



Rockets and Feathers? Petroleum Product Price Movements

“Shooting up like a rocket, drifting downward like a feather in the wind,” or so goes the perception of petroleum product prices. This became the focus of public attention world over in 2008, when the international price of oil surged in the first six months, only to fall dramatically to a third of its peak value in the following five months. This briefing note discusses factors influencing the relationship between the prices of petroleum products on the world market and the domestic retail market.

Increased like the jump of a rabbit but now falling like the walk of a turtle,” complained a taxi driver about gasoline prices in Cambodia in October 2008 [1]. Do petroleum product prices rise rapidly in times of rising world oil prices and fall slowly when world prices come down? If so, is this because of legitimate physical supply issues, such as inventory adjustment costs? Or is such an uneven pattern a result of uncompetitive market behavior (in which case government intervention may be called for)? “Rockets and feathers” have been the subject of much debate and study in the last two decades. This briefing note reviews the evidence in other countries and possible explanations for such a price movement pattern.

Price Lag

Because there are several stages in the supply chain before petroleum products are sold to consumers, it takes time before a change in the price of crude oil is fully transmitted to the retail market. In the case of Cambodia, as explained in [2], the issue is the lag between the time a change in the price of a refined product occurs in Singapore, Thailand, or any other country from which Cambodia imports petroleum products, and the time that change is reflected in the prices at the retail shops in Cambodia.

One important determinant of price lags is the rate of inventory turnover. Most firms follow the first-in, first-out accounting rule. When prices are falling, the first in stock of refined products would have been purchased when prices were higher, and conversely when prices are rising, the first in stock would have been purchased when prices were lower. If the inventory turnover is faster when prices are rising than when they are falling—a fast inventory turnover can occur if the initial inventory is low, if sales volume is high, or both—that would produce the phenomenon of rockets and feathers.

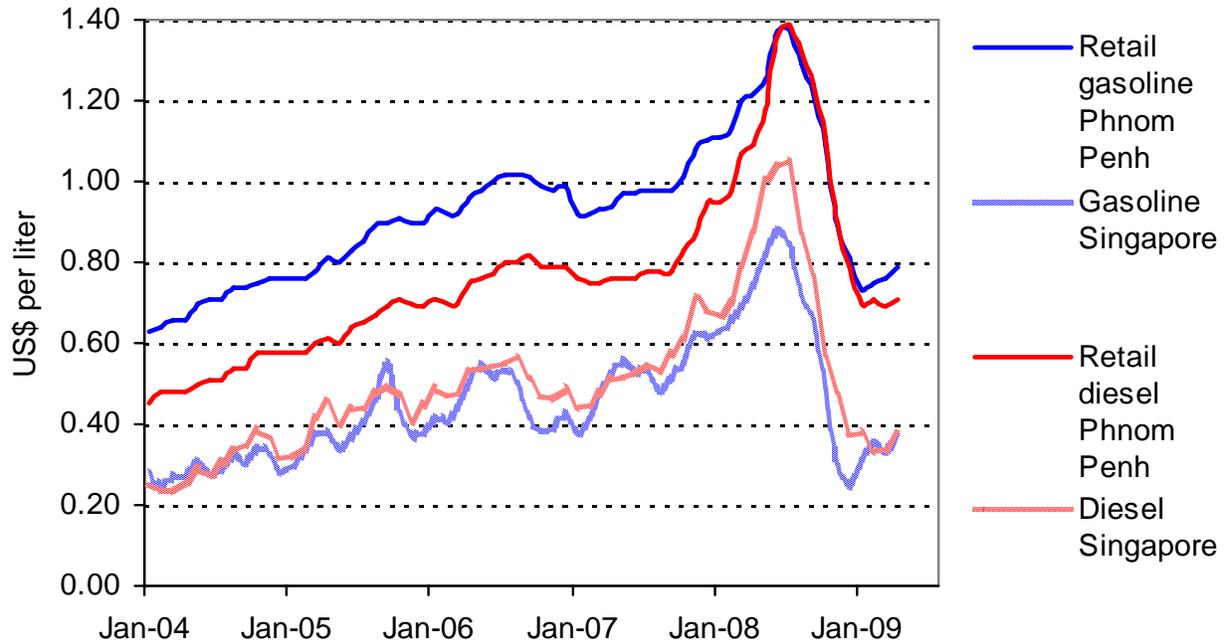
A percentage reduction in the world crude oil market

does not generally translate to the same percentage reduction for retail prices. First, crude oil and petroleum product prices are governed by different supply and demand forces. Headline news is usually about the price of a benchmark crude oil, and over a short span of time crude oil prices could rise while spot (net-of-tax) prices of refined products fall, and vice versa. Second, exchange rate fluctuations affect domestic prices even if the world oil prices remain constant, although the Cambodian economy is highly dollarized and the riel-dollar exchange rate has been stable. Third, retail petroleum product prices include taxes, which are not always set in percentage terms. In Cambodia, reference prices for petroleum products have been frozen since 2004, thereby converting, in effect, various taxes, set nominally in percentages, to specific taxes—constant in riel and consequently independent of the world oil price movement. Fourth, the costs of shipping, railing, and trucking petroleum products—which are included in retail prices—depend only in part on the price of fuel, and again do not halve if the world oil price halves.

Comparison of net-of-tax free-on-board prices in Singapore and retail prices (inclusive of taxes) in Phnom Penh for gasoline and diesel is shown in Figure 1. Cambodian retail prices are smoothed and exhibit less volatility than the prices in Singapore. As explained above, the tax component in Cambodia is essentially fixed and does not fluctuate throughout the period shown in the figure. The diesel price came down by the same amount from the peak in 2008 to April 2009 in Singapore and Phnom Penh, but came down more for gasoline by about US\$0.08 a liter in Phnom Penh. There is no obvious evidence of rockets and feathers

Reaction in 2008

Consumers the world over became alarmed at the pace of oil price increases in the first half of 2008. Even in a market as large and competitive as the U.S. gasoline market, a poll taken in July 2008 found that more than half of those surveyed

Figure 1 Monthly Prices of Gasoline and Diesel in Singapore and Phnom Penh

blamed price gouging by oil companies and producing countries, as well as a lack of effective action by government, for high oil prices [3].

In Kenya, where prices are determined by market forces, the energy minister announced in September 2008 that his ministry would launch a campaign through the media to compel fuel marketers to lower prices by more 10 Kenyan shillings (576 riel) a liter. 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 re-introducing price control [4].

Closer to home, the government of the Philippines in 2008 announced that a joint task force of the Departments of Energy and of Justice would be investigating if cases of unfair market practice and overpricing could be filed against the top three oil companies with a combined market share of 83 percent. Calls were made in the senate to "act upon" the oil companies' pricing practice. In September 2008, when small oil companies reduced prices but the major oil companies did not immediately follow, both the energy secretary and President Arroyo asked the oil companies for an explanation and the energy secretary held a meeting with the parties concerned. In January 2009, the task force submitted a report, clearing the oil companies of monopolistic practices and cartelization. In Cambodia, the government formed a special ministry committee in June 2008 to monitor prices with a view to assessing if there might be price gouging. Prime Minister Hun Sen has called upon oil companies to lower prices on several occasions, and in September 2008 instructed the finance ministry to meet with fuel marketers

to lower prices [4].

These reactions suggest that many consumers perceived the movement of retail prices for petroleum products in 2008 to be governed by factors other than market forces, and believed that government intervention would be justified. If there has indeed been some collusive behavior, then this becomes a regulatory issue. If, on the other hand, there has not been price collusion for the most part, government interventions could even make the matter worse.

Defining and Explaining the Problem

The question asked by researchers who have examined this topic is three-fold:

- (1) How long does it take for a change in the price of crude on the world market to be transmitted to the domestic retail price?
- (2) Are changes in prices passed on fully to consumers?
- (3) Is the lag for response the same whether prices are going up or down?

Most studies concern the movement of retail gasoline prices, and are part of a larger body of literature on the impact of changes in the prices of inputs (used to manufacture finished products) on the retail prices of finished goods. One study examined price changes of 77 consumer and 165 producer goods, and found that prices tend to increase fast

and decline slowly. It found that the immediate price response to an increase in input cost is twice the price response to a decrease in input cost. The study also argued that the more intermediaries there are in the supply chain, the greater the difference in speed between price increases and decreases. However, the study also found that the greater the price volatility, the smaller the differences in the speed of price response [5].

In the petroleum sector, a number of studies—mainly in developed countries—have found that retail prices catch up more quickly with crude oil price increases than with decreases. Given sufficient time, price changes appear to be fully passed on to consumers eventually. However, a few studies have also arrived at the opposite conclusions: either that prices rise as fast as they fall, or, in a couple of studies, prices fall faster than they rise. Different analytical techniques and different data sets used account for the differences in the conclusions. One author used the same datasets in the United States and applied two different methods, and found that entirely different conclusions were reached depending on which method was used [6]. In studying this phenomenon, the price movements have been sub-divided further into various stages in the supply chain.

In situations where researchers believe they have found faster price increases than decreases, several explanations have been offered.

- ◆ *Lack of competition.* An explanation that has raised the greatest concern is that arising from a handful of oil companies dominating the market and tacitly agreeing not to follow price decreases rapidly. Consider a country with no refineries. When world prices of refined products rise, oil marketing companies increase retail prices to ensure that their profit margins do not fall—that is, they may stand to lose if they do not adjust prices quickly. When prices of refined products fall on the world market, however, oil marketing companies' profit margins do not decrease, and for profit maximization it would make sense to keep prices high until one or more companies start undercutting the retail prices of the remaining firms. In a highly competitive market, someone would start cutting prices immediately to expand the market share, and others follow. In a market with only a limited number of firms and not enough competition, it is possible to have an unspoken and unwritten agreement not to undercut, and prices could remain high for much longer and come down much more slowly than the time it takes for prices to rise in times of rising world prices.
- ◆ *Limits on consumer knowledge of price movements.* Firms can also exploit consumers' incomplete knowledge about who is charging how much when and where. It takes time and effort to visit several shops or filling stations, compare prices, and choose the seller with the

lowest price. Consumers may try harder to find better deals when prices are increasing than when prices are decreasing, potentially reinforcing the phenomenon of rockets and feathers. If the cost of searching for sellers with lower prices is high—for example, if prices are not displayed clearly—then it becomes easier for sellers to maintain high prices. In contrast, wholesalers can be sophisticated buyers. Particularly in regions with futures markets, information about prices is readily available and changes in the prices of crude oil and refined products are transmitted rapidly to spot prices at various parts of the supply chain upstream of retail.

- ◆ *Hoarding.* If consumers buy more in anticipation of further price increases when prices are rising, then inventories are run down faster and prices rise more quickly. Panic buying in recent years has indeed caused fuel shortages in the countries where governments control prices, resulting in fuel shortages and sending prices high on the black market. If, on the other hand, consumers postpone purchase when prices are falling—because they expect that the longer they wait, the lower the prices will be—then the inventory turnover is slowed and prices correspondingly decrease more slowly.
- ◆ *Inventory adjustment.* Oil companies will do whatever they can to avoid running out of fuels altogether. A reduction in supply (which causes price increases) could prompt a firm to increase selling prices to slow down sales and avoid running out of refined products, especially if their own inventories are running low. If supplies are plentiful (causing prices to fall), and if running an inventory above normal levels carries relatively little additional cost, there is less incentive to lower prices rapidly.
- ◆ *Recovering losses.* When prices rise steeply—because of physical disruptions to supplies, demand rising faster than supply, and so on—refiners and wholesalers may make a loss. A period of falling prices provides an opportunity to recover commercial losses caused by price shocks by maintaining prices high and sustaining higher profit margins.

Response

Despite highly sophisticated statistical analysis, researchers in the United States and other developed economies have found it difficult to arrive at a consensus view on whether prices rise faster than they fall. This may be an indication that limits on market competition, if they exist at all, are small in these countries, in part because of tight regulation governing anti-competitive behavior. There is stronger evidence that price changes are eventually fully passed on to end users. Consumers can have perceptions of rockets and feathers even when the phenomenon does not exist,

because a price lag is inevitable in all markets and because, after a period of exceptionally high prices, consumers are anxious to see prices come down. It is important to have public awareness campaigns so that wrong perceptions do not lead to misguided policies.

An important step is empowering consumers by providing them with price information. In this way, the cost of searching for lower prices can be reduced. The first priority is to require that all filling stations display prices on display boards using letter sizes that are clearly visible from the road, and *enforce that rule*. Vehicle drivers can obtain information about prices as they drive, even when they are not looking to refill their fuel tanks.

Another step is to make historical price information publicly available. One example of how a government has come about publishing prices is Tanzania. The government liberalized the petroleum sector in 2000. In 2007, the Energy and Water Utilities Regulatory Authority of Tanzania (EWURA) conducted an inquiry—soliciting comments through mass media and holding a public hearing—into the circumstances leading to a uniform price increase that occurred on July 1, 2007. The inquiry did not find clear evidence of price collusion. However, the report on the findings of the inquiry cited several areas of inefficiency in the supply chain. One recommendation was to require all filling stations to “publish on clearly visible boards prices charged for petroleum products on sale” on their premises. To promote more effective competition, EWURA began publishing, on its website, “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 [4].

Among Cambodia’s neighbors, Thailand’s Energy Policy and Planning Office (EPPO) posts the price buildup of each petroleum product in Bangkok daily. Ex-refinery, wholesale, and retail prices, as well as all taxes and charges are shown separately for a total of 11 products [7]; the effort involved in collecting so much information would be considerable. In addition, monthly average wholesale and retail prices, and taxes collected are posted on EPPO’s website [8].

Posting prices is clearly easier if prices are controlled. If prices are uniform throughout the country and are changed only once a month, then the government can easily post prices for the entire country. This approach to pricing, however, almost never makes for efficient market operations. If prices are determined by market forces, as in all developed countries, a survey of retail prices will have to be carried out regularly. The U.S. Department of Energy surveys gasoline (approximately 115,000) and diesel outlets throughout the country and posts weekly retail prices [9]. The Philippine Department of Energy conducts price surveys in three cities once a week and posts prices for seven products by com-

pany [10]. Posting historical prices is invaluable—consumers can see historical patterns—and should not be difficult because it entails merely retaining information already collected. For Cambodia, posting spot prices of gasoline, diesel, and kerosene in Singapore, both in U.S. dollars and after conversion to riel, might also be informative.

Observations

Although the perception of uneven price changes depending on whether oil prices are rising or falling is widespread, it is difficult to demonstrate rigorously that such a pattern exists. And even where such a pattern can reasonably be shown to exist, demonstrating that it was caused by a market failure—firms colluding to keep prices high—is even more challenging.

Cambodia’s oil market is relatively small, making price competition inherently more difficult to achieve. But even in such a market, empowering consumers with information about prices, current and historical, and explaining mechanisms for price transmission specific to the Cambodian market goes a long way to promoting competition, while helping to dispel misperceptions about legitimate price lags.

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For more information contact:
Mr. Bun Veasna
Infrastructure Officer
Email: vbun@worldbank.org or
Masami Kojima
Lead Energy Specialist
Email: mkojima@worldbank.org