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# New Zealand fuel market financial performance study

A report to the Ministry of Business, Innovation and Employment

29 May 2017

This report was prepared jointly by Cognitus Economic Insight, Grant Thornton and the New Zealand Institute of Economic Research (NZIER).

# Authorship

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The assistance of the New Zealand fuel companies and other industry participants who provided us with the material on which this report is based and officials from the Ministry of Business, Innovation and Employment is gratefully acknowledged.


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# Executive summary

We have been commissioned by the Ministry of Business, Innovation and Employment (MBIE) to analyse the financial performance of the New Zealand fuel sector over 2011-15 (the study period). We received financial and other information from BP, Mobil and Z Energy (the majors). We also received information from Gull, and spoke to other industry participants (including suppliers other than the majors, the independents).

## Three questions

Our study addresses three questions:

1. Are retail fuel prices reasonable?
2. What factors could explain regional differences in those prices?
3. Is there evidence of cross-subsidisation between products and markets?

One of the key focuses of the study was to determine if retail prices were reasonable by assessing a market Return on Average Capital Employed (ROACE) and comparing this market return to a market Weighted Average Cost of Capital (WACC). This analysis, based on financial information provided by the majors, would have then been used to determine if the market was earning significant returns in excess of the market WACC, which may have indicated that retail prices were unreasonable. However, we were not able to complete this analysis as financial data provided by the majors was not provided on a comparable basis. In addition, some of the majors were not able to provide sufficient information within the timeframes for us to report. We discuss the limitations in respect of data received in detail in Section 4 of our report.

As a result of the limitations in data we have had to make qualitative assessments in conjunction with financial analysis to answer the questions posed. The limitations in data have meant that we have only reached tentative conclusions on each of these questions

We can indeed identify features of the New Zealand fuel industry possibly giving cause for concern that consumers are not as well served as they could be. We can identify certain measures which might address at least some of these concerns, but with the information and time available it has not been possible to be more definitive, nor could we assess whether the benefits of all of those measures exceed their costs.

This causes us to conclude that we cannot definitely say that fuel prices in New Zealand are reasonable, but we have reason to believe that they might not be.

## Three-limb test for assessing price reasonableness

To determine whether prices are reasonable or not, we asked the following three questions:

- Are there features of the existing fuel industry structure and conduct giving cause for concern – either causing margins to rise more than they should, or causing prices to be unnecessarily higher overall?

- Could any such causes for concern be remedied?
- Would the benefits of remedying those concerns outweigh the costs of doing so?

In other words, to determine whether prices are reasonable or not, we ask whether there is some feasible counterfactual New Zealand fuel industry, in which its structure and conduct would result in better prices for consumers over time, and for which the benefits of changing to that counterfactual industry exceed the costs?

If we clearly answer "yes" to all three questions, then we would conclude prices are unreasonable. If we cannot clearly answer "yes" to all three questions, it is still possible that there is evidence suggesting – to some degree at least – that prices are not reasonable. In that case, we would conclude that it is possible that prices are not reasonable (to that degree). However, if we clearly answer "no" to any of the three questions, we would conclude that prices are not unreasonable.

## Findings regarding margins

We have been commissioned to investigate the reasonableness of **prices** faced by consumers using data about **margins**. Margins are the difference between what a producer pays for the inputs used in production and the selling price of their final product. In the case of fuel in New Zealand, the main margin of interest – often referred to as the "gross margin" – is the difference between the price consumers pay at the pump and the cost of the refined product including logistics, storage and handling costs to the retail station.

Higher margins are not necessarily conclusive proof that profits are excessive or that consumers are not being well-served by a market. Higher margins can, for example, simply reflect high costs of converting a wholesale product into a retail offering.

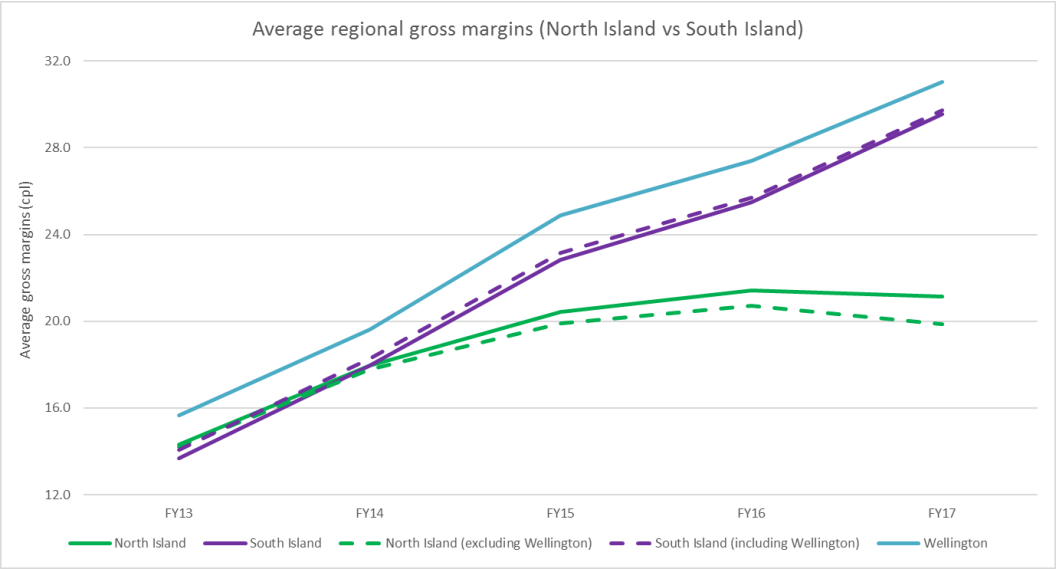
That said, an observed increase in margins in the absence of any change in underlying cost structures or demand conditions can be evidence of prices being or becoming unreasonable.

Our analysis of the majors' financial data has resulted in us being able to conclude that:

- Retail gross margins[1] have increased significantly over the period under review which is consistent with MBIE's published margin monitoring. As part of our study we reviewed the calculation of MBIE's margin analysis and concluded that despite the difference in absolute margins calculated (as some costs are excluded from MBIE's calculation of importer margin), MBIE's calculated importer margins identify a similar trend to the gross margins calculated by the majors
- Retail gross margins in Wellington and the South Island have increased at a faster rate than margins in the North Island (excluding Wellington) as illustrated in the graph below

[1] Gross margin is defined in Section 4 as being profit after discounts, transfer price, storage and handling and logistics.

## Figure 1 Retail gross margins




Source: data provided by majors.

- Retail gross margins have increased over the period under review while gross margins for other business units (aviation, truckstop etc.) have been flat or are declining.

It is important to note that increases in gross margin do not necessarily represent increases in net profit and returns on investment. This is due to the fact that these margins are calculated prior to allocation of overheads and do not reflect investment in fixed and other assets. However, we did observe that where retail ROACEs had been provided[2] these ROACEs had increased significantly over the period under review and in some cases ROACEs had increased by over 100% through the period 2012 to 2017.

We do note that the increases observed at the retail level did not necessarily reflect changes in company ROACEs, and in one particular case we identified no significant change in a company's ROACE over the period under review despite significant increases in its retail ROACE. In this particular case, part of the difference related to corporate costs not being allocated to the retail business units.

Our review of publicly available financial information did not identify significant capital expenditure made by the majors over the period under review which would possibly explain such an increase in gross margins.

[2] Capital employed is calculated on an historical cost basis with the exception of inventory which has been adjusted using replacement cost methodology (as previously discussed).

## Three possible reasons for rising margins

We have identified three possible reasons for rising fuel margins:

1. *A weakening of competitive intensity:*
    - The conscious decision by Z Energy to change pricing strategy after it acquired Shell in 2010. Shell's strategy when it owned the business prior to 2010 was to be slow to follow any price increases by its competitors, and quick to lower prices if crude oil prices fell
    - Z Energy has abandoned that strategy[3], and on the information available to us it appears that no other major has adopted it
    - It is possible that Shell's strategy caused margins at the beginning of our study period to have been unduly suppressed, and that some of the observed margin increase since then was simply a recovery from that position. On the information available to us we are not able to assess that possibility, but it is supported by the actual or attempted exits of some New Zealand firms.
2. *A shift towards greater product differentiation and price discrimination:*
    - A deliberate strategy of the fuel industry majors to offer increasingly differentiated product offerings (e.g. better quality forecourts)
    - This softens competition and segments the retail fuel market, and enables firms to increasingly discriminate between customer types when setting prices (including using price discounting).
3. *A rise in independent retailers, with possible inefficiencies in how they set prices*
    - The number of retailers not aligned with one of the majors increased over our study period, partly through new entry and expansion, but partly due to majors reducing their retail footprint
    - This can result in retail margins being added to wholesale margins.

This third reason is more tentative than the others, as we were unable to learn much about the specific contractual arrangements between independents and the majors.

Furthermore, we have also tentatively identified three possible reasons for why margins may now have been able to rise more or for longer than they should:

1. *Vertically-integrated majors:*
    - The majors own operations at different levels of the industry, including refining, wholesaling and retailing (i.e. are vertically integrated). If integration lowers costs and avoids retail margins being added to wholesale margins, then consumers can benefit. But if it allows firms to raise prices by limiting competition, then consumers can be worse off than with a separated industry structure
    - In either case, vertical integration may create incentives for the majors to restrict rivals' access to key infrastructure assets, like the refinery and

[3] Commerce Commission (2016).

fuel terminals. This access restriction creates a barrier to entry that may have allowed margins to rise.

We have only reached a tentative conclusion on the effects of vertical integration because very fine judgements are required to determine whether vertical integration has lost its beneficial effects and has instead been net harmful to consumers.

2. *Refinery arrangements (Part 1):*

    - The refinery is run with tight capacity which is fully committed to the majors. In addition, the refinery produces a bundle of products which can deter entry to firms only wanting to sell part of the bundle
    - These requirements represent possible barriers to entry which reduce the ability of entrants to respond to rising margins and limit their increase.

    We have had only a limited ability to inquire into the specifics of the refinery's ownership and contracting arrangements, and so this conclusion is also tentative.

3. *The independents' limited sources of product:*

    - While Gull has its own supply arrangements enabling it to serve much of the North Island, New Zealand lacks liquid regional wholesale markets through which independent suppliers can reliably access fuels – instead they are reliant on being able to secure long-term supply contracts from the majors.
    - This reliance potentially limits their ability to compete head-to-head with the majors – either on price, or on expansion/entry – dampening the downward pressure they can exert on margins.

    We are more confident that this third reason is a material factor, since we have been provided with information about how the independents purchase fuel.

Finally, we identify three possible reasons – again, tentatively – for why fuel margins are simply higher than they need to be:

1. *Z Energy's publication of its Main Port Price (MPP):*

    - Z Energy publishes its reference retail price for all to see, including its competitors
    - While we understand that Z Energy often reduces its prices from the MPP in areas where it faces more intense competition, the MPP still potentially serves as a retail pricing signal that can serve to dampen competition

    The Commerce Commission, in its decision clearing Z Energy's acquisition of Chevron, noted that the publication of the MPP may be an indicator of price coordination.[4]

2. *Information exchange between the majors:*

[4] Commerce Commission (2016), p. 61.

- The majors share terminal facilities under a borrow and loan (B&L) arrangement, through which we understand that they share information allowing them to monitor each other's market shares
- Such information sharing is often a cause for concern to competition authorities because it might help to support coordination among firms leading to higher prices.[5]

While we are confident that information sharing of this type is a cause for concern, we are tentative about this reason because we have had only a limited ability to inquire into the specifics of the B&L arrangements.

3. *Refinery arrangements (part 2):*
    - The majors' part ownership of the refinery might be changing how they price across the various industry levels in which they operate.

This third reason is tentative because we have had only limited ability to inquire into the specifics of the refinery's ownership and contracting arrangements. Also, there are (or appear to be) features of the refinery's ownership and contracting arrangements that are different from those applying in jointly-owned production facilities that have been studied overseas. This means existing frameworks for assessing the operation of such facilities require modification to properly analyse the impacts of these features.

## How could unreasonableness (if it were confirmed) be addressed?

New Zealand is not the only country where governments have been concerned about the structure, conduct and performance of the fuel sector. There are, therefore, examples of regulatory responses with varying degrees of success that we can turn to in addressing the second limb of our three-limb test. At the same time, overseas experience suggests that even the most well-intended regulations can lead to perverse outcomes and unintended consequences.

The fuel sector is interconnected, and regulation of one part can have unforeseen – and unwelcome, from the point of view of consumers – consequences in other parts. It is therefore necessary to take a holistic view of the sector should reforms be contemplated.

For example, overseas studies of regulations forcing refiners to exit their ownership of retailers (so-called divorcement laws) find that retail prices *rise* as a result, because some of the efficiency gains from vertical integration are lost, even if greater retail competition emerges.[6]

5 The New Zealand Commerce Commission has observed that "Successful coordination requires a high level of price or volume transparency so firms can check whether their competitors are complying with the expected coordinated outcome. … National volumes are likely to be transparent given the borrow and loan scheme the major fuel firms participate in". See Commerce Commission (2016), p. 53.

6 For examples, see Borenstein and Bushnell (2005), Eckert (2013) and Noel (2016).

Furthermore, the fuel sector is dynamic, and the various players will respond to the changed incentives that regulations create. One example is price transparency: in Germany, the mandated supply of better pricing information to consumers *increased* prices, because the information was also available to the suppliers, who could use it to respond more effectively to their competitors' prices.[7]

Finally, regulations that rely on market participants providing financial data on a consistent and comparable basis are likely to be expensive, contentious and time-consuming to operate – and ultimately less effective at producing pro-consumer outcomes than is often imagined.

We have identified three changes that warrant further examination:

- The removal of Z Energy's MPP from its website;
- The creation of a registry for the B&L system that limits the visibility of other participant's market shares; and
- The possible creation of a liquid wholesale market, at least in selected regions.

These changes could all be achieved by voluntary industry actions, and thus we recommend that officials discuss them with industry, in light of the findings in this report.

## What can we say about regional pricing and cross-subsidies?

We have not been able to access sufficiently detailed information to enable deep inquiry into the drivers of regional pricing differences. What we can say is:

- Part of the observed divergence between South Island and Wellington fuel price margins on one hand, and margins in the rest of the New Zealand on the other, may be the result of the majors' increasing use of product differentiation and price discrimination, though it seems unlikely that this explains significantly higher South Island and Wellington prices
- Margins in the South Island and Wellington are able to rise relative to the rest of New Zealand due to the inability of truly-independent rivals (i.e. those with their own product supply) to access terminals owned by the majors
- However, they are also able to rise due to other obstacles to competitive entry, including:
  - The low population density and relatively high distribution costs in the South Island make it unlikely that a new entrant could recover the capital cost of building their own infrastructure (terminals and retail outlets);
  - The relatively low population in Wellington, and limited opportunity to serve markets surrounding the city (due to geography, and the fact that those other markets are already operating relatively competitively); and
  - The need of an entrant – in either the South Island or Wellington – to quickly secure retail sites and market share as well as terminal access, which would require taking significant market share from existing firms in those markets, given limited opportunity to grow the total market.

7 See, for example, Dewenter et al. (2016).

Unless and until terminal capacity in places like Wellington and Lyttelton were to become available to an entrant, such entry is unlikely to occur despite high margins.

However, if margins in these areas are sustained at sufficiently attractive levels, this might induce investment in new terminal capacity (e.g. by a merchant terminal operator, if not an entrant retailer or major). Such an investment would open those markets up to the possibility of more intense competition by a truly independent operator.

On the question of cross-subsidies, we received only limited and anecdotal evidence. Specifically:

- We understand, but have not been able to independently verify, that a small number of locations are operated by at least some of the majors at negative margin – suggesting those sites are indeed cross-subsidised by others
- The way in which shipping costs are allocated by the majors under their joint venture in coastal shipping may be favouring the South Island (though the impact of this is small)
- The price-setting process of at least some majors involves attempting to recover margin lost in areas facing more intense competition by increasing margin in other areas. Their ability to do so is constrained not just by competitive conditions, but also by prevailing demand conditions.

In terms of materiality, only the third point is likely to be of note – particularly if rising margins in the South Island and Wellington are in a significant way due to lost margin in the North Island excluding Wellington being "recovered" from those other areas.

We have not been able to access any specific data or information suggesting this is the case. Furthermore, we question the incentives for firms to do this, since it implies they are not (or were not) behaving in a profit-maximising manner. Simply increasing prices when underlying demand or cost conditions have not changed might increase unit margins, but sacrifices overall margin due to a resulting contraction in demand. As we note in Section 3.3.1, the demand response will be greater in the long-term than the short-term.

Any such behaviour would clearly be inefficient, since it would result not just in excess prices for customers in those areas, but lost profits for the firms as well. However, this begs the question as to why South Island and Wellington margins have risen so strongly relative to the rest of the country. Given the lack of data available to us to address this question, further data and investigations are required.

We simply note that attempting to make up for lost margin in one market by increasing prices in another makes economic sense if firms are simultaneously coordinating on less-intensive competition. That way lost volumes from increasing prices are possibly more than offset by softer price competition. Without further evidence, such as that which would be produced by a study of the sort discussed in Section 6, it is not possible to test if this explanation for stronger margin rises in Wellington and the South Island is valid.

Finally, we received insufficient evidence to enable us to offer a view on whether cross-subsidies were occurring between different products (e.g. between motor spirits and aviation fuel). In principle, some level of cross-subsidisation can be expected from products like motor fuels (where customers are dispersed and exercise limited buyer power), to products like bulk diesel and aviation/marine fuels (where customers have

greater buying power). However, to the extent this is happening, all majors have a shared incentive to make such cross-subsidies due to refinery arrangements requiring them to refine a full range of products (see *Refinery arrangements* above). It is possible that refinery arrangements are contributing to higher retail fuel margins by providing all majors with a shared incentive – and ability – to use such higher margins to cross-subsidise other products. Further data and analysis would be required to be definitive.

## Conclusions

We cannot definitely say that fuel prices in New Zealand are reasonable, and we have reason to believe that they might not be. There are features of the current market structure and conduct that are of concern.

### Table 1 The results of our three-limb test

| Element | Is the issue material | Cause for concern | Could it be addressed | Would benefits exceed costs | Recommendation |
|---|---|---|---|---|---|
| Terminal access | Yes | Probably | Possibly | Unclear | Discuss the design of a liquid wholesale market with industry. |
| MPP | Possibly | Yes | Yes | Yes | Discuss with Z Energy. |
| B&L transparency | Possibly | Possibly | Yes | Probably | Discuss with industry. |
| Refinery arrangements | Probably | Probably | Unclear | Unclear | Investigate further. |
| Product differentiation | Possibly | Unclear | Unclear | Unclear | Investigate further. |
| Cross-subsidies | Possibly | Unclear | Unclear | Unclear | Investigate further. |

Source: NZIER, Cognitus, Grant Thornton

An important finding of our study is that the fuel companies measure their returns in different ways, and with varying levels of detail. Furthermore, there are many important industry arrangements that are not easily examined.

We recommend that further investigation be undertaken, based on different types of data. Specifically, these data should be of types that fuel industry firms can provide on a consistent basis, and at a level of detail fine enough that analysis can be undertaken in specific markets (e.g. cities or regions). The following data should be used:

- Prices for each fuel type and/or sales (which include discounts implicitly), as well as sales volumes (i.e. prices and quantities)
- At least on a weekly basis, ideally for the whole period under study (but two years of weekly data should be ample)

- Ideally by station, for all stations in the country (although studies could instead be made of specific cities and regions of particular interest)
- With details of station characteristics – i.e. pump types, payment methods, type of store, other services such as car washes, cafes, etc.[8]

These data types will not support the kind of analysis originally envisaged for our study, but they open up the possibility of many other types of analysis, including some that are well-suited to addressing our study's three questions.

Importantly, these other types of analysis should give:

1. A clearer indication of the nature and extent of any problems in fuel sector competition in specific markets;
2. An ability to gauge the impact on retail fuel margins in those markets of possible remedial changes to industry arrangements (i.e. through policy simulations); and
3. A better idea of whether the benefits of any possible remedial changes outweigh their costs.

In short, with better access to data of these types, it should be possible to provide more definitive and evidence-based responses to our study's three questions, by more definitively assessing each of the limbs in our test of price reasonableness. In turn this will provide better information about the causes of regional price differences.

In advance of this study, there are some aspects of the industry which we recommend be subject to early policy development work, with a view to deciding whether changes are warranted, including more detailed assessment of costs and benefits.

The areas are:

- The removal of Z Energy's MPP from its website
- The creation of a registry for the B&L system that limits the visibility of other participant's market shares
- creation of a liquid wholesale market.

We note that these three matters could be addressed by industry action and do not necessarily require regulation.[9] As a first step, we recommend that they be subject to discussion between officials and industry, in light of the findings in this report.

[8] Obtaining data surrounding the Canterbury earthquakes would be particularly useful, since it would enable additional types of analyses to be undertaken. Economic studies often look for "exogenous shocks" such as natural disasters, since they then present a "natural experiment" that better assists in distinguishing changes in the data due to firms' and consumers' choices from those which are beyond those parties' control.

[9] As we note in Section 7, the development of the wholesale electricity market was led by the industry and initially operated as a series of multi-lateral contracts between the market participants. Of course, most markets are privately run and provide good outcomes for consumers. Regulation is only required if markets are not providing good outcomes for consumers.

# Contents

## Appendices



## Figures

## Tables

# Glossary of terms

| Term | Description |
|---|---|
| B&L | Borrow and Loan |
| COCO | Company Owned, Company Operated |
| CODO | Company Owned, Dealer Operated |
| COLL | Coastal Oil Logistics Limited |
| DODO | Dealer Owned, Dealer Operated |
| Majors | The three vertically integrated fuel companies operating in New Zealand: BP, Mobil and Z Energy. |
| MBIE | Ministry of Business, Innovation and Employment. |
| MPP | Main Port Price. A national benchmark retail price published by Z Energy. |
| RAP | Refinery to Auckland Pipeline. A pipeline owned by the New Zealand Reining Company that is used to ship refined fuel products from the Marsden Point Refinery to Auckland. |
| Refining NZ | The trade name of the New Zealand Refining Company Limited, which owns and operates the Marsden Point Refinery. |
| Supermajor | The six largest publicly owned international oil and gas companies, and comprise: BP plc (UK), Chevron Corporation (USA), ExxonMobil Corporation (USA), Royal Dutch Shell plc (Netherlands and the UK), Total SA (France) and Eni SpA (Italy). The supermajors are all involved in the entire production chain, from exploration, production, refining and distribution through to retailing. |

# 1. Introduction

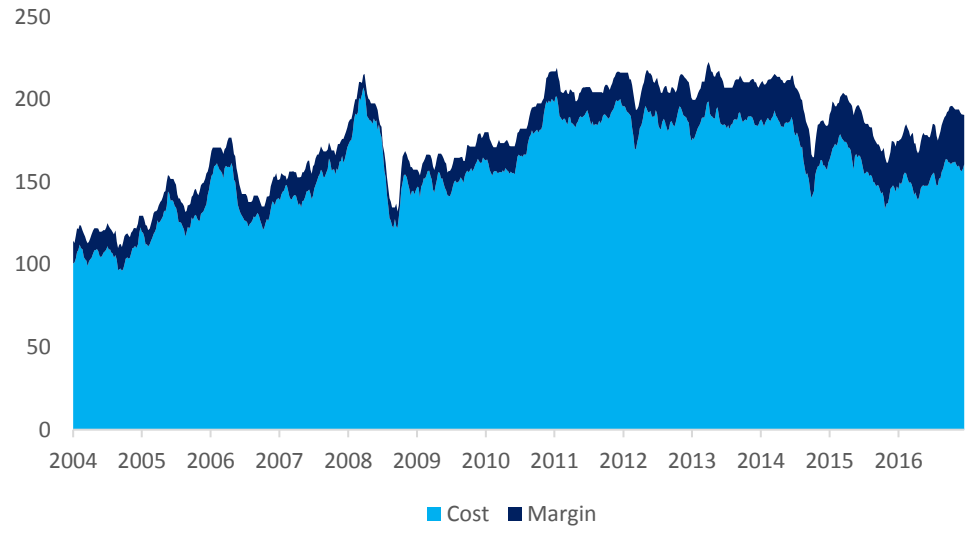
On 9 February 2017, the Minister of Energy and Resources announced that she had asked the Ministry of Business, Innovation and Employment (MBIE) to take an in-depth look at fuel company finances to determine if the price New Zealanders are paying at the pump is reasonable. As part of that study, MBIE engaged NZIER, Grant Thornton and Cognitus Economic Insights to undertake detailed economic and financial analysis of the sector.[10] This report contains the results of that analysis.

## 1.1. Background

The genesis of this study was the steady increase over recent years in the difference between the cost of imported fuel and the price final consumers pay (known as the importer margin or the gross distribution margin).

### Figure 2 Margins have been increasing

Real importer costs and margin, petrol, cents per litre. 2016 base year.

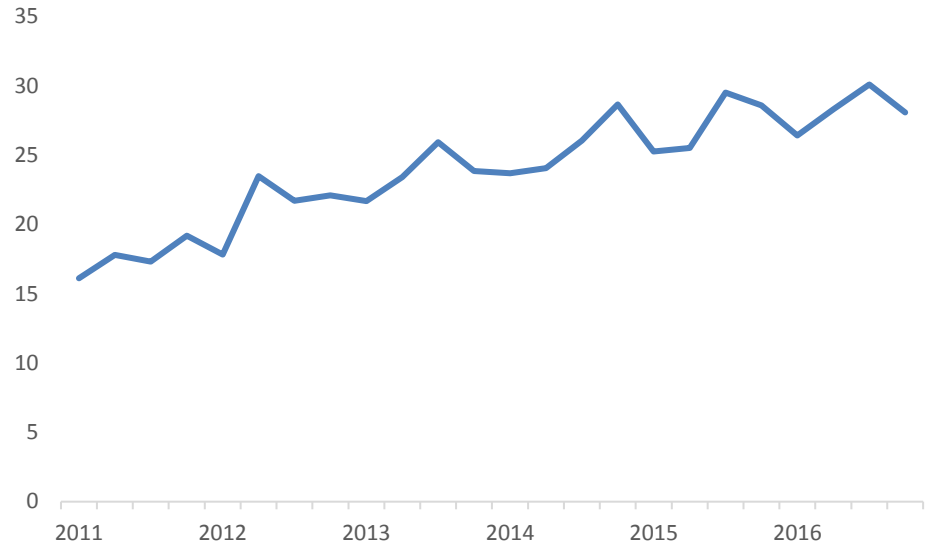



Source: MBIE

[10] NZIER lead the project. NZIER is a specialist consulting firm that uses applied economic research and analysis to provide a wide range of strategic advice to clients in the public and private sectors, throughout New Zealand and Australia, and further afield. Grant Thornton is one of the world's leading organisations of independent assurance, tax and advisory firms. Cognitus Economic Insights offers specialist expertise and experience in the economics of regulation, competition, governance, environmental policy and Treaty settlements.

## Figure 3 In the recent past, margins have been drfting up

Real importer margin, cents per litre. Rebased to December 2016




Source: MBIE

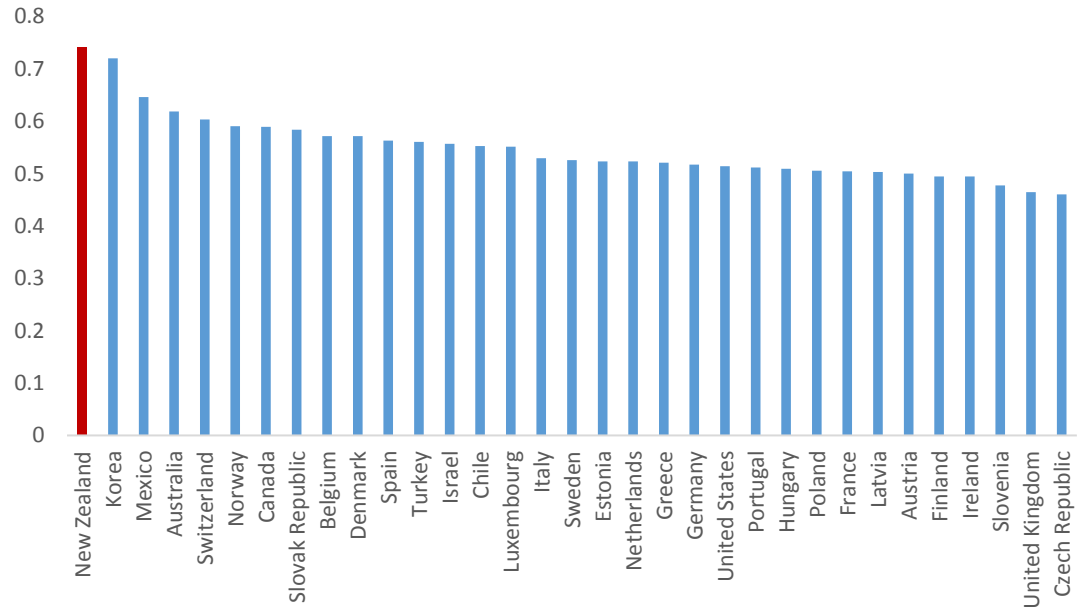
MBIE has been monitoring prices and margins for many years and has progressively refined its methodology to adapt to changing circumstances in the sector.[11]

Another motivation is the high pre-tax cost of fuel sold in New Zealand. As is the case in many other OECD countries, a large portion of the pump price of fuel is taxes and charges. Deducting these amounts from retail prices yields a pre-tax cost. See Figure 4.

[11] One recent development is the increasing incidence of discounting, where consumers receive discounts off the posted (or "board" price), through things like supermarket vouchers and loyalty programmes. These discounts are often variable and are not directly observable. The accuracy of MBIE's calculation of discounts is a point of contention for some fuel companies but, despite the difference in absolute terms, MBIE's calculated margins identify a similar trend to our analysis of margins supplied by the major participants (see Section 4.56).

## Figure 4 Cost of fuel is high in New Zealand

Pre-tax prices, US dollars per litre. Q4 2016.

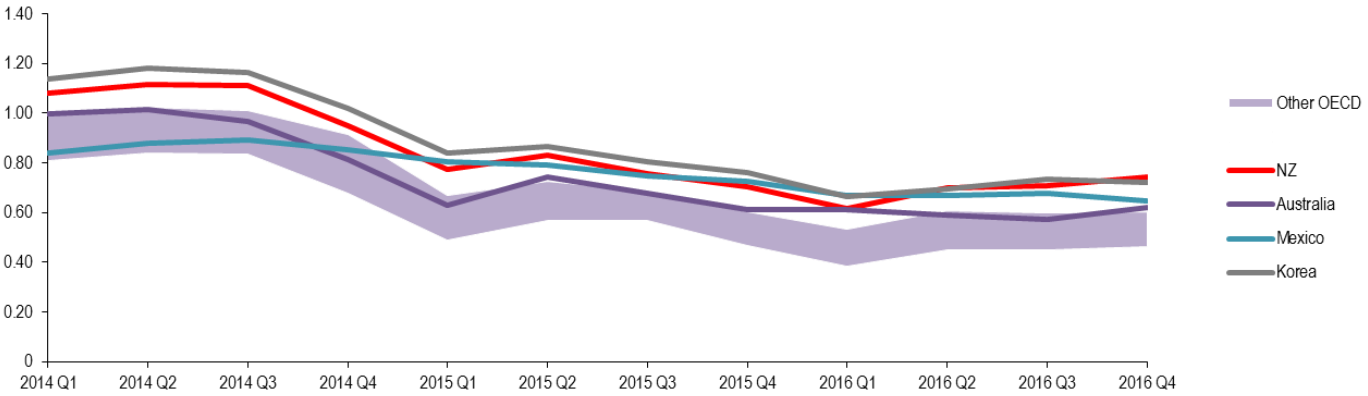



Source: International Energy Agency from MBIE

New Zealand is now an outlier when it comes to the pre-tax price of fuel.

## Figure 5 Pre-tax cost of fuel in New Zealand is now the highest in the OECD

Pre-tax prices, US dollars per litre.




Source: International Energy Agency from MBIE

## 1.2. Initial terms of reference

The Terms of Reference announced by the Minister are included in Appendix A.

The Terms of Reference for the Study envisage that we would analyse data provided by the fuel companies, gather other information from a range of sources and then build models that would use that data to assess the financial performance of the fuel industry in New Zealand. Specifically, for the period 2011 to 2015, we would provide:

- Estimates of the fuel companies' Return on Average Capital Employed (ROACE) on both historical cost and replacement cost basis, at aggregate level and individual level as well as by market, product segments and regions if possible
- Estimates of an appropriate weighted average cost of capital (WACC) for those companies, which will be in turn be informed by analysis of benchmark values for WACC in other countries (including those set by regulators, where appropriate)
- Gross and net margins of each of the major business individually and in aggregate, by business channel, product type and by regions if possible
- Other market performance measures if possible e.g. rudimentary quantitative analysis relating to observed excess returns to industry features predicted to affect those returns
- Answers to the following questions:
  - Are retail consumers in New Zealand paying reasonable prices for petrol and diesel and why? At what level might prices be considered unreasonable?
  - What factors could explain the observed regional differences in those prices?
  - Is there any evidence of cross-subsidisation between regions and markets?

## 1.3. Data provided

In order to complete the study, we have relied on publicly available information and information directly sourced from the major participants (Z Energy, Caltex, BP, Mobil) and Gull, which we have discussed with them in some detail. In addition to information provided by the major participants we have held discussions with the following downstream fuel operators to obtain their views of the New Zealand fuel market: Gasoline Alley Services, Allied Petroleum, Waitomo Petroleum and Southfuels.

In order to ensure anonymity of companies' data, we have grouped the data provided to form "market" analysis. Where we have included data in respect of a particular operator this data has been sourced from publicly available information, including financial statements and company announcements, published studies and websites.

The data has been derived from the accounting records that the companies keep to support their operations and comply with their reporting obligations. As such, they were

each based on the accounting policies that the companies have adopted, which in some cases reflect practices adopted by their parent companies.

Details of the data supplied are discussed in Section 4.1.

We advised MBIE on Thursday 13 April 2017 that we had not received sufficient information to be able to perform the Study to the extent set out in the initial terms of reference. The specific issues that prevented us from proceeding were:

- Valuation of assets
- Accounting treatment of shares in Refining NZ
- Lease costs
- Allocation methods
- Accounting standards.

As a result of these data issues, the data is not comparable at the ROACE level and we could not conclude the average market ROACE. We were also not provided with enough information on a regional basis to determine regional ROACE.

Without ROACEs, there was nothing which we could compare WACCs to draw definitive conclusions about the reasonableness of returns and thus prices.

## 1.4. Revised scope

While we did not have the data that would allow us to fully respond to the Terms of Reference, we did consider it possible to produce a report that makes progress towards answering the fundamental question of whether prices are reasonable or cross-subsidy free.

Following discussions with MBIE, Cabinet agreed to a revised scope for the study.

Based on our understanding of the industry, the material we have gathered, and the engagements we have had with other players, we would:

- Use the data provided by the companies to set out as detailed a financial analysis as possible. This would include gross margins by channel and location, as well as ROACEs to the extent that the data permits
- Explain the limitations of the data supplied and why we were not able to answer the full Terms of Reference of the study
- Describe the industry from the perspective of looking for structural or behavioural elements that might allow for the exercise of market power to the detriment of consumers
- Include a framework for thinking about judging whether the prices facing consumers in New Zealand are reasonable. This would allow readers to at least start to form a view of whether the industry is structured and behaving in a way that yields the best possible prices for customers
- Provide a high-level review of performance of the fuel sector in other countries to put the New Zealand data into context

- Discuss how economic analysis and econometric techniques could be used to address the issue of price reasonableness without relying only on financial performance data. Specific matters that we would cover are:
  - Describing how to estimate demand elasticities using price and quantity data, and ideally data on station characteristics
  - Developing theoretical models to predict price-cost margins under different forms of competition (i.e. competition and collusion), distinguishing between vertically-integrated and independent retailers
  - Estimating the corresponding price-cost margins using accounting data, and then seeing if those accounting margins are more consistent with competitive margins or collusive ones
- look to overseas approaches, the literature on best-practice regulation, and our knowledge of the current tools available in New Zealand to provide advice on what regulatory responses (or pre-regulatory responses – e.g. information disclosure, with threat of more direct regulation to induce behavioural changes) would provide the greatest benefit to consumers, given the nature of the industry.

## 1.5. What we have delivered

To place the analysis in context, we briefly discuss the structure of the New Zealand fuel sector. As the sector has been subject to a number of recent studies, we refer to those studies rather than present an exhaustive analysis.

We then present a framework for thinking about prices, based on economic principles. In doing so, we discuss the factors that determine whether prices are "reasonable" or not.

In Section 4, we present our analysis of the financial performance of the major fuel companies at the gross profit level. However, as we have noted, it has not been possible to draw conclusions about comparative ROACE performance, since that would entail comparing apples to oranges.

In Section 5, we outline our conclusions regarding the reasonableness of the prices paid by consumers today. These are preliminary and tentative and often they take the form of recommendations for further analysis.

Section 6 contains our discussion of the alternative techniques that could be used to shed light on the reasonableness of prices paid by New Zealand consumers. First we outline what sorts of comparable data would be required to allow the original Terms of Reference to be met. We then discuss a set of economic and econometric techniques that use different types of data to analyse the reasonableness of prices. As we note, some of these techniques, while data-hungry, are less reliant on individual company reporting practices.

Section 7 looks at overseas experience to inform a discussion of possible regulatory responses.

Section 8 contains our findings and recommendations.

# 2. The New Zealand fuel sector

To set the rest of this report in context, we begin with a brief outline of the New Zealand fuel sector, concentrating on the parts of the sector that are most relevant to our inquiry.[12]

The fuel sector is not subject to any industry-specific economic regulation. Prices and quantities sold are determined by the market.[13]

There are currently 21 retail fuel brands in New Zealand, but only four importers of refined products: BP, Gull, Mobil and Z Energy.

In this study, we refer to BP, Mobil and Z Energy as "the majors".[14]

BP, Gull and Mobil are subsidiaries of overseas firms. BP and Mobil are owned by the "supermajors"[15] BP plc and ExxonMobil respectively. Z Energy is a publicly-listed New Zealand company, with a wide ownership base.[16]

Gull's operations in New Zealand were originally a local subsidiary of a privately-owned company based in Perth, Western Australia. Caltex Australia has recently agreed to acquire Gull's New Zealand operations.[17] This transaction is awaiting Overseas Investment Office approval.

The majors – BP, Z Energy and Mobil – are part owners of Refining NZ, which operates the refinery at Marsden Point, and the associated pipeline to Auckland. The refinery processes imported crude oil, plus a small amount of crude from New Zealand's oil fields. The majors procure crude oil for refining. The refinery operates on a "tolling" basis: the ownership of the crude oil and the refined product does not pass from the majors to the refinery and the majors pay for the refining services provided.

The output of the refinery is a range of petroleum products, including motor spirit (commonly known as petrol), diesel, aviation fuel, fuel oil and bitumen. This output is all delivered to the three majors. The amount of each refined product produced is determined by the refining process and the feedstock. As the proportions do not exactly

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12 Commerce Commission (2016) contains an informative summary for readers seeking further details.

13 Prior to 1988, regulations were in place that restricted the number of retailers and wholesalers that could operate in an area, prices and margins were controlled, to ensure that both prices paid by customers and income earned by suppliers were "fair" and wholesalers were restricted from entering the retail market (structural separation).

14 Traditionally in New Zealand, the local operations of the various multi-national fuel companies, which have involved a high degree of vertical integration have been called the "majors". This should not be taken to imply that other players aren't important in providing good outcomes for consumers.

15 The "supermajors" are the six largest publicly owned international oil and gas companies, and comprise: BP plc (UK), Chevron Corporation (USA), ExxonMobil Corporation (USA), Royal Dutch Shell plc (Netherlands and the UK), Total SA (France) and Eni SpA (Italy). The supermajors are all involved in the entire production chain, from exploration, production, refining and distribution through to retailing.

16 In 2010, Royal Dutch Shell sold its local downstream operations (then called Shell New Zealand) to Infratil and the Guardians of the New Zealand Superannuation Fund, which changed the name of the company to Greenstone, but it continued to trade under the Shell brand. The retail operations were rebranded as Z in 2011. In June 2015, Z Energy announced that it had agreed to acquire 100% of Chevron New Zealand, which operated the Caltex and Challenge brands. This sale was finalised in 2016, after Commerce Commission clearance was obtained (which required Z Energy to divest 1 truckstop and 19 retail sites due to competition concerns).

17 Caltex Australia was, until March 2015, 50% owned by the US "supermajor" Chevron Corporation, with 50% owned by Australian investors. Chevron sold its shareholding to the market and Caltex Australia is now a listed Australian company. However, it retains the brand name "Caltex". In New Zealand, Chevron operated under its Caltex and Challenge brands until 2016, when it sold it local operation to Z Energy. Z Energy continues to operate these stations under the Caltex and Challenge brands.

match New Zealand demand requirements, petrol, jet fuel, diesel and bitumen are imported and fuel oil is exported.

About 50% of the refined product produced is transported to Auckland through the pipeline, while the rest is shipped to other ports. The majors jointly own a coastal shipping company, Coastal Oil Logistics Limited, which operates two ships that ply the coast of the two islands.

The refinery offers limited opportunities for economies of scale since it is less efficient than the newest refineries in the region and small by world standards. The refinery cannot supply the whole New Zealand market, so the majors and Gull import refined product directly.

BP and Mobil buy fuel from associated companies in Singapore; Z Energy purchases fuel at arms-length from Korea. Gull imports refined product. Fuel can be landed at any of the ports that service coastal shipping.

Fuel that is landed is stored in large terminals and then is trucked to retail outlets and major users.

The three majors operate a "borrow and loan" (B&L) system, whereby they can take fuel from the terminals operated by the other companies. The refined products held within the terminals that are part of the B&L system are jointly owned by the majors. The system operates under rules which are intended to ensure that each company's dealings with the others are balanced: the net amount of fuel taken from the other's facilities is zero (takings are netted against fuel added to terminals). Gull operates its own terminal in Tauranga.

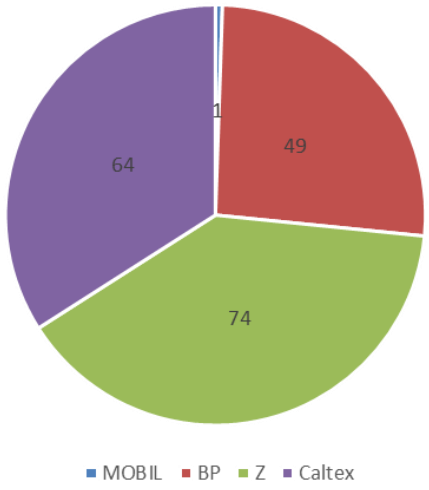
The majors own or outsource their distribution operations. Allied Petroleum, a privately-owned New Zealand firm, has a nation-wide contract to distribute fuel for Mobil, as well as operating its own chain of retail outlets and selling to direct customers.

Seventeen of the retail brands are supplied from one of the majors, either directly or via a wholesaler. Gull is the only retailer that has independent supplies of fuel and operates its own terminal.

There are two types of retail outlets in New Zealand. "Truckstops" are unmanned facilities[18], where fuel is purchased via an electronic payment (either a credit card or a fuel card operated by the site operator). Originally, these stations only sold diesel, but are now increasingly selling petrol as well. These are more common in rural areas, although there are some operating in urban centres. There are 196 truckstops currently operated by one of the majors. A number of the independent retailers also operate unmanned sites, but we have not been able to ascertain in what locations.

[18] Some truckstops are co-located with service stations, and could therefore be considered manned.

## Figure 6 Truckstops operated by the majors




Source: MBIE[19]

Traditional service stations sold petrol, diesel and other motoring products and often had a mechanical workshop attached. This sort of enterprise has largely disappeared from urban New Zealand. Today, the majors mostly operate service stations that sell petrol and diesel (and sometimes LPG), and which often also sell groceries and takeaway food.

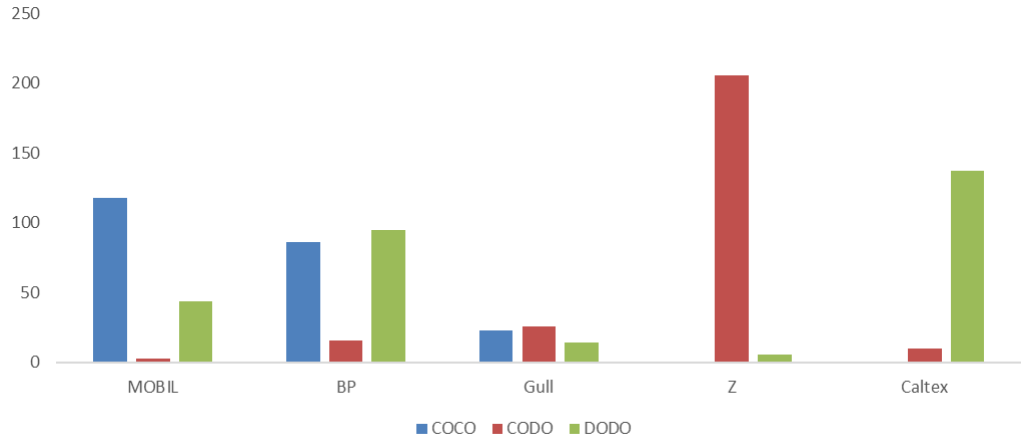
There are several different ownership arrangements for service stations in New Zealand. In some cases, a fuel company owns and operates the station, using its own employees and sets retail prices. These are referred to as Company Owned, Company Operated (COCO) sites. Another common arrangement is where a fuel company owns the assets and enters a contract with a third party to operate the site under the fuel company's brand. Contractual arrangements vary from company to company. These are Company Owned, Dealer Operated (CODO) sites. Finally, some service stations are owned and operated by a third party, but trade under the brand of a fuel company (Dealer Owned, Dealer Operated: DODO). It is often very hard for customers to distinguish between the different types of ownership structure.

Based on data provided to us from MBIE, we set out in Figure 7 the number of the branded service stations of the majors and Gull. Points of note are:

- There are 784 service stations operating under the brand of one of the majors or Gull, out of approximately 1,265 retail sites across the whole country as at July 2015
- The business models followed by the majors are quite different when it comes to ownership structures
- Gull only operates in part of the North Island. Gull told us that the location of its outlets is limited by the distance that its trucks can drive from its terminal in Mount Manganui in a single day.

[19] Numbers based on 2015 data for BP, Gull, Z Energy, and Caltex, 2017 for Mobil. These numbers do not include BP locations classified as 'Service Station/Truckstop", and do not include Mobil 'sites that are the equivalent of a stand-alone truck stop' (Commerce Commission (2016) p. 88).

## Figure 7 Service stations operated by the majors and Gull




Source: MBIE

The overall structure of the sector is one of both vertical and horizontal arrangements.

The vertical arrangements are the familiar integration of the majors: they all participate in importing, refining, distribution, storage and retailing. As subsidiaries of supermajors, Mobil and BP are also part of even more integrated groups, since their parents are also involved in petroleum exploration and extraction.

The horizontal arrangements do not involve common ownership, but rather sharing of facilities:

- BP, Mobil and Z Energy are all shareholders in Refining NZ and are also users of its refining facilities
- BP and Z Energy undertake joint procurement of oil and refined products overseas
- BP, Mobil and Z Energy are joint owners of Coastal Oil Logistics Limited
- BP, Mobil and Z Energy share terminal facilities under the borrow and loan arrangement, which as well as allowing them to reduce costs, also provides information regarding each other's sales volumes
- The independent wholesalers are each contracted to a single major under a long-term supply contract
- The independent retailers (other than Gull) are all contracted to a single wholesaler.

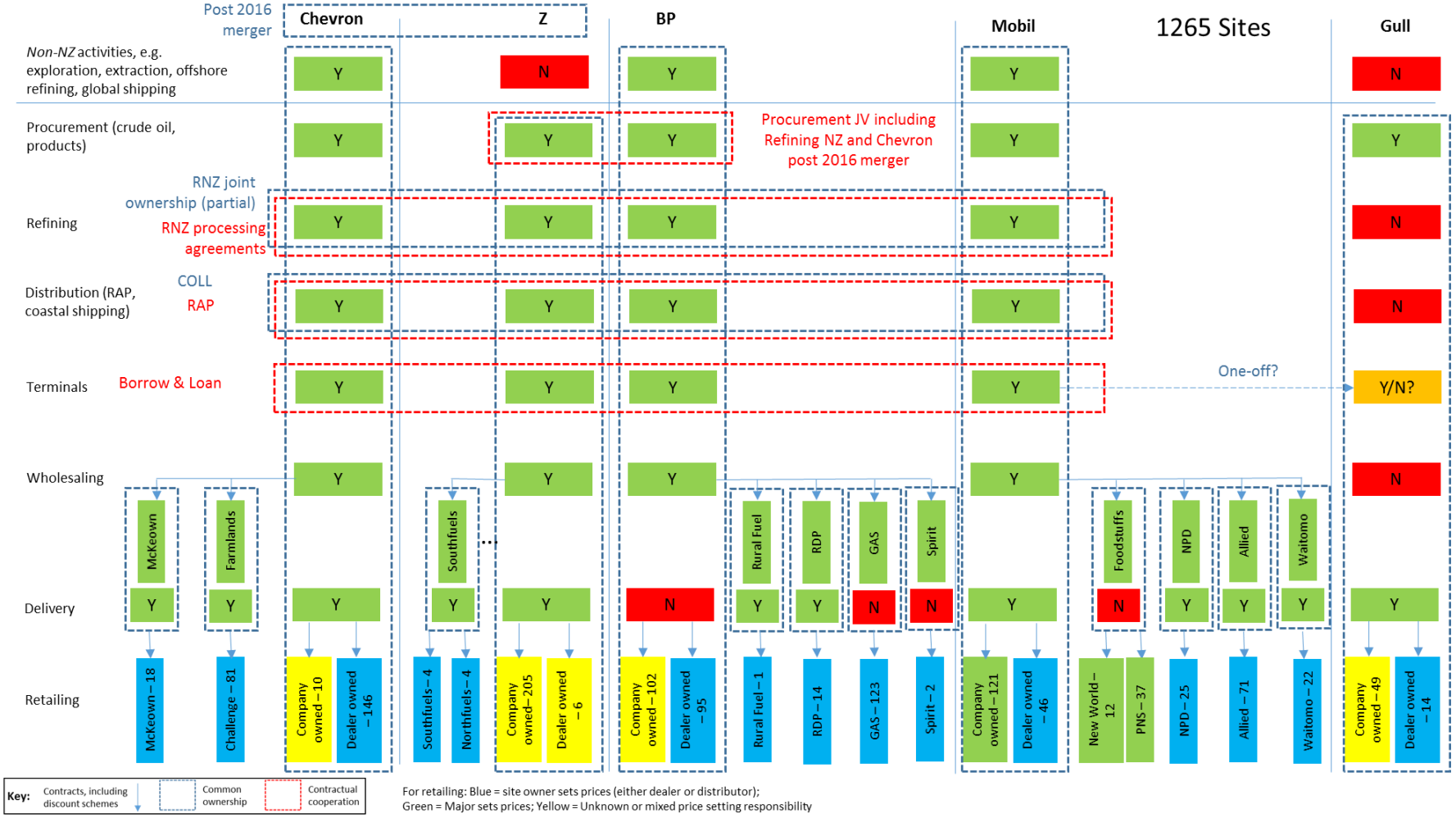
The last two points mean that there is only a limited wholesale "market" in New Zealand. We were told that most wholesale contracts involve a pricing formula that pegs price to the costs of imported refined product and while prices will move based on movements in the price of crude oil, the pricing formulas are fixed for the term of the contract.

The overall structure of the sector is set out in Figure 8.[20]

[20] Figure 8 is illustrative, as precise data on the details of the industry structure are not available. For example, the number and type of retail facilities is MBIE's estimate, based on data from a number of sources.

## Figure 8 The fuel sector is vertically and and horizontally integrated

Ownership and other relationship across different parts of the sector




Source: MBIE

## 2.1. Major players

In the section below, we provide a high-level description of each of the major fuel market participants.

### 2.1.1. Z Energy

Z Energy imports crude oil for processing at Marsden Point which it distributes as refined product throughout New Zealand. It supplies fuel to retail customers, as well as to commercial customers in various industries including, transport, airlines, mining, shipping and vehicle fleet operators. It also supplies bitumen to roading contractors. The company offers Z card and Star card services for businesses to buy fuels.

The company was formed in 2010, when Infratil Limited and the Guardians of the New Zealand Superannuation Fund acquired Shell's New Zealand downstream fuel business.

Z Energy owned and managed approximately 205[21] service stations and 74[22] truck stops as at July 2015; together with pipelines, terminals and bulk storage terminal infrastructure. Z Energy also has a 15.4% stake in the New Zealand Refining Company Limited, a 50% stake in Coastal Oil Logistics Limited and a 25% stake in Loyalty New Zealand (Fly Buys).

In June 2016, Z Energy purchased the assets of Chevron New Zealand, which means that Z Energy became the wholesale supplier of fuel to Caltex and Challenge branded stations throughout New Zealand and the only refiner of bitumen in New Zealand (note: bitumen is also imported).

#### Ownership structure

Z is publicly listed on the Australian and New Zealand stock exchanges with around 10,000 shareholders.

#### Operational structure

Inland operations include a national network of truckstops, a mini tanker operation that provides a refuelling service directly into a customers' equipment, a retail service station network that is predominantly owned by Z Energy (with Z Energy responsible for setting retail fuel prices), a relationship with Southfuels, which distribute Z Energy's transport fuels in the rural sector, and bulk delivery into customers' storage facilities. Z Energy is one of the four terminal owners in New Zealand, with Z Energy, Mobil and BP owning all of the terminals aside from Gull owning one terminal in Mt Maunganui.

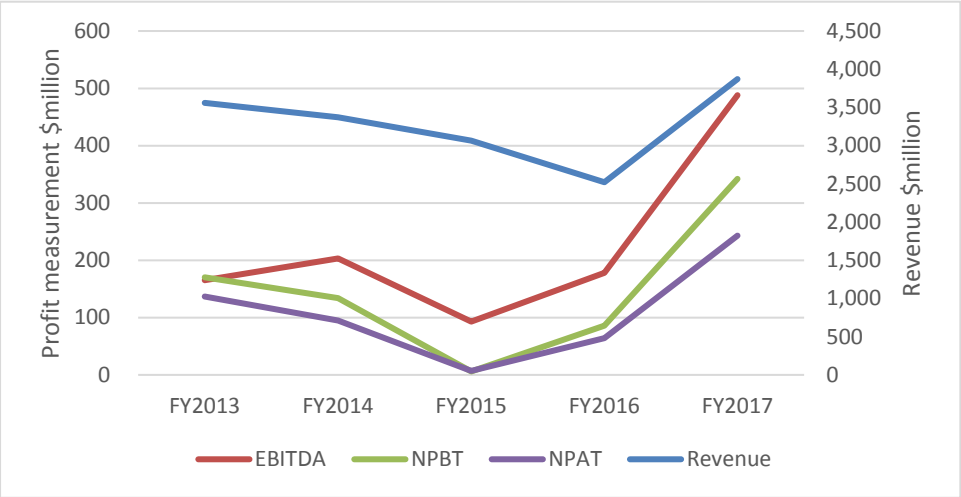
[21] Another six Z branded service stations are dealer-owned (as at 2015).

[22] As presented in Figure 6 "Truckstops operated by the majors"

## Financial snapshot

### Figure 9 Z Energy profit information on an historic cost basis

Z Energy revenue, EBITDAF, NPBT and NPAT




Source: Z Energy public accounts

The graph above has been prepared based on financial information as recorded in Z Energy's financial statements. This information is recorded on a historic cost basis.

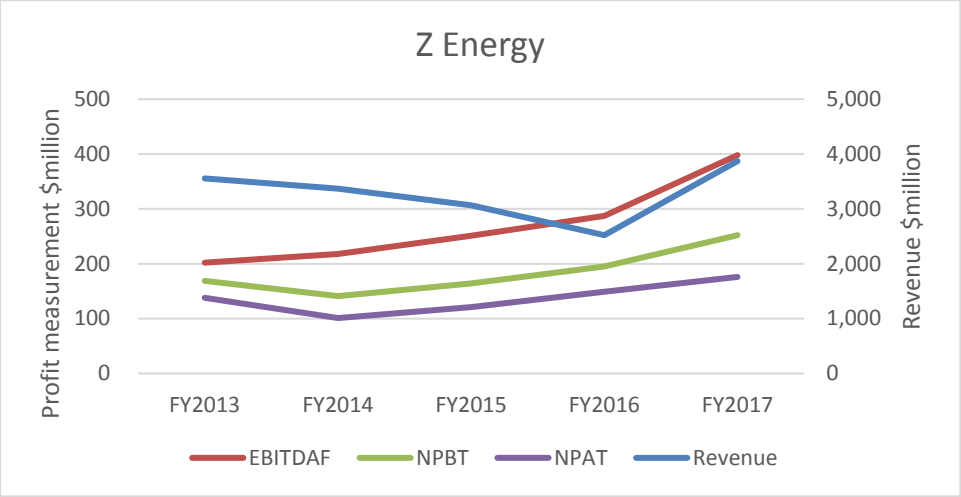
As the majors hold approximately three months' worth of inventory (crude and refined oil) at any particular time, profitability calculated on a historical cost basis can vary significantly depending on movements in market crude oil and refined product prices as pricing to customers is set with reference to the current market price. For example, if market prices significantly decline then profitability based on historical cost will reduce as the original cost of inventory acquired will be higher than the current price of acquiring such inventory (which is what pricing is based off).

Accordingly, when the cost of crude oil declined in 2014 (see Section 2.2) the majors experienced a reduction in profit recorded using historical cost methodology, which is evidenced in Z Energy's reported results and the results for Caltex, BP and Mobil as illustrated later in this section of our report.

The majors adjust for the above fluctuations by also reporting results using Replacement Cost methodology. This methodology adjusts the financial results so that the revenue from selling fuels, which is based on current market prices, is measured against the current cost of such inventory sold.

## Figure 10 Z Energy profit information on a replacement cost basis

Z Energy revenue, EBITDAF, NPBT and NPAT

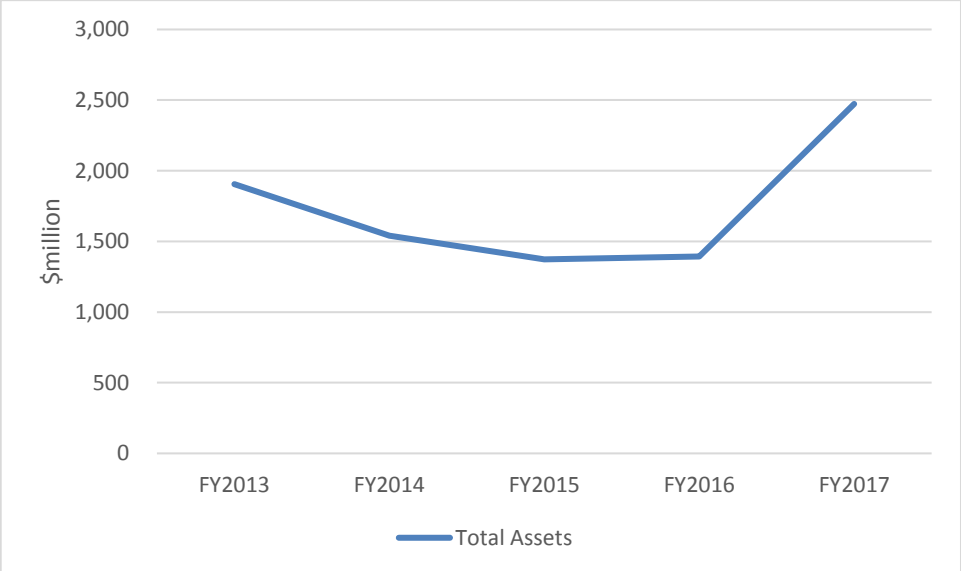



Source: Z Energy public accounts

In the graph above we report Z Energy's financial results using Replacement Cost methodology.

## Figure 11 Z Energy assets information

Z Energy total assets[23]




Source: Z Energy public accounts

[23] Z Energy's property plant and equipment is measured at fair value

The increase in Z Energy assets in FY17 is due to the acquisition of Chevron, in particular goodwill of $642m which was recognised in FY17.

As we discuss further in this report, the various operators account for assets differently and accordingly we have not been able to use the asset amounts presented in the financial statements as part of our financial analysis of market returns.

### 2.1.2. Caltex

The company was formerly known as Caltex New Zealand and changed its name to Chevron New Zealand in 2006. Chevron New Zealand was founded in 1920 and was headquartered in Auckland. The company provided fuel to New Zealand motorists and business from 1936. On 1 June 2016, Chevron New Zealand was acquired by Z Energy, which operates the Caltex network in New Zealand using the brand under licence from Chevron International.[24] Caltex also supplies fuel to commercial customers.

The company has more than 140 Caltex branded services stations and 72 truck stops (of which 64 are owned and operated by Caltex) truckstops around New Zealand as at July 2015.

#### Ownership structure

100% owned subsidiary of Z Energy Limited.

#### Operational structure

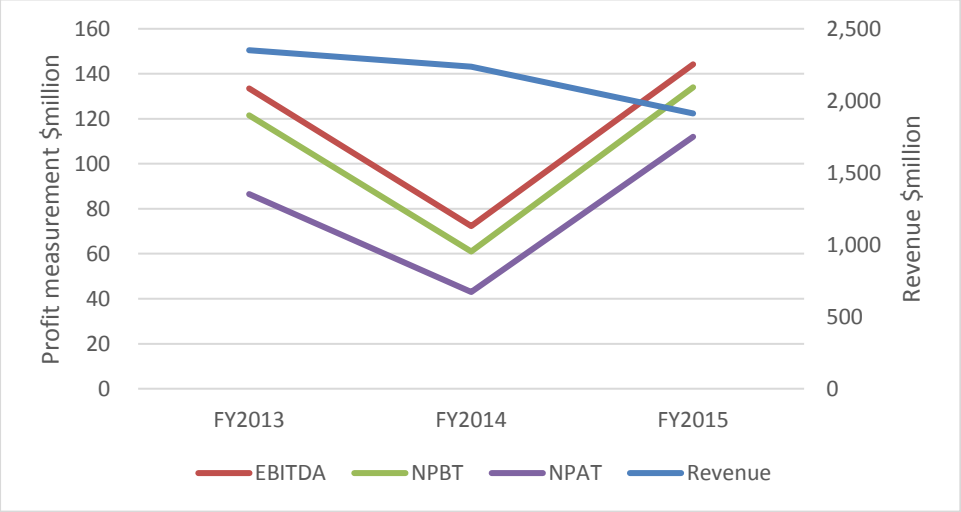
Caltex's service stations are predominantly owned and operated by independent operators.

#### Financial snapshot

##### Figure 12 Caltex profit information

Caltex revenue, EBITDA, NPBT and NPAT

[24] The name of the company was again changed to Z Energy 2015 Limited on 1 June 2016.

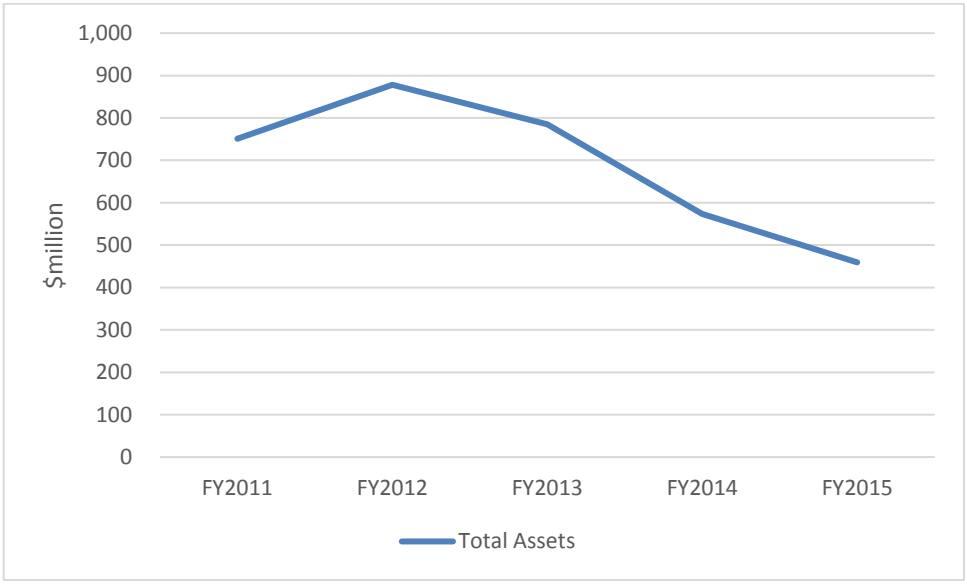



Source: Caltex public accounts

As discussed in our review of Z Energy's financial performance, the reduction in 2014 profitability is a result of historical cost accounting of inventory being adopted for financial statement purposes. The financial statements did not include replacement cost analysis.

## Figure 13 Caltex assets information

Caltex total assets




Source: Caltex public accounts

The decrease in 2015 of total assets is mainly due to the sale of Chevron's investment in the New Zealand Refining Company with the decline in 2014 a result of decreases in cash and inventory held.

## 2.1.3. BP

BP New Zealand Holdings Limited is headquartered in Auckland, New Zealand and imports, and distributes petroleum products in New Zealand. BP has been operating in New Zealand since 1946 and is a subsidiary of BP Asia Pacific Holdings Ltd.

As at July 2015, the company operated more than 90 BP Connect stores and Wild Bean Cafes in New Zealand. The company also has a national network of BP branded independent retailers, distributor partners, truckstops and a terminals and logistics operation. It also is a part owner of Refining NZ with a 10.1% shareholding (on a consolidated group basis) and holds a 25% shareholding in Coastal Oil Logistics Limited. The company's wider operations include the Castrol lubricants business, an aviation (Air BP) business as well as sale of fuels commercially.

### Ownership structure

100% subsidiary of BP Asia Pacific Holdings Limited.

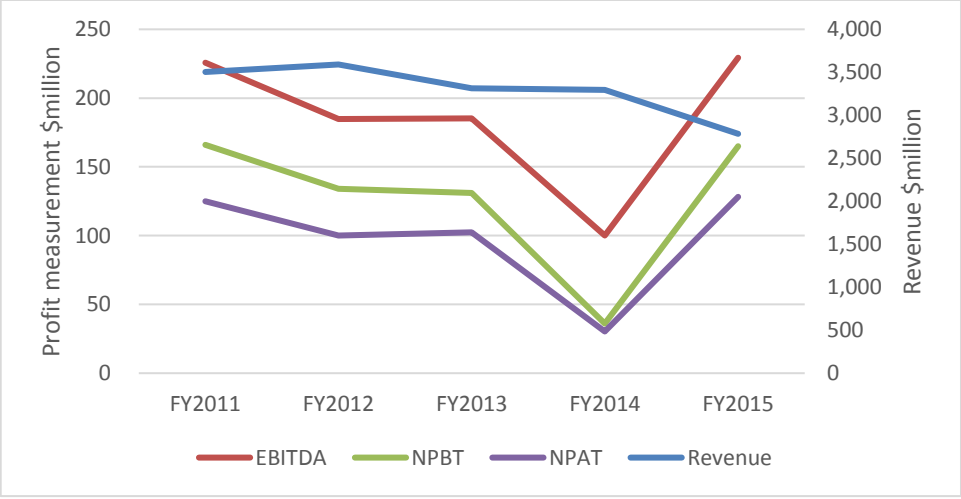
### Operational structure

The company's network of service stations are a mixture of company owned and independently owned sites. BP also supplies Gasoline Alley Services with transport fuel.

### Financial snapshot

Figure 14 BP profit information

BP revenue, EBITDA, NPBT and NPAT

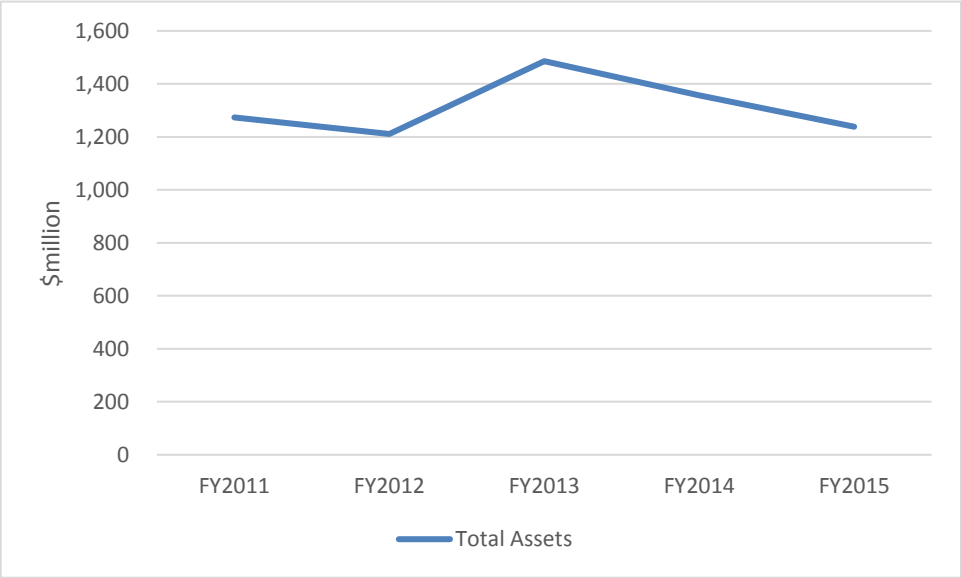



Source: BP public accounts

As discussed in our review of Z Energy's financial performance, the reduction in 2014 profitability is a result of historical cost accounting of inventory being adopted for financial statement purposes. The financial statements did not include replacement cost analysis.

Figure 15 BP assets information

BP total assets




Source: BP public accounts

## 2.1.4. Mobil

ExxonMobil New Zealand Holdings, together with its subsidiaries, markets and distributes petroleum and chemical products. It also operates service stations. Mobil is New Zealand's oldest oil company, with predecessor companies having first commenced operation in New Zealand in 1896.

The company owns storage terminals throughout New Zealand and it has a 17.2% shareholding in the New Zealand Refining Company and a 25% shareholding in Coastal Oil Logistics Limited.

### Ownership structure

ExxonMobil New Zealand Holdings operates as a subsidiary of Mobil Petroleum Company Inc, headquartered in Irving, Texas.

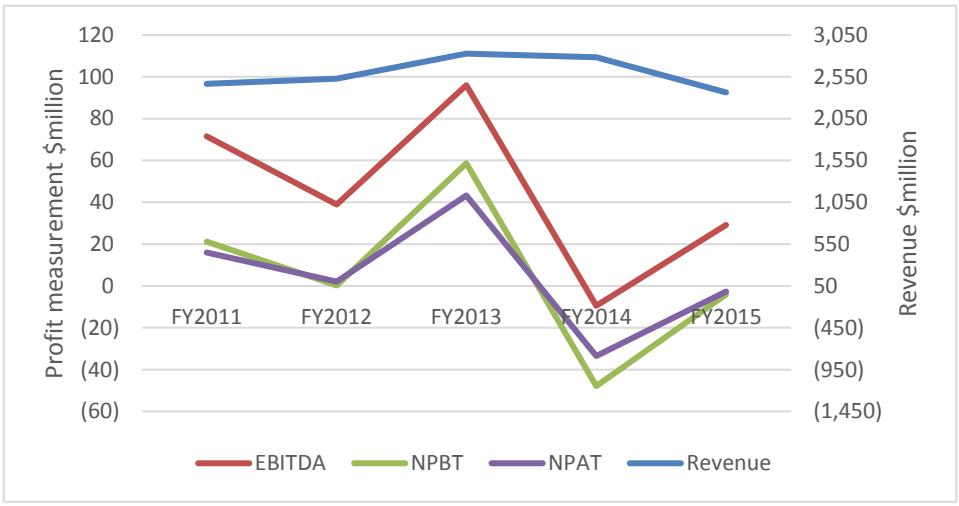
### Operational structure

As at July 2015, the company supplies to a nationwide retail service station network of approximately 170 Mobil branded sites, of which circa 121 are Mobil owned or leased. The company also supplies to over 150 independently branded sites, via its arrangements with Foodstuffs, Allied Petroleum, Waitomo Petroleum and NPD and sells fuel commercially.

## Financial snapshot

### Figure 16 Mobil profit information

Mobil revenue, EBITDA, NPBT and NPAT

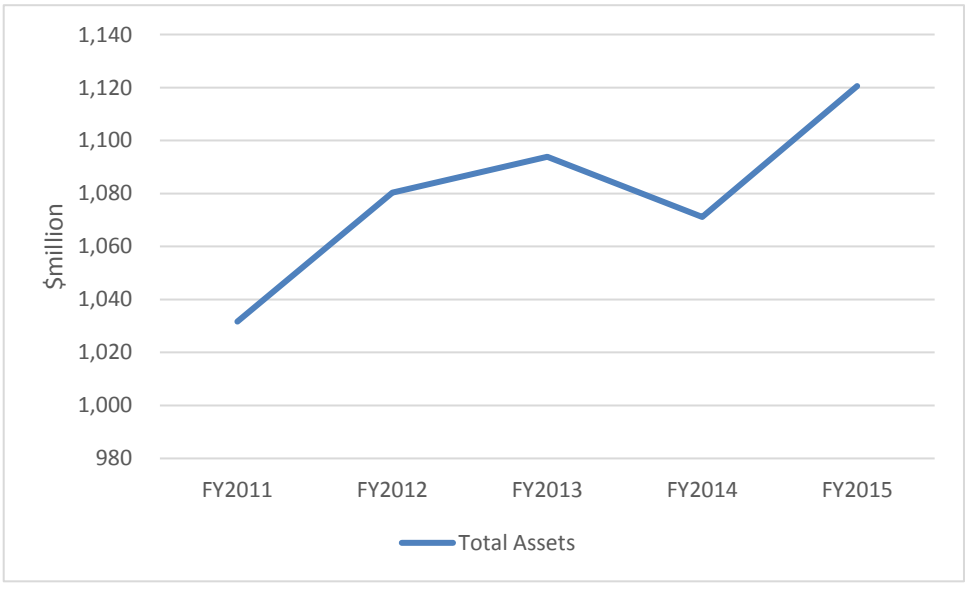



Source: Mobil public accounts

As discussed in our review of Z Energy's financial performance, the reduction in 2014 profitability is a result of historical cost accounting of inventory being adopted for financial statement purposes. The financial statements did not include replacement cost analysis.

### Figure 17 Mobil assets information

Mobil total assets




Source: Mobil public accounts

The increase in Mobil's reported total assets in FY2015 represents an increase in its investment in Refining NZ.

### Gull

Gull New Zealand Limited operates as a fuel retailer in New Zealand. The company operates convenience stores and fuel terminals; delivers fuel for commercial use; provides bunkering services in ports for large commercial vessels and super yachts; and offers fuel cards. It offers petrol, biofuel, diesel, and other fuels. Gull started operations in New Zealand following its investment in a terminal in Mount Maunganui in 1998. The company started its retail operation in 1999 and now has a network of 74 branded sites[25].

### Ownership structure

Caltex Australia Limited purchased Gull New Zealand in December 2016. This transaction is awaiting Overseas Investment Office approval.

### Operational structure

The company's network of service stations is a mixture of company owned and independently owned sites.

### Financial snapshot

No publicly available information.

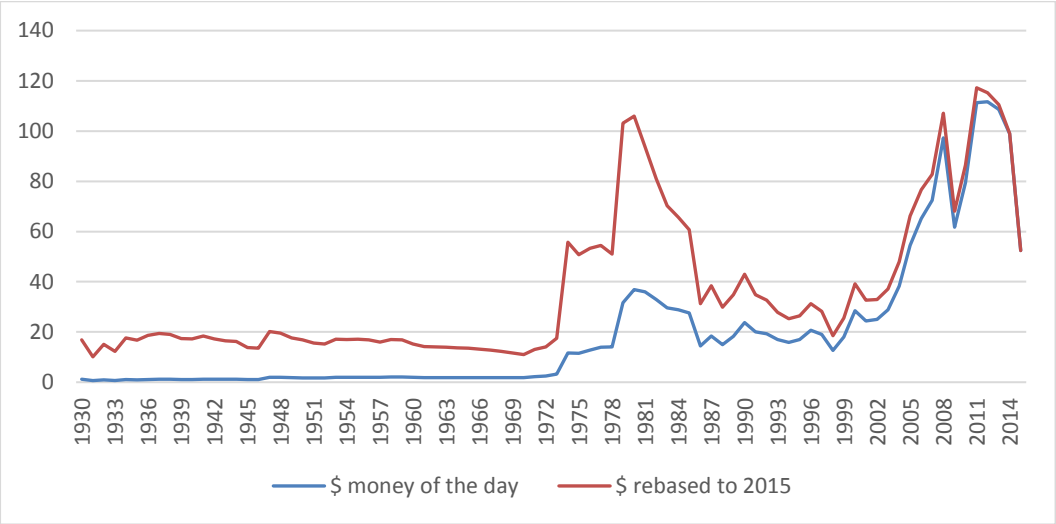
## 2.2. Prices

From the end of the second world war to end the of 1973, the price of crude oil, which is the key determinant of fuel prices, was low and stable. This changed with the "first oil shock", and since then, prices have been highly volatile. In Figure 18, we show historical prices for Brent Oil prices, which is currently the relevant international price in the New Zealand market.

[25] As per Gull's website May 2017

## Figure 18 Crude oil price have been volitile since 1973

Brent Crude oil prices, USD per barrel[26]




Source: BP Statistical review of World Energy 2016

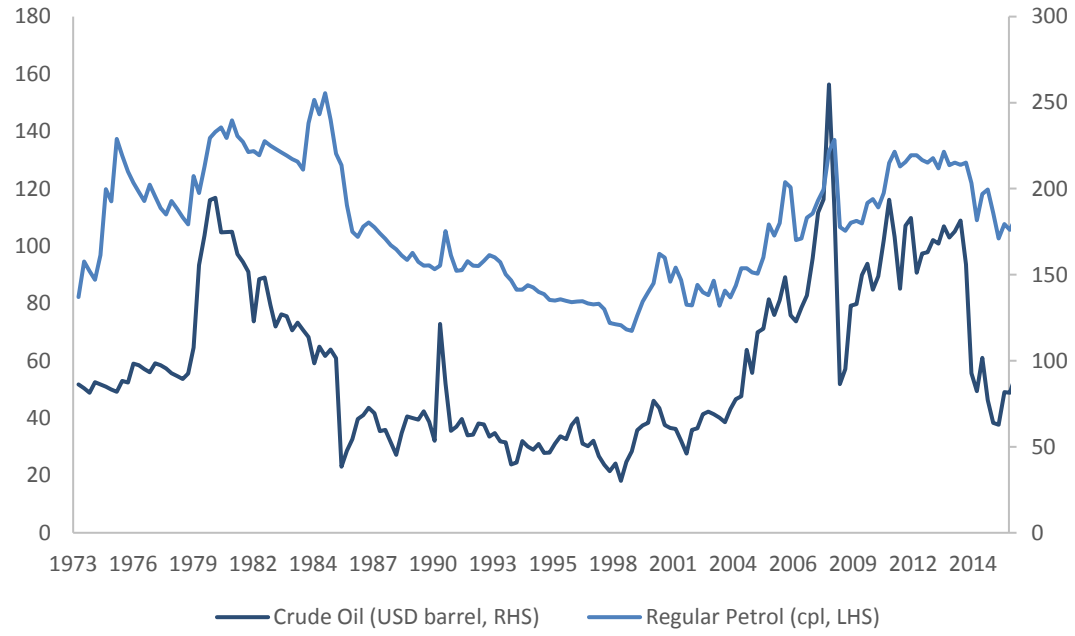
This price volatility has been reflected in the prices that motorists around the world pay for their petrol. In Figure 19 19 we show two prices: that for West Texas Intermediate crude oil and regular petrol in New Zealand, both in inflation-adjusted (real) terms.[27]

[26] $ rebased to 2015 crude oil prices deflated using the Consumer Price Index for the US as presented in the BP Statistical review of World Energy 2016 workbook

[27] The price of crude oil is in US dollars per barrel, while the petrol price is New Zealand cents per litre. While price of the crude oil imported into New Zealand is not linked specifically to West Texas crude, this figure illustrates a clear relationship between the world price of oil and retail prices here.

Figure 19 Petrol prices in New Zealand follow crude oil prices

West Texas Intermediate crude oil and Regular petrol, both real.




Source: MBIE, Macrotrends

Commenting on the volatility of fuel prices, the Business and Industry Advisory Committee ("BIAC") to the OECD has observed:

> *The vast majority of road fuel price fluctuations are attributable to crude oil market forces. Over time, the prices of road fuel and crude oil typically trace parallel paths with very little variation between the two. These prices move in step with world events that influence supply and demand both subtly and brusquely. While local conditions such as holidays and weather events certainly hold some sway, the fact is most consumers purchase road fuel at a price determined by events in multiple hemispheres.*[28]

## 2.3. Previous studies: New Zealand

The fuel sector and fuel prices have been subject to considerable study in New Zealand in the past. We have summarised the main findings in Table 2.

[28] OECD (2013).

## Table 2 Previous fuel sector studies

| Study | Date | Conclusions |
|---|---|---|
| NZIER: Issues in Oil Sector Deregulation | 1989 | New Zealand has relatively low petrol prices compared to other OECD countries.<br>The margin between landed price and pump price in New Zealand is, however, one of the largest in the OECD and has increased in the ten years to 1987. Without access to data, the authors could not identify the cause of this increase.<br>Changes expected to occur due to deregulation were:<br>• Intensified competition and periodic "price wars" in urban areas<br>• Differences in regional prices, reflecting transport costs<br>• Fewer, larger retail outlets, selling groceries and other goods<br>• Relocation of sites away from high cost inner city sites<br>• Wholesalers acquiring retail operations to secure market share<br>• Continued niche markets for smaller urban and rural outlets.<br>The threat of new entrants was important to restrain excessive profits. The chief obstacle to new entrants was securing sufficient market share to make imports of refined products economic. Allowing new entrants access to existing facilities on a common carrier basis would reduce the risks new entrants face. |
| NZIER: Petrol Prices | 1996 | After deregulation, petrol prices in New Zealand fell relative to other OECD countries. However, since 1993, they have risen.<br>Oil companies are shielded by import barriers, including port facilities and access to infrastructure. Imposing open access at bottlenecks is one way to reduce these barriers. |
| ACIL: Barriers to entry to the New Zealand Downstream Oil Market | 1997 | Entry is never costless and takes time and resources. The costs of entry are not a barrier to entry. A true barrier to entry is a persistent or long-run cost advantage that incumbents have over potential new entrants.<br>In New Zealand, there are no regulatory or institutional barriers to entry. Regulations like the RMA and health and safety apply equally to new entrants and incumbents.[29]<br>ACIL could not identify any long-run cost barriers to entry. "The only limiting issue is whether entry is commercially viable", which is not a barrier to entry as ACIL have defined it.<br>Strategic pricing behaviour to deter new entrants can only be sustained if other barriers to entry are present (i.e. incumbents must have an underlying cost advantage).<br>Any attempt by the government to break-down horizontal arrangements would be expected to increase costs to motorists. |
| Hale & Twomey Report to MBIE: Review into the 2007 ACCC report into | 2008 | In 2008 the then Ministry of Economic Development conducted a review into the factors impacting on the competitiveness of the New Zealand petrol market. This included an assessment by Hale & Twomey of the applicability of an Australian market review to the New Zealand market.<br>Hale and Twomey concluded that:<br>• The New Zealand petrol market is fundamentally competitive |

[29] We note that since this report was written, the Resource Management Act has been progressively amended to reduce the ability of incumbents to block new entrants. A trade interest in no longer sufficient grounds to object to the granting of a resource consent.

| Study | Date | Conclusions |
|---|---|---|
| Australian petrol prices and applicability to the New Zealand petrol market. | | • Retail petrol prices are not fast to rise and slow to fall<br>• Price rises during 2008 were mainly due to increases in the international crude oil price<br>• A Fuelwatch scheme like Australia's would not benefit consumers, because our market works differently<br>• More transparency about the makeup of importer margins and a move to report daily margin movements would be useful for consumers. |
| MBIE Report to Minister of Energy and Resources | 2013 | Recent increases in margin are explainable by increases in costs, investment and shareholders seeking higher returns.<br>The market is competitive. There is no evidence of coordination between oil companies.<br>Z has changed its pricing strategy and is seeking higher returns. |
| MBIE Report to Minister of Energy and Resources | 2015 | Petrol and diesel importer margins have increased since 2008 and are now at levels last seen before Challenge and Gull entered the market in 1998.<br>Despite the increase in margins, profits do not appear to be excessive.<br>Report discussed, but did not recommend, intervention options.<br>Suggest that the Minister write to suppliers indicating his intention to undertake a financial performance study. |
| Commerce Commission Clearance of Z Energy's acquisition of Chevron's New Zealand business | 2016 | The clearance was undertaken with the context of specific provisions of the Commerce Act. The Commission was not required to assess whether prices were too high or whether profits were excessive. Rather, it was required to determine whether the proposed transaction would "substantially lessen competition", compared to the counterfactual of the transaction not proceeding.<br>The Commission concluded that provided Z Energy divested 19 retail sites and a truckstop, it would approve the transaction.<br>One Commissioner considered that there was evidence of coordination between the major oil companies. She noted that Z Energy had changed the pricing strategy that Shell had operated under about a year after acquiring Shell's business. This had the effect of increasing retail prices and returns.<br>All the Commissioners acknowledged that the possibility of coordination existing in the lower North Island and the South. However, the majority of the Commissioners decided that the sale of Chevron's business was unlikely to remove an important obstacle to coordination. |
| MBIE Report to the Minister of Energy and Resources | 2016 | MBIE observes that margins in New Zealand have been steadily increasing and that industry returns appear to be well above normal levels. In the absence of the ability to require oil companies to provide data on a consistent basis, no definitive conclusions can be reached.<br>A market study is recommended.<br>The report addresses, but does not recommend, a number of regulatory interventions that could increase competition and reduce prices. |

Source: NZIER

Prior to the 2016 MBIE report, the various studies, while noting that margins were high, did not suggest that profits were excessive or that prices might be unreasonable.

## 2.4. Overseas studies

The price of fuel is a major matter for all the world's motorists and has been subject to extensive study.[30]

Those studies have looked at all segments of the supply chain, from extraction to retail.

A major review was undertaken by the OECD in 2013, when the experiences of 31 different countries were discussed at an international roundtable. The concerns in all countries were similar and familiar: fuel prices are material, and volatile. In its summary, the BIAC concluded:

> *The price of road fuel is often unpredictable but seldom unexplainable or even particularly mysterious. Empirical evidence has long shown that road fuel prices move in harmony with rational interactions between supply and demand. Undoubtedly, these market fundamentals are subject to an array of seemingly indiscriminate pressures – natural disasters, political upheaval, human error, economic crisis, and innovation – rendering fuel prices volatile and seemingly haphazard. However, the volatility is almost invariably explained by market forces operating in competitive markets.*

The apparent disconnect between the many studies undertaken across the world and BIAC conclusions is perhaps explained by the different motivations of the players. As the chairman of the Roundtable expressed it:

> *… the petroleum products sector is one where price stability has a value. This leads to tensions between competition authorities and politicians. The latter often think that these markets are not functioning properly and call for regulation, whereas competition policy makers are generally not in favour of price regulation and are not concerned with price stability but instead try to deal with abuses of market power, which are however not fully understood.*[31]

Put another way, politicians and the consumers they represent see retail price volatility as a symptom of markets not working (especially when this price volatility is not often present in other markets in which they trade), while regulators and policy advisers often see volatility as proof that they are working (because it is the result of the underlying price of crude oil being reflected at the pump).

[30] The academic literature is surveyed in Eckert (2013) and Noel (2016).

[31] OECD (2013), p364.

# 3. Framework for assessing price reasonableness

## 3.1. Three questions

In this study we address three questions:

1. Are retail fuel prices reasonable (and at what level would they be unreasonable)?

2. What factors could explain regional differences in those prices?

3. Is there evidence of cross-subsidisation between products and markets?

Answering (2) and (3) requires relatively less judgement than (1). Question (3) depends largely on the absence or existence of evidence, while question (2) can in principle be addressed based on inquiry, and economic understanding of industry *structure* and *conduct* (which in turn affect industry *performance*¸ and vice versa).[32] Answering (1) is more challenging, however, because it requires some normative benchmark, or counterfactual, pricing against which actual prices can be compared.

## 3.2. Our approach

### 3.2.1. Perfect competition is not the benchmark

It is superficially tempting to treat the benchmark as "perfectly competitive" prices, for which – in principle – fuel margins should be zero in the long-term at least, if not over short periods of time in which entry cannot occur to erode margins. That would suggest that prices resulting in any positive margin are unreasonable. However, that approach is unhelpful because perfect competition is a stylised ideal based on certain assumptions that is not relevant for industries violating those assumptions. For example, perfect competition assumes the absence of economies of scale, yet large economies of scale due to large fixed costs are a feature of the fuel industry.

This means some degree of imperfect competition is inevitable, with positive rather than zero fuel margins as a result. Moreover, our study period is a reasonably short period of time, spanning just part of an upwards general movement in margins. It is unlikely to be long enough for entry – involving significant investments by entering firms – to effectively be disciplining margins.

[32] Modern industrial organisation theory recognises that industry structure is not simply a given, but reflects choices by firms. See, for example, Carlton and Perloff (2015), chapter 8.

It is therefore necessary to assume some degree of imperfect competition when defining a meaningful counterfactual against which actual fuel prices and margins can be compared. The question is how much imperfection should there be, relative to how much there is? In other words, should actual fuel margins be higher or lower than they are, accepting that they will be more than zero? Alternatively, if we accept that there should be some measure of economic inefficiency in the fuel industry (i.e. deviation from perfectly competitive prices and margins), how much inefficiency should there be?

### 3.2.2. Three-limb test

To address these questions we adopt the "remediableness criterion" proposed by Williamson (2000, p. 601):

> *"…an extant mode or organization for which no superior feasible alternative can be described and implemented with expected net gains is presumed to be efficient. …analysts can no longer condemn extant modes because they deviate from a hypothetical ideal…"*

This criterion "presses the public policy analyst to display a superior feasible alternative", allowing also for any costs of implementation in the net benefit calculation. On this basis, an existing institution – in this case the fuel industry – is inefficient only if no better alternative is feasible, *and* can be implemented at greater benefit than cost.

Paraphrasing this criterion for our context, we apply the following three-limb test in assessing the reasonableness (or otherwise) of retail fuel prices in New Zealand over our study period:

1. Are there features of the existing fuel industry structure and conduct giving cause for concern – either causing margins to rise more than they should, or causing prices to be unnecessarily higher overall?

2. Could any such causes for concern be remedied?

3. Would the benefits of remedying those concerns outweigh the costs of doing so?

In other words, to determine whether prices are reasonable or not, we ask whether there is some feasible counterfactual New Zealand fuel industry, in which structure and conduct result in better prices for consumers, and for which the benefits of changing to that counterfactual industry exceed the costs?

If we clearly answer "yes" to all three questions in our three-limb test, then we would conclude prices are clearly not reasonable. If we cannot clearly answer "yes" to all three questions, it is still possible that there is evidence suggesting – to some degree at least – that prices are not reasonable. In that case, we would conclude that it is possible that prices are not reasonable (to that degree). However, if we clearly answer "no" to any of the three questions, we would conclude that prices are not unreasonable (i.e. they are, in effect, as good as anyone can realistically hope for).

In Sections 5 we provide our reasoning and conclusions regarding these questions. Answering (3) ultimately comes down to fine judgements, given there is no simple formula for determining the net benefits of an industry change. In particular, we must look beyond just possible short-term consumer gains (*static efficiency*). We must also account for long-term benefits and costs (*dynamic efficiency*), including how any remedial measures affect investment, as well as industry entry and exit. We are therefore cautious in our approach to this question in particular.

### 3.2.3. Holistic approach

We holistically examine the existing fuel industry structure (and conduct) to identify whether there is some feasible alternative New Zealand fuel industry structure (or conduct) that delivers sufficiently better retail fuel prices to justify the costs of moving to that alternative. This requires us to look for features that might be causing unnecessary levels of imperfect competition, distinguishing three types of performance issues that might be arising:

1. Unnecessary growth in retail fuel prices (and hence margins)

2. Unduly weak constraints on price growth

3. Unnecessarily high retail fuel prices overall.

A holistic approach is required because the New Zealand fuel industry – like those in many other countries – is rife with two types of overt coordination:

1. Vertical coordination between "upstream" activities like procurement and refining, "midstream" activities like distribution and terminaling, and "downstream" activities like trucking and retailing – the majors, and Gull, each own assets in some or all of these vertical industry levels, while other parties (e.g. fuel distributors and "independent" retailers) achieve some degree of vertical coordination via contracting

2. Horizontal coordination, through both ownership and cooperation agreements – two majors cooperate in procurement, each of the majors partly owns Refining NZ with the associated Refinery to Auckland Pipeline (RAP) – with use of those assets controlled via contracts. They also jointly own coastal shipping (the Coastal Oil Logistics Limited joint venture, COLL), and share terminal access (the "borrow and loan" system, B&L).

The industry schematic presented in Figure 8 makes it clear that the New Zealand fuel industry contains considerable (though not unusual) amounts of vertical integration. The figure also makes it clear that there are multiple overt ways in which the majors coordinate horizontally. These horizontal arrangements can have efficiency benefits (e.g. economies of scale, better asset utilisation). However, they might also be

supporting – intentionally or not, and in plain sight or more subtly – undesirable levels of coordination among firms to the detriment of competition.

Such high degrees of both vertical and horizontal coordination have two implications:

1. It is unwise to think one aspect of industry structure or conduct can be adjusted in isolation – any such adjustment has implications across vertical industry levels, and horizontally (between industry members operating at the same vertical levels)[33]

2. Coordination might simultaneously be leading to both positive and negative impacts on retail fuel prices, so it is necessary to judge whether these trade-offs are net beneficial, or net harmful, to consumers.[34]

### 3.2.4. Priority areas for examination

It remains pertinent, however, to focus on aspects of industry structure or conduct most likely to be contributing to unduly imperfect competition. These include:

1. Key infrastructure assets, where competitive entry is likely to be important, but incumbents effectively can veto that entry – e.g. Refining NZ, RAP, terminals

2. Inefficiencies in vertical coordination, such as poor contracting or market-based supply arrangements for vertically separated activities – e.g. as between majors and distributors, or between majors and distributors on the one hand, and retailers on the other

3. Industry features enhancing horizontal coordination, which may therefore reduce competition (with insufficient mitigating benefits) – e.g. MPP, B&L

4. The intensity of the competitive process itself, given other aspects of industry structure – i.e. are incumbent or entrant firms aggressively competing head-to-head, or being more passive/"live and let live"?

Ultimately, any examination of such factors is directed at whether the right level, timing and type of competitive entry is possible in the New Zealand fuel industry, or if it is being inefficiently deterred (recognising that excessive entry can occur, and be socially undesirable).[35] This is because efficient and timely competitive entry is the ultimate discipline on any industry in which incumbent firms are enjoying excessive profits.

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[33] Indeed, evidence exists that policies to cause vertical separation between refiners and retailers – so-called divorcement laws – tend to cause retail prices to rise (Eckert (2013), Noel (2016), Borenstein and Bushnell (2005)). Likewise, regulations to increase price transparency can facilitate undesirable price coordination among retailers (Byrne and de Roos (2017)).

[34] OECD (2008) provides a good summary of the arguments behind some of the trade-offs in relation to vertical coordination in fuel industries.

[35] For example, if firms entering an industry must incur fixed costs (e.g. replicating terminal capacity), there comes a point where the social benefits from entry in terms of more competitive prices is outweighed by these fixed costs (Carlton and Perloff

Regional price variation or cross-subsidies, like prices and margins, are indicators of industry performance. They therefore may be indicative of unnecessarily imperfect competition, but themselves stem from possibly unnecessary industry structure or conduct. We treat them as symptoms, rather than causes. However, to judge retail fuel price reasonableness, it is also necessary to consider whether any regional price variation or cross-subsidies are unreasonable.

We analyse these priority areas in Section 5.

## 3.3. Some economic basics used in our analysis

Our analysis draws heavily on the branch of economics concerned with competition issues known as industrial organisation. For the benefit of readers unfamiliar with the subject, some key ideas and terminology are summarised below.[36] Further explanations are provided, as required, in Section 5.

### 3.3.1. Price elasticity of demand

For readability, in this report we use terms like "price-insensitive" or "price-sensitive" demand when referring to how much fuel demand responds to a price change. We implicitly assume that a rise in fuel price leads to a decline in fuel demand, all other things being equal.[37]

These terms are referring to a more precise term used by economists called the price elasticity of demand (sometimes referred to as demand elasticity for short). This measures the percentage change in quantity of a good's demand if its price increases by 1%.

In fact the above measure is more properly referred to as a good's own-price elasticity, since it measures the change in demand when a good's own price changes. This is to be contrasted with cross-price elasticities of demand, which measure the change in demand for one good, when the price of some other good changes. While own-price elasticities should in general be negative, cross-price elasticities can be either positive or negative. They can be positive because some goods are substitutable – a rise in the price of one good causes consumers to buy more of the substitute good.

Demand elasticities – particularly own-price elasticities of demand – provide key information about the nature of demand a firm faces. This information is crucial for firms when determining their profit-maximising price (see next).

The more price-elastic is their demand (i.e. the "higher" is their demand elasticity, meaning by convention the more negative it is), the less able they are to increase price. If they do, then they lose a relatively large amount of demand. They might enjoy a higher

(2015)), Mankiw and Whinston (1986). Alternatively, if entry causes a market to segment, this can result in price rises for some customers, potentially outweighing the benefits of more competitive prices for others (Roessler (2012)).

[36] An introductory text is Carlton and Perloff (2015). Texts for more advanced readers include Tirole (1988), and Belleflamme and Peitz (2010).

[37] While it is possible to identify goods whose demand increases with price, these are generally regarded as exceptional. Hence, goods whose demand falls as price rises are often referred to as "normal" goods.

unit margin (i.e. difference between price and supply cost for a single unit of output they supply) by increasing price, but they face a fall in the number of units they sell. It is the joint impact of these that determines whether a price increase raises profits, or causes them to fall. This situation is more likely to characterise competitive industries. In the extreme, when a firm operates in a perfectly competitive industry, its demand is so price-elastic that it has no scope to increase prices, since it will then simply lose all its output volume to cheaper rivals.[38]

Conversely, if a firm faces price-inelastic demand, then it faces a smaller contraction in output volume for a given increase in price. This makes it more likely that a price increase might raise profits, but even then the nature of demand (characterised by demand elasticity) is a constraint on a firm's ability to raise prices. This situation is more likely to characterise monopoly or imperfectly competitive (oligopolistic) industries – industries with only one or just a few competing firms. Since these firms are able to choose their price without losing all their demand to competitors, we say they enjoy a degree of market power.[39]

For New Zealand it has been estimated that a 1% rise in fuel prices will lead to a 0.15% fall in demand over one year, rising to a fall of 0.2% over two years.[40] This means the short-term own price elasticity of demand is lower than the longer-term demand elasticity. A sustained price increase leads to a relatively low short-term demand reaction, but in the longer-term customers can adjust their need for fuel (e.g. by buying more fuel-efficient cars), and so their demand becomes more price-elastic.

### 3.3.2. Setting prices to maximise profits

In an imperfectly-competitive industry such as the New Zealand fuel industry, each supplier has some degree of market power. Indeed, we discuss in Section 5.5.3 how some firms are deliberately differentiating their product offerings in order to increase their ability to increase prices (e.g. by offering high-quality service stations). This means those firms do not simply take the market price of fuel as given, and sell as much as is profit-maximising at that price. Instead, they each choose their fuel price bearing in mind that this will affect the amount of fuel they sell (including via their rivals' reactions to their price choices). If acting to maximise profits – a standard assumption made of private investor-owned firms – then they choose their price such that the combination of unit margin and quantity sold yields them the highest profit (given their costs, given the competitive situation they face, and given the portion of market demand they serve).

Following standard economic analysis, the profit-maximising price choice of any firm boils down to setting their price-cost margin equal to (the negative of) the inverse of their own-price elasticity of demand. This is known as the "inverse elasticity rule", where price-cost margin is defined to be their product price net of the incremental cost (known as marginal cost) of the last unit they supplied, divided by price. The more price-elastic is a firm's

[38] In such a situation, we say that the firm faces a flat (i.e. horizontal) demand curve.

[39] In this situation, we say that each firm faces a downward-sloping demand curve. A monopolist faces the entire market demand curve, while oligopolists face downward-sloping *residual* demand curves – that portion of demand which they serve, being the market demand net of how much of that is supplied by their rivals.

[40] Kennedy and Wallis (2007).

demand, the lower they set their price-cost margin. Conversely, the more price-inelastic the demand, the higher the price-cost margin.

Firms in highly competitive industries (facing elastic demand) are predicted to optimally set a price-cost margin that is lower than in less competitive industries (where demand is more price-inelastic, i.e. where demand elasticity is lower). In a perfectly competitive industry, firms price to just cover their costs (including a normal rate of return on invested capital), meaning in that case their profit-maximising price-cost margin is zero.

An important implication of the above is that how a profit-maximising firm optimally sets its price is not simply a matter of adding some sort of fixed margin to marginal cost of supply. In particular, while marginal cost certainly is highly relevant to price choice, information about demand must also be taken into account.

In Figure 20 we present some scenarios to illustrate how costs and demand together affect the difference between price and marginal cost of supply. These diagrams represent a firm's illustrative demand curves and marginal costs of supply.[41]

In the upper two panels we represent a situation in which marginal supply costs are high (solid black lines "high"), while in the lower two panels they are low. In the left panels demand (solid red lines) is "high" while in the right panels it is "low". Thus, the top left panel represents a location where demand is high (e.g. high-income households) but cost is also (e.g. due to high supply delivery costs). In the top right demand is low (e.g. location with lower-income households) but cost is high (e.g. high delivery costs). In the bottom left panel demand is high but costs are low, while in the bottom right both demand and costs are low.

Under standard economic theory, profits are maximised when a firm sets its price such that the cost of supplying an additional unit of output just equals the incremental, or marginal revenue (dashed red lines) from supplying that unit. That point is the solid dot in each graph. The location of that point in each case determines the firm's profit-maximising price, which then (via the demand facing the firm) determines the corresponding profit-maximising output.

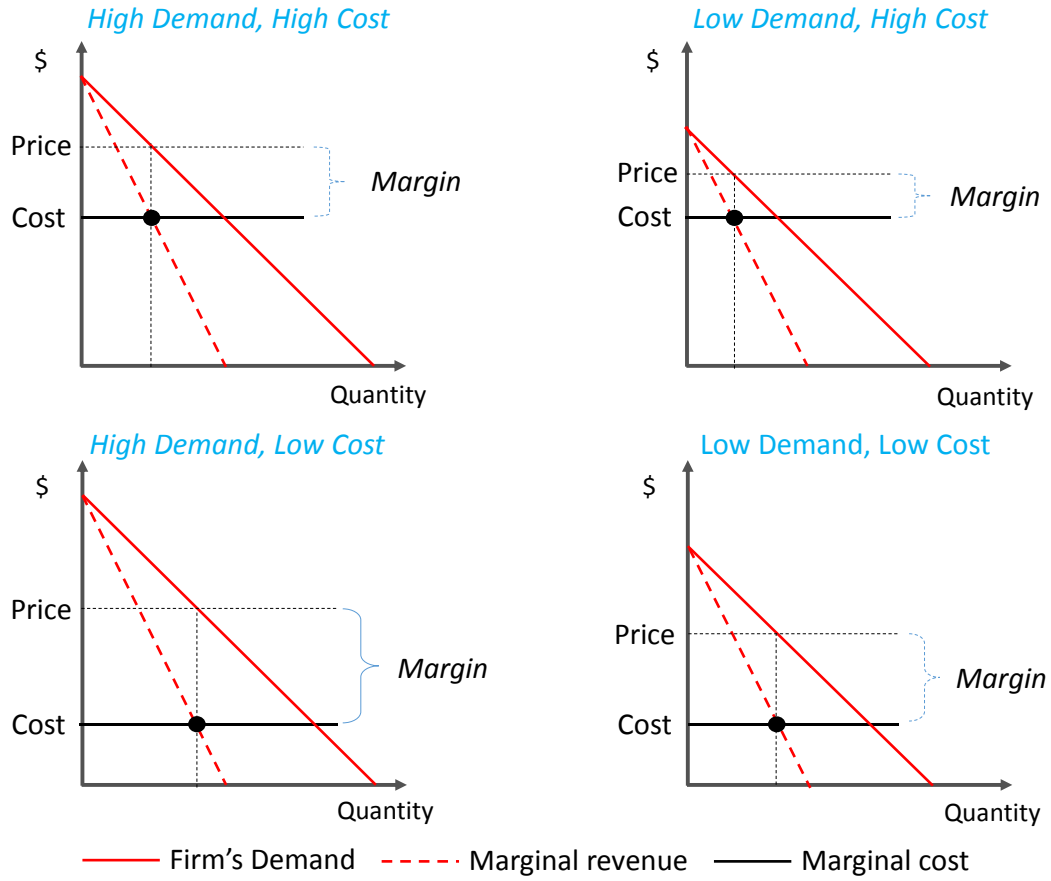
It is evident from these graphs that the profit-maximising price a firm sets, and the margin it enjoys (here, taken to be the difference between price and marginal supply cost) depends not just on price. In the upper two panels each firm has high cost, but the firm with high demand can set a higher price (and hence enjoys a higher margin) than the firm with identical costs but low demand. For example, a service station in a high-income area should be able to set a higher profit-maximising margin than a station with identical costs in a lower-income area.[42] Likewise, in the lower panels, the firm with the higher demand enjoys the higher margin, for a given cost. Whether price and margin is higher or lower in the top right panel (low demand, high cost) than in the bottom left panel (high demand, low cost) depends on precisely how close or far demand is from cost in each case.

[41] Effectively we treat a firm as a monopolist, in which case it faces the entire market demand curve. Alternatively, we suppose firms are competing imperfectly with others, in which case we interpret demand curves as each firm's residual demand curve (i.e. their portion of demand after accounting for the supply of their rivals). Constant (i.e. flat) marginal costs are assumed to simplify the presentation.

[42] For the same reason, a pharmaceutical can be sold at a higher price in a high-income (i.e. high demand) country than the same pharmaceutical being sold in a low-income country, even if it costs the same to supply in each location.

Figure 20 Influence of demand and cost on profit-maximising prices (and margins)

Profit-maximising price choices for different levels of demand and marginal costs




Source: Study authors.

The upshot of this is that while some locations may have higher (lower) costs than others, this does not automatically translate into higher (lower) prices or margins. It is essential to know something about demand conditions in each location, as well as costs, to make judgements about relative prices and margins. Indeed, a great many other considerations are also relevant, but the important roles of demand relative to cost deserve highlighting.

### 3.3.3. Competitive entry

Entry by new firms into a profitable industry – and exit of firms from a loss-making industry – is a key process affecting competitive outcomes. In any industry, it is possible that firms earn positive short-run profits. Provided entrant firms face no barriers to entry, they will enter a profitable industry until the last entering firm – after accounting for entry costs – can no longer earn positive profits. This process of entry expands industry output, and places downward pressure on prices. In the "long-run", this process should drive profits to only "normal" levels (i.e. zero economic profits, where those profits allow for firms earning a "normal" return on invested capital).

This disciplining process – of entry by new firms in response to existing firms enjoying positive profits – works imperfectly or possibly not at all if there are barriers to entry. Some barriers are natural, such as the need to make large, fixed investments in productive capacity (especially if those investments cannot be recovered if the firm has to exit the industry – e.g. specialised plant and equipment with no resale value). Others are artificial, such as enjoying a statutory monopoly in an industry that could otherwise support multiple competing firms (who cannot enter because they are prohibited from entering by law). Finally, some entry barriers are strategic, in the sense that existing firms in an industry might be able to take actions which make it harder for other firms to enter (e.g. investing heavily in advertising to build consumer loyalty, forcing an entrant to do likewise if they wish to secure any market share).

An important part of any competition analysis is therefore to assess the nature and extent of entry barriers. The presence of such barriers means existing firms in an industry might be able to sustain prices, margins and profits above what they require to justify their investments and operations in that industry. Conversely, reducing entry barriers can increase the threat or fact of competitive entry – creating downward pressure on prices and margins enjoyed by existing firms.

That being said, it is possible to have "too much" entry, especially in imperfectly competitive industries where firms must incur high fixed costs when entering.[43] This is because there is a social cost to having "excessive" investments in fixed assets. If the entrant is simply taking market share from existing firms, rather than growing the overall market by serving new customers as well (or offering superior quality), then the benefits of entry might be outweighed by the costs. For example, it is likely to be socially wasteful for an entrant in the New Zealand fuel industry to build a second national refinery. While that entrant might cause consumer welfare to improve, the very substantial costs of building a new refinery are unlikely to outweigh the benefits.

Likewise, entry can have the perverse effect of causing prices to increase, at least for some customers, in some circumstances.[44] This arises when an entrant causes a market to "segment" between high value and low value customers (from a firm's perspective), such as can occur when a low-cost "no frills" entrant begins to compete against an existing firm that serves both customer types. By attracting the lower-value customers, the existing firm can better identify its high-value customers, and as a consequence charge them a higher price (e.g. as opposed to charging a uniform price for all customers). We return to these ideas in Sections 5.5.3 and 5.5.4 when discussing firms' use of product differentiation and price discrimination.

[43] Carlton and Perloff (2015), Mankiw and Whinston (1986),

[44] Roessler (2012).

# 4. Financial analysis

## 4.1. Introduction

As part of this study, we conducted financial analysis focusing on two metrics identified by MBIE which are return on average capital employed (ROACE) and gross margin.

One of the intentions of the study was to use financial data to understand the underlying financial performance of the major fuel participants in New Zealand to determine whether margins and returns indicate consumers are being charged reasonable prices and whether there is any indication of cross-subsidisation between regions. However, our findings only allow a review of the trend in the recent period due to limitations in the comparability of the data obtained which we outline in this report.

## 4.2. Methodology

Our financial analysis is focused on the major participants in the industry. We have analysed the underlying data supplied and obtained further clarification and explanations from the major participants where necessary to determine comparability of the data obtained.

Gross margin data provided by the majors has been prepared on a replacement cost basis.

Where there are differences between the major participants' financial information that can be adjusted to improve comparability, adjustments have been made to the underlying data supplied. Whilst this method improves comparability, it may not be reflective of how each fuel participant views its operations or returns. However, given the inherent differences in accounting policies, the level of information provided from each major participant, reporting format, calculation methods and operational structure, it is difficult to obtain fully comparable information for each of the major participants. Accordingly, we have not been able to analyse all of the product types and business channels as specified in the Terms of Reference. In addition, due to the issues with comparability, it has not been possible to report a market view of ROACE.

## 4.3. Results (gross margins)

### 4.3.1. Definition

For the purposes of our study we have defined the following terms:

- **Gross margin**: profit after discounts, transfer price, dealer commissions, storage and handling and logistics cost
- **Revenue**: revenue net of discounts and rebates and excluding ETS and duties
- **Gross margin percentage**: gross margin divided by revenue.

### 4.3.2. Assumptions

In order to appropriately calculate comparable gross margins for the major participants to determine a market view, it has been necessary to make adjustments to reported revenue so that gross margin percentage for each company is calculated on a consistent basis.

Major fuel participants provided information net of ETS and duties, except for one that presented this information gross (inclusive of ETS and duties). Based on our definition of revenue above, we have adjusted one major participant's revenue to be net of ETS and duties (we have based this adjustment on estimates derived from other major participants given that the actual split cannot be obtained). Whilst this may not reflect actuals, we consider this to be a reasonable estimate of the expected ETS and duties portion of cost.

Differences were also identified in relation to year ends. Some major participants have reported gross margin data based on a March year end while others have provided this based on December year ends. Rather than adhering to conventional balance date year ends, we have grouped December 2016 year ends as 'FY2017' (a balance date ending 31 March 2017) as we consider that this is appropriate in relation to comparing changes in margins over time.

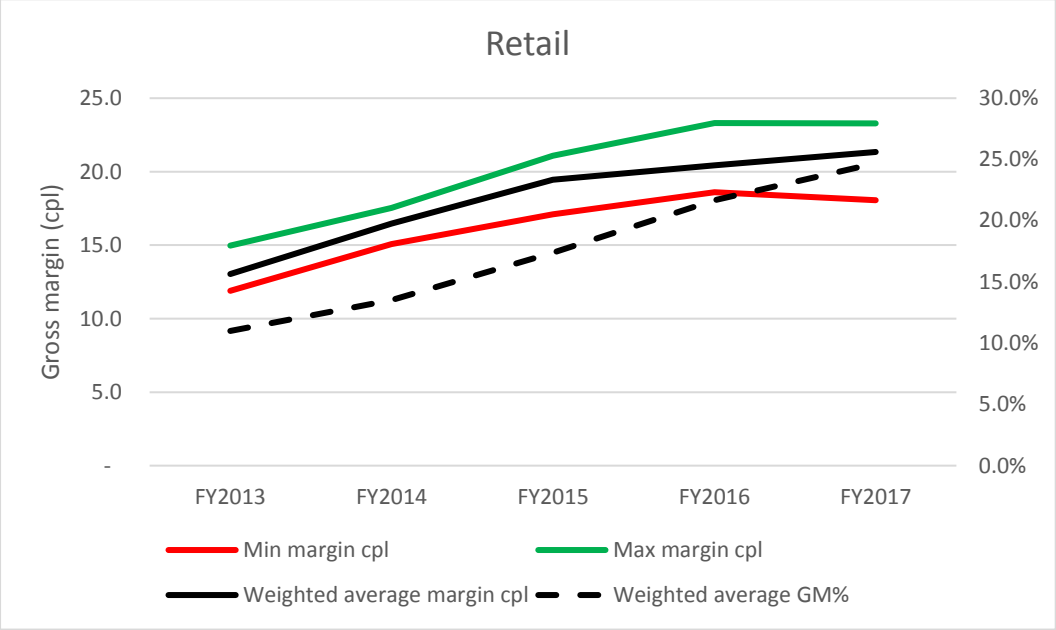
Our analysis could not take into account a significant part of the market as the major participants could not provide us with data for third party distributors, instead data could only be provided for company owned and controlled sites, which is only part of the downstream market.

An important fact to remember when analysing gross margins is that they can reflect changes in either revenue, direct cost performance or a combination of both. However, an improvement in gross margin does not necessarily result in improvements in net profit and returns on investment. This is because gross margins are calculated prior to the allocation of corporate overheads and do not reflect investment in fixed and other assets required to generate returns. Also, if margins are increasing while volume is contracting, total profit may actually decline. In addition, an increase in retail gross margins does not necessarily represent an increase in overall company gross margin as product mix may also impact on the overall company profit result.

Consistent with MBIE's analysis of financial performance, our analysis has identified that retail gross margins have increased over the financial years 2013 through 2017 (calendar years 2012 through 2016).

## Figure 21 Retail margin

Retail margin, cents per litre and average GM%




Source: data provided by majors.

Our analysis of the market reveals that on a cents per litre basis, weighted average retail gross margins have increased from approximately 13.0 cents per litre in FY2013 to 21.3 cents per litre in FY2017. In respect of gross margin percentage this resulted in an increase from 11.0% to 24.7% over the same period.

The reasons for the increase in gross margins could be due to a number of factors including:

- Increases in prices per litre, or volumes (assuming some direct costs are fixed)
- Reductions in sourcing and direct costs
- Mixture of the above.

The reduction in sourcing and direct costs could be a result of more efficient operations or reductions in the cost of imported and/or domestically sourced refined product. In addition, the savings in the cost of sales may also reflect capital expenditure and investment made by the companies in direct storage and distribution, the cost of which is not reflected in the gross margin. For example, if a major participant was investing significantly in assets to improve distribution then it would likely require higher returns to justify such investment.

Our review of the financial statements for the major participants did not identify significant capital investment by the participant during the period under review which would explain such an increase in margin. However, from gross margins alone we cannot determine if prices are reasonable.

From a regional analysis perspective, fuel prices were initially similar between the North Island and the South Island for the financial years 2013 through 2014. However, in

financial year 2015 a significant variance in retail prices between the North Island and the South Island emerged.

We have analysed gross margins for the North Island and South Island regions based on average weighted based volume.[45] In addition, we tested the hypothesis as to whether Wellington prices are more consistent with the trends in the South Island compared with the North Island. The graph below shows that the spread between the North Island and South Island is larger when Wellington is grouped into the South Island category. We have performed this analysis as the Wellington market shares a common characteristic to the South Island in that the three majors (Z Energy, BP and Mobil) own all terminal assets and supply all downstream petroleum products. In the North Island, as stated previously, Gull also owns terminal assets and downstream retail distribution. Accordingly, the Wellington market has similar characteristics to the South Island market.

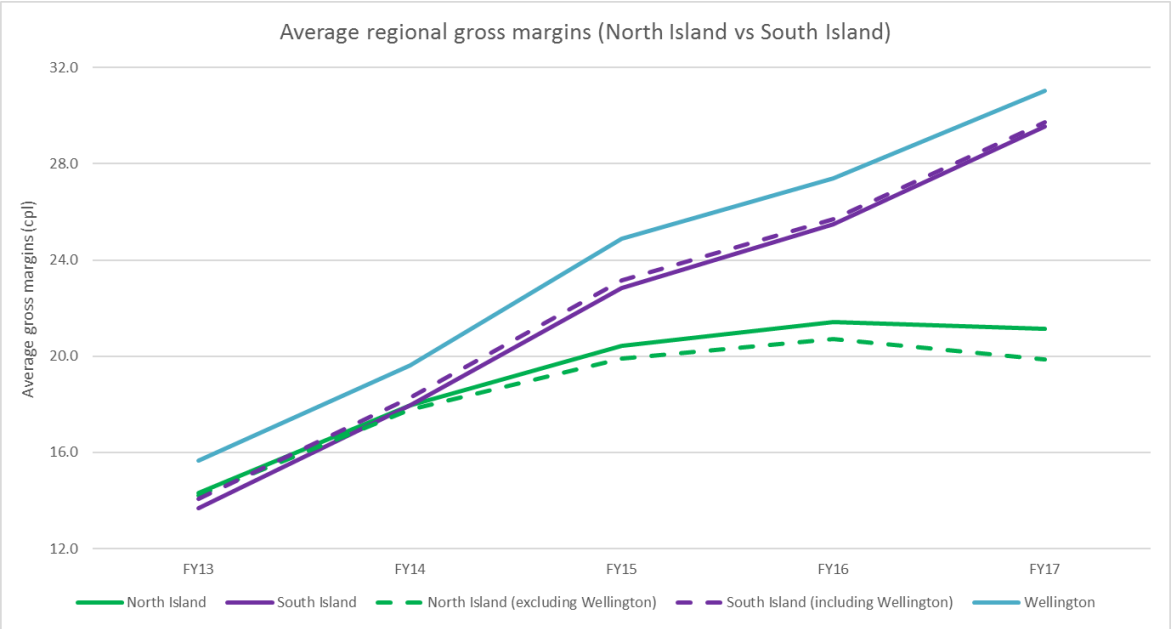
The average gross margin difference between the North Island and South Island is 8.4 cents per litre compared with 9.9 cents per litre if Wellington is grouped with the South Island. From the data obtained, the Wellington-Hutt Valley region also has margins in the higher range for the North Island between FY2013 and FY2017 which are more consistent with the margins exhibited in the South Island.

It would also appear that gross margins continue to improve in the South Island while the North Island is demonstrating relatively flat margin growth over the last three years. From a retail perspective, based on the data obtained, we estimate that the North Island (excluding Wellington) consumes two thirds of the overall retail petrol in New Zealand. In FY2013, gross margins generated were smaller in the South Island compared to the North Island. From FY2014, growth in South Island margins relative to the North Island margins has increased significantly.

[45] **Average Weighted Based Volume:** gross margins were calculated by dividing total gross margin by total volume.

## Figure 22 Average regional gross margins

Average regional gross margins, NI, SI and Wellington[46]




Source: data provided by majors.

We have reviewed the fuel market participants' assets from financial statements for the financial years 2015 through 2017 but were unable to identify any major capital expenditure projects that can be linked to the increase in margin in Wellington and the South Island. This information is relatively high level and accordingly, further detailed analysis of the major's actual capital investment over this time period would be required to conclude on this aspect.

Due to differences in the level of information supplied for each region we could not analyse regional gross margins on a more granular basis.

The geographic spread of the population in the South Island results in additional transportation costs which could explain a higher cost base than in the North Island. However, the quantum of transportation costs expressed as cents per litre does not explain the size of the variances identified. While this population spread may result in an expectation of higher prices this does not explain increases in margins and in particular does not explain the reason for the margin divergence since the 2015 financial year.

Our analysis does suggest that there may be some regional subsidisation with growth in Wellington and South Island margins compensating for lower growth rates in the North Island. However, as stated previously without understanding changes in investment between the North Island and South Island we cannot conclusively state this.

[46] The differences in average retail gross margins used in Figure 1 and the regional average retail margins presented in Figure 222 relate to a small difference in data sets.

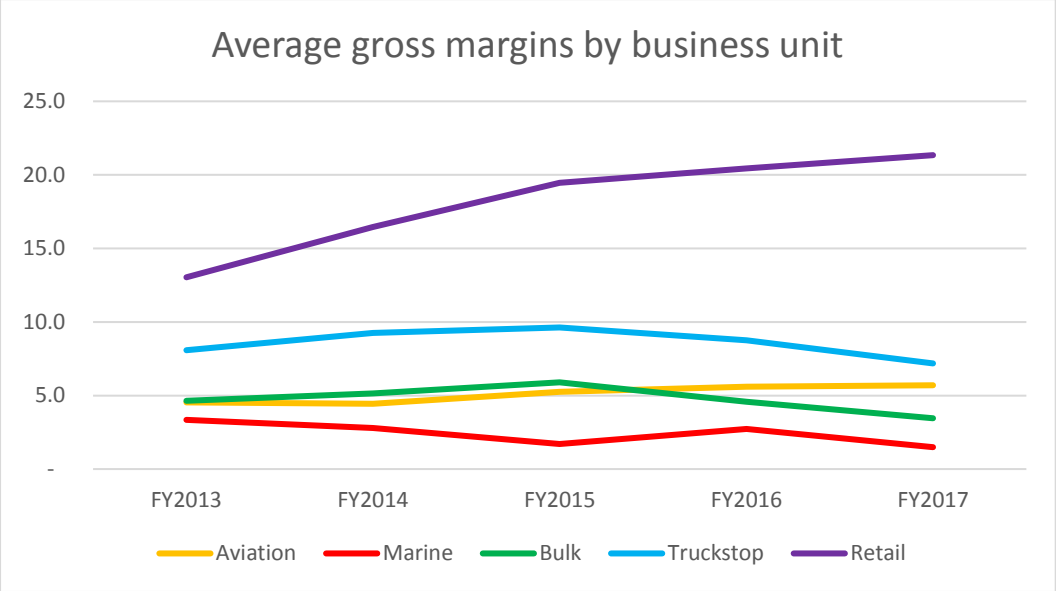
### 4.3.3. Review of gross margins by business unit

We have also reviewed gross margins by different business units. Based on the data received we have categorised the business units as follows: Aviation, Marine, Bulk, Truckstop and Retail. We have excluded Bitumen from our analysis due to the fact that of the major participants only Z Energy sell bitumen as the other participants have exited this market.

Our analysis illustrates that gross margins for retail have been increasing while margins from other business units on average have been flat or declining. Marine gross margins fluctuate over the period, but would appear to also be following a declining gross margin trend.

Figure 23 Average gross margins by business units

Average gross margins for Aviation, Marine, Bulk, Truckstop and Retail




Source: data provided by majors.

The reason for the margin differential between retail and other customers is most likely due to buying power combined with capital investment. It is likely that large wholesale customers are provided with higher discounts than retail customers given contracts in place and volume acquired. In addition, some wholesale customers have their own storage facilities or lower quality requirements in respect of distribution (for instance more unmanned sites) and therefore this means the major participants have invested less in distribution assets. Also many of the large commercial customers are priced using landed cost price build ups with a fixed margin add-on rather than a discount off a list or retail price. Those customers will be insulated from rising retail margins.

## 4.4. Limitations

### 4.4.1. Overall observations

The analysis is prepared based on information supplied by each major participant. We have evaluated that information through analysis and enquiry. However, we have not verified the accuracy or completeness of any of the information. Accordingly, we cannot accept any responsibility for the consequences of errors or omissions contained therein. We do not imply, and it should not be construed, that we have carried out any form of audit or due diligence on the information provided to us and nor do we express any opinion on this information.

Initially, MBIE provided a standardised template for each major participant to complete detailing different measures of financial performance and investment over the time period under review. MBIE asked major participants to provide such financial data on a comparable basis. However, the major participants found the template incompatible with their reporting information and therefore, this template was not completed. Instead, major participants provided information available from their accounting system in their own reporting format. This created an inherent limitation in our study as the underlying data was not fully comparable. Whilst every effort was made to improve comparability, some information could not be provided and therefore ultimately not all of the data received was comparable.

We were also limited by the level of information provided from each major fuel market participant. There was a significant range in the level of detail of the information provided which further limited the analysis for the study. This meant that although we had information comparable for some of the partcipants we could not form a 'market' view as the data omitted was material and could have impacted our overall conclusions. Some major fuel market participants also declined certain information requests due to confidentiality concerns or alternatively could not provide the information within the specified timeframes.

Ultimately the lack of comparable information resulted in us not being able to analyse a market Return on Average Capital Employed (ROACE).[47]

However, we did observe that where retail ROACEs had been provided[48] these ROACEs had increased significantly over the period under review and in some cases ROACEs had increased by over 100% through the period 2012 to 2017. We do note that the increases observed at the retail level did not necessarily reflect changes in company ROACEs, and in one particular case we identified no significant change in a company's ROACE over the period under review despite significant increases in its retail ROACE. In this particular case, part of the difference related to corporate costs not being allocated to the retail business units.

[47] We define ROACE as: EBIT/Average Capital Employed and we define Average Capital Employed as: total assets less current liabilities.

[48] Capital employed is calculated on an historical cost basis with the exception of inventory which has been adjusted using replacement cost methodology (as previously discussed).

Such analysis was key in determining the appropriateness of returns being achieved by the major participants and as such this has been a major limitation of our study. The reasons for not being able to calculate market ROACE's are included below in our report.

### 4.4.2. Accounting treatment issues

We explain below the accounting treatment issues identified based on our analysis of the information provided from the major participants.

#### Investment in New Zealand Refining Company Limited

Some of the major participants included in the study have accounted for their investment in the Refining NZ as an investment in associate (i.e. accounted for using equity accounting), whereas some majors have accounted for their investment as an 'available for sale financial asset' and therefore, they measure the value of this asset at fair value. The accounting treatment is significantly different between the two methods. The available for sale financial asset has been revalued based on the share price at year end, with annual changes in value recognised within other comprehensive income (which is not included within the ROACE calculation). Investments in associates accounted for using the equity method recognises the major participant's share of profits within the profit and loss statement. The carrying value of the investment (i.e. part of capital employed) is based on historical cost plus or minus the participant's share of profit/loss and share of movements in the associate's other comprehensive income less dividends received.

To ensure comparability of data, the accounting treatment for refinery shares must be consistent between major participants.

#### Fixed assets

Most of the major participants have accounted for fixed assets on the basis of historical cost rather than fair value. For those using fair value, comparability is still an issue as one major participant provided historical cost information on the basis of its tax depreciation schedule. Tax depreciation rates are usually higher than accounting depreciation rates and accordingly the carrying value of fixed assets depreciated using tax depreciation rates reduces faster than if accounting depreciation rates had been used. This has the effect of reducing total capital employed and potentially inflating the ROACE relative to if the assets had been depreciated using accounting depreciation rates.

Use of historical cost creates significant comparability issues as the cost base is determined by when assets were acquired and how they have been subsequently depreciated. We illustrate this in the following example:

The carrying amount of a retail site purchased and built 40 years ago will have a significantly different value to the same retail site acquired and developed this year. Each major participant's history, depreciation rate and accounting method all impact on the net book value used to calculate capital employed. This is generally one of the largest components of capital employed. Therefore, if there are comparability issues around this, it can cause significant changes to the final ROACE calculated. Use of historical cost also means that it cannot be compared with other returns measurements such as truncated IRRs, limiting the interpretation of ROACEs calculated.

We consider accordingly that meaningful ROACE analysis should be prepared on the basis of fair value. However, as not all major participants were able to provide such information we could not analyse a market ROACE on this basis.

## Leases capitalised

With the upcoming changes imposed by NZ IFRS 16, companies will need to review their leases and capitalise operating leases onto their balance sheets. One major fuel market participant has capitalised its leases in its calculation of ROACE.

This accounting treatment is different to other major participants and therefore, creates comparability issues. In our view, we consider that it is only appropriate to include capitalised leases if fixed assets are also accounted for at fair value. The purpose of capitalising leases is to reflect the differences in funding structures used by the major participants. Some participants may lease a large number of sites, while other major fuel market participants may own a large number of sites. Therefore, capitalising leases effectively eliminates this comparability issue.

## Allocations of costs

Method of cost allocations are different between major participants. Some majors have allocated cost on the basis of volume, some on gross profit and some have not made allocations. In our view, the method of cost allocation should be balanced between meaningfulness and comparability.

Major participants have analysed their cost allocations using various methods and chose the method they identified as providing the most appropriate estimation of actual cost allocation between business units. The method that applies to one major participant may not reflect the most appropriate method for another participant given differences in operating structures or strategies. However, for comparability purposes, it is necessary that the allocation method is consistent between major participants. We recommend a consistent level of allocation between major participants for any future studies. The appropriate method should be determined after consultation with participants.

## Inventory: inventory held at year end can fluctuate year on year resulting in fluctuations in ROACE.

Some major participants have not provided inventory at year end on the basis of replacement cost. In addition, fluctuations in working capital requirements and inventory balances at year end also result in differences in ROACE calculated. Some majors have calculated ROCE and not ROACE (i.e. no average is used), some have used a simple averaging methodology (taking the opening and closing balances and dividing the total by 2 (2-point average) while other participants use a 12-point average approach (using the balances at month end throughout the year) to smooth out potential spikes or troughs in the analysis.

In addition, some market participants have not allocated terminal assets inventory to individual business units. We consider this to be an important component of capital employed which should be allocated. The method of allocation should be consistent as discussed in the point above.

### Unallocated items

We have identified that there are unallocated profit and loss items for one participant. Their financial information provided was based on USD US GAAP information. We have not been able to reconcile this to the NZD financial statements obtained from the NZ Companies' office. These balances were then allocated subsequently using the same allocation method as other costs. However, without understanding the reasons for these unallocated items, which were then reallocated, we could not use this company's data in our calculation of a market ROACE.

## 4.5. Considerations for future studies

We have outlined in the previous section the significant issues identified in our analysis that prevents us from calculating an appropriate and comparable market ROACE.

As mentioned previously, the financial year end for the major participants examined includes both December and March year ends. For the purposes of our analysis, we have grouped December 2016 information with March 2017 information as we consider these two balance dates are closer and more comparable in comparison to grouping March 2016 and December 2016 year ends together. However, if the major participant's accounting system permits, the most appropriate analysis would be to use time bands that are consistent across all major fuel market participants. In addition to this, we also recommend that during any subsequent review, major participants should ensure that any changes to their mapping of the chart of accounts or accounting systems are documented in sufficient detail to group information on a consistent basis on a year on year basis. Implementation of these points may be difficult in practice.

In our view, in determining an appropriate and comparable market ROACE, it is also necessary to address the underlying accounting treatment issues identified above. In order to achieve this, it is necessary to prescribe a set of accounting rules for each major participant to follow in collating information for the study. Undoubtedly, this will require major participants o allocate additional resources and cost in order to measure and collate this information.

Given the rise of the independents which are also expanding into the retail network, in order to fully understand the reasonableness of retail margins charged to consumers at retail sites, we consider future fuel studies should also include information from large independents. In addition, with more companies participating in the fuel study, this reduces the potential concerns some fuel market participants have around other participants obtaining their margins and other financial information. However, increasing the number of participants also may conversely result in an increase in comparability issues to resolve.

## 4.6. MBIE's margins' analysis

MBIE publishes weekly monitoring of "importer margins" on its website for regular petrol and automotive diesel. We understand the method of determining these "importer margins" has resulted in the industry questioning the appropriateness of the calculations. In particular industry participants have stated that MBIE margins do not appear to take into account discounting. MBIE has stated that the margins do take into account

discounting but that the discounting applied is based on historical analysis and that accordingly the differences are due to timing. MBIE considers the margins still reflect the actual trend experienced.

MBIE has provided us with an analysis carried out by Hale & Twomey Limited where Hale & Twomey has reconciled the gross margins provided by the fuel market participants with the MBIE calculations (the analysis reconciles to within a few cents). Hale & Twomey has performed this analysis by adjusting for expense items which have purposely been excluded from MBIE's analysis.

After reviewing the reconciliation, we believe the methodology used by Hale & Twomey appears reasonable. As a result, a lot of the difference between MBIE's calculated importer margins and gross margins provided by the fuel market participants can be attributed to the inclusion of additional expense items in the fuel market participant calculations. We also note that, despite the difference in absolute terms, MBIE's calculated margins identify a similar trend to our analysis which is based on margins supplied by the fuel market participants.

# 5. Price reasonableness

## 5.1. Introduction

This study has relied on industry cooperation with MBIE and the study's authors, as we were unable to inspect industry documents directly. The object of the study was not to identify anti-competitive behaviour – indeed we have no evidence that such behaviour is taking place.

Instead, in applying the framework set out in Section 3, our fact base includes the disclosures made by the main industry participants, as well as conversations and meetings with the majors, Gull, and certain other industry participants and experts. We have augmented that fact base using publicly available sources, such as the Commerce Commission's publications regarding the 2016 Z Energy/Chevron merger application (e.g. Commerce Commission (2016)), and information compiled by MBIE.

In this section we apply relevant economic frameworks and empirical evidence to the fact base described above, seeking to identify whether there are features of the New Zealand fuel industry that might be considered to be unduly imperfect – either causing margins to rise more than they should, or allowing them to stay higher than they need. In the main these frameworks and evidence are from the economics of industrial organisation, which provides general tools for assessing competition issues (primers on some of the tools used in this analysis were provided in Section 3.3, others are explained below). We also have drawn heavily on the many international academic and policy studies into fuel sector performance in and across a range of countries.

In the following subsections, we analyse the priority areas for examination identified in Section 3.2.4, as they affect the main focus of our study, price reasonableness. This is followed by our analysis of the related questions regarding regional price variation and possible cross-subsidies.

## 5.2. Key infrastructure assets

In general terms, we believe that any assessment of the overall performance of the New Zealand fuel industry cannot be provided without taking full consideration of the operation of a key infrastructure asset like the refinery and terminals into account. In a vertically integrated industry such as this, when access to key assets like these is tightly controlled in the favour of vertically integrated firms, questions as to how this affects performance in other parts of the industry, and competitive entry by other firms, are unavoidable.

### 5.2.1. The refinery

We have not been able to access the detail of the ownership and contracting arrangements that together govern the operation of Refining NZ. We base our discussion on publicly-available materials (e.g. Commerce Commission (2016), Hale & Twomey

(2014, 2017)), and our interviews with industry participants and others.[49] In the time available for our study we have not had the opportunity to interview Refining NZ, and condition our conclusions accordingly.[50]

We address four areas where ownership and contracting arrangements for Refining NZ may be resulting in unreasonable growth in, or levels of, retail fuel margins:

1. Refining NZ is run with tight capacity
2. Refining NZ capacity is fully committed to the majors
3. Refining NZ is a tolling operation that sells only bundles of refined products
4. There are features of Refining NZ's ownership and contracting arrangements that bear a resemblance to so-called "input joint ventures".

Each is discussed in turn.

## Tight capacity

Hale & Twomey (2017) review Refining NZ's processing agreements. The reviewers judge that these agreements between Refining NZ and each of the majors – its only customers – contain features that incentivise the majors to maximise their use of the refinery. They also note that the refinery plays a major role in the New Zealand fuel supply chain, even though direct imports of refined products are required to meet domestic demand for all key petroleum products (including petrol and diesel).

The refinery does not produce enough to meet New Zealand market demand, and so has no spare capacity to allocate to new entrants. While operating at high capacity has the possible efficiency rationale of achieving economies of scale,[51] it is possible that it also has the effect of limiting entry. The majors – through their ownership of terminals – can simply import refined product to compensate for refining capacity constraints, but (potential) rivals other than Gull have no such option unless they secure terminal capacity themselves. Hence, investment decisions regarding Refining NZ capacity – over which the majors exercise some control (directly or indirectly) – have the possible effect, if not intent, of limiting entry.

Owners other than the majors might be more prepared to invest in profitable refinery capacity expansions, thus enabling entry.[52] However, access to Refining NZ capacity is fully committed to the majors through their processing agreements (see next section). Even without a majority vote on investment decisions, support of the majors would be required for any investment to succeed.

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49 Rather than repeat a description of these arrangements as they are publicly known, we refer the reader to Commerce Commission (2016) and Hale & Twomey (2014, 2017).

50 In any case, a number of the parties we interviewed stated that contracting arrangements surrounding the refinery were confidential, and that disclosure of their details would require the consent of other refinery customers. We therefore expect that Refining NZ would similarly be constrained in its ability to discuss such details.

51 This is not the same thing as maximising output, since an asset's most efficient point of operation could fall well-short of maximum output.

52 We note that not all the majors supported Refining NZ's most recent major investment project, which was supported by most of the company's other shareholders. We further note that we are not suggesting owners other than the majors would wish to make investments leading to excess refining capacity. Rather, we are suggesting that that they might be prepared to invest in more capacity than at present, even if this still requires refining shortfalls to be made up by imports.

Firms can pursue a range of strategies, when determining investment levels, to influence (i.e. accommodate or deter) competitive entry by rivals.[53] If Refining NZ were to invest in capacity that proved to be more than enough to meet the demand of the majors (supposing the added capacity was not committed to the majors via contracts) then this could pave the way for competitive entry.[54] In particular, being able to access any excess refining capacity on a consistent basis means an entrant could gain a toehold in the New Zealand fuel industry, without needing to invest in its own terminal capacity (as Gull had to when it entered).

Consequently, the majors have an incentive to ensure that Refining NZ under-invests so as to maintain tight capacity.[55] Furthermore, through their contracting arrangements with (as well as part ownership of) Refining NZ, they have the means to influence refining capacity in their favour. It is possible that these incentives, and means provided through Refining NZ governance arrangements, have the effect of artificially raising entry costs.[56]

The current governance arrangements for Refining NZ are a matter of ownership, constitution and contract. Hence enabling capacity investments to proceed, without the majors effectively wielding a veto right in their capacity as customers, might be achieved at relatively little cost, if only constitutional and contractual changes are required.

## Capacity committed to the majors

Hale & Twomey (2017) note that under its processing agreements with each of the majors, Refining NZ makes all of its capacity available to "Refinery Users".[57] Though we have not been able to see the detail of these processing agreements, our interviews with industry participants suggest that in practice this means Refining NZ's capacity can only be accessed by the majors.[58] Hence, while the majors have an incentive and the means to ensure Refining NZ capacity is kept tight (see above), they additionally have the means to ensure any existing capacity is not available to entrants.

This too represents an artificial entry cost, not least because Refining NZ is operated such that it supplies locally-refined product effectively at import parity. The majors could choose to import product instead of refining it, and would have no need to lock up

53 For in-depth discussions of how investment affects firms' incentives to deter or accommodate entry, see Fudenberg and Tirole (1984), or the discussion in Belleflamme and Peitz (2010, Chapter 16).

54 Indeed, one possible reason why the majors refine locally instead of simply importing all their requirements – given Refining NZ effectively prices to achieve import parity – is that not doing so would release existing refining capacity to potential entrants (if that capacity was not committed to the majors through their processing agreements).

55 Strategically under-investing to deter entry is consistent with Fudenberg and Tirole (1984)'s "lean and hungry" strategy, under which incumbent and entrant firms compete in strategic complements (e.g. prices), and investment makes the incumbent firm a softer competitor.

56 It should be noted that admitting a new entrant to an existing refinery might also have detrimental effects. Chen and Ross (2000) show that there are circumstances in which admitting a new customer to a shared facility might harm ultimate consumers by deterring an admitted firm from building its own capacity. See also Shapiro and Willig (1990). This scenario seems unlikely in New Zealand, where there is likely insufficient demand to support another refinery, given current technologies (and the rise of large, efficient refineries in Asia, and closure of refineries in Australia – Hale & Twomey (2017)).

57 Hale & Twomey (2017) refer to this provision when discussing that in consideration for Refinery Users having exclusive access to Refinery NZ capacity, they agree to pay a floor price when refining margins are low (so as to help pay for capacity costs). Their willingness to support the refinery even when importing would be more advantageous suggests they gain by ensuring that capacity is not made available to others.

58 In particular, we understand that each of the majors have mutual right of first refusal over each other's unutilised refining capacity, only after which might third parties be able to make use of that unutilised capacity (which, in practice, does not occur).

Refining NZ capacity.[59] Refining NZ committing all of its capacity to the majors appears to be a simple matter of contract, and should not be costly to change.

## Bundled refinery output

Refining NZ is run as a tolling operation, rather than as a merchant refinery. This means each of its customers owns the crude oil it refines, as well as the full range of refined products it produces. In return, Refining NZ charges just for the value-added it produces (a share of gross refining margin, set by reference to international product and oil price benchmarks after allowing for shipping costs), not the total value of the refined product.

This is in contrast to a merchant refinery, which refines its own crude oil, and sells the resulting refined products to customers at refined product prices (which would need to be competitive with imported alternatives, as is currently the case). While merchant refiners could decide to only sell bundled products, they might also allow customers to pick and choose which products they require.[60]

Even if Refining NZ capacity was not fully committed via contract to the majors, any new refinery customer would need to commit to taking a full range of refined products due to its tolling operation. This would require them to find a buyer of any undesired products, should it wish to focus on serving only a subset of market segments. Such a practice – variously referred to as bundling or tying – impedes entry by firms that might effectively serve some market segments, but have no comparative advantage (or face market size constraints) in others. This represents a barrier to entry, and one often associated with negative welfare impacts for consumers.[61]

Since unbundled merchant refining is, in principle, a possibly feasible alternative to tolling, this raises the possibility that bundling is not a necessary feature of the New Zealand industry.[62] Furthermore, since any merchant refiner would need to price at import parity or better (otherwise the majors could simply import product), this should not result in higher fuel prices.[63] There could be significant transaction costs involved, however, in changing Refining NZ from a tolling operation to a merchant operation. Furthermore, this could require a substantial change in ownership structure.

## Input joint venture characteristics

Finally, Refining NZ's ownership and contracting arrangements, taken together, bear some resemblance to "input joint ventures" (IJVs, alternatively, production joint

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59 Hale & Twomey (2017) find that Refining NZ supplies product to the majors at better than import parity. However, they argue that this is necessary since there are other benefits the majors would enjoy from importing rather than refining locally, hence any cost advantage enjoyed by the majors through refining is not excessive. Interviews with industry participants reinforce the view that effectively Refining NZ supplies at import parity (neither better nor worse).

60 See the discussion of terminal gate pricing introduced in Australia in Section 7.3.1. Under this approach, vertically integrated refiners make separate products (rather than bundles) available to third-party buyers.

61 Nalebuff (2004), Whinston (1990). Kuhn (2004) and Economides (undated) provide overviews.

62 For example, the fact that the majors and Gull are able to import specific fuels rather than having to import a full range of products demonstrates that fuels are available internationally on an unbundled basis, despite the technical constraint that crude oil results in a mix of products when refined.

63 A merchant refiner would have greater capital committed to raw inputs than a tolling refiner, which would need to be reflected in higher output prices. But the majors would no longer have to invest as much capital in those inputs themselves, meaning their cost base reduces correspondingly. Non-major customers of a merchant refinery would not need to invest in terminal capacity in order to serve the Auckland market (assuming they also gain access to the RAP and terminals at Wiri in this scenario).

ventures, PJVs).[64] Under these arrangements firms in need of an input product (e.g. processed fuels) jointly own a facility to produce that product. Such IJVs can replicate collusive outcomes at the upstream industry level without outright collusion or merger.[65] However, other studies indicate that IPVs can lead to consumer benefits.[66] They can also be used to improve bargaining power when purchasing product from alternative suppliers (e.g. imported product, instead of locally-produced).[67]

To the extent that Refining NZ's governance arrangements have IJV-like features, this could affect how the majors price across the various levels of the industry in which they operate. However, further research is required to fully assess how these refinery arrangements in New Zealand affect customer outcomes. Once again, we have had only limited ability to inquire into the specifics of the refinery's ownership and contracting arrangements, so we have been unable to do this research for this study.

The foregoing analysis may be summarised as follows:

- The governance arrangements of Refining NZ (particularly the processing agreements between Refining NZ and each of the majors) could potentially enable the majors to ensure that refining capacity is being kept tight so as to deter competitive entry
- Those processing agreements may also be serving to deter access by entrants to the existing refinery capacity and its associated distribution assets
- Requiring refinery customers to take a full range of products also creates an entry barrier, even if access to the refinery was not already committed to the majors via contract
- Refining NZ's ownership and contracting arrangements could affect how the majors price across the industry levels in which they operate, possibly detrimentally, but further research is required to determine whether this is detrimental or beneficial (given features of Refining NZ arrangements that differ from those in other types of input joint ventures)
- In the main, these features are matters of contract, and potentially represent artificial entry barriers that could be changed at low cost
- All of these conclusions are conditioned by the fact that we have not been able to access details of Refining NZ's governance arrangements, and have had to rely on public sources, and interviews with industry participants, to glean relevant details for our analysis.

We note that none of Refining NZ's ownership and contracting arrangements have changed materially over the study period (indeed, these are largely legacy arrangements from earlier industry reforms). Hence they are unlikely to have directly contributed to the rising margins observed. However, some of them serve to raise entry barriers, meaning

[64] There are distinguishing features also – e.g. the fact that Refining NZ is a tolling rather than merchant operator, and also Refining NZ's pricing formula, which sets its tolling price based on international input and output prices.

[65] Chen and Ross (2003). See also Rossini and Vergari (2011).

[66] E.g. Brito et al. (2016).

[67] Spencer and Raubitschek (1996). Our discussions with industry suggest the opposite is the case (imported product prices constrain Refining NZ prices), which would seem natural given its likely lower market power relative to large overseas refineries.

margins are able to rise higher and/or for longer than they might without those barriers. Also, they may be directly contributing to prices being higher than they need to be.

We therefore consider that these arrangements indicate potential causes of concern (limb (1) of our three-limb test). It is possible – in some cases likely – that there are feasible alternative arrangements which might be preferable (limb (2)). However, the net benefits of moving to such alternative arrangements – or the feasibility of moving to those alternatives (regarding Refining NZ ownership in particular) – are unclear.

Further inquiry is needed to be more definitive about the impacts of these arrangements on prices and entry, and whether the net benefits of changing to any alternative arrangements are materially positive, taking into account their possible effects across all industry levels.

### 5.2.2. Terminals

#### Foreclosure incentives

Terminal access is controlled by the majors, particularly in key ports such as Wellington, and Lyttelton (from where, we understand, an entrant could service much of the South Island population). For reasons of optimising supply logistics, and also because of their high levels of vertical integration (see Section 5.3), the majors are unlikely to relinquish control of existing terminals, or even offer reliable and economic terminal access to non-major rivals (like Gull). This impedes an entrant (Gull or another) from importing refined product directly to Wellington or Lyttelton, and potentially offering robust competition to the majors without relying on them for product supply.

This "foreclosure" of terminal access by the majors is a well-known consequence of vertical integration.[68] It creates a trade-off between the benefits of better vertical coordination (e.g. avoidance of "double marginalisation", i.e. retail margins being added to wholesale margins) and the costs of reduced entry and competition. In the case of terminals, this trade-off is potentially biased against vertical integration, to the extent that it precludes not just entry into retailing, but also entry upstream (i.e. by an entrant able to directly import product).[69]

#### Entrant investment in new terminals

These foreclosure incentives mean entry by non-majors into Wellington and the South Island is only available via wholesale contracts that the majors are prepared to offer (more on this in Section 5.3.5), or by building new terminal capacity. The latter is constrained in Wellington by the city's limited market size, and because surrounding markets that could be served from Wellington are already served by Gull and independent distributors. Likewise, the economics of a new terminal in (e.g.) Lyttelton are constrained by the South Island's relatively low population density.

[68] E.g. see Rey (2012).

[69] Meade (2012, Figure 4.3) shows that adding an additional upstream firm (e.g. fuel importer and distributor) can have a strong downward impact on downstream (i.e. retail) prices, particularly if that firm is also integrated downstream. However, this effect declines as the number of upstream firms increases.

In the case of industry entrants, terminal construction would also hinge on their ability to secure or build a retail and distribution network. Despite relatively high margins in Wellington and the South Island, and absence of barriers to building new terminals, there appears to have been insufficient profit in the South Island and Wellington to induce the construction of new terminal capacity, and hence those margins have been sustainable. In part this is because a South Island or Wellington entrant would likely need to secure market share from existing firms in order to be profitable, with small market size limiting its ability to instead grow the market (even at lower prices).[70] This, however, may simply reflect lead-times in new terminal investments, so such investments may prove to be forthcoming if margins in the South Island and Wellington continue to be sustained at relatively high levels.

## Incentives to maintain tight terminal capacity

Finally, we note that the majors' optimisation of terminal usage through close coordination of refining, coastal shipping and terminal management results in logistical benefits as well as efficiencies in terms of high capacity utilisation.[71] However, as discussed in Section 5.2.1, in relation to the refinery, the majors have shared strategic incentives to maintain tight capacity throughout the supply chain, including at terminals. This limits – possibly as a matter of strategic choice – the ability of any one major to provide significant wholesale volumes to entrant firms on a consistent basis.

These features therefore reinforce any existing incentives for the majors to foreclose entrants – i.e. to deny them a toehold in either terminals or the refinery. Alternatively, it means that any entrants that can secure access to capacity at these key infrastructure assets face limits to their ability to expand. This alone is likely to be sufficient to deter outright entry by parties such as supermarkets, which conventionally rely on a business model featuring high volumes at low margins. Where supermarkets are active in fuel retailing – through either voucher discounts or through operating stations – they have limited ability to compete head-to-head with the majors they rely upon for supply.

## Possible alternatives

So what feasible alternative arrangements might provide a superior outcome? International studies of "divorcement laws" – regulations requiring integrated firms to shed their ownership of facilities at one industry level or another – show they are likely to harm consumers by raising prices.[72] However, an intermediate solution, requiring terminal owners to make some part of their terminal capacity (either at each terminal, or just for selected terminals) available to others at regulated access prices, might represent

[70] Additionally, the economic literature recognises that it is possible to have inefficiently high entry in markets where entrants must incur high fixed costs of entry. This is because the benefits of increased competition through lower prices must be weighed against the social costs of replicating costly facilities. See Carlton and Perloff (2015), Mankiw and Whinston (1986).

[71] The benefits of tight coordination and optimisation were also claimed by Electricity Corporation of New Zealand (ECNZ) as a reason to retain its monopoly structure rather than create competing electricity generators. Evans and Meade (2005) show that the wholesale electricity prices achieved under competition – without tight coordination and optimisation – compared favourably with those that would have resulted had ECNZ's "optimised and coordinated monopoly" been retained.

[72] Noting that these studies typically relate to vertical separation between refining and retailing, rather than terminaling from either. See Eckert (2013), Noel (2016), Borenstein and Bushnell (2005).

an intermediate solution. That way much of the benefit of vertical integration could be preserved, while greater benefits from retail competition can be facilitated.[73]

An alternative, discussed further in Section 7, is the model adopted in Australia. Under that model, refiners are required to post wholesale prices at terminal gates – although they can decline to supply if capacity is needed for their own requirements (which incentivises refiners to keep capacity tight).[74]

A variation on this theme would be to require the majors to post wholesale prices for forward delivery at each terminal (i.e. delivery at a later date). Abundant literature exists showing that creating such forward trading opportunities can induce firms to trade, even if they privately prefer not to.[75] The reason is that the opportunity for forward trade creates a "prisoner's dilemma" – if a firm (i.e. one of the majors) does not sell forward, then its rivals (i.e. other majors) might, leaving them worse off in later wholesale trade.[76] This induces firms to trade in the forward market to minimise their fall in profits from later trade.

Either way, feasible alternatives exist, and with welfare gains possible. Whether these gains are material for given markets – e.g. South Island or Wellington – requires further, specific analysis. That would also inform whether the net benefits of implementing such alternatives are positive.

## Ability of independents to enter new territories

Whereas in the past independent distributor/retailers were subject to territorial restrictions under their wholesale supply contracts with majors, over our study period these restrictions had been lifted.[77] That being the case, it might now only be a matter of time for strong margins – e.g. in the South Island and Wellington – to induce entry by distributor/retailers formerly operating in other territories. That could serve to dampen margins, or at least margin growth, depending on the depth of their entry, and whether in practice they face any constraints when accessing terminal capacity (e.g. due to majors prioritising supply to themselves, and potentially having incentives to strategically under-invest in capacity to deter entry).

## Conclusions

In conclusion, limited terminal access by non-majors represents a predictable though not inherently harmful barrier to entry (given the possibly offsetting benefits of the majors' vertical integration). Where that barrier arises in Lyttelton and Wellington it has more severe consequences for margins in those markets. However, the limited sizes of the

[73] Meade (2011, Section 3.3) models the possible impacts of such a policy on welfare, showing that incumbent firms' profits fall, while overall welfare increases.

[74] As discussed in Section 5.2.1, ownership of a key resource by integrated firms rather than third parties potentially provides incentives for strategic underinvestment in capacity as a way to deter entry by rivals.

[75] See Allaz and Vila (1991), and subsequent literature. Meade (2014) provides a survey.

[76] Meade (2014) develops a model showing that forward trading opportunities in vertical industries with some firms integrated (e.g. majors) and others not (e.g. independents) provide independent retail firms with an opportunity to strategically overbuy supply in forward markets. This means they become de facto suppliers in later wholesale trade (selling what they do not need for their own retail supply). In other words, the opportunity for forward wholesale purchases by independents could increase the liquidity and competitiveness of later wholesale trading.

[77] We understand that territorial restrictions still apply for distributors of one of the majors. We also understand that independent distributor/retailers continue to face constraints on accessing terminal capacity due to it being allocated based on territorial market shares, especially when capacity rationing is required.

South Island and Wellington markets – combined with high distribution costs in the South Island, and limited market expansion opportunities in Wellington (due to its geography, and because proximate markets are already functioning relatively competitively) – naturally exacerbate those entry barriers.

Unless and until South Island and Wellington margins rise sufficiently to induce entry – despite market size limitations – terminal access constraints will continue to allow margins in those locations to remain relatively high. The ability of distributor/retailers to access terminals throughout the country might yet prove to be an important constraint on future margin growth in those areas.

Further analysis is required to determine whether alternative arrangements, such as opening up access to selected terminals at regulated access prices, or requiring majors to post forward wholesale prices at selected terminals, result in positive net benefits. Such analysis may be unnecessary if the absence of territorial restrictions on independents results in significant entry and expansion in markets with high margins.

We note that, there have been no significant changes in entrants' ability to access terminals over the study period. Hence terminal barriers to entry are unlikely to have directly contributed to the rising margins observed. However, their existence means margins may have been able to rise higher, and/or for longer, than they might have without those barriers.

## 5.3. Possible inefficiencies in vertical coordination

### 5.3.1. Benefits of vertical integration

Common ownership of activities at different vertical levels of an industry – i.e. vertical integration – is generally regarded as inherently desirable in vertical industries with imperfect competition at each industry level.[78] It resolves the so-called "double marginalisation" problem, in which a firm with market power at one industry level (e.g. refining) sets a price above cost (i.e. a positive wholesale margin). Firms at lower industry levels buying the first firm's output (e.g. distributors, independent retailers) then add their own margin(s) to that price. In doing so they do not account for the demand contraction this causes for all firms in the vertical chain, and the lower overall profits enjoyed by both firms (thus creating a problem of "vertical coordination" between firms).

All other things being equal, vertical integration resolves this vertical coordination problem. Not only is this associated with higher industry profits, it also leads to an expansion of downstream industry output, leading to lower prices and higher quantities being enjoyed by consumers. Vertical integration is therefore often seen as being efficient.[79]

[78] Indeed, studies of regulations to vertically *separate* refiners from retailers – so-called divorcement policies – are associated with increased retail prices. While they facilitate entry at the retail level, such policies also reduce the benefits of vertical coordination offered by vertical integration. See, for example, surveys in Eckert (2013), Noel (2016). OECD (2008) discusses the cases for and against vertical integration in retail fuel sectors.

[79] Rey (2012) surveys theoretical reasons for and against vertical integration. Lafontaine and Slade (2007) survey empirical studies on vertical integration and confirm the general result that vertical integration is beneficial to consumers.

### 5.3.2. Contracts as an alternative to integration

While integration is sufficient to resolve vertical coordination problems, it is not always necessary. In particular, provided contracts between vertical levels are constructed appropriately, it is possible to resolve some or all of the vertical coordination problems without common ownership across vertical layers of activity. Examples of relevant contractual provisions include upstream firms setting the prices of their retailers (resale price maintenance) or setting both fixed and variable charges ("two-part tariffs"), or assigning retailers exclusive territories.[80]

However, contracts are specific tools that may not work comprehensively in all relevant circumstances.[81] Furthermore, in some cases desirable contract features can be precluded by law (e.g. exclusive territories). Contracts can therefore be imperfect substitutes for vertical integration.

### 5.3.3. Potential costs of vertical integration

While vertical integration can bring strong benefits (see Section 5.3.1), it also creates incentives for integrated firms to refuse to supply non-integrated downstream rivals ("foreclosure"). This means the benefits of vertical integration in terms of improved vertical coordination must be weighed against the costs of deterring entry by rivals. Some countries have imposed vertical separation between fuel refining and retailing through "divorcement laws", judging that the benefits of enabling competitive entry outweigh the costs of introducing double marginalisation.[82] However, studies of divorcement tend to find that they result in higher retail prices (and lower service levels), and hence harm consumers.[83]

Another possibly anti-competitive effect of vertical integration is that it provides incentives for integrated firms to increase the wholesale price they offer to separated retailers ("raising rivals' costs"). Once again, this is a cost of integration to be weighed against its benefits.[84] In any case, depending on the opportunities for retailers to secure supplies in both forward and spot wholesale markets, separated retailers can pursue a strategy that undermines raising rivals' costs by integrated firms ("strategic forward overbuying"), and which can improve welfare.[85]

Other studies indicate that vertical integration can increase integrated firms' incentives to coordinate their behaviour horizontally with other integrated firms, thereby reducing competition (increasing profits at consumers' expense).[86] The majors' shared ability to deter access to Refining NZ is possibly one manifestation of these incentives.

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80 Rey (2012) surveys the relevant range of provisions and their effects on profits and welfare.

81 Meade and O'Connor (2011) analyse the limitations of using contracting instead of vertical integration in electricity sectors. Howell et al. (2010) do likewise for telecommunications.

82 OECD (2008) summarises the pros and cons of vertical integration in fuel retailing.

83 See the surveys in Eckert (2013), Noel (2016) and Borenstein and Bushnell (2005).

84 Lafontaine and Slade (2007) survey the empirical evidence.

85 Meade (2014).

86 Nocke and White (2007, 2010), Normann (2009), Rey (2012). See also Borenstein and Bushnell (2005).

### 5.3.4. Vertical separation is sometimes warranted

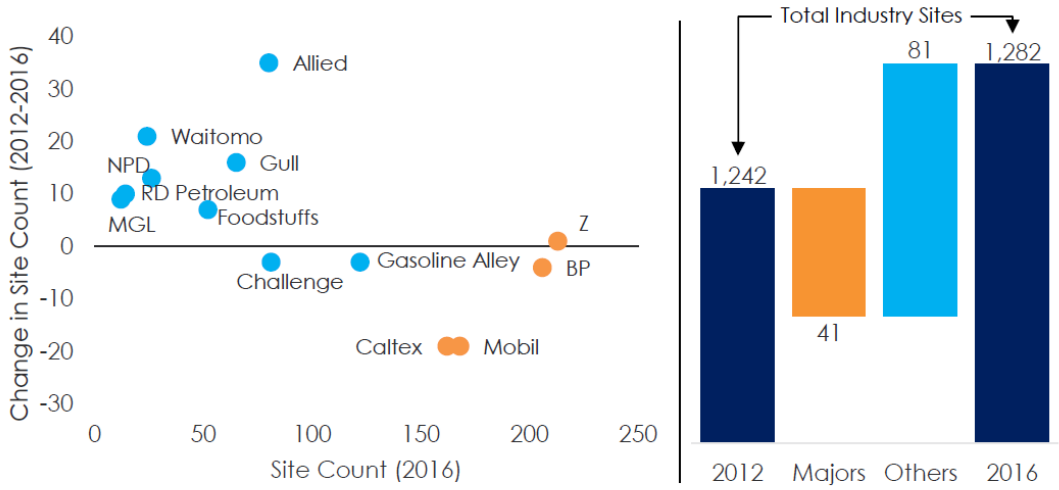
There can be offsetting reasons to suggest that vertical separation remains preferable for firms – and potentially consumers – relative to vertical integration. This includes when downstream activities like fuel retailing involve hard-to-monitor actions by retailers (e.g. safety effort, or convenience store service quality).[87] Some participants in the New Zealand industry have been differentiating their offerings by such activities. This means a greater level of vertical separation might occur, with ambiguous implications for consumers (potentially higher prices from double marginalisation – depending on the nature of retailer contracting – but offsetting improvements in service quality).

### 5.3.5. Rise of the independents

Of particular note in our context has been the rise, over the study period, of "independent" retailers (see Figure 24). Their entry or expansion into new markets, is induced when fuel margins are sufficiently high, entry costs are sufficiently low, and supply can be accessed on a sufficiently secure basis. One interviewee noted that falling costs of pump technology – particularly unmanned pumps that can accept card payments – has made entry through "no frills" unmanned fuel sites increasingly viable.

#### Figure 24 Rise of the independents

Change in site share by brand (2012-16)

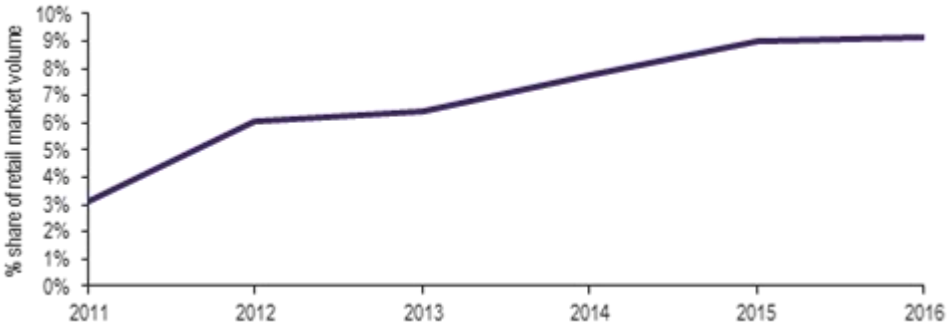



Source: Z Energy (used with permission).

[87] Rey (2012). Shepard (1993) provides evidence of this effect in fuel retailing.

Figure 25 Market share of the independents (petrol and diesel)

Retail market share of non-majors excluding Gull (2011-16)




Source: MBIE.

## Declining levels of vertical integration into retailing – voluntary "divorcement"

Unlike Gull, which has its own terminal and independently sources refined fuel at the international wholesale level, other non-major retailers are supplied by distributors (in some cases the distributor and the retailer are same – see Figure 8) that are, in turn, supplied by one of the majors (usually on an exclusive basis, through contracts lasting up to 10 years or possibly more). This rise has coincided with the majors decreasing their retail presence, meaning that there has been a net expansion of vertically separated retailers, as well as a contraction in the number of vertically integrated retailers. Furthermore, these independent retailers more commonly offer low-cost retail services, whereas the majors more commonly offer full service at higher-cost.

Notably, independent entrants set their own retail prices. In the absence of wholesale contracting features to resolve vertical coordination issues (see Section 5.3.2), this price-setting can introduce double marginalisation, with retail margins being added to wholesale margins. In effect, the New Zealand fuel sector has been undergoing voluntary "divorcement", and often for simple, low-cost offerings (e.g. unmanned sites) where there are no issues of unobserved effort motivating such vertical separation between refining plus other upstream activities and retailing.

## Possible contracting inefficiencies

Our interviews of industry participants suggest that the contracting arrangements between majors and distributors, and between distributors and retailers, do not include the sorts of features that might substitute for vertical integration. However, we were unable to gain access to those contracts to confirm their relevant features.

On the evidence available to us, it appears that there may be increasing inefficiencies in vertical coordination between refining and other upstream activities on the one hand, and retailing on the other. The total number of retail brands increased over our study period, including through expansion and entry by "independents". But the number of retail sites fully owned by the majors has simultaneously decreased. This means the net increase in retail sites is lower than the expansion of retail brands might suggest, and

comes at the cost of increased double marginalisation. The welfare impact of this net change in retail brands is not unambiguously positive – it is possible that the apparent increase in retail competition has not resulted in sufficiently lower prices to justify the inefficiencies possibly being introduced through greater reliance on wholesale contracting than vertical integration.[88]

## How can double marginalisation be raising independents' prices if they are pricing lower than the majors?

This raises a subtle issue, namely that on the limited evidence available to us, independent retailers tend to price lower than the majors. This apparently conflicts with the suggestion that possible inefficiencies in contracting arrangements between independents and their supplying major firms should be leading to higher retail prices.

However, since the independents apparently focus on lower-cost offerings (e.g. unmanned, no-frills sites), they are catering to a more price-sensitive, and hence lower-price, market segment (see Section 5.5.3 for more). So while the independents are not apparently offering higher prices than the majors as a consequence of possible contracting inefficiencies, they are possibly offering too high a price for the price-sensitive market segment they serve, as a result of those inefficiencies.

In other words, a vertically integrated major should be able to offer a cheaper no-frills offering than the independents, but this is not apparent because they instead focus on higher-priced full service offerings (which should be more expensive than the independents' offerings). Notably, the majors continue to own these more complicated retail offerings (i.e. for which unobserved station-level efforts are more likely to be important for performance) despite the efficiency rationale for greater vertical separation in that case (Section 5.3.4).

Hence, while we have not been able to confirm the precise details of contracting arrangements between refiners and distributors or retailers, or between distributors and their retailers, we have reason to believe there are possible inefficiencies in these arrangements. This is reinforced by the fact that we are seeing greater use of contracting for activities less likely to require it (i.e. retailing via unmanned sites), and continued vertical integration into retail sites for which greater vertical separation might be expected (i.e. full-service retail sites). In each case the inefficiencies are in terms of ownership, or contractual. The latter can be addressed at relatively low cost, while the former can in principle be addressed through regulation (e.g. divorcement), though the costs of such an approach are likely to be inefficient.

## Majors' possible incentives for allowing contracting inefficiencies

If indeed these inefficiencies are emerging, it is useful to inquire into the majors' incentives for this. The willingness of the majors – or at least a subset of majors – to offer wholesale supply contracts to distributors has various possible explanations. One is simply that it can be efficient for a major with limited presence or supply infrastructure

[88] Meade (2012) models the impacts of differing degrees of vertical integration for various combinations of upstream and downstream firms in an imperfectly competitive industry. He shows that vertical integration with a given number of retail firms can be equivalent in welfare or pricing terms to vertical separation with a greater number of competing retail firms (e.g. see Figures 4.1-4.3).

in hard-to-serve areas of the country to contract with other parties to do so. We understand this to have been the case for Mobil in (e.g.) remote parts of the South Island.

A number of interviewees also mentioned that they have faced increased health and safety risks (e.g. in fuel supply and handling), motivating them to pass these risks to third parties – consistent with the predictions in Section 5.3.3 that vertical separation could be efficient when unobservable actions by downstream parties (here, in relation to safety practices) are important. Consumers are likely to be beneficiaries of this form of supply arrangement via independents, particularly if, in the counterfactual, they are served by a smaller number of firms.

However, there are other possible explanations for the majors being prepared to allow inefficiencies to emerge in vertical coordination, with less clear benefits for consumers. One is that using independents to cater to the low-cost/low-price market segment (e.g. through unmanned sites) better enables the majors to cater to the high-cost/high-value segment. By doing so they also potentially deter entry in the markets served by the independents, in particular by rivals (such as Gull) that might compete more vigorously with the majors on price. Accommodating apparently competitive entry by the independents can assist the majors by insulating them from more intense competition by a more aggressive entrant.

This strategy bears some resemblance to that used by full-service airlines in response to entry by low-cost airlines (i.e. a "carrier within carrier" strategy).[89] Under this strategy, established full-service firms (i.e. airlines) create their own low-cost, no-frills brand to either deter or vie with low-cost, no-frills entrants. This rationale gains greater credence when it is recognised that over our study period at least some of the independents were owned to some degree by a major. There is only limited evidence on the benefits or costs of this strategy (in the airline industry, let alone fuel retailing), so we are unable to draw any firm conclusions on whether this is harmful to consumers or not.

Another explanation for why majors might allow (apparent) inefficiencies to enter into contracting arrangements with retailers, is that this enables them to increase profits. Circumstances can arise in which wholesalers increase their profits by strategically delegating price-setting to independents. We have no specific evidence that this is the motivation for allowing these apparent inefficiencies, but offer this as a possible explanation for why this might be happening.[90]

### 5.3.6. Conclusions regarding vertical coordination

We have found that there has been expansion and entry by independent retailers, indicating that retail entry barriers are low and retail competition is functioning, for the benefit of consumers. However, this has apparently come at the cost of increases in vertical coordination problems, and in particular, double marginalisation (though access to details of wholesale supply contracts would be required to be more definitive, as well as better data on where independents have or have not been expanding or entering).

[89] E.g. Fageda et al. (2011), Graham and Vowles (2006), Homsombat et al. (2014).

[90] Slade (1998) examines fuel companies' strategic motives for vertically separating. She finds evidence that where station operators could increase margins through vertically separating, authority to set retail prices was more likely to be delegated to station level. Rey (2012) discusses other possible rationales for strategic delegation.

These apparent increases in vertical coordination problems serve to dampen or even reverse the competitive benefits of retailer entry, and possibly contribute to the increase observed in margins over our study period. Direct empirical analysis (see Section 6) would be required to confirm the net impact of such entry – and increase in vertical separation by the majors – on retail fuel prices and margins. The question is whether the benefits of increased retail competition have outweighed any costs from increased vertical coordination problems?

## 5.4. Horizontal coordination

In Section 5.3 we discussed the possible benefits (as well as costs) of vertical integration in resolving vertical coordination issues. In the main, resolving such issues is positive for efficiency, so much so that the costs of vertical integration are often less important in practice than its benefits. By contrast, horizontal coordination between competing firms is typically regarded by competition authorities as having negative efficiency impacts, mainly by reducing competitive intensity. Consequently, there is a need for merger clearance processes, such as that successfully concluded between Z Energy and Chevron in 2016.

In Section 5.3.3 we cited studies showing that one of the potential costs of vertical integration is that it can increase integrated firms' incentives to coordinate their behaviour horizontally with other integrated firms, thereby reducing competition.

Additionally, in Section 5.3.5 we noted that one of the reasons the majors may be accepting of increasing entry by independent retailers – despite this potentially having increased vertical coordination problems – is that it might increase their profits. This arises due to strategic delegation, in which prices are set by retailers instead of majors, and those retailers have exclusive territories.

Noting these two examples of how industry arrangements over our study period may have contributed to greater horizontal coordination between majors, we now consider two others:

- Information sharing through the B&L system operated by the majors regarding terminals
- Z Energy's publication of a retail price indicator (MPP).

As we noted in Section 5.1, we have uncovered no reason to suggest that industry participants are engaging in explicit collusion (e.g. deliberate price-fixing). There remains the possibility, however, of firms tacitly colluding – i.e. coming to an implicit understanding that they will enjoy higher profits on a long-term basis if they refrain from competing in certain ways. Such tacit collusion can arise in industries in which a few firms with comparable costs have repeated multi-market contacts, in stable and non-innovative markets, and with barriers to entry and high transparency over each other's activities.[91]

[91] See Ivaldi et al. (2003) for an in-depth discussion of the factors sustaining tacit collusion.

### 5.4.1. Borrow and loan system

The B&L system creates certain logistical efficiencies for the operation of Refining NZ, coastal shipping, and terminaling (e.g. enabling Refining NZ and coastal distribution to be operated at high capacity utilisation, and avoiding each major firm needing to replicate the fixed costs of terminaling). While these benefits are real and substantial, they potentially come at the cost of restricting competition. In particular, they create stronger incentives for majors not to grant access to terminals to rival entrants (e.g. Gull, at Lyttelton or Wellington). This reduces the potential for competitive entry into the South Island and Wellington in particular, which goes a long way to explaining why retail fuel margins are higher in Wellington and the South Island than in the North Island excluding Wellington.

An ongoing potential issue is that the B&L system apparently provides the majors with a high level of visibility regarding the regional market shares of their fellow majors (as well as independents). This is conventionally regarded as one of the main elements useful for monitoring and enforcing tacitly collusive supplier agreements.[92] It remains an industry feature that increases the risk that such undesirable horizontal coordination might occur.

It should be reasonably simple and inexpensive to modify the B&L system so that the participants exchange volume data via an independent third party (e.g. an external registry). That would ensure that participants receive only the information they require for the system's operation, and not full visibility regarding rivals' market shares.

### 5.4.2. Z Energy's Main Port Price

Another possible opportunity for horizontal coordination arises from one major (Z) publishing its so-called Main Port Price (MPP) on its website. This represents Z Energy's target retail price for all retailers it controls, though we understand that increasing competition from Gull and other independent retailers means Z Energy reduces its own station's prices from the MPP where such competition arises.

A possible benefit of publishing this information is that it acts as a de facto form of retail price maintenance, and compensates for inefficiencies in contracting arrangements with distributors and independent retailers (i.e. reducing vertical coordination problems).[93] On the other hand, it serves as a means of reducing the strategic uncertainty faced by Z Energy and its rival retailers in setting retail prices, and thus reduces the intensity of price competition.[94] Furthermore, it could, in principle, be used by Z Energy to "test the waters" for price rises – being raised to see if rivals follow suit, and lowered again if they do not.

On balance we see the MPP as most likely having insufficient efficiency benefits to outweigh its potential costs. Certainly ceasing its publication involves little cost to implement. To the extent that publication of the MPP by Z Energy has served to increase horizontal coordination over our study period, this may have contributed to margins being higher overall than they needed to be. However, we understand that Z Energy

[92] E.g. see the discussion about factors likely to increase the risk of horizontal coordination in Commerce Commission (2016), or Ivaldi et al. (2003).

[93] Slade (1998).

[94] Faber and Janssen (2011). One interviewee said that they set their retail prices by reference to Z Energy's MPP.

intends to cease its publication, in which case any such margin impact will no longer continue.

## 5.5. Intensity of the competitive process

### 5.5.1. Impact of entry on prices

Gull's entry into the New Zealand fuel sector in 1998 represented a watershed in retail fuel competition in New Zealand. With its independent fuel supply, Gull has had the ability (indeed, given its terminal investment at Mt Maunganui, the imperative) to aggressively expand its retailing network throughout those parts of the North Island economically serviced by its trucking distributors.[95] It has apparently also priced aggressively relative to the majors, forcing them to reduce (if not meet) Gull's pricing in the markets it has entered. In markets where Gull does not operate – notably the South Island and Wellington – retail fuel margins have grown more strongly, and to higher levels, than in the rest of the country.

While Gull has been the only successful entrant with independent product supply (through imports to its terminal), a number of other "independents" have also entered and expanded over our study period. As noted in Section 5.3.5, they have typically expanded through low-cost sites (e.g. unmanned pumps), meaning they offer price competition relative to the majors, at least for the market segment prepared to use their sites (e.g. price-sensitive customers who do not highly value other service station services or products).

Additionally, as discussed in Section 5.3.5, the majors are potentially accommodating entry and expansion by these independents as a way to defend their higher-value offerings from the impacts of more aggressive entry (e.g. by Gull, or supermarkets – each constrained by access to key infrastructure assets, as discussed in Section 5.2).

As with the response to Gull, however, the majors do not necessarily match these independents' prices, recognising differences in the quality of their respective offerings (more on this in Section 5.5.3).

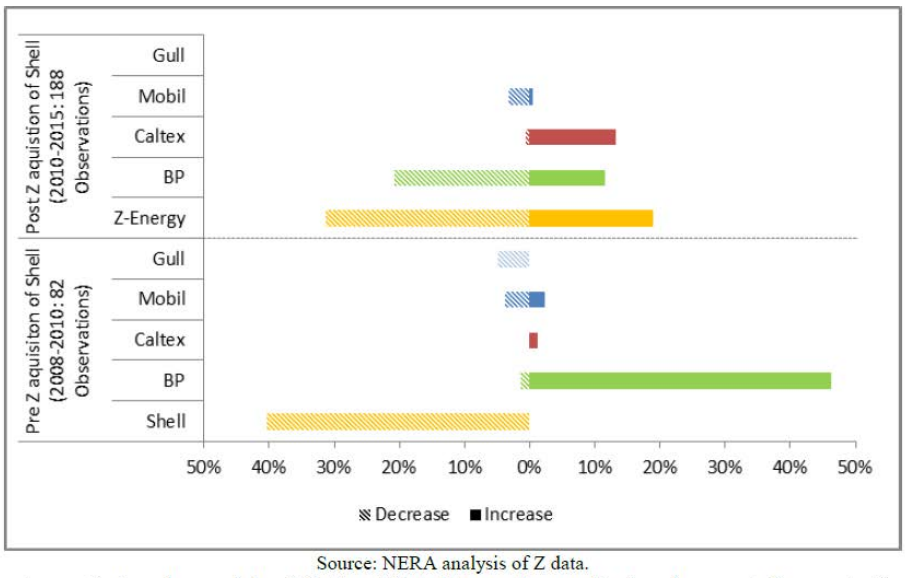
### 5.5.2. Z Energy's abandonment of Shell's pricing strategy

Z Energy's acquisition of Shell in 2010 represented a different kind of watershed. Shell had developed a reputation in the industry for being the first to lower retail prices, and the last to increase them (or at least never being first to increase them, see Figure 26).

[95] Fletcher Challenge entered the retail market with its Challenge brand at the same time as Gull. It lacked independent supply, however, anticipating that it could secure refinery access to support its retail offerings. That access could not be secured, and Fletcher Challenge – unlike Gull – was not able to remain as a viable rival to the majors, exiting the market at a loss.

## Figure 26 **Initiation of price changes before and after Z Energy's acquisition of Shell**

Percentage of price decreases and increases initiated by each firm before (2008-10) and after (2010-15) Z Energy's acquisition of Shell




Source: NERA analysis of Z data.
Note: Greenstone entries have been coded as Z. Entries attributed to more than one firm have been counted as an entry for each firm.

Source: Z Energy (used with permission)

Within a year of its acquisition of Shell, Z Energy abandoned this approach, and a strong source of downward pressure on retail prices was lost.[96] Z Energy – and some other interviewees – maintain that this was necessary, due to margins being too low because of Shell's approach. In support of this they pointed to firms having exited, or attempting to exit, the New Zealand industry. If true, this potentially provides some explanation for why petrol prices and margins have been increasing over our study period – they might initially have been suppressed due to Shell's pricing strategy, and possibly overly so. It does, however, still beg the question how such a margin rise could be accomplished in a competitive industry, absent a fall in competitive pressure due to outright exit.

What is clear from Figure 26 is that no single firm has reinstated Shell's approach of being first to reduce prices, but never first to increase them. This evidence can be taken to suggest that the majors and Gull operate with a tacit understanding about how aggressively to compete on price following Z Energy's abandonment of Shell's pricing strategy, and none has an incentive to deviate from that understanding.

This evidence suggests that tacit collusion – e.g. firms implicitly and lawfully agreeing not to compete aggressively on price – has possibly limited the intensity of competition in the New Zealand fuel industry, allowing margins to rise higher and for longer than they might otherwise.

The ultimate constraint on such behaviour is that competitive entry is induced if fuel margins rise sufficiently as a consequence. Alternatively, market conditions may change

[96] E.g. see Commerce Commission (2016) for further details.

in such a way as to destabilise any horizontal coordination.[97] One example is a reduction in market transparency. The possible alternatives to current industry features potentially increasing market transparency at the cost of facilitating horizontal coordination (Section 5.4) – i.e. discontinuing publication of Z Energy's MPP, and modifying the B&L system to use an independent information registry – could feasibly serve to increase competitive intensity at low cost and likely positive net benefits.

### 5.5.3. Increasing use of product differentiation

#### Fuel itself largely undifferentiated

Product differentiation is a strategy sometimes used by firms to distinguish their product offerings from those of rivals. It serves to soften price competition, enabling higher margins. It also enables firms to better appeal to customers who prefer their offerings, so they can charge those customers a higher price. This increases their profits provided a sufficient number of customers are prepared to pay a sufficiently higher price to cover any costs of differentiation (e.g. advertising costs, costs of supplying higher quality).

Motor fuels themselves are largely undifferentiated products, instead being identifiable as either petrol or diesel, and further distinguishable by octane rating for petrol (91, 95, 98), as well as biofuel content. Suppliers sometimes include additives in their fuels, such as for cleaner burning, which further differentiates the fuels themselves (that are otherwise homogeneous).

#### Supply of fuel differentiated by location

However, the *supply* of motor fuels – as opposed to the fuels themselves – is differentiated by station location. Aside from differentiating fuel supply, station location can affect prices and margins simply by locating in, for example, high-income or low-income locations (see Section 3.3.2). In driving to buy petrol, buyers incur direct costs such as fuel consumption and vehicle depreciation, where costs depend on station location relative to their driving route (and by other choices such as the location of their home and work, etc.). Additionally, buyers incur search costs in identifying where they wish to buy fuel, plus travel time and transacting (e.g. checkout) costs in travelling to stations and filling up (with such costs varying by driver characteristics such as time urgency, as well as time of day/week, among other things).

Even a station's location on a particular side of the road differentiates its offering – e.g. being the first station into or the last station out of town, or being positioned to catch peak traffic on homeward-bound trips versus that for work-bound trips.[98] The location of

[97] The conditions supporting tacit collusion discussed by Ivaldi et al. (2003) also provide guidance as to what factors might undermine horizontal coordination – e.g. increase in number or asymmetry of competitors, demand growth becoming more unpredictable, increases in cost asymmetries, etc.

[98] Another example is service stations located near airports. They cater to sometimes particularly time-urgent customers, such as travellers returning rental cars before flights who need to refuel or face penalty refill rates from their rental company. This locational advantage is likely to be reflected in higher margins.

stations relative to driving routes, and relative to each other, is therefore an important dimension affecting drivers' choices as to where to obtain fuel.[99]

## Other dimensions of fuel supply differentiation

The supply of motor fuels is further differentiated in terms of the quality of fuel delivery. Relevant dimensions include the safety and cleanliness of forecourts, the type and number of pumps (e.g. pay at pump), and refuelling service quality (e.g. availability of attendants to help with refuelling).[100] It might also be differentiated in terms of more intangible qualities, such as being New Zealand and/or independently owned, or committed to sustainability.

Over the study period, greater differentiation has occurred on two levels. First, higher-quality offerings are increasingly offered by the majors and affiliated sites. Z Energy in particular has emphasised that improving the quality of its service station offerings has been a key business strategy over our study period. Second, new technologies such as card-payment only, self-service pumps have allowed both multiple payment options at full-service stations, and pay-at-pump only options at low-cost unmanned sites. The latter have particularly been adopted by independent distributor/retailer groups as a low-cost way to expand retail presence, and catering to a more price-conscious customer group (more in Section 5.5.4). In either case, firms seek to enjoy better overall margins by better matching offerings to consumer preferences.

## Implications of differentiation

While product differentiation softens price competition and enables retailers to enjoy higher margins, consumer welfare is not unambiguously harmed. Provided differentiated offerings are sufficiently better at satisfying consumer preferences than undifferentiated ones, the gains from better matching of preferences and offerings offset the losses from firms being able to soften price competition through differentiation. Conversely, if barriers to entry (e.g. at terminals) mean that margin rises due to differentiation are under fewer competitive constraints aside from those due to differentiation itself, then there is potential for differentiation to lead to undue margin increase.

We do not suggest that rising fuel margins due to increasing levels of product differentiation are necessarily a potential cause of price unreasonableness. Rather we simply offer it as a possible explanation for why fuel margins have been rising, and note that additional data and analysis would be required in order to gauge the consumer welfare impacts of rising margins due to increased product differentiation. In any case, potential remedial measures, if warranted, would likely be directed at reducing any artificial barriers to entry that allow margin growth from differentiation to rise unduly, rather than to reduce differentiation itself.[101]

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99 Houde (2012) analyses the competitiveness of Quebec City fuel supply using a model of petrol demand based on consumers choosing among stations based on proximity to their driving patterns.

100 Shepard (1991) and Barron et al. (2001) find evidence that service station configuration enables station operators to price discriminate. Consumers who highly value service quality prefer full-service stations, while those who do not prefer self-service pumps. Offering one pump-type configuration attracts only one such type of consumer, while offering both types caters to both.

101 In US states where self-service pumps are banned (Oregon and New Jersey), retail prices are slightly higher, and station sizes are smaller, than in areas where bans do not apply (Noel (2016)).

### 5.5.4. Increasing use of price discrimination – loyalty discounts and bundling

In addition to using greater degrees of product differentiation, fuel companies have been increasingly engaging in price discrimination over our study period. Price discrimination involves charging different customers different prices for the same product, as a way to cater to more parts of the market than would be served at uniform prices.[102] Whereas charging the same price to all customers means a firm must lower its price for all customers if it wishes to expand its market share, with price discrimination – if customers can be suitably segmented – it can expand market share by offering a lower price to just a subset of customers (retaining a higher price for customers it already serves).[103]

This enables the firm to make higher profits than with uniform pricing,[104] but with different margins in respect of different customer groups (higher ones on the more valuable groups, and lower ones on the less-valuable customers). Price discrimination can have efficiency benefits (e.g. by recovering fixed costs more from price-insensitive customers than price-sensitive ones).[105] But in imperfectly competitive industries, price discrimination – in the form of charging different types of customers different prices for the same product – can increase profits (if it causes total output to rise). However, it does not improve outcomes for consumers.[106]

In our case price discrimination takes two forms:

- Selective price discounts using supermarket discount vouchers and loyalty card rewards programmes
- Extending offerings of other products and services with fuel offerings.[107]

#### Selective discounts

Supermarket discount vouchers, for example, can be used to attract price-sensitive customers to fill up at Mobil. Loyalty cards such as Flybuys can be used to enjoy fuel discounts and/or savings on other in-station purchases at Z Energy. AA Smartfuel cards can be used to secure fuel discounts at Caltex and BP. Some majors even bundle fuel discounts with purchases at other stores (e.g. appliance stores or with electricity retailers), and directly notify loyalty programme members of such bundled discounts.

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102 Depending on the relative sizes of different market segments – those prepared to purchase at lower prices, and those prepared to pay at higher prices – price discrimination might result in only one market segment being served.

103 One such form of price discrimination is geographic price discrimination. For example, textbook prices have been found to be higher in the US than in other markets, aside from cost differences, simply due to a higher willingness to pay in that market (Belleflamme and Peitz (2010)). Likewise, pharmaceutical manufacturers will charge higher prices on the same drug in high-income countries than they do in low-income countries, simply because they can increase profits by serving both countries at different prices, rather than just the wealthier one at a uniform price (that is too high for the poorer one to bear).

104 Belleflamme and Peitz (2010, Chapter 8) show that uniform pricing is preferred to price discrimination when firms have only low quality information about customer preferences, while price discrimination is preferred when high quality information is available.

105 OECD (2002).

106 Adachi and Matsushima (2014).

107 This can be thought of as a form of mixed bundling, since consumers can choose to purchase just fuel, just other products or services, or both. In general, bundling can be used by firms as a form of price discrimination, designed to better align offerings with the preferences of target customer groups, and thereby to better target prices to those consumers and increase profits. E.g. see Carlton and Perloff (2015).

Either way, customers without vouchers or loyalty cards (or who forget to, or simply do not care to, use them) pay posted board prices for fuel, while customers who do use them enjoy discounts for the same fuel. The use of such selective price discounts helps retailers to screen price-sensitive customers (i.e. voucher/card users) from price-insensitive ones (i.e. the others). Retailers must offer lower prices to price-sensitive customers as a consequence, if they continue to serve that part of the market (rather than, e.g., leaving them to be served by low-cost rivals). Conversely, by screening out the price-insensitive customers, retailers can charge higher prices on that market segment. Since board prices represent the default prices paid by customers other than the price-sensitive ones, a consequence of an increased use of price discrimination is that posted board prices are likely to rise relative to uniform fuel pricing (i.e. in which all customers pay the board price).

## Extending offerings of other products and services

Traditionally service stations might offer other services alongside fuel delivery, such as vehicle repairs and warrants of fitness, plus a small range of consumer purchase items (e.g. cigarettes, newspapers, confectionery). More recently, particularly for stations owned by the majors or operating under their brands via retailer contracts, this range has expanded and changed. Fewer stations offer repair services (now left more to specialist repairers and tyre shops), and instead combine fuel delivery with convenience stores offering a far more extensive range of products (including staples such as bread and milk), and services such as takeaway food, café-style coffee, and clean public toilets. Other services often offered alongside fuel supply include car washes and trailer hire.

Such a joint offering of fuel delivery with other "premium" services will appeal to some customers more than others, for example those who enjoy those other products or services, and for whom the convenience – in terms of reduced travel and checkout time, direct travel and parking costs, and search costs – makes them prepared to pay a premium. This willingness to pay extra for a joint offering is demonstrated by the fact that many items sold in service stations can be bought more cheaply elsewhere, such as supermarkets, or at better quality (e.g. specialist cafes). However, customers would have to make separate trips to each of these alternative suppliers, and incur potentially substantial costs in doing so (especially travel and checkout time costs, which are too great for time-urgent customers, and search costs for out-of-towners).[108]

To the extent that non-fuel offerings are complementary to fuel offerings (e.g. consumers eager to buy one are also keen to buy the other), retail firms might be able to enjoy increased margins on either. A time-urgent customer stopping to buy fuel may also be prepared to pay a premium for (e.g.) snack foods or drinks. Likewise, such a customer may be prepared to pay more for their fuel if they can make better use of their time at the service station by buying a coffee as well. In either case, such consumers are enjoying economies of scope in travel time and transacting costs – for a given expenditure of travel time and other (checkout time) costs to get to a petrol station, they can purchase both fuel and non-fuel items. These travel time savings (i.e. not having to spend extra travel

[108] Families going on long trips, or working people in a hurry to get to work or home after activities, are obvious candidates for time-urgent customers who might be prepared to pay a premium for a bundled service offering.

time to purchase a coffee elsewhere) might therefore be reflected in higher margins on both categories of products.[109]

Over the study period there has been an increase in the use of "full-service" offerings to complement fuel delivery, particularly by the majors (with Z Energy a prominent example). Simultaneously, as discussed in Section 5.3.5, independent retailers with supply contracts from one of the majors have entered or expanded their retail presence in various parts of the country. So too has Gull in parts of the North Island that can be serviced from its Mt Maunganui terminal. In contrast to the majors, this has often been based on a low-cost model involving unmanned sites, self-service pumps with card-only payment, and no store (appealing to more price-sensitive customers who do not value pump-side service or other complementary offerings).

Notably, lower-cost/lower-price no-frills offerings can be co-located near higher-cost/higher-priced full-service offerings by rival brands.[110] The latter would not attract any custom if fuel buyers cared only about fuel prices, and not about the convenience of being able buy other bundled products and services. If they did, they would simply buy at the nearby lower-priced alternative. Instead, price-sensitive customers not prepared to pay a premium in petrol prices for the opportunity to buy non-fuel products or for other perceived "brand" values will be attracted by low-priced no-frills offerings. Conversely, less price-sensitive but time-urgent customers, and those who value other perceived "brand" benefits, will be attracted by full-service offerings, and share some of their travel time and other transacting-related savings with retailers in the form of higher margins for both fuel and non-fuel offerings.

## Assessment

As for the increased use of product differentiation over our study period, the increased use of price discrimination is likely to have caused overall margins to rise. However, in the case of price discrimination, consumers are unlikely to benefit from the practice absent other efficiency benefits.

One possible benefit is through more efficient allocation of fixed costs. Another – in respect of joint offerings of fuel and non-fuel products – is potential travel time and transacting-related savings from being able to buy a wider range of products for a given trip (convenience by another name). However, in respect of supermarket vouchers and loyalty cards, while price-sensitive users of those mechanisms enjoy lower prices, other users pay board prices which rise on average (relative to uniform pricing), with ambiguous net consumer gains.

And against any such efficiency benefits should be weighed any potential consumer costs from reduced competition. In the case of stations jointly offering fuels and non-fuel products (a form of bundling), this could arise from service stations leveraging market

[109] NZTA (2016, p. 5-201) provides estimates of travellers' willingness to pay to reduce travel time. For drivers of motor vehicles (who typically determine where to buy fuels) these range from $6.90/hour for non-work related travel, to $7.80/hour for travel to or from work, and up to $23.85/hour for work-related travel. Figures such as these give an order-of-magnitude of the value of fast and convenient service (including access to non-fuel products when purchasing fuel). They also show that some customer types have much greater time-urgency (i.e. willingness to pay for travel time savings) than others.

[110] For example, an unmanned Gull station is located within 200 metres of a BP Connect site (offering a bundle of products and services) on the same side of the main road in Tokoroa.

power in one market (e.g. fuels) to exercise greater market power in others (e.g. non-fuel products).[111]

On the data available to us it has not been possible to evaluate whether the increasing use of price discrimination is net positive or net negative for consumers. As for increasing product differentiation, we note that the extent of margin increases may be exacerbated by other industry features such as barriers to entry in terminals. Any policy responses to this might be directed at addressing those entry barriers. In addition, it is possible to impose limits on (e.g.) the size of supermarket voucher or loyalty card discounts (as has been done in Australia, where discounts are limited to A$0.04/litre). However, such a measure shares similarities with "sales below cost" laws imposed in many parts of the US. These are generally associated with higher fuel prices, relative to other parts of the US that do not have such laws, and hence are considered to be inefficient.[112]

### 5.5.5. Reliance of independents on majors for supply

Potentially as important as entry by Gull, over the study period we have observed an increase in entry by "independent" retailers, resulting in the majors facing increasing price competition, including in the South Island and Wellington. However, these retailers are not wholly independent of the majors that supply their fuel at the wholesale level (e.g. via distributors). While they are indeed free to set their own retail prices, their suppliers can influence those prices through the wholesale prices they set. This raises the risk that independents that compete "too hard" with the major that ultimately supplies their fuel face the risk of not having their supply contracts renewed upon termination. This reduces their ability to aggressively compete head-to-head with the majors – either on price, or through expansion or entry – unlike Gull (which has its own fuel supply channels and can compete vigorously without such fear of supply interruption).

Relying on such an illiquid contracts market – rather than distributors or retailers being able to access wholesale product in liquid spot and forward markets – possibly limits the ability of existing independent retail entrants to compete aggressively with the majors, and of other entrants (e.g. supermarkets) to gain a toehold in any market. This situation is likely to persist for so long as Refining NZ and terminal capacities remain tight, since majors have little incentive in that case to offer supply in such markets. Contract market illiquidity has been, and in the foreseeable future will remain, a constraint on competition intensity by independent retailers, under existing refinery governance arrangements.

In effect, the majors (and the subset of majors prepared to supply distributors and independent retailers at volume) have accommodated competitive retail entry rather than fought it head-to-head. This is possibly to the benefit of consumers, if the alternative is that they competed so hard as to eliminate rivals (as was the case with Challenge when it entered the New Zealand market in 1998), or to deter competitive entry altogether (e.g. through predatory or limit pricing).[113] However, it represents a proscribed form of entry relative to (e.g.) a company like Gull obtaining terminal access at Wellington or Lyttelton

[111] Martin (1999).

[112] Eckert (2013), Noel (2016).

[113] Carlton and Perloff (2015) describe each pricing strategy.

(hence increasing competition in Wellington and much of the South Island), or supermarkets or other national "big box" chains doing likewise.

Possible remedies include those discussed in Section 5.2.2 regarding terminals, since access to terminals and/or liquid wholesale markets would enhance the ability of independents to enter and expand in markets with high margins, and therefore increase the competitive intensity of those markets.

# 5.6. Regional price variation, and cross-subsidies

## What can we say about regional pricing and cross-subsidies?

There is clear evidence that prices for petrol vary across New Zealand, sometimes significantly. A common complaint is that this is the result of cross-subsidisation by fuel companies.[114]

Firms will often incur short-term losses and profits in different regions as part of normal business variability. Sustained cross-subsidies – where prices in one region are set significantly above cost, so that prices can be set below cost elsewhere – can only happen if there is insufficient competitive pressure in the region being charged the high prices. Normally, ongoing excess profits would induce new entrants to enter the market.

We have not been able to access sufficiently detailed information to enable deep inquiry into the drivers of regional pricing differences. What we can say is:

1. Part of the observed divergence between South Island and Wellington fuel price margins on the one hand, and margins in the rest of the New Zealand on the other, may be the result of the majors' increasing use of product differentiation and price discrimination, though it seems unlikely that this explains significantly higher South Island and Wellington prices
2. Margins in the South Island and Wellington are able to rise relative to the rest of New Zealand due to the inability of truly-independent rivals (i.e. those with their own product supply) to access terminals owned by the majors
3. However, they are also able to rise due to other obstacles to competitive entry, including:
    - The low population density and higher average delivery distances in the South Island makes it unlikely that a new entrant could recover the capital cost of building their own infrastructure (terminals and retail outlets)
    - The relatively low population in Wellington (the market on offer is small) and state of competition in markets surrounding the city
    - The need of an entrant – in either the South Island or Wellington – to quickly secure retail sites and market share as well as terminal access,

[114] On 6 March 2017, the New Zealand Herald reported: "Aucklanders and other North Islanders are having their cheap petrol prices subsidised by motorists in Wellington and the South Island and the price gap is growing bigger." Retrieved from: http://m.nzherald.co.nz/business/news/article.cfm?c_id=3&objectid=11812634.

which would require taking significant market share from existing firms in those markets, given limited opportunity to grow the total market.

Unless and until terminal capacity in places like Wellington and Lyttelton was to become available to an entrant (not supplied by one of the majors), such entry is unlikely to occur despite high margins.

However, if margins in these areas are sustained at sufficiently attractive levels, this might induce investment in new terminal capacity (e.g. by a merchant terminal operator, if not an entrant retailer or major). Such an investment would open those markets up to the possibility of more intense competition by a truly independent operator.

On the question of cross-subsidies, we received only limited and anecdotal evidence. Specifically:

1. We understand, but have not been able to independently verify, that a small number of locations are operated by at least some of the majors at negative margin – suggesting those sites are indeed cross-subsidised by others
2. The way in which shipping costs are allocated by the majors under their joint venture in coastal shipping may be favouring the South Island (though the impact of this is small)
3. The price-setting process of at least some majors involves attempting to recover margin lost in areas facing more intense competition by increasing margin in other areas. Their ability to do so is constrained not just by competitive conditions, but also by prevailing demand conditions.

In terms of materiality, only the third point is likely to be of note – particularly if rising margins in the South Island and Wellington are in a significant way due to lost margin in the North Island excluding Wellington being "recovered" from those other areas.

We have not been able to access any specific data or information suggesting this is the case. Furthermore, we question the incentives for firms to do this, since it implies they are not (or were not) behaving in a profit-maximising manner (see Section 3.3.2). Simply increasing prices when underlying demand or cost conditions have not changed might increase unit margins, but sacrifices overall margin due to a resulting contraction in demand.[115]

Any such behaviour would clearly be inefficient, since it would result not just in excess prices for customers in those areas, but lost profits for the firms as well. However, this begs the question as to why South Island and Wellington margins have risen so strongly relative to the rest of the country. Given the lack of data available to us to address this question, further data and investigations are required.

We simply note that attempting to make up for lost margin in one market by increasing prices in another makes economic sense if firms are simultaneously coordinating on less-intensive competition. That way lost volumes from increasing prices are possibly more than offset by softer price competition. Without further evidence, such as that which

[115] Note that overall fuel consumption can be rising even at a time of rising prices (e.g. due to population growth). This is not to suggest that the usual negative relationship between price and volumes has broken down. So long as the price elasticity of demand is negative (see Section 3.3.1), an increase in price will result in a fall in demand.

would be produced by a study of the sort discussed in Section 6, it is not possible to test if this explanation for stronger margin rises in Wellington and the South Island is valid.

## 5.7. Conclusions

By way of summary, we have identified three possible reasons for rising fuel margins:

1. *A weakening of competitive intensity:*
    - The conscious decision by Z Energy to change pricing strategy after it acquired Shell in 2010. Shell's strategy when it owned the business prior to 2010 was to be slow to follow any prices increases by its competitors, and quick to lower them if crude oil prices fell
    - Z Energy has abandoned that strategy, and on the information available to us it appears that no other major has adopted it
    - It is possible that Shell's strategy caused margins at the beginning of our study period to have been unduly suppressed, and that some of the observed margin increase since then was simply a recovery from that position. On the information available to us, we are not able to assess that possibility, but it is supported by the actual or attempted exit of some New Zealand firms.
2. *A shift towards greater product differentiation and price discrimination:*
    - A deliberate strategy of the fuel industry majors to offer increasingly differentiated product offerings (e.g. better quality forecourts)
    - This softer competition segments the retail fuel market, and enables firms to increasingly discriminate between customer types when setting prices (including using price discounting).
3. *A rise in independent retailers, with possible inefficiencies in how they set prices*
    - The number of retailers not aligned with one of the majors increased over our study period, partly through new entry and expansion, but partly due to majors reducing their retail footprint
    - This can result in retail margins being added to wholesale margins.

    This third reason is more tentative than the others, as we do not know much about the specific contractual arrangements between independents and the majors.

Furthermore, we have also tentatively identified three possible reasons for why margins may now have been able to rise more or for longer than they should:

1. *Vertically-integrated majors:*
    - The majors own operations at different levels of the industry, including refining, wholesaling and retailing (i.e. are vertically integrated). If integration lowers costs and avoids retail margins being added to wholesale margins, then consumers can benefit. But if it allows firms to

raise prices by limiting competition, then consumers can be worse off than with a separated industry structure

- In either case, vertical integration creates incentives for the majors to restrict rivals' access to key infrastructure assets, like the refinery and fuel terminals. This access restriction creates a barrier to entry that allows margins to rise.

We have only reached a tentative conclusion on the effects of vertical integration because very fine judgements are required to determine whether vertical integration has lost its beneficial effects and has instead been net harmful to consumers.

2. *Refinery arrangements (Part 1):*

    - The refinery is run with tight capacity which is fully committed to the majors. In addition, the refinery produces a bundle of products which can deter entry to firms only wanting to sell part of the bundle.
    - These requirements represent possible barriers to entry which reduce the ability of entrants to respond to rising margins and hence limit their increase.

    We have had only limited ability to inquire into the specifics of the refinery's ownership and contracting arrangements, and so this conclusion is also tentative.

3. *The independents' limited sources of product:*

    - While Gull has its own supply arrangements enabling it to serve much of the North Island, New Zealand lacks liquid regional wholesale markets through which independent suppliers can reliably access fuels – instead they are reliant on being able to secure long-term supply contracts from a subset of the majors.
    - This reliance potentially limits their ability to compete head-to-head with the majors – either on price, or on expansion/entry – dampening the downward pressure they can exert on margins.

    We are more confident that this third reason is a material factor, since we have been provided with information about how the independents purchase fuel.

Finally, we identify three possible reasons – again, if tentatively – for why fuel margins are simply higher than they need to be:

1. *Z Energy's publication of its Main Port Price:*

    - Z Energy publishes its reference retail price for all to see, including its competitors
    - While we understand that Z Energy often reduces its prices from the MPP in areas where it faces more intense competition, the MPP still potentially serves as a retail pricing signal that can serve to dampen competition.

The Commerce Commission, in its decision clearing Z Energy's acquisition of Chevron, noted that the publication of the MPP may be an indicator of price coordination.[116]

2. *Information exchange between the majors:*

    - The majors share terminal facilities under their borrow and loan (B&L) arrangement, through which we understand that they share information allowing them to monitor each other's market shares
    - Such information sharing is often a cause for concern to competition authorities because it might help to support coordination among firms leading to higher prices.[117]

    While we are confident that information sharing of this type is a cause for concern, we are tentative about this reason because we have had only limited ability to inquire into the specifics of the B&L arrangements.

3. *Refinery arrangements (part 2):*

    - The majors' joint part ownership of the refinery might be changing how they price across the various industry levels in which they operate.

    This third reason is tentative because we have had only limited ability to inquire into the specifics of the refinery's ownership and contracting arrangements. Also, there are (or appear to be) features of the refinery's ownership and contracting arrangements that are different from those applying in jointly-owned production facilities that have been studied overseas. This means existing frameworks for assessing the operation of such facilities require modification to properly analyse the impacts of these features.

We address the policy options open to the government to respond to these issues in Section 7.

116 Commerce Commission (2016), p. 61.

117 The New Zealand Commerce Commission has observed that "Successful coordination requires a high level of price or volume transparency so firms can check whether their competitors are complying with the expected coordinated outcome. … National volumes are likely to be transparent given the borrow and loan scheme the major fuel firms participate in". See Commerce Commission (2016), p. 53.

# 6. Alternatives to financial analysis

## 6.1. Overview

In Section 5 we noted that further analysis is required to gain a better understanding of the types of issues identified as potentially causing margins to be increasing or remain high. These include:

- Changing degrees of vertical integration and number of retailers, with possible inefficiencies in vertical contracting arrangements between majors and independent distributors/retailers, and also between majors and retailers they supply directly under contracts (Section 5.3)
- Industry features possibly supporting tacit collusion (Section 5.4)
- A change in competitive intensity, including through increasingly differentiated product offerings for which consumers might be willing to pay a premium (Section 5.5)
- Possible recovery of margin lost in more competitive parts of the country from less competitive parts of the country (Section 5.6).

While in principle a rate-of-return type of analysis can help to shed light on such questions, for the reasons stated in Section 4 it is unlikely that existing accounting-type data can be used even for high-level returns analysis (e.g. for firms), let alone at granular levels (i.e. for individual products by region or station).

This section further assesses the usefulness of a rate-of-return type of analysis, but then sets out a different type of approach used in competition analyses. Advantages of this approach include its ability to address questions of the sort set out above, but also its reliance on simple data types (avoiding accounting measurement issues, and using data that can be measured consistently across firms, and on a very granular basis).

In short, the approach discussed here uses information about product demand to infer what sort of margins should be produced by firms under different assumptions regarding competitive conduct and industry configuration. These predicted margins are then used to statistically estimate firms' incremental production costs (marginal costs) without reliance on accounting data (thus side-stepping accounting measurement and consistency issues).

Additional statistical techniques are then used, along with data on drivers of marginal costs (e.g. input prices such as for oil) to infer which assumed competitive conduct best predicts costs. In other words, it ultimately sheds light on whether firms in any given market, and for any given product, are pricing in a way that is more consistent with imperfect competition (given industry structure, e.g. the number of competing firms and their degree of vertical integration), or whether they are pricing in a way more consistent with collusion. Variants on the approach have also been used to infer what type of contracting structure is applied in vertical industries where both details of those contracts, and even wholesale prices, are not available to the researcher.

The approach is therefore versatile and well-suited to addressing the types of questions set out above. It has been applied in a wide range of consumer goods industries, including for retail fuels.

## 6.2. Financial returns analysis

Financial returns analysis is an intuitive and tempting place to start for a competition analysis.[118] In particular, with a large enough sample of comparable firms, and reasonable estimates of their required rates of return (i.e. "normal" or "benchmark" rates of return, e.g. weighted-average costs of capital), actual returns can be compared with required rates to identify if particular firms are generating financial returns in excess of what is required for their investments to be adequately compensated.

An immediate complication – aside from the accounting issues identified in Section 4 – is that for competition analysis what is required is a measure of economic rate of return (based on economic profit), rather than accounting rate of return (as measured according to standard accounting conventions). A key area of difference between the two profit measures is the treatment of long-lived assets, which under standard accounting rules are capitalised and then depreciated (using estimates as to how long assets are useful, and rules of thumb about how to allocate depreciation across time).[119]

Economic profit, by contrast, wishes to measure the annualised "rental charge" for an asset, based on the firm's cost of capital, as well as the economic rate of depreciation (the rate at which an asset's value changes over time). Importantly, to measure this rental charge, asset values measured on a replacement cost basis (or other variants) are required, rather than the historical cost basis often used for accounting purposes.

Another complication arises when measuring only short-term returns of firms making lumpy investments. This is because short-term returns can be significantly affected by substantial changes in asset size (and hence rental charges). In this case even more specialised rates of return measures, based on more specialised measurements of asset values, are required.[120]

However, even if economic rates of return are properly estimated on a consistent basis, the information provided by a rate of return analysis is only a non-specific screen. This is because:

- Detecting rates of return in excess of "normal" rates of return says very little about underlying economic conduct. Economic theory predicts that "long-run" rates of return should tend to normal rates in a competitive industry, while they can remain above normal rates in monopolistic or imperfectly-competitive industries. But in the "short-run" even competitive industries can exhibit rates of return above normal (which is predicted to induce entry,

[118] See Chapter 8 of Carlton and Perloff (2015) for further background on these issues. A more advanced discussion is provided in Oxera (2003).

[119] Similar issues arise in respect of R&D expenditures, and accounting expenditures. Each can produce multi-period benefits, creating differences between the economic measurement of these benefits, and how they are treated under accounting rules and conventions (as well as tax rules).

[120] Specifically, truncated internal rate of return, using asset values measured on a "modern equivalent asset" basis. See Oxera (2003) for details.

until such excess returns are bid away in the long-run, assuming no entry barriers). In industries with very long-lived assets and high entry barriers, excess returns might be able to persist for many years

- Detecting rates of return below normal rates also says little about competitive conduct. It is possible for even a monopoly to suffer inadequate returns, for example due to poor management, or bad luck[121]
- Even if excess rates of return are detected over a timeframe long enough for competitive entry to have been able to occur, it is possible that they have arisen for reasons other than anti-competitive conduct. Possible alternative causes of excess returns include managerial skill (e.g. constant innovation and improving products or services), and blind luck.

Thus, even with appropriately measured rates of return and benchmark rates, other types of analyses are required to interpret any excess (or sub-normal) rates of return, and to infer what they imply for competitive conduct. The structure-conduct type analysis provided in Section 5 is one approach. Next we discuss an alternative approach for measuring firm performance, combining both data-based analysis and structure-conduct type analysis.

## 6.3. Estimating margins and testing for competitive conduct using demand data

Limitations of the financial-returns based approach, plus the specific questions needing to be addressed in our study (see Section 6.1), motivates the use of a different range of techniques commonly used to analyse whether industry performance is more consistent with competitive or non-competitive behaviour.[122]

### 6.3.1. Desired features of approach

Some features we would like an approach to deal with are:

- The vertical nature of the industry, with some firms integrated into retailing and/or selling to wholesale distributors, while others operate at just the wholesale or retail level
- While the basic product offering (motor fuels) is largely homogeneous, the supply of motor fuels, perhaps along with other products or services, is not – retail offerings are differentiated, at the very least by station location with associated search, travel time and transacting costs for customers, let alone pump types, convenience stores, car washes, brand recognition, etc.
- Changes in station ownership, as well as some degree of new entry
- A major input cost – the cost of crude and/or refined product – is observable

[121] Evans and Meade (2005) compare actual and normal rates of return for the New Zealand national electricity grid operator, Transpower. Despite Transpower being a monopoly, its average rate of return fell short of its normal rate of return over an extended period.

[122] This is known as the New Empirical Industrial Organisation (NEIO) approach. See Ackerberg et al. (2007) for a comprehensive summary.

- Many contracting arrangements (e.g. between majors and distributors, or between distributors and retailers, are not known, so either must be discovered (i.e. via disclosures), or their type inferred statistically (see below).

### 6.3.2. Outline of a suitable approach

The leading empirical approach to address questions such as ours, used in major jurisdictions such as the US and EU for competition analyses, involves variations on the following:

- Statistically estimating the relationship between demand (e.g. of a particular fuel type from a given station in a given time period) and price and other attributes (e.g. station type) – using just data on prices (usually, sales), sales quantities and, ideally, retailer and other product characteristics (i.e. station characteristics – number of pumps, payment systems, availability of other services, etc.):
  - This enables estimation of demand elasticities (see Section 3.3.1), which show the responsiveness of demand to price – these are key inputs for assessing how a profit-maximising firm *should* be setting its prices (see Section 3.3.2), and hence margins, assuming a particular mode of competition
  - Ideally this step also accounts for different types of consumer having different preferences, enabling much improved estimates of elasticities.[123]
- Combining this information with assumed models of firm behaviour to *estimate* "price-cost margins" (PCMs) (see Section 3.3.3), defined to be the difference between price and incremental production cost (i.e. marginal cost), expressed as a ratio to price:[124]
  - Any profit-maximising firm should set its price-cost margin according to a known or derivable relationship, based on economic theory, using demand elasticities
  - Different types of firm behaviour (i.e. competition, collusion etc.) involve different such relationships, so estimated demand information can be used to predict what price-cost margins should be under different forms of competition.
- Statistical techniques can then be used to determine which of the assumed firm behaviours (competitive, collusive, etc.) is most consistent with the data:

[123] The main approach for incorporating variation in tastes across consumers – reflecting either observed demographics, e.g. from Census data, and/or based on statistical assumptions – is the random-coefficient logit model of demand. Nevo (2000) provides a comprehensive introduction. The technique was pioneered by Berry (1994), and Berry et al. (1995). The importance of allowing for taste variation across consumers is that this leads to more reasonable estimates of price elasticities of demand than demand models assuming consumers have identical tastes (e.g. multinomial logit).

[124] If price is $p$, and marginal cost is $c$, then PCM is measured as $(p - c) / p$. Note that the approach does not attempt to directly *measure* margins, for example using accounting data. As for rate of return measurement, estimating margins directly using accounting data involves serious measurement issues. See Carlton and Perloff (2015, Chapter 8) for a discussion.

- The simplest approaches involve directly measuring *actual* marginal costs (e.g. using accounting data and statistical techniques), and then comparing them with *estimated* marginal costs implied by the price-cost margins predicted above[125]
- More sophisticated approaches use data on drivers of costs (e.g. crude oil prices in the case of retail fuels) to statistically estimate marginal costs. They then apply statistical tests to discern which type of competition generates marginal cost estimates (backed out from estimated price-cost margins based on an assumed mode of competition) most consistent with the data.[126]

In summary, the approach begins by estimating demand for the product of interest (e.g. motor fuels). When estimating demand, allowance is made for consumers having different tastes, and for service stations having different characteristics. This enables estimation of measures such as consumers' willingness to pay for particular station characteristics (e.g. self-service pumps, station with a carwash, comprehensive convenience store, access to a café, etc.). Another key output from this process is estimates of price elasticities of demand (i.e. measures of demand responsiveness to price changes).

Having obtained estimates of demand elasticities, assumed models of competitive behaviour (i.e. competition, collusion, etc.) are used to predict what price-cost margins ought to be, under each assumed mode of competition. These predicted price-cost margins are then "reversed" to back out estimates of marginal production cost. Once obtained, these estimates are then (statistically) compared with actual marginal costs measured directly using accounting data.[127]

Alternatively, and preferably, data on major drivers of actual marginal cost (e.g. oil prices and other relevant costs for the marginal cost of producing and/or retailing fuel) are used to estimate marginal cost. Statistical tests are then used to determine which assumed mode of competition – competition, collusion, etc. – produces estimated marginal costs that are most correlated with the drivers of actual marginal cost.[128]

### 6.3.3. Example applications of the approach

#### Consumer goods studies

The approach outlined above has been particularly important in studies of consumer goods industries. An early example was for the US ready-to-eat cereals industry which, like many other industries like fuels, is dominated by a small number of major brands.[129]

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125 Since price-cost margins are predicted to be a function of demand elasticities, knowing elasticities and prices is sufficient to back out marginal costs. The accounting-based approach to estimating actual marginal costs was used in Nevo (2001) for assessing competition in the US ready-to-eat breakfast cereals industry. Estimating marginal costs using accounting data can result in significant biases (Carlton and Perloff (2015, Chapter 8)

126 E.g. see Bonnet and Dubois (2010) for details, in a study of the French bottled water industry.

127 Earlier approaches attempted to estimate market conduct (i.e. competition, collusion, etc.) more directly. However, this approach was found to result in potentially severe mismeasurement (Corts (1999)).

128 See Bonnet and Dubois (2010) for details.

129 Nevo (2001).

A limitation of this study's approach was its reliance on accounting-based measures of actual marginal costs (to compare with predicted marginal costs, for determining which assumed mode of competition was most consistent with the data). It also did not account for the vertical nature of the industry (cereals sold in supermarkets, not directly to customers by manufacturers), assuming that retailer margins were simply fixed and a cost to manufacturers.

Other earlier studies examined market power issues in the soft-drink industry (Coca Cola vs Pepsi), and for camera film sales (Kodak vs Fuji).[130] In either case the broad approach was similar to that outlined above, but simpler approaches were used for estimating demand (at the cost of being able to infer less about consumer preferences for particular product attributes – e.g. willingness to pay for access to a service station café, etc. – and potentially less reliable demand elasticities).

A number of studies have since been undertaken in both consumer goods and retail fuel industries.[131] Unlike the breakfast cereals study, they explicitly allow for manufacturers selling to retailers, who then sell to customers (i.e. recognising vertical structure – as we would like for a fuel industry study). Applications in consumer goods industries include for yoghurt in the US,[132] bottled water in France,[133] coffee in Germany,[134] ketchup in the US,[135] and supermarket private labels in Germany.[136]

## Fuel industry studies

The approach has also been used in at least two fuel industry studies. Manuszak (2010) uses demand estimates to simulate the impact of upstream mergers in the Hawaiian fuel industry, allowing for both upstream and retailing activities. He does not attempt to infer what type of competition best fits the observed pricing data, and assumes vertically separated firms.

Houde (2012) estimates a sophisticated model of demand for retail fuels in Quebec City. Specifically, he uses detailed data on customers' commuting paths to identify which stations compete with which (other models make simpler assumptions, such as looking at stations within a certain driving distance or time from each other). He also tests for what form of competition is most consistent with his data, allowing for the vertical structure of the industry. This study – as is Bonnet and Dubois (2010) – is closest in spirit to the type of study that would best address the types of questions posed in Section 6.1, and reflecting the relevant types of industry features set out in Section 6.3.1. However, it is possible that his sophisticated approach to modelling commuter paths might be difficult using New Zealand data, but in any case, simpler methods would suffice.

130 Gasmi et al. (1992) and Kadiyali (1996), respectively.

131 For a review, see Ailawadi et al. (2010).

132 Villas-Boas (2007).

133 Bonnet and Dubois (2010).

134 Draganska et al. (2010).

135 Villas-Boas and Zhao (2005).

136 Haucap et al. (2013).

### Studies inferring contracting arrangements

An important feature of these later studies is that they also test for the economic nature of (in their case) unobservable contracting arrangements between manufacturers and retailers. In other words, they not only distinguish what form of competition is being used by firms, but also the nature of wholesale contracting arrangements (e.g. whether simple contracts are being used, or more sophisticated contracts addressing vertical coordination issues – see Section 5.3). A New Zealand study would ideally involve access to details of contracting arrangements between majors and contracted retailers or distributors, and also between distributors and any contracted retailers they supply. However, if those details cannot be obtained, the approach outlined above is flexible enough to infer the nature of these contracts.[137]

## 6.3.4. Data requirements

Any study along the lines of that above would only proceed with the cooperation of industry (certainly, by the majors and Gull) – unless the required data could be purchased from commercial sources. This implies that we can assume some access to data – the only question is how much?

A key advantage of the approach is that it requires data that are relatively easy to obtain on a consistent basis – side-stepping accounting measurement issues. Specifically, the basic data requirements include:

- Prices for each fuel type and/or sales (which include discounts implicitly), as well as sales volumes (i.e. prices and quantities)
- At least on a weekly basis, ideally for the whole period under study (but two years of weekly data should be ample)
- Ideally by station, for all stations in the country (although studies could instead be made of specific cities and regions of particular interest)
- With details of station characteristics – i.e. pump types, payment methods, type of store, other services such as car washes, cafes, etc.[138]

As mentioned above, data on consumer characteristics are also useful for improving demand estimation, and for better understanding consumer preferences (e.g. willingness to pay for non-fuel petrol station offerings). These can be obtained from public sources such as the Census.

Data on vertical contracting arrangements would be highly desirable. But the approach is flexible enough to infer these arrangements.

Finally, to help determine which form of competition being practiced by firms is most consistent with the data, data on cost drivers is required. This includes the cost of major inputs such as crude oil and/or refined product. Drivers of petrol stations' operating costs

[137] Specifically, assuming an industry vertical structure, price-cost margins can be predicted not only for different modes of competition, but also for the types of vertical contracting that might be applied under each mode of competition.

[138] Obtaining data surrounding the Canterbury earthquakes would be particularly useful, since it would enable additional types of analyses to be undertaken. Economic studies often look for "exogenous shocks" such as natural disasters, since they then present a "natural experiment" that better assists in distinguishing changes in the data due to firms' and consumers' choices from those which are beyond those parties' control.

would also be useful, such as information on labour costs, etc. Many of these should be available from public sources.

### Advantages of the approach

Aside from requiring only data types that each firm should be easily able to provide on a consistent basis, the main advantages of the proposed approach include:

- Price-cost margins, and marginal production costs, are estimated directly, rather than measured using accounting data (with associated measurement and consistency issues)
- The competition mode being practiced by the firms (i.e. competition, collusion, etc.) can be inferred directly from the data
- Likewise, even the form of vertical contracting arrangements being used by the firms (i.e. simple wholesale contracts vs more sophisticated contracts addressing vertical coordination issues, etc.) can also be inferred directly from the data
- We can examine how much consumers are willing to pay for differentiated service offerings (and which types of customers, for which offerings)
- We can gain insight into how changes in demand might be affecting margins (e.g. can we explain observed South Island or Wellington margin rises in terms of changes in demand elasticities, or in terms of other factors such as changes in competition mode?).

## 6.3.5. Appraisal of the approach

While the proposed approach is now well-established and highly versatile, it has its limitations.[139] Notably, it relies on assumed forms of competitive behaviour, and these assumptions are not easily tested. Alternative approaches exist, such as inferring margins from production data rather than from demand data.[140] However, while the demand data approach has its limitations – as does any approach – it is sufficiently flexible to address a wide range of questions of interest for a fuel industry study. And until a better approach emerges, it remains the workhorse approach for competition studies of the kind contemplated.

[139] Angrist and Pischke (2010) provide a critique.

[140] De Loecker and Scott (2016) present evidence that the two approaches produce comparable results.

# 7. The appropriate regulatory response

## 7.1. Introduction

We have not been able to conclude that fuel prices are reasonable. This is because we have identified some features of the structure, conduct and performance of the industry that warrant further investigation, using techniques with better or different data.

If those investigations did determine that prices are unreasonable, then this begs the question of what the appropriate response by the government might be.

In this section, we provide our initial views on this question, in part to allow the government to consider what sort of further analysis might be appropriate. That is, that review should be established with a clear idea of the ultimate purpose to which any results might be put.

## 7.2. Workably competitive markets are the aim

Experience and research has clearly established that competitive markets are the best way to deliver goods and service at the quality and price that consumers value.

> *At its most primal level competition is rivalry. In business, rivalrous actions are intended to secure the patronage of consumers. Most often, competition provokes firms to take actions that benefit consumers. Competition is routinely attributed to be a cause of improved firm-level efficiency, lower prices, increased quality, accelerated innovation, and more rapid development of new services.*[141]

Rather than promote the unrealistic perfect competition of the text books, the goal of policy has been to use "workable" or "effective" competition as the benchmark, based on the work of the United States economist J. B. Clark.[142] Clark emphasises three key features of competition: rivalry among sellers, the free option of buyers to buy from alternative vendors, and efforts by sellers to equal or exceed the attractiveness of others' offerings.

Thus, the aims of regulation are, first, to ensure that workable competition exists and, only when due to some inherent feature of the marked that cannot be removed should fit-for-purpose regulation be imposed. Common reasons to impose regulation are:

- To prevent monopolies from harming consumers by charging higher prices or offering limited quality

[141] Delp and Mayo (2016).

[142] Clark (1940).

- To mitigate "spill-over effect" or externalities – cases where the actions of one person or firm has adverse effects on other that cannot be remedied by traditional legal solutions
- To correct imbalances in the information held by various parties.

## 7.3. Overseas examples

### 7.3.1. Australia

The Australian oil market is often used as a comparator for New Zealand, as the two markets share some similar features:

- Local refineries can supply part of demand – even though Australia produces more oil than New Zealand, it is still an importer of refined product

Two of the supermajors (ExxonMobil and BP) are present, as is Gull. Chevron sold its local downstream operation, held via a 50% ownership stake in Caltex Australia, to local shareholders in March 2015. Shell sold its Australian refining and retail assets to Dutch energy and commodities company Vitol Group in 2014; and

- Deregulation of the markets in the 1980s and 1990s allowed vertical integration to develop in both countries; previously there were restrictions on the entry of refiners into retailing.

There are, however, important differences:

- How the markets responded to deregulation. In Australia, there are "true" independent retailers: companies that are not tied to any one wholesaler and source petrol via a competitive wholesale market[143]
- State as well as federal government industry-specific regulation. At the Federal level, the *Competition and Consumer Act* allows the Government to make codes, which have the force of law, regulating an industry
- Short-term (day-to-day) price cycles at the same outlet have been the focus of concern in Australia, as opposed to price variations between outlets or regions, which has been the focus in New Zealand.

#### Price monitoring by the ACCC

The Australian Competition and Consumer Commission (ACCC) has the power under its enabling legislation to undertake market studies, which includes the power to compel the provision of information.

In 2008, the government directed the ACCC to monitor unleaded petrol products and report to the Minister annually its findings. From 2008 to 2014, the ACCC published reports on the prices, costs and profits of unleaded petrol in Australia. Since 2015, the ACCC has published quarterly reports that mainly cover retail prices, although they do

[143] In the time available, we have not been able to determine whether this feature of the market is a result of regulations, especially open access to terminals, or whether those regulations were put in place to support a pre-existing structure.

report on gross indicative retail differences (GIRDs), which are the difference between average terminal gate prices (TGPs) and average retail petrol prices. The ACCC has also conducted focused market studies on selected cities.[144]

As well as price monitoring, the ACCC has also undertaken enforcement action under Australia's general competition law in the fuel sector.

## Oilcode

The Oilcode, technically the *Competition and Consumer (Industry Codes – Oil) Regulations 2017* is a set of regulations of the Australian wholesale petroleum industry sector. The Oilcode was first introduced in 2006 as part of reforms on the Australian downstream petroleum sector by the Federal Government.

> *The purpose of the Oilcode is to regulate the conduct of suppliers, distributors and retailers in the downstream petroleum retail industry. The Oilcode encourages greater transparency of terminal gate pricing and fuel re-selling agreements, greater certainty for industry participants regarding supply of petroleum products and tenure under fuel-selling agreements. The Oilcode also provides an effective and relatively inexpensive way of resolving disputes that may arise between suppliers, distributors or retailers.*[145]

The Australian Government undertook a review of the Oilcode in 2016 and has recently re-issued the Regulations establishing the scheme.[146]

The main provisions of the Oilcode are set out in Table 3.

### Table 3 Australian Oilcode main provisions

| Provision | Contents |
|---|---|
| Scope | The Code applies to "declared petroleum products"", which are:<br>• Unleaded petrol<br>• Blended unleaded petrol and ethanol<br>• Biofuels<br>• Premium unleaded petrol<br>• Diesel fuel.<br>The code regulates arrangements between **wholesalers** (defined as a person who sells a product from an oil refinery, a shipping facility or a product transfer pipeline) and **retailers** (being a person who sells or supplies petroleum products to end-users).<br>It also applies to fuel re-selling agreements, under which a retailer attains the rights to sell products in a way that is associated with the brand of a supplier. |

[144] Armidale, in New South Wales, Launceston and Darwin.

[145] Australian Consumer and Competition Commission (2011) *The guide to the Oilcode for industry participants in the downstream petroleum retail industry*

[146] Department of Industry, Innovation and Science (2016) *Oilcode Review – Final Report*. Canberra: Department of Industry, Innovation and Science.

| Provision | Contents |
|---|---|
| Terminal gate prices | Wholesalers are required to set and make public each day a "terminal gate price", which is the price they will charge for wholesale sales of the declared products.<br>Any offer of sale by a wholesaler on a term contract must include the option of purchase at the terminal gate price and if a customer seeks sale otherwise on a term contract must be met by an offer to supply at the terminal gate price.<br>A wholesaler may not "unreasonably refuse to sell" a product to any customer, unless they do not have sufficient product available to supply the customer, reasonably believe that the customer cannot pay for the supply or if they reasonably belie that the customer cannot meet relevant health and safety standards for the receipt or transport of the product. |
| Fuel re-selling | Mandatory disclosure of information by wholesalers to those seeking to purchase refined products. "Cooling-off" periods that allow a retailer to cancel a wholesale contract. |
| Dispute resolution | Low-cost alternative dispute resolution system for retailers and wholesalers. |

Source: *Competition and Consumer (Industry Codes – Oil) Regulations 2017* and Australian Consumer and Competition Commission

### 7.3.2. Others

Borenstein and Bushnell (2005) reviewed the regulatory arrangements in the US, including the possibilities outlined in Table 4.[147]

#### Table 4 Regulatory possibilities

| Possibility | Description |
|---|---|
| Divorcement | Ownership of retail facilities by oil refiners is not permitted.[148]<br>A weaker form would be to allow branding under a refiner's name, but with actual ownership of facilities by refiners not permitted.<br>A milder form of divorcement would be to only require new retail facilities to be separated from a refiner. |
| Regulate margins directly | The government could set levels of margins, or floors and ceilings.[149] |
| Branded open supply | Allow independent retailers to source refined product from any refiner. This is like the system that operates in Australia. |
| Full open supply | Petrol can only be sold by refiners as unbranded. It is unclear what would happen under this arrangement to branded retail outlets. |

[147] Later studies by Eckert (2013) and Noel (2016) confirmed that these arrangements remain in place.

[148] This type of regulation existed in New Zealand prior to 1988.

[149] In some US States and in Canada, this form of retailing is used to prevent majors and "big box retailers" from driving out independents and involve the setting of **minimum** margins. That is, these regulations involve ensuring that prices are not "too low".

| | |
|---|---|
| Contract length | Limiting the length of wholesale contracts, as a way of encouraging parties to continually seek better arrangements. |

Source: Borenstein and Bushnell (2005)

### 7.3.3. Transparency

One popular form of regulation, in both Australia and in parts of Europe, is to require greater transparency of pricing. Western Australia, operates a FuelWatch scheme, where prices are posted on to a website and can only be changed daily.

A similar scheme operates in Germany, and a number of consumer information service providers run websites and apps that allow consumers to access data about retail prices.

While at first glance this type of regulation seems attractive and pro-consumer, it is a double edged-sword, although the second edge is not obvious. While these schemes give greater information to **consumers**, they give the same information to **suppliers**. That is, they increase the ability of suppliers to coordinate their prices.

One study of the German scheme found that prices for petrol **increased** by between 1.2 and 3.3 euro cents per litre as a result of the scheme, while the price of diesel increased by about 2 cents per litre.[150]

These considerations do not apply if individual suppliers are required to make available to consumers information that is already available by some means to their competitors.

## 7.4. Current regulatory tools in use in New Zealand

As we noted above, there is no general market regulation mechanism open to the government. While many industries are regulated, that regulation is specific to the industry and is enacted via separate legislation. Examples include the Electricity Act 1992[151] and the Electricity Industry Act 2010; the Gas Act 1992, the Land Transport Act 1998 and the Civil Aviation Act 1990.

Some regulations have imposed regimes like that contained in Table 4: the Electricity Industry Reform Act 1998 forced separation of lines companies from retailers and generation and prohibited lines companies from owning generation assets[152], and the 2011 amendments to the Telecommunications Act 2001 provided the incentives for the separation of Chorus from Spark.

### 7.4.1. The Electricity Industry Act 2010

[150] Dewenter et al. (2016).

[151] The Electricity Act 1992 is mainly concerned with protecting the health and safety of the public and workers in the electricity industry and the regulation of equipment and appliances.

[152] The operative provisions of the 1998 Act are now included in the Electricity Industry Act 2010.

The Electricity Industry Act 2010 provides for regulation of the governance and operations of the electricity industry, including the operation of the wholesale electricity market. The Act establishes the Electricity Authority as the major industry-specific regulator of the electricity sector.[153] The Authority's objective is: "to promote competition in, reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers".[154]

The electricity industry process shows that there are alternatives to reform that are not based exclusively on legislation driven by central government. Especially relevant for the fuel sector was the development of the wholesale electricity market, which was lead by a joint industry-government body, the Wholesale Electricity Market Development Group and, at least initially, was based on a series of multi-party contracts and agreements, rather than legislative codes.

### 7.4.2. The Gas Act 1992

The gas industry is another example where industry action can lead to the development of markets and other governance structures.

The gas industry operates under a co-regulation model, with an industry body (the Gas Industry Company or GIC[155]) taking the lead on many issues. The GIC's role as the industry body and co-regulator is to:

- develop arrangements, including regulations where appropriate, which improve the operation of gas markets, access to infrastructure, and consumer outcomes;
- develop these arrangements with the principal objective to ensure that gas is delivered to existing and new customers in a safe, efficient, reliable, fair and environmentally sustainable manner; and
- oversee compliance with, and review such arrangements.

The Company's stated objective is to *optimise the contribution of gas to New Zealand*.

Under the co-regulation model, some rules that are given force of law by the Act can only be made on the recommendation of the GIC following a prescribed consultation process.

### 7.4.3. Commerce Act 1986

The Commerce Act 1986 is New Zealand's general competition regulation. It contains general competition provisions related to conduct that apply to all markets and it also contains provisions requiring approval for mergers and acquisitions that might reduce competition.

Part IV of the Act contains provisions that impose price and quality regulation on classes of assets where competition is unlikely: natural monopolies. While it is unlikely that any

[153] The Commerce Commission regulates prices and quality of supply and investment, while Worksafe New Zealand regulates occupation health and safety.

[154] Section 15 of the Electricity Industry Act 2010.

[155] The company is owned in equal shares by 13 industry participants. The Board of the company comprises seven Directors, four of whom are Independent and three are associated with industry stakeholders (usually senior executives of industry participants).

part of the fuel sector would meet the threshold for this regulation, Part IV does provide examples of what is possible.

There are three general types of regulation under Part IV: information disclosure, negotiate/arbitrate, and price/quality regulation.

The first is information disclosure. This is the only one of these three forms of regulation that currently applies to three major airports – Auckland, Wellington and Christchurch International Airports – and smaller, community-owned electricity lines companies. Under information disclosure, as the name suggests, firms are required to disclose information about their operations.[156] Regulated firms must disclose annually their financial performance and quality of their services. The form of disclosure is mandated by the Commerce Commission, and supported by detailed determinations regarding methodology.[157] Some of the methodologies involve the Commerce Commission preparing detailed templates, in the form of Excel spreadsheets, that the firms must complete.

The information disclosed not only includes data about operations, but also calculations of financial metrics like profits and returns on investment. These are not unlike the matters that we were initially tasked with determining.

The development of these information disclosure methodologies was long and fraught, and involved extensive consultation with the industry and court challenges.[158]

Larger electricity lines companies, gas distribution and transmission companies, and Transpower (the electricity transmission operator) as well as being subject to information disclosure, are also subject to price/quality regulation. Under this form of regulation, the Commerce Commission sets the maximum prices or revenue that the regulated firms can charge. The purpose of these regulations is to replicate the prices that would be charged by an efficient competitive supplier. Again, there are detailed methodologies prescribed by the Commerce Commission which were also developed after extensive consultation and court actions.

The Commerce Commission is responsible for approving Transpower's investment plan, to ensure that it is not over-investing in its networks (so-called "gold plating"). Other regulated firms are required to disclose their asset management plans, but they are not subject to approval.

Finally, under negotiate/arbitrate, consumers negotiate directly with suppliers and if agreement cannot be reached, the Commerce Commission can arbitrate. This type of regulation has never been used in New Zealand, although it has applied to the airport sector in Australia.

[156] As an example, Vector's disclosures can be found here: https://www.vector.co.nz/about-us/regulatory/disclosures-electricity/financial-and-network-information

[157] For the electricity information disclosure requirements, see: http://www.comcom.govt.nz/regulated-industries/electricity/electricity-information-disclosure/current-electricity-information-disclosure-requirements/

[158] See, for example, Wellington International Airport Ltd v Commerce Commission [2013] NZHC 3289 (11 December 2013).

## 7.5. Conclusion

Overseas experience suggests that even the most well-intended regulations can lead to perverse outcomes and unintended consequences.

The fuel sector is interconnected, and regulation of one part can have unforeseen – and unwelcome, from the point of view of consumers – consequences in other parts. It is therefore necessary to take a holistic view of the sector should reforms be contemplated.

Furthermore, the fuel sector is dynamic, and the various players will respond to the changed incentives that regulations create.

Finally, regulations that rely on market participants providing financial data on a consistent and comparable basis are likely to be expensive, contentious and time-consuming to operate – and ultimately less effective at producing pro-consumer outcomes than is often imagined.

Taking these warnings into account, we consider that there are some aspects of the industry which we recommend be subject to policy development, including detailed cost benefit analysis, to determine if action would benefit consumers.

These areas are:

- The removal of Z Energy's MPP from its website
- The creation of a registry for the B&L system that limits the visibility of other participant's market shares
- The creation of a liquid wholesale market.

In making this recommendation, we note that these three matters are currently the result of voluntary arrangements by various industry players. As both the electricity and gas sectors show, pro-consumer changes can be led by, and entirely facilitated by industry. Indeed, in most markets, consumer are well-served by the operations of market participants and regulation is only required where for some reason the markets "fail".

We therefor also recommend that officials discuss these three matters with the industry, in light of the findings in our report, before undertaking any work on whether regulation might be cost effective.

# 8. Conclusions, findings and recommendations

The fuel sector is important to New Zealand. Approximately 37% of total energy consumption in New Zealand relates to transport, and total expenditure on all forms of transport was over $17.5 billion in 2016[159].

## 8.1. Important, but difficult to answer questions

We were asked to answer some important, but notoriously difficult questions. These questions are important to consumers, but also to producers, who have invested considerable sums in the capital needed to supply their customers.

Whether prices are reasonable is something for which there is no simple or clear answer. Any situation needs to be compared with an unobservable counterfactual: a set of different market conditions that lead to better outcomes for consumers.

More precisely, to determine whether prices are reasonable or not, we asked the following three questions:

- Are there features of the existing fuel industry structure and conduct giving cause for concern – either causing margins to rise more than they should, or causing prices to be unnecessarily higher overall?
- Could any such causes for concern be remedied?
- Would the benefits of remedying those concerns outweigh the costs of doing so?

In other words, to determine whether prices are reasonable or not, we ask whether there is some feasible counterfactual New Zealand fuel industry, in which structure and conduct result in better prices for consumers, and for which the benefits of changing to that counterfactual industry exceed the costs?

If we clearly answer “yes” to all three questions, then we would conclude prices are clearly unreasonable. If we cannot clearly answer “yes” to all three questions, it is still possible that there is evidence suggesting – to some degree at least – that prices are unreasonable. In that case, we would conclude that it is possible that prices are unreasonable (to that degree). However, if we clearly answer “no” to any of the three questions, we would conclude that prices are not unreasonable.

The fuel sector in New Zealand contains vertical and horizontal connections that need to be considered in assessing the sector-wide implications of any one feature in isolation and experience shows that changes in one part of the supply chain can have implications in others.

[159] This is based on Statistics New Zealand national accounting data.

## 8.2. Data and time were limiting factors.

To complete this study, we had to rely on partial data, collected from multiple sources that was not always comparable. We had limited means for resolving inconsistencies in data that could be obtained. We also had to work within a tight time-frame for a question of this size and importance. While the fuel companies and other participants were generous in providing information and explanations about their operations, some of this material took time to collate, and in some instances, was provided very late into our review.

The study period was also reasonably short – 2011 to 2015 – in an industry that is characterised by long-term pricing cycles. This carried a risk that those long-term trends would not be captured in the data we were using. We have had to bear this in mind when reaching our conclusions.

Combined, these limitations required us to undertake a desk-based review, rather than the sort of comprehensive market studies that have been conducted here and overseas by competition and industry authorities.

Part way through the review, we concluded that the data we were being provided with by the fuel companies was not going to allow us to answer our initial terms of reference. Each company reports its business operations using different accounting techniques (in some cases, local firms prepare their accounting using the global accounting policies of their parents).

Rather than terminate the study, we agreed with MBIE to use the data we had to make progress towards answering the question of whether prices are reasonable. In so doing, MBIE understood that this would mean that our findings would be more tentative and were likely to suggest avenues for further analysis, rather than provide definitive answers. We have had to make judgements about some causes for some of the results that the data suggests, and about key aspects of industry structure and conduct, and we acknowledge that others might reasonably come to different conclusions to ours. We have made apparent where we have could reach firm conclusions and where we have not.

## 8.3. What we have done

We have looked at the issue of the reasonableness of prices using all the available data, drawing on an extensive body of studies undertaken here and overseas looking at vertically integrated industries.

Despite the limitations we faced, we could undertake a useful check of the New Zealand fuel sector's operation and issues from the perspective of consumers. We have identified several key drivers of recent sector performance that warrant either immediate attention or further investigation. We have identified analytical techniques that will allow more definite conclusions to be drawn.

In looking at overseas practices, we have identified both potential approaches to improving the performance of the New Zealand market, as well as the risk from regulations that do not take the whole structure of the industry into account, or give insufficient weight to the dynamic nature of the market.

## 8.4. Conclusions

We have not been able to reach a firm view on the questions of whether the fuel sector is delivering reasonable prices to consumers.

There appear to be aspects of the structure and conduct in the sector that, to varying degrees, could be altered in cost-effective ways to produce materially better outcomes for consumers.

We emphasise that this clearly is not enough evidence to suggest that regulation is the answer – in fact we point out that regulation could have unintended, negative, consequences for consumers and suppliers.

Instead, given the importance of the industry, and the potential materiality of the issues, there is merit in deeper inquiry using different data and methodologies that are well-suited to addressing the study's questions.

## 8.5. Recommendations

Our main recommendation is that a more comprehensive analysis of the sector be undertaken, using a range of techniques that offer the promise of arriving at firmer conclusions of whether change is required.

There are, however, some issues that should be discussed with industry in advance of that analysis, in light of the findings in this report.

In Table 5, we outline a summary of our conclusions on the various elements of the sector against our three-limb test.

### Table 5 The results of our three-limb test

| Element | Is the issue material | Cause for concern | Could it be addressed | Would benefits exceed costs | Recommendation |
|---|---|---|---|---|---|
| Terminal access | Yes | Probably | Possibly | Unclear | Discuss the design of a liquid wholesale market with industry. |
| MPP | Possibly | Yes | Yes | Yes | Discuss with Z Energy. |
| B&L transparency | Possibly | Possibly | Yes | Probably | Discuss with industry. |
| Refinery arrangements | Probably | Probably | Unclear | Unclear | Investigate further. |
| Product differentiation | Possibly | Unclear | Unclear | Unclear | Investigate further. |
| Cross-subsidies | Possibly | Unclear | Unclear | Unclear | Investigate further. |

Source: NZIER, Cognitus, Grant Thornton

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# Appendix A Initial Terms of Reference

## Terms of Reference – Fuel Market Financial Performance Study

**Context**

1. The Ministry of Business, Innovation and Employment (MBIE) monitors the performance of markets for the supply of energy in New Zealand, including the supply of petrol and diesel. The markets for petrol and diesel are unregulated and have historically been considered broadly competitive. However, MBIE has observed a trend of rising importer price margins since 2008, and proposes to commission a study to better understand the significance of that trend. The study may extend to a consideration of the effectiveness of competition and measures to improve competition in the relevant markets.

**Proposed Study**

2. The proposed study into the financial performance of the New Zealand fuel industry will be an important input in the Government's efforts to build an accurate picture of the overall performance of the fuel markets in New Zealand, and is likely to significantly influence any further work carried out by the Government. Consultants selected to undertake the study will be asked to address the questions set out below, using information currently available in the public domain and using additional information that may be provided by relevant firms. MBIE will seek to facilitate access to additional information (such as performance measures derived on the basis of replacement cost of sales operating profit) but cannot guarantee if, or how promptly, it will be made available.

**Part 1: Financial performance and cost of capital benchmarks**

**Subpart 1(a): Return on average capital employed**

3. On both historical cost and replacement cost bases (HCOP and RCOP), what is the return on average capital employed (ROACE) of the major businesses (Z Energy, BP, Mobil and Gull), individually and in aggregate, for both fuels and non-fuels, in each year since 2011? Report also on Chevron NZ for the period 2011 to 2015. What factors might explain any trends in ROACEs and what future trends might be expected and why? (Note that we expect the major businesses to provide financial information on a financial year basis, which is the calendar year for all but one.)

4. Provide ROACEs at the level of each integrated business and broken down by market and product segments, to the extent possible given the available information. In particular, please estimate ROACEs on an RCOP basis, for each of the major fuel suppliers for each year since 2011, by:

a. Midstream, in aggregate and broken down as applicable by:

   i. Refining NZ

   ii. Primary distribution of refined products (Refining NZ pipelines and terminals – distribution to Auckland, coastal shipping – COLL, distribution by truck)

   iii. Terminal storage and associated pipeline facilities

b. Commercial supply of refined products, in aggregate and broken down as applicable into the following market segments:

   i. Aviation

   ii. Marine

   iii. Bitumen

   iv. Card

   v. Bulk

   vi. Distributor, and

   vii. Other

c. Retail supply of refined products (primarily petrol and diesel). ROACE estimates for retail should split out returns from fuels versus non-fuels, and where possible be broken down by region.

5. ROACE estimates by market and product segment, and by region, should be prepared utilising a generally accepted cost allocation model that allocates costs appropriately, and be presented both with and without any asset revaluations that have occurred since 2010.

6. ROACE estimates may include the cumulative impact of differences in historic cost earnings and replacement cost earnings when calculating net assets on a replacement cost basis. The base year for these adjustments would be 2011.

7. Identify any other financial performance metrics relevant to assessing the competitive performance of the sector? Where relevant, these other financial performance metrics should be applied to each of the major fuel suppliers.

8. Taking into account the nature of the business activities, economies of scale, and any other relevant matters, how does the ROACE (and any other relevant financial performance indicator) of the fuel suppliers in New Zealand compare with those of:

   a. comparable fuel suppliers in other countries, and

   b. firms engaged in comparable wholesale or retail activities in other sectors in New Zealand or elsewhere (e.g. energy utilities)?

**Cost of capital benchmark range**

9. Given the nature of the business activities, market risks, scale economies, cost of debt, and any other relevant factors, what is an appropriate benchmark weighted average cost of capital (WACC range) for a business engaged in wholesale and retail supply of fuel in New Zealand?

10. What benchmark WACCs are applied in the regulation of comparable fuel supply businesses in other countries?

11. How do the ROACEs of fuel suppliers in New Zealand compare with the benchmark WACC range (informed by responses to the questions above)? Are the ROACEs reasonable, given the nature of the fuel wholesaling and retailing?

**Subpart 1(b): Margin analysis**

**Gross and net margins (accounting margins)**

12. What are the annual gross and net margins of each of the major businesses (Z Energy, BP, Mobil and Gull), individually and in aggregate, by business channel and product type, and by region. What trends are apparent since 2011? What factors might explain any trends and what future trends might be expected and why?

13. Relevant product types and business channels are set out in the table below.

| **Product type** | **Business channel** |
|---|---|
| Petrol | Retail |
| Diesel | Commercial – card |
| Jet fuel | Commercial – bulk |
| Fuel oil | Distributor |
| Bitumen | Aviation |
| | Marine |
| | Other |

14. Gross margin means revenue less taxes and cost of goods sold (COGS) on a replacement cost basis (and with COGS reported on a consistent basis).

15. Net margin means gross margin less other operating costs. Common operating costs may be allocated between business channels, product types and regions using appropriate allocators such as staff numbers or volume.

**Subpart 1(c): Other market performance measures**

16. What inferences can be drawn from analyses of prices and volumes in discrete products and markets? What time series analyses of fuel prices and volumes at the level of retail outlets or regions could be used to inform an understanding of price and margin movements in those products and locational markets over time?

17. What characteristics of the market explain differences in fuel prices between regions? What financial or non-financial indicators best measure the effectiveness of competition at a regional level?

**Part 2: Conclusions and observations**

18. What conclusions can be drawn from the financial performance and cost of capital benchmarks, margin analysis or other market measures? What conclusions can be drawn from the financial performance and cost of capital benchmarks? In particular:

a. Are retail consumers in New Zealand paying reasonable prices for petrol and diesel and why? At what level might prices be considered unreasonable?

b. What conclusions can be drawn about retail fuel price differences at a regional level?

19. To the extent that returns in any individual market segment are considered to be unreasonably high, what are the market features that limit the effectiveness of competition in this market segment? What regulatory or non-regulatory barriers may prevent the entry and/or expansion of new competitors in national or regional fuel markets?

20. For any material barrier to market entry and expansion identified, what specific measures could be considered to reduce it and what are the estimated costs and benefits of any measures identified above?

21. What further work, if any, should be carried out to build an accurate picture of the performance of fuel markets in New Zealand?

22. An outline of the approach undertaken, summary findings and all information in the conclusions and observations section should be presented in an aggregate form that can be publicly disclosed.