

# Insight

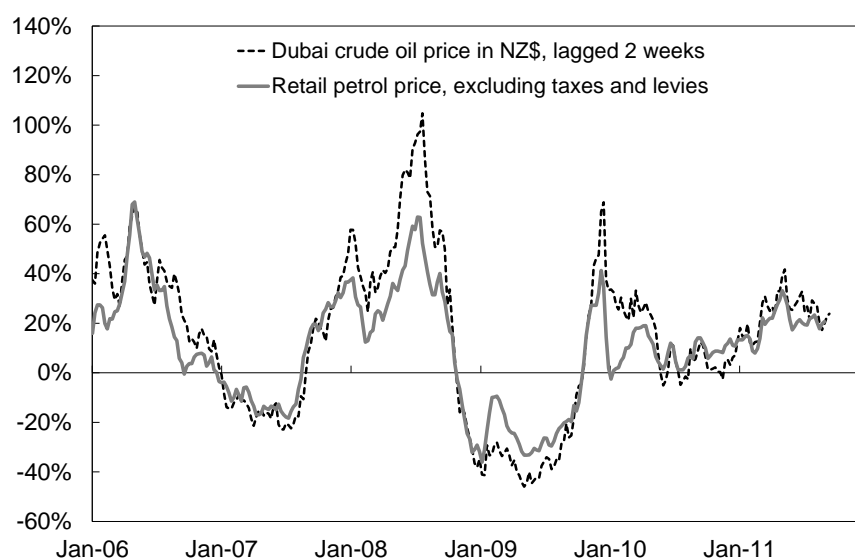
## No bias in pump price movements up or down

Petrol prices have been rising in recent weeks. It may feel like petrol prices at the pump move up faster and further than they fall, but we find there is no empirical evidence to support this. Prices fall as quick and as far as they rise when crude oil prices change.

Motorists notice the majority of crude oil price changes at the pump within 2-3 weeks. Our analysis of the data shows it takes around 7 weeks for international price and exchange rate movements to fully pass through to retail prices.

**Figure 1 International and retail petrol price moves**

Annual % change



Source: MED, NZIER

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## Motorists feel that pump prices rise further and faster ...

“Rockets and Feathers” is how some of the international literature describes petrol price movements (Bacon, 1991). There is an impression that prices rise quickly in response to crude oil prices, but fall away slowly when crude oil prices drop.

Similar views are often aired in New Zealand. We tend to notice it when pump prices rise. That is not surprising. Transport accounts for around 10% of weekly household spending, and almost all households face this cost.

These concerns were raised again earlier this year when in May petrol prices reached a record high. But when oil prices fell back, the AA commented early July that by comparison the modest fall in retail prices “is not really going to cut it for motorists”.<sup>1</sup> A week later the media reported that “[d]espite the high dollar and a recent drop in crude oil prices, the price of petrol has risen today”.<sup>2</sup> And on 15 September, questions were being raised about increases in the pump price as international prices of refined oil were falling.<sup>3</sup>

## ... and this is reported in some international research ...

So do pump prices rise further and faster than they fall in response to a similar change in oil prices? Or is the transmission of oil to pump prices symmetric?

The question has been tested in the international literature. Researchers have concluded there was short term asymmetric price transmission in the United States, Canada, United Kingdom and Australia<sup>4</sup>. That is, pump prices do move further and faster than they fall.

These studies tend to argue that this is because fuel retailers have market power. Motorists and fuel retailers, it is said, have imperfect information about the prices charged by competitors. When there is an increase in the price of the crude oil, the retailer would immediately increase petrol prices to maintain profit margins. But when there is a decline in crude oil prices, retailers do not have the same impetus to drop prices. Instead they drop petrol prices more slowly over time to enjoy better margins for as long as possible.<sup>5</sup>

## ... but New Zealand data shows pump prices move in symmetry

We are not convinced by that kind of argument. Perhaps the situation is different overseas, but in New Zealand it is easy to find out about petrol prices. Motorists can check out pump prices daily as they drive past service stations. Or they can visit a specialist website like PriceWatch<sup>6</sup>. In cities it is not even uncommon to see competing petrol stations situated very close to one another.

Unless there is collusion among brands, we expect competition for motorists to drive pump prices down as fast and as far as they go up in response to changes in crude oil prices.

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<sup>1</sup> <http://tvnz.co.nz/national-news/lower-oil-prices-not-flowing-through-pump-4283817>

<sup>2</sup> <http://tvnz.co.nz/national-news/bad-petrol-pump-4300219>

<sup>3</sup> <http://www.stuff.co.nz/business/industries/5626792/Petrols-big-guys-exploiting-cup>

<sup>4</sup> Deltas (2008), Noel (2009), Bacon (1991), Valadkhani (2010).

<sup>5</sup> Borenstein et al. (1997).

<sup>6</sup> <http://www.pricewatch.co.nz/pricewatch.aspx>

To settle the debate for the case of New Zealand we analysed the Ministry of Economic Development's weekly oil price monitoring data. In summary, New Zealand data indicates that:

- price transmission is symmetric in magnitude and speed. The parameters for price increases and decreases are not statistically different from each other
- a 10% increase in crude prices leads to around 6% increase in imported fuel cost. There is no statistical evidence the response is different when prices are rising compared to falling
- a 10% increase in imported fuel cost leads to around 6% increase in retail petrol price before taxes and levies. The increases and decreases are not statistically different
- changes in importer prices are fully passed through to retail prices within about 7 weeks. The majority of price changes are passed through in the first 2-3 weeks. This is the same when importer prices are rising or falling.

Table 1 summarises our results.

	When prices are –		Statistically different? <sup>(3)</sup>
	Rising	Falling	
<b>International to importer cost</b>			
Magnitude <sup>(1)</sup>	0.69	0.55	No
Speed <sup>(2)</sup>	7	11	No
<b>Importer cost to retail</b>			
Magnitude <sup>(1)</sup>	0.63	0.58	No
Speed <sup>(2)</sup>	6	8	No

Note: (1) 1% change in crude price leads to x% change in international price  
(2) Number of weeks to fully pass through to retail prices  
(3) Wald test at the 1% significance level. Tests if the hypothesis of symmetry can be rejected.

Source: NZIER

## References

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## Appendix A Methodology

### Methodology to test price transmission asymmetry

The aim is to test symmetry in price transmission from:

- **international** prices to the **importer** cost
- **importer** cost to **retail** price.

We test for symmetry in:

- the **magnitude** of price movements up and down
- the **speed** at which changes up or down in prices are passed on.

**Figure 2 Pathway for price transmission**



Source: NZIER

We constructed an Error Correction model, similar to Frey et al (2007). This is the typical approach used to test price transmission asymmetry.

$$\Delta \ln P_t = \sum_1^i \alpha_1 \Delta \ln I_{t-i}^+ + \sum_1^i \alpha_2 \Delta \ln I_{t-i}^- + \gamma_1 ECT_{t-1}^+ + \gamma_2 ECT_{t-1}^- + \varepsilon_t$$

We perform two key tests:

- if the two  $\alpha$  coefficients are the same, statistically, then prices move up and down by the same magnitude
- If the two  $\gamma$  coefficients are the same, statistically, then prices move up and down at the same speed.

We used the Ministry of Economic Development's weekly oil price monitoring data from 23 April 2004 to 1 July 2011. This oil price monitoring data includes: Dubai crude oil price (NZ cents per litre), petrol retail price without tax and levies, and petrol importer costs.