2008	Jan. 2009	Aug. 2008	Jan. 2009	Aug. 2008	Jan. 2009	Aug. 2008	Jan. 2009
Rwanda	924	756	927	756	—	—	—	7,083
Senegal	808	553	798	504	679	396	370	370
South Africa	10.2	5.82	11.273	6.544	9.53	4.97	—	—
Sri Lanka	157	120	110	70	80	50	136	112
Syrian Arab Rep.	40	40	25	25	25	25	20	—
Tajikistan	3.2	2.6	3.80	2.50	3.3	2.2	4.2	3.2
Tanzania	1,731	1,224	1,991	1,393	1,451	868	—	—
Thailand	36.84	22.07	34.37	18.63	42.33	37.11	18.13	18.13
Togo	595	500	590	495	370	—	280	—
Tunisia	1.32	1.27	0.96	0.91	0.76	0.71	0.577	0.562
Uganda	2,790	2,870	2,740	2,350	—	2,100	—	413
Venezuela, R. B. de	0.070	0.070	0.048	0.048	—	—	0.37	0.37
Vietnam	18,000	11,000	15,950	11,000	19,000	12,000	—	—
Yemen	60	60	35	35	—	35	—	—
Zambia	9,647	5,818	8,355	5,478	5,769	3,834	—	—
Canada	1.29	0.80	1.36	0.91	—	—	—	—
France	1.42	1.09	1.12	0.82	—	—	—	—
Germany	1.46	1.13	1.17	0.88	—	—	—	—
Italy	1.46	1.11	1.20	0.88	—	—	—	—
Japan	185	106	167	102	—	—	—	—
Spain	1.18	0.85	1.04	0.74	—	—	—	—
United Kingdom	1.13	0.86	1.07	0.86	—	—	—	—
United States	0.99	0.47	1.11	0.61	—	—	—	—

Source: Author's calculations using price information from table A.1.

Note: — = not available. Units are in local currency per liter except for LPG, which is in local currency per kilogram.

# APPENDIX C:

## SUMMARY OF TOPICS COVERED BY COUNTRY

This appendix contains a summary table of the main topics covered in this report by country. For a total of 18 topics, a check mark (✓) appears if the following has occurred since 2006 and is discussed in this report:

1. The government has provided price subsidies or reduced fuel taxes and charges for all consumers for one or more petroleum products.
2. The government, or the private sector at the request of the government, has provided targeted fuel price subsidies or reduced fuel taxes for certain consumer categories. (Targeted fuel subsidies entail a dual or multitier price structure.)
3. The government has rationed one or more subsidized fuels.
4. In a country where petroleum product prices are either deregulated or are automatically adjusted following international prices, the government froze the prices of one or more fuels in response to world oil price increases.
5. The government has historically subsidized petroleum products, but is moving to eliminate, has announced the intention to eliminate with a target date, or has eliminated the subsidies.
6. A fund has been used to smooth or subsidize prices when they are high.
7. Fuel price subsidies have caused fuel shortages.
8. Fuels have been smuggled out of the country.
9. Subsidies have led to oil company losses.
10. The government has used moral suasion or threats, resorted to legal force, or used export bans or export fuel taxes to keep domestic prices low.
11. Price information is available on the government website or on the website of a national oil company.

12. The government has implemented compensation measures—excluding lowering end-user fuel prices through subsidies or fuel tax reduction—for higher oil prices.
13. The government is promoting energy conservation measures, has exhorted citizens to conserve energy, or has joined a regional organization that has set energy conservation as one of its goals.
14. The government is promoting biofuels or has joined a regional organization that has set pursuit of biofuels as one of its goals.
15. The government is promoting automotive CNG.
16. The government is pursuing energy diversification other than biofuels and CNG, or has joined a regional organization that has set energy diversification as one of its goals.
17. The government or a national oil company has been helped financially by net oil exporters.
18. The government is building, or has announced its intention to build, strategic stocks.

Table C.1 should not be regarded as an exhaustive list of policies in the countries considered. In particular, many countries have been pursuing energy conservation and diversification policies for a number of years, and it is not the intention of this report to give a comprehensive list of such activities. The table is intended to provide a quick overview of most of the topics covered here, particularly those related to government policy responses.

Because information is more readily available in some countries than in others, the lack of a check mark does not necessarily mean that a given policy has not been undertaken in a particular country. Also, some of the information was gleaned from news articles, which may not be completely accurate on such topics. Lastly, several of the issues in the table require subjective judgment. For example, oil companies may claim they are losing money because of subsidies, either because they are not fully reimbursed or because reimbursement payments are late. However, firms lose money for any number of reasons, and attribution of causes may not be straightforward. Regarding late reimbursement payments, note that no reimbursement is ever immediate, and how late it can be before an oil company is considered to be losing money on its account is another gray area.

TABLE C.1 TOPICS TREATED BY COUNTRY

Country	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Argentina	✓					✓	✓		✓	✓	✓		✓					
Bangladesh		✓							✓						✓			
Brazil	✓								✓	✓	✓			✓				
Cambodia	✓									✓								
Cameroon	✓					✓												
Chile	✓	✓				✓				✓	✓	✓						
China	✓				✓		✓		✓				✓	✓	✓			✓
Colombia	✓					✓				✓				✓	✓			
Egypt, Arab Rep. of	✓											✓						
Ethiopia	✓				✓	✓												
Ghana	✓			✓						✓			✓	✓ <sup>a</sup>		✓ <sup>a</sup>		
Guatemala										✓							✓	
Guinea-Bissau	✓												✓ <sup>a</sup>	✓ <sup>a</sup>		✓ <sup>a</sup>		
Honduras	✓			✓					✓		✓		✓				✓	
India	✓	✓	✓				✓		✓		✓		✓	✓	✓	✓		✓
Indonesia	✓										✓	✓		✓		✓		
Iran, Islamic Rep. of	✓		✓		✓			✓	✓					✓	✓			
Iraq	✓				✓		✓		✓									
Jordan	✓				✓				✓			✓					✓	
Kazakhstan	✓	✓								✓	✓							
Kenya										✓						✓		✓
Lao PDR	✓												✓					
Madagascar											✓		✓ <sup>a</sup>	✓ <sup>a</sup>		✓ <sup>a</sup>		
Malawi	✓			✓		✓												
Malaysia	✓	✓	✓					✓				✓						

(continued)



TABLE C.1 TOPICS TREATED BY COUNTRY (CONTINUED)

Country	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Mexico	✓								✓		✓							
Morocco	✓			✓									✓	✓ <sup>a</sup>		✓		✓
Mozambique	✓	✓		✓									✓					
Nepal	✓	✓					✓		✓		✓							
Nicaragua		✓									✓							✓
Nigeria	✓						✓	✓	✓		✓							
Pakistan	✓						✓				✓	✓			✓			✓
Peru	✓					✓					✓			✓	✓			
Philippines	✓	✓								✓	✓	✓	✓	✓		✓		
Rwanda	✓	✓								✓			✓					✓
Senegal	✓	✓						✓					✓ <sup>a</sup>	✓ <sup>a</sup>		✓ <sup>a</sup>		
South Africa											✓			✓		✓		
Sri Lanka	✓			✓					✓								✓	
Syrian Arab Rep.	✓	✓	✓			✓		✓				✓						
Tajikistan																		
Tanzania										✓	✓				✓			✓
Thailand	✓					✓	✓	✓			✓	✓	✓	✓	✓			
Togo													✓ <sup>a</sup>	✓ <sup>a</sup>		✓ <sup>a</sup>		
Tunisia	✓					✓							✓			✓		
Uganda										✓						✓		✓
Venezuela, R. B. de	✓							✓							✓			
Vietnam	✓				✓			✓	✓		✓	✓						
Yemen, Rep. of	✓	✓					✓	✓										✓
Zambia													✓ <sup>a</sup>	✓ <sup>a</sup>		✓ <sup>a</sup>		✓

Source: Author.

a. Checked because country is a member of APNPP.

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## **The World Bank Oil, Gas, and Mining Policy Division**

The World Bank Group's role in the oil, gas, and mining sectors focuses on ensuring that its current interventions facilitate the extractive industries' contribution to poverty alleviation and economic growth through the promotion of good governance and sustainable development.

The Oil, Gas, and Mining Policy Division serves as the Bank's global sector management unit on extractive industries and related issues for all the regions of the world. It is part of a joint World Bank/International Finance Corporation department, the Oil, Gas, Mining and Chemicals Department.

Through loans, technical assistance, policy dialogue, and analytical work, the Policy Division leads a work program with multiple sector activities in more than 70 countries, of which almost half are in Sub-Saharan Africa. More specifically, the Oil, Gas, and Mining Policy Division:

- Advises governments on legal, fiscal, and contractual issues and on institutional arrangements as they relate to natural resources, as well as on good governance practices.
- Assists governments in setting up environmental and social safeguards in projects in order to promote the sustainable development of extractive industries.
- Helps governments formulate policies that promote private sector growth and foreign direct investments.
- Advises governments on how to increase the access of the poor to clean commercial energy and assess options for protecting the poor from high fuel prices.

In essence, the Oil, Gas, and Mining Policy Division serves as a global technical advisor that supports sustainable development by building capacity and providing extractive industry sector related advisory services to resource-rich governments. The Division also carries out an advocacy role through the management of the following global programs:

- The Extractive Industries Transparency Initiative (EITI) multi-donor trust fund, which supports countries implementing EITI programs
- The Global Gas Flaring Reduction (GGFR) Public-Private Partnership, which brings governments and oil companies together to reduce gas flaring
- The Communities and Small-Scale Mining (CASM) Partnership, which promotes an integrated approach to addressing issues faced by artisanal and small-scale miners
- The Women and Extractive Industries Program, which addresses gender issues in extractive industries
- The Petroleum Governance Initiative (PGI), which promotes good governance.



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