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Asymmetric pricing of diesel at its source☆

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ABSTRACT

Competitive diesel pricing can yield tangible benefits to truck drivers, fleet operators and farmers. The ability, and willingness, of wholesale distributors to asymmetrically pass on changes in diesel costs to consumers can adversely distort the market. Existing studies for Australia have focused on petrol (gasoil) prices, while there has been no testing for asymmetry in diesel prices. We test for rocket and feather effects in Australian wholesale diesel prices at their source. We find that in all seven seaport cities, when the price of oil goes up, diesel prices shoot up like a rocket and when the price of oil decreases, diesel prices fall like a feather. The asymmetric responses are more noticeable when oil prices are rising than falling. Results support the view that suppliers adopt or coordinate almost the same asymmetric pricing behaviour before distributing diesel among retailers.

1. Introduction

The rockets and feathers hypothesis states that when international oil prices increase, domestic fuel prices will rise rapidly (shoot up like a 'rocket') and when international oil prices fall, domestic fuel prices decrease slowly (drop like a 'feather') (Bacon, 1991). We test the rockets and feathers hypothesis for weekly wholesale diesel prices in Australia between January 2004 and August 2015. To do so, we utilize asymmetric models for all seaboard terminals in seven capital cities. We identify in which seaboard terminals oil companies are more inclined to pass cost increases onto diesel users more rapidly and fully, as well as do the opposite in response to a price fall. We find that a rise in the price of crude oil is passed onto wholesalers more, and faster, than a price fall with Melbourne being slightly ahead of the other cities. Second, when the price of oil falls, diesel prices are adjusted downwards statistically more sluggishly. Hence, it appears that almost the same asymmetric pricing strategy is applied in all seaport cities with negligible differences.

Energy and fuel prices influence production costs in almost all sectors of the Australian economy (Valadkhani et al., 2014). Motorists, farmers, livestock breeders and miners mostly bear the burden of a rise in energy costs. Demand for diesel in Australia has been strong in recent years on the back of industrial growth, largely reflecting the commodity and mining boom (AIP, 2015). Australian households, and in particular low-income households, spend a significant share of income on fuel (Valadkhani and Mitchell, 2002). The share of diesel in the fuel mix has increased over time. Since 2006, in Australia the number of registered diesel vehicles has increased by 40%, diesel passenger vehicles have more than doubled and almost 15% of all registered vehicles are now powered by a diesel engine (Honnery, 2012).

In the past, fuel prices in Australia were regulated through the Price Justification Tribunal, the Prices Surveillance Authority and later the Australian Competition and Consumer Commission (ACCC). However, in August 1998 major oil companies; namely, BP, Caltex, Mobil and Shell, managed to successfully lobby the Federal Government to stop setting maximum endorsed wholesale prices (Davey, 2010). In the period since fuel prices were deregulated, the role of the ACCC, as the government competition and consumer watchdog, has been to monitor retail fuel prices in all capital cities, as well as 150 regional locations. It uses this information to ensure that suppliers comply with competition and consumer protection laws (ACCC, 2015).

We focus on diesel prices for the following three reasons. The first is that the behaviour of wholesale prices of diesel is an increasingly important issue for Australia as it has steadily shifted away from domestic to

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imported sources of fuel. As shown in Fig. 1, there are 20 outport terminals in Australia which set their wholesale price based on the import parity price determined at one of the seven seaboard capital cities. Retailers then purchase diesel at gate prices from the nearest outport terminal. In addition to the Singapore (gasoil) price of diesel and the exchange rate, several other factors also contribute to changes in the wholesale price of diesel such as: government excise at 38 cents per litre, 10% GST; State Government rebates; shipping, wharfage and insurance costs; and profit margins. However, one does not expect these factors to exhibit frequent and sizable variation over time, particularly when approximately 50% of the price is the cost of crude oil (Valadkhani, 2013a). By focusing on the diesel prices prevailing at the seven seaports, our aim is to detect any possible asymmetric pricing at its very source.

The second reason for focusing on diesel prices is that in the midst of an overall decline in oil and other fuel prices in Australia over the last few years, diesel prices remained relatively high. For example, the price of crude oil (Tapis) fell by 38% from A$117 per barrel in February 2012 to A$72 in February 2015 (AIP, 2015). However, during the same period, the fall in the retail price of diesel (18%) was conspicuously less than those of the Singapore diesel price (38% in A$) and the retail price of unleaded petrol (28%) (AIP, 2015).

Using weekly data, Table 1 shows that diesel ($r = 0.958$) and unleaded petrol ($r = 0.956$) prices were almost equally correlated with the price of crude oil (Brent) in the pre-global financial crisis (GFC) period (179 weeks: 1 Jan 2004 to 31 May 2007). However, during the post-GFC era (429 weeks: 7 June 2007 to 20 August 2015), the pairwise correlations for both prices have fallen, particularly in the context of the price of diesel ($r = 0.822$). The fact that diesel prices have not fallen by as much as unleaded petrol has attracted much media attention in Australia and has generated a great deal of discussion on blogs among consumers in light of the growth in diesel-powered vehicles (see e.g. Janda, 2015; Lekakis, 2015).

In the absence of significant changes in the supply-side determinants (i.e. land transport, administration, marketing, wages, rent, utilities and government taxes) of the prices of unleaded petrol and diesel, the results in Table 1 are interesting. Unless the crude oil content (i.e. chemical formula) in both types of fuel has changed, which is unlikely, the sizable disconnect between the pairwise series in Table 1 is a cause for concern from the supply point of view. On the demand side, Ratti and Vespignani (2013) attribute significant changes in oil prices, global oil production and global real aggregate demand to unanticipated fluctuations in global real liquidity (M2), particularly since 2005. In their comprehensive study they found that Brazil, China, India and Russia reinforce one another in terms of their liquidity effects on global demand. The major oil companies tend to link relatively high diesel prices in Australia to the rising demand in Asia, India and South America (see ACCC, 2015; AIP, 2015; Janda, 2015), emphasising that 60% of diesel used in Australia is imported from Asia (AIP, 2015). But, one may be sceptical of the argument made by the oil companies, given that "the refiners' profit margins on diesel were roughly about double the margins for unleaded petrol as world crude oil prices began to tumble" (Lekakis, 2015).

Table 1
Pairwise correlation coefficients between weekly crude oil and national average fuel prices.

Variables	Before GFC 1 Jan 2004–31 May 2007 ($n = 179$)	After GFC 7 June 2007–20 Aug 2015 ($n = 429$)
Oil price and diesel price	0.958	0.822
Oil price and unleaded petrol price	0.956	0.855

Note: The breakpoint is determined using Bai and Perron's (1998, 2003) sequential approach.

The third reason for focusing on diesel prices is simply the lack of studies on the topic. Despite the increasing importance of movements in diesel prices, petrol prices have received most of the regulatory (Industry Commission Inquiry, 1994; ACCC, 2007, 2013; Queensland Parliament, 2006) and academic (e.g. Byrne, 2014; Davey, 2010; Davidson, 2008; Valadkhani, 2013a,b; Valadkhani and Babacan, 2014; Wang, 2008, 2009) scrutiny in Australia. There are basically no Australian studies, at all, that have focused on movements in diesel prices.

Similarly, most of the studies in the literature for other countries have also examined asymmetric vs. non-asymmetric gasoline (not gasoil or diesel) price responses (e.g. Bachmeier and Griffin, 2003; Bacon, 1991; Borenstein et al., 1997; Chen et al., 2005; Duffy-Deno, 1996; Galeotti et al., 2003). There are very few studies examining asymmetries in diesel prices for any country. Of those that exist, similar to the much larger literature on asymmetries in gasoline prices, most focus on Europe or the United States (see Bermingham and O'Brien, 2011; Fosten, 2012; Karagiannis et al., 2014; Liu et al., 2010). As Fosten (2012) notes, given that the sale of diesel cars is already relatively high in Europe and is on the rise in a number of other countries, it is important that we increase our knowledge of potential distortions in the diesel market.

Findings for asymmetry in gasoline prices in the existing literature are mixed. Perdiguero-Garcia (2013, p. 389) states, "the great variation in the outcomes reported makes the drawing of any definitive conclusions difficult". He suggests: "The use of different methodologies, models, frequencies and periods of data, applied to a range of countries, may underlie this heterogeneity in results" (Perdiguero-Garcia, 2013, p. 389). This said, while there has been variation in results for gasoline prices, most studies have found at least some evidence of asymmetric pricing behaviour. Eckert (2013) summarizes the findings from existing studies. He concludes, "most studies, for different jurisdictions, have found at least some statistical evidence of asymmetry in the response of retail [gasoline] prices to upstream (wholesale or crude oil) prices. In particular, many studies have concluded that, for at least some

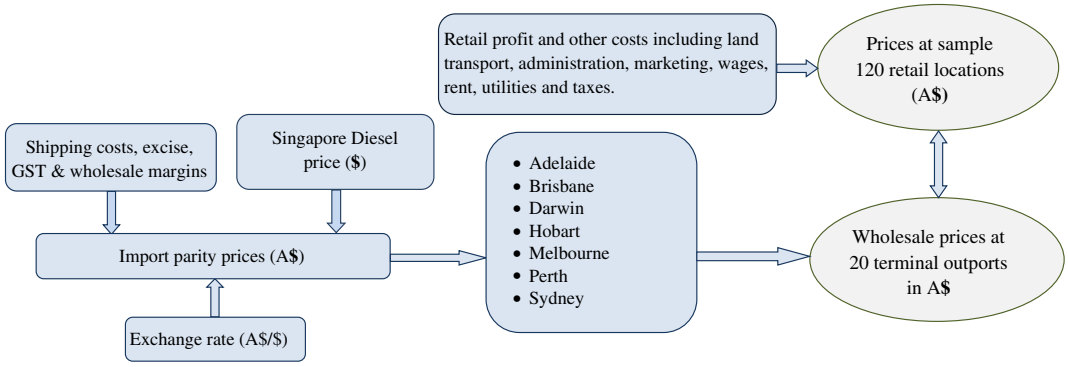

Fig. 1. Supply-determinants of diesel prices in Australia (source: AIP, 2015).