Comments on the NZCC's Retail Fuel Sector Draft Report

Profitability Analysis and Econometric and Empirical Modelling

Prepared for

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1. INTRODUCTION AND SUMMARY

We have been asked by Bell Gully, on behalf of BPNZ, to review and comment on certain aspects of the Commission's analysis as set out in its Market Study into the Retail Fuel Sector Draft Report (Draft Report). In particular, we have been asked to comment on the Commission's:

- Profitability analysis, as set out in Appendices B to E of the Draft Report; and

- Econometric and empirical modelling, as set out in Appendix F of the Draft Report.

A summary of our observations on the Commission's analysis is set out in the sections below.

1.1. Profitability analysis

The Commission adopts a range of measures to assess the 'profitability' of retailers. However, each of these measures has limited information value and cannot be used as a basis for a finding that retailers are making excessive profits as a result of prices being persistently above competitive levels. In particular:

- The Commission's forward-looking analysis of business cases identifies proposals for new investment that are consistent with what one would expect to observe in a competitive market. It is common for firms to adopt hurdle rates of return well above the weighted average cost of capital (WACC) and for managers to require new investments to have short payback periods. Commentators have suggested that this is because firms ration their capital and seek to only invest in those projects that offer the highest returns, and that managers take account of idiosyncratic risk when making investment decisions.

- Tobin's q is an unreliable measure of forward looking profitability. There should be no expectation that firms in competitive markets will have a Tobin's q of one, and estimates of Tobin's q are commonly above one in markets that are likely to be competitive. Part of the problem with Tobin's q estimates is how replacement cost is estimated and the quality of data used in the estimation. In our opinion, the Commission has significantly overstated Tobin's q for Chevron and Z Energy as a result of the exclusion of contracts acquired from the replacement cost of Chevron's assets and the reliance on Z Energy's share price at a single point in time to estimate its market value. Accounting for these measurement issues, we find the Tobin's q for Chevron and Z Energy to be much lower than 2.2 and 2 respectively.

- Gross margins, such as the importer margins relied on by the Commission, are not a measure of profitability and provide little information on whether returns are excessive or competition is ineffective. Although gross margins have risen over the last ten years, this may reflect that we are approaching (or have reached) the peak of the business cycle. Entry and expansion, such as is currently occurring by independent retailers such as Gull, NPD, Waitamo and Allied, as well as in the form of a new importer with terminal infrastructure in the South Island, is likely to erode these margins, as occurred following the entry of Challenge and Gull in the late 1990s and early 2000s. Importer margins also overstate the margins that retailers have actually made, and the growth of those margins, since they do not include all costs associated with the retailing of motor fuel, and customer facing costs have been increasing.

- ROACE based on historic cost provides no indication as to whether retailers are or have been earning excess returns due to prices being above competitive levels. The Commission's use of a rolling three-year average ROACE is also of little information value because it does not reflect the extent to which ROACE can vary from one retailer to the next and from one year to the next. An analysis of the annual weighted average ROACE for the major retailers reveals that they have not consistently generated a ROACE above the Commission's estimate of the WACC since 2010 and that their ROACE has in fact fallen in 2018. We also consider the Commission's analysis of the rolling three-year average ROACE for international comparators and for firms in the NZX50 to present a misleading picture of the returns generated by these firms over time. In particular, the Commission's analysis of the ROACE for international peers is heavily weighted to just two firms, and fails to recognise the much higher returns realised by many other international peers that are in line with or greater than the returns realised by the New Zealand firms. The returns realised by the New Zealand fuel firms are also not out of line with the range of returns generated by other firms in the NZX50.

1.2. Econometric modelling

In Section 3, we make a number of observations in respect of the Commission's econometric and empirical modelling, including the following.

- It is not clear to us why the Commission states that it would not expect to observe pass-through rates significantly greater than one in a competitive market. Our understanding of the economic theory of pass-through rates is that they depend on the shape of the demand curve and may well be greater than one in competitive markets. More generally, pass-through rates tend to be higher the more competitive the industry. The Commission's finding of high pass-through rates including rates greater than one is therefore not a basis for competition concerns.

- The Commission's finding of pass-through rates greater than one may, in any event, be an artefact of a mis-specification of the main regression. Estimated pass-through rates may be close to one, even in 2015, once GST is accounted for.

- The Commission expresses surprise that a portion of cost pass-through occurs contemporaneously with spot market cost changes. This should not be cause for surprise or concern given that spot market cost changes alter the value of the entire stock of fuel held by retailers.

- The Commission appears to be concerned that the size of discounts has increased significantly in the past decade, in line with increasing importer margins. However, the Commission should not assume from this correlation that there is a causal effect from increasing discount sizes to increasing importer margins, since there may be an endogenous relationship or no relationship at all between importer margins and discount sizes.

- The consumer welfare effects of discounting are ambiguous. Although higher prices may be charged to less price sensitive customers that do not use discounts, at the same time lower prices may be charged to more price sensitive customers that do take advantage of discounts. If this is the case, consumers that pay board prices would be worse off, but consumers that take advantage of discounts would be better off. The Commission's findings suggest that the benefit to each consumer that takes advantage of the discounts exceeds the harm experienced by each consumer that does not.

- The Commission's findings of relationships between discounts and prices a week or two in advance of those discounts may be an artefact of mis-specification of the Commission's econometric model, such as the arbitrary lag structure that the Commission has imposed and the potential for the relationship between board prices and discounts to be the opposite of what the Commission assumes (e.g. larger discounts might tend to be offered when board prices are higher).

- There may be good reasons why the Commission is not finding much of an effect of entry of smaller retailers on the prices and volumes of the majors. First, entry is not random and is most likely to occur in locations that are most sheltered from direct competition and that consequently do not divert much demand from existing sites. Second, where entry does occur close to existing sites, while volume effects should be expected if the two sites are substitutable from a motorist's perspective, there may be little effect on prices if competition among existing sites is already effective at constraining prices.

In addition to the above observations we have offered more detailed comments on the Commission's modelling.

2. PROFITABILITY ANALYSIS

2.1. Commission's approach to assessing profitability

2.1.1. The time period over which to assess "persistent" excess returns

Effectively competitive markets with relatively high returns for a period of time will attract entry or expansion, which should reduce returns. Similar to the Commission's observation in para B29 of the Draft Report, if competition is working well, relatively high returns are likely to be temporary. It is for this reason that the Commission is right to "not place too much weight on estimates of profitability over short time periods (as noted above, short-term profits can be above or below normal levels even when there is workable competition)".[1]

The question then is how long is "temporary" and how long is "persistent". In our view, the answer to this question should reflect the lives of investments and business cycles in the industry, and will therefore vary from industry to industry. To understand the appropriate length of time over which high returns should be viewed as persistent, evidence on the length of the business cycle is therefore relevant. If a business cycle is longer than ten years, for example, high levels of returns for five years would not qualify as "persistently"

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[1] Draft Report, para B33.2.

high, particularly if there is evidence of much lower returns in another part of the cycle. High returns observed over a number of years may represent a peak of a cycle and to focus on those years would result in a distorted view of the effectiveness of competition in the industry.

The Commission acknowledges that it should have some regard to the low returns generated by retailers in the period before 2010 when assessing whether levels of profit currently being earned by retailers are consistent with workable competition. However, it does not consider that its assessment of the persistence of excess profitability needs to be assessed over a timeframe that reflects the business cycle and the lives of investments.[2]

On this basis the Commission focusses its forward-looking assessment of profitability on returns expected to be achieved by retailers from 2014 onwards and its backward-looking analysis of profitability on returns realised from around 2010 onwards, with a particular focus on higher returns generated by majors and smaller retailers since 2014.

The Commission's reasons for this shorter focus appear to be presented in para B86 of the Draft Report. In our opinion, the reasons in para B86 do not support the Commission's view that persistence does not need to be assessed over the business cycle. The Commission's reasons appear to be that a longer period would only be justified if there were low utilisation for a period of a lumpy infrastructure investment, and that the low returns across the fuel industry prior to 2010 was not the result of low initial utilisation of infrastructure.[3]

In our view this is a limited analysis that ignores the business cycle. When business cycles are long, low returns earned over long periods of time, even at full utilisation, may be balanced by high returns over long periods, without generating excess overall profits. The Commission therefore should not draw any conclusions as to the effectiveness of competition on the basis of high returns made over one part of the cycle. Entry in retail fuel markets should also not be expected to occur quickly in response to rising margins when history has demonstrated that sustained periods of low returns may be expected over long periods of time.

The Commission also argues that there can be value in looking at profitability over much shorter time horizons because fuel companies expect and are achieving rapid paybacks on new site investments and in a competitive market investments offering greater than normal rates of return and rapid paybacks would attract new entry, regardless of what point has been reached in the business cycle.[4] However, the "rapid paybacks" the Commission refers to are in relation to particular sites that are likely to be the most profitable new investment opportunities and are unlikely to reflect the profitability and paybacks of an entire retail fuel network (we discuss this further in Section 2.2 below).

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[2] Draft Report, para B92, p. 270.

[3] One reason to consider profitability further back in time is that investment in infrastructure may be lumpy and that such infrastructure may have significant excess capacity in the early days of its life. Where returns are low in the early days of the life of the asset, higher profits in later years could therefore give a misleading impression of excess profitability.

[4] Draft Report, para B93, p. 270.

2.1.2. Use of historic costs v replacement costs

The Commission justifies its use of ROCE estimates based on historic cost on the basis that, because valuation (holding) gains are not included in historic cost measures, historic cost ROCE estimates will "generally" underestimate returns.[5] This appears to represent a rebuttal of BPNZ's argument that estimates of ROCE using historic cost will overstate ROCE using replacement cost, and the overstatement could be significant.[6] The Commission also argues that "[a]ny assessment of a company's profitability should include the operating results as well as the capital gains".[7] In each respect we disagree with the Commission.

First, estimates based on historic cost will not "generally" underestimate ROCE based on replacement cost even when valuation gains are accounted for in measures of ROCE based on replacement cost. In Table B2 of the Draft Report, the Commission presents an amended version of the stylised example that BPNZ submitted to the Commission. In this amended version, the Commission illustrates the effect of including valuation gains in the total returns in the estimate of ROCE using replacement cost, and observes that the *average* ROCE using replacement costs shows an *average* return over the ten years in the example that is higher than the average ROCE using historic cost over the same ten years. However, as can be seen in the table, averages are deceiving. The ROCE using replacement cost is *smaller* than the ROCE using historic cost from year 7 onward. What is more, the Commission has overstated the valuation gains in Table B2. Valuation gains should be calculated as the difference between depreciated replacement cost and historic cost, not the difference between full replacement cost and historic cost. With smaller valuation gains than shown in Table B2, the ROCE using replacement cost may be smaller than the ROCE using historic cost in even more years. The Commission's analysis of Tobin's q for Z Energy demonstrates that *depreciated replacement cost*, may be lower than full replacement cost by a significant amount.[8] As a result, the Commission's stylised example overstates ROCE based on replacement cost because it values the capital gain by reference to the cost that would need to be incurred to purchase a new asset as opposed to what the business could sell the depreciated asset for.

Second, we do not agree that "any" assessment of profitability should include valuation gains. In our opinion it depends on the purpose for which profitability is being assessed. In particular, when the purpose is to understand whether an industry is competitive or whether prices and margins in an industry are excessive, a measure of profitability that includes valuation gains (or losses) should be interpreted with caution, and it may be preferable to estimate ROCE excluding those gains (or losses). Where the replacement

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[5] Draft Report, para D225.10, p.342, and see also paras B76-B79, where the Commission presents an example that seeks to establish when valuation gains are accounted for, estimates of ROCE based on historic cost are lower than estimates of ROCE based on replacement cost.

[6] Draft Report, para B75, which is followed immediately by the Commission's discussion of valuation gains

[7] Draft Report, para B79, p. 266.

[8] For the purpose of calculating Tobin's q for Z Energy, the Commission estimates both the depreciated replacement cost of Z Energy's assets, as recorded in Z Energy's accounts, as well as the full replacement cost of certain specialised assets, with the latter being valued far more highly than the former. Specifically, the Commission estimates a Tobin's q of between 1.6 and 1.7 for Z Energy based on the full replacement cost for specialised assets. This implies a replacement cost estimate of $2,406 million to $2,265 million, which is higher than the depreciated replacement cost of its assets, being $1,880 million.

cost of assets is increasing over time and the inclusion of revaluation gains raises the ROCE above the WACC, this does not imply that the firm has been pricing its services above a competitive level. Rather, in such a circumstance, the firm may be charging competitive prices, but have made an unanticipated capital gain. For example, let us assume that the entire difference between the replacement and historic cost of assets shown in Table B2 is due to unanticipated increases in the value of land. If this were the case, then a large proportion of the ROCE in each year will be due to unanticipated capital gains on land holdings, rather than margins on the supply of services to customers. In year 1, for instance, only two percentage points of the 10.9% ROCE was a return from the supply of products or services to customers, with the remaining 8.9 percentage points a return on the value of land.

In our view, unless the Commission understands the extent to which valuation gains drive retailer returns, it cannot draw any inferences from estimates of ROCE that include valuation gains regarding whether the retail fuel market is competitive or whether excess returns are being realised in that market.[9]

2.2. Business cases for new investment do not imply excess returns in respect of the entire retail network

In our opinion the Commission has erred in concluding that internal rates of return (IRRs) on new investments that average 20%, hurdle rates for new investments that are double or more than the firm's WACC and payback periods of five years or less are suggestive of excess returns or excess profitability in the industry.[10]

It is common for firms in competitive industries to set hurdle rates for new investments of 15% or more and well in excess of their WACC, for IRRs on approved investment proposals to consequently be at that level or higher, and for payback periods to be as short as three years. This phenomenon is widely reported across industries and therefore cannot be interpreted in the retail fuel context as evidence of expectations of excessive returns or an uncompetitive market.

For example, a 2016 US study found that, on average, firms use hurdle rates of twice their cost of financial capital in evaluating projects.[11] The authors interpret this finding as a form of capital rationing when limitations prevent a company from undertaking all projects with a positive net present value.[12] They also suggest that firms (in particular, their managers)

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[9] As noted by the Commission in its Draft Report, Z Energy considers underlying land values to be the significant determinant of fair value changes for itself. However, the Commission does not appear to have considered the extent to which Z Energy's ROCE is driven by gains in the value of land rather than margins on the retail supply of fuel. See Draft Report, para D79, p. 302.

[10] Draft Report, para D32 and D39, pp. 291 and 293.

[11] Jagannathan R, Matsa, D Meier, I. & Tarhan, V (2016) "Why Do Firms Use High Discount Rates?" *Journal of Financial Economics* Vol. 120, No. 30 (1 June) 18.

[12] The authors find that the firms that add the largest premiums to their cost of financial capital generally have large cash holdings, which suggests that they 'hoard cash' in anticipation of more valuable projects. The authors surmise that these firms may also have operational constraints such as limited time to expand their work force and limited managerial bandwidth and that they inflate their discount rates above their cost of financial capital to account for such constraints or expectations.

are more wary of taking on risk that is idiosyncratic to their firm than diversified shareholders would be, and that this may contribute to hurdle rates above the firm's WACC.[13]

Similarly, a recent study by the Reserve Bank of Australia (RBA) highlights that Australian firms often adopt hurdle rates well above their WACC when evaluating business opportunities.[14] The RBA found that hurdle rates of around 15% were common, and that some firms adopt much higher hurdle rates of up to 30%. Furthermore, not all projects that meet this quantitative criteria will proceed, with some rejected because of other constraints, including strategic considerations, heightened risk aversion or a restricted capital budget imposed by higher levels of management. The authors note that hurdle rates do not tend to change with changes in a firm's WACC (e.g. due to changes in interest rates), which they suggest may be due to uncertainty over the true cost of equity or a reduced appetite for risk in a low interest rate environment.[15] The same authors also report that Australian firms that use payback periods as an investment criteria most commonly require payback within three years, and observe that this is consistent with studies of firm behaviour in the United States and the United Kingdom.[16] In light of this, the Commission should not be surprised to observe business cases for new to industry (NTI) or raze and rebuild (R&R) sites that have IRRs and hurdle rates well in excess of WACC and short payback periods.

We understand that BPNZ's own experience is consistent with the studies of other firms referred to above. We are informed that any new investment proposal within BP needs to "fight" for free cash flow with other new investment proposals globally, as free cash flow is rationed within the company and reserved for only the most profitable investment opportunities.

As a result, we understand that proposals for new investments will tend to be made only where there is an opportunity to establish a site at a highly desirable location (e.g. in an area where there is a rapidly growing and currently under-served population such as a large new residential development and where there are few or no other competitors in the immediate vicinity).[17] Given that BPNZ will only tend to develop business cases in respect of the most profitable investment opportunities at the time, the Commission should not infer

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[13] For a summary of the authors' views, see Ravi Jagannathan and David A. Matsa, *Why Do Companies Turn Down Profitable Investments*, Kellogg Insight, 6 July 2017, accessed at: https://insight.kellogg.northwestern.edu/article/why-do-companies-turn-down-profitable-investments.

[14] Lane, K. and Rosewall, T, Firms' Investment Decisions and Interest Rates, RBA Bulletin, June Quarter 2015, p. 3.

[15] Some RBA contacts argued that keeping the hurdle rate constant acts as an automatic time-varying risk adjustment: interest rates tend to be low when uncertainty is high, so the gap between the hurdle rate and the cost of capital should be higher (and vice versa).

[16] Lane, K. and Rosewall, T, Firms' Investment Decisions and Interest Rates, RBA Bulletin, June Quarter 2015, pp. 4 – 6.

[17] For example, at the time that BPNZ established its site in Ormiston, this area was one of Auckland's fastest growing suburbs. Likewise, BPNZ's site in Tauriko represented early entry into a growing area, with the site constructed adjacent to a new shopping centre.

from its analysis of those business cases that BPNZ's entire retail operation would have an IRR of ▮▮▮ or greater if it were to be established today.

We also note that not all of BPNZ's capital expenditure relates to the development of NTI sites that are chosen as the best possible investment opportunities and are expected to deliver relatively high returns. As demonstrated in Figure 1 below, around ▮▮▮▮▮ of BPNZ's capital expenditure is on site modifications or other capital items such as shop modifications, upgrade of carwash facilities and the installation of safety equipment, for which the return on investment is ▮▮▮▮▮▮▮▮▮▮ A ▮▮▮▮▮▮ is spent on R&R sites, which typically have an IRR ▮▮▮▮▮▮▮ given the difficulty of achieving volume uplift at these sites once they are rebuilt.[18]

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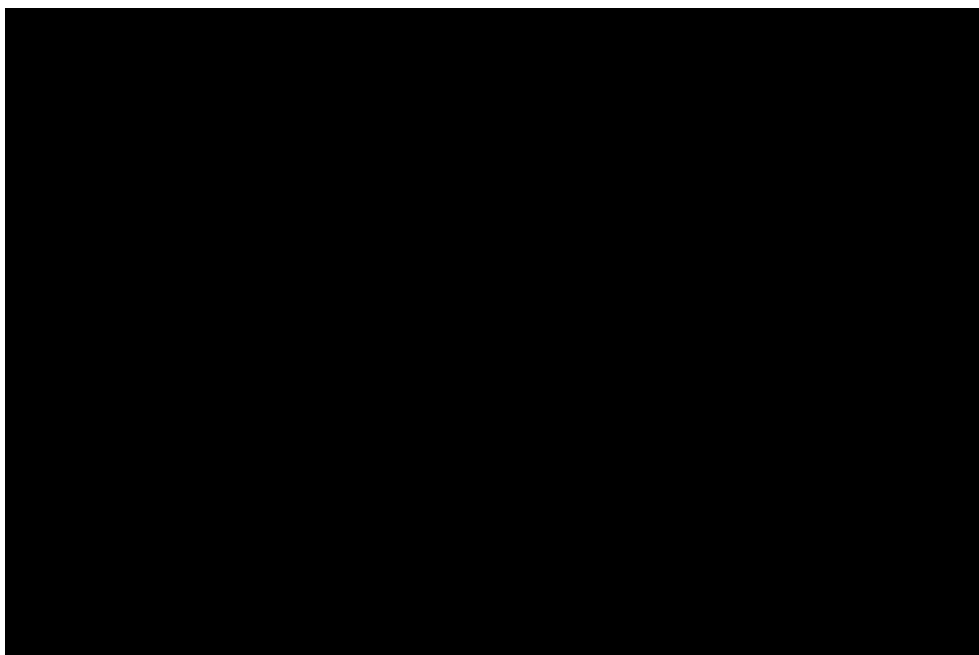
2.3. Estimates of Tobin's q

The Commission considers that Tobin's q can be used as a measure of profitability and market power[19] and that a Tobin's q in excess of one is indicative of an expectation of excess returns.[20] It calculates a Tobin's q of:[21]

- 2.2 and 2.0 for Chevron and Z Energy respectively, using depreciated replacement cost of specialised assets; and

- 1.8 to 1.9 for Chevron, 1.6 to 1.7 for Z Energy and 1.3 to 1.6 for Gull, using full replacement cost for specialised assets.

In our opinion, the Commission's comparison of measures of Tobin's q to one does not provide a robust indicator of whether the firms and assets in question are or were expected

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19 Draft Report, para D41, p. 293.

20 Draft Report, para D46, p. 293.

21 Draft Report, para D103, p. 310.

to earn future excess returns. First, while theory suggests that Tobin's q should tend toward one in competitive industries, actual evidence is that Tobin's q is often well above one for firms that operate in competitive industries. This is reflected in the results of the seminal study published by Lindenberg and Ross.[22] Of the 246 firms included in the Lindenberg and Ross study, 159 (65%) had a Tobin's q significantly above one[23] and the average q was above 1.4 for firms in many industries that are likely to be competitive, including general merchandise stores (1.42), producers of food products (1.72), producers of electric machinery (1.79) and manufacturers and/or suppliers of chemicals (2.42).[24]

Second, Tobin's q is highly dependent on how replacement cost is estimated, the quality of data used in the estimation, and also investor sentiment or how distressed a seller is at the time that the market value is assessed. In particular:

- If not all assets are included in the estimate of replacement cost, Tobin's q will be overstated. This was recognised by Lindenberg and Ross, who noted that the exclusion of certain intangible assets from their analysis, such as those that flow from advertising and research and development activities, may overstate their estimates of Tobin's q.[25]

- At the same time, estimates of market value can vary considerably over short spans of time and in idiosyncratic ways. For example, when market value is estimated using share prices, Tobin's q may fluctuate from one day to the next with changes in investor sentiment. Tobin's q calculated based on the share price from any one day is therefore unlikely to be informative of whether investors expect to achieve persistent excess returns. Where market value is estimated using actual purchase prices for assets, the value may vary depending on how distressed the seller is at the particular time and the relative bargaining positions of the buyer and seller. Again, estimates of Tobin's q may vary considerably depending on this bargaining balance.

In the following sub-sections we explain that, in our opinion, the Commission overstates Tobin's q for both Chevron and Z Energy as a result of the exclusion of contracts acquired upon the acquisition of the Chevron assets, and the Commission's estimates of Tobin's q for Z Energy are unreliable given the choice of a share price from a single day to arrive at the Commission's estimate of the market value of Z Energy.

A further data quality issue arises because Chevron and Z Energy were and are, respectively, engaged in a range of business activities in addition to fuel retailing. This means that an analysis of Tobin's q for Chevron and Z Energy can at best provide an indication as to whether these firms were/are expected to earn excess profits in respect of

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22   Lindenberg, E. B and Ross, S.A., Tobin's q Ratio and Industrial Organisation, The Journal of Business, Vol 54, No. 1 (Jan 1981), pp. 1 - 32.

23   Lindenberg, E. B and Ross, S.A., Tobin's q Ratio and Industrial Organisation, The Journal of Business, Vol 54, No. 1 (Jan 1981), pp. 23 and 27.

24   Lindenberg, E. B and Ross, S.A., Tobin's q Ratio and Industrial Organisation, The Journal of Business, Vol 54, No. 1 (Jan 1981), Table 4, p. 26.

25   Lindenberg, E. B and Ross, S.A., Tobin's q Ratio and Industrial Organisation, The Journal of Business, Vol 54, No. 1 (Jan 1981), p. 17. The authors recognise that advertising and research and development expenditures, which are generally expenses, are capital investments and that to omit them would bias replacement cost downwards and q upward.

all of their activities. It cannot provide a clear indication of whether these firms were/are expected to earn excess profits in relation to their retailing of fuel, specifically.

Another data quality issue with the Commission's estimates of Tobin's q is the Commission's reliance on depreciated replacement cost. We consider this to be conceptually flawed.[26] If the purpose of the analysis is to determine whether retailers are pricing above the level that would encourage de novo entry and investment,[27] then an analysis of Tobin's q should be based on full replacement costs of all assets.[28] De novo entry requires the establishment of new retail sites and terminal assets. Acquisition of an existing player or acquisition of existing sites and terminals, by a player that was not previously in the industry, is better characterised as a change in ownership of existing assets, rather than entry and investment. Such a change of ownership also requires that there are assets for sale to the buyer. For this reason, since the Commission has used depreciated replacement cost in all of its measures (even its measures that use full replacement cost for specialised assets), we consider that its estimates of Tobin's q further overstate the expected future profitability of a de novo entrant.

In the following sub-sections we expand on the Commission's exclusion from its replacement cost estimates of the value of acquired contracts and the Commission's use of a share price from a single day to estimate the market value of Z Energy.

2.3.1. Relevance of acquired contracts

When calculating Tobin's q for Chevron and Z Energy, the Commission excludes from its estimate of replacement cost both the value of customer contracts acquired and goodwill recognised upon the purchase of assets.[29] The rationale provided by the Commission for excluding both of these intangible assets is that these are not costs that a new entrant would incur or that an incumbent would incur when expanding its network.[30]

We consider the exclusion of acquired contracts from the Commission's estimate of replacement cost to be an incorrect approach to the estimation of Tobin's q in the circumstances, resulting in overestimates of Tobin's q for both Chevron and Z Energy. Z Energy's purchase of the Chevron business included, among other things, the acquisition of ten terminals, 146 Caltex branded retail sites and 73 truck stop sites. At the time of purchase, Z Energy valued the net assets it was acquiring from Chevron at $857 million, of which $433 million (50%) comprised customer contracts, supply agreements and acquired

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[26]   We do not agree with the Commission's assertion that "Strictly speaking, Tobin's q should be calculated using depreciated replacement costs". See Draft Report, paras D73 to D75, pp. 301 – 302.

[27]   See Draft Report, para B66.

[28]   See Draft Report, para B67.

[29]   The Commission does, however, include the cost of intangible assets such as software, acquired brands, rights, licences, easements and emission units, which are capitalised by fuel retailers. It excludes the cost of internally generated brands.

   See: Draft Report, paras D87 to D89, p. 304. In line with accounting rules, internally-generated intangibles are not accounted for in company financial statements in New Zealand and so are not easily valued. The Commission does include the cost of Z Energy's rebrand as one of its intangible assets. However, this is not the same as an estimate of Z Energy's internally generated capital.

[30]   Draft Report, D90, p. 305.

leases.[31] Had these contracts and agreements not formed part of the deal, the price that Z Energy would have been willing to pay for the Chevron business would have been far lower. Likewise had another retailer sought to purchase the Chevron assets, it would not have valued those assets anywhere close to $857 million if the customer contracts and supply agreements that Chevron then had with other parties did not form part of the deal. Contracts that provide certainty over fuel supply have value precisely because they avoid the potential for capacity to be unused for a lengthy period of time.

More generally, there is no coherence in comparing the price paid for a business or the share market value of a business to just a subset of the assets of that business, which is what the Commission's approach of excluding the value of these intangible assets amounts to. A coherent approach to estimating q requires that the numerator and denominator are consistent. One cannot "pick and choose" by comparing a numerator that reflects a certain set of valuable assets (including intangible assets) with a denominator that excludes some of those assets.

Had the Commission included the value of acquired contracts in its estimate of depreciated replacement cost, it would have calculated a Tobin's q of:

- 1.1 for Chevron using depreciated replacement cost for specialised assets,[32] which is substantially lower that the Commission's estimate of 2.2 and incorporates an expectation of synergy benefits post-acquisition;[33]

- 1.0 for Chevron using full replacement cost for specialised assets, which, as noted above still overstates Tobin's q due to the use of depreciated replacement cost for other assets;[34]

- 1.7 for Z Energy using depreciated replacement cost for specialised assets,[35] which is much lower than the Commission's estimate of 2.0; and

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31 Z Energy Annual Report 2007, p. Note 4, p. 67 and Note 13, p. 75.

32 The Commission estimates Chevron's market value to be $959 million as at 1 June 2016 and the depreciated replacement cost of its assets to be $442 million. The contracts that Z Energy acquired from Chevron were estimated to have a value of $433 million. Using a revised replacement cost of $875 million, the Tobin's q for Chevron would be 1.1. See Draft Decision, paragraph D68, p. 300 and paragraph D101, p. 309 and Z Energy Annual Report 2017, Note 13, p. 75.

33 At the time of the acquisition it was reported that Z Energy expected to achieve synergy benefits of between $15 million and $25 million per annum in terms of earnings before interest, tax, depreciation, amortisation and fair value adjustments (EBITDAF). See: Z Energy, Acquisition of Chevron New Zealand, 2 June 2015 at: https://investors.z.co.nz/static-files/7499c30f-a11d-4a5c-bf05-8785c6fc4547

34 The Commission estimates a Tobin's q range of between 1.8 and 1.9 for Chevron based on full replacement cost for specialised assets. This implies an estimated replacement cost range of $505 million to $533 million. Z Energy valued the contracts acquired from Chevron at $433 million. Using a revised replacement cost range of $938 million to $966 million, the Tobin's q for Chevron would be 1.0.

35 The Commission estimates Z Energy's market value to be $3,850 million as at 31 March 2019 and the depreciated replacement cost of its assets to be $1,880 million. The contracts that Z Energy acquired from Chevron that it did not divest were estimated to have a value of $426 million in Z Energy's accounts as at 31 March 2019. Using a revised replacement cost of $2,306 million, the Tobin's q for Chevron would be 1.7. See Draft Decision, paragraph D68, p. 300 and paragraph D101, p. 309 and Z Energy Annual Report 2019, Note 12, p. 82.

- 1.4 for Z Energy using full replacement cost for specialised assets.[36]

### 2.3.2. Share price volatility

The Commission calculates Tobin's q for Z Energy based on the Z Energy share price as at 31 March 2019, the number of shares outstanding as at that date and Z Energy's own estimates of the depreciated replacement cost of its assets. Based on this information, the Commission calculates a Tobin's q of 2.0, based on depreciated replacement cost for specialised assets. Had the Commission included the value of contracts acquired, it would have estimated a q of 1.7, based on depreciated replacement cost for specialised assets and only 1.4 based on the full replacement cost for specialised assets.

However, these estimates of Tobin's q are not stable over time. Since 1 January 2018, Z Energy's share price has ranged from a high of $NZ7.80 in to a low of $NZ5.18, with the share price trending downward over that period as demonstrated in Figure 2 below. Adopting the Commission's approach to estimating Tobin's q and adding the value of contracts acquired (before amortisation) to the estimate using depreciated replacement cost for specialised assets, over the one year period from 31 March 2018 to 31 March 2019 the Tobin's q for Z Energy ranges from 1.89 to 1.47. Calculating Tobin's q on the basis of the full replacement cost of specialised assets, the bottom end of the range would fall from 1.47 to just 1.20 to 1.26. Our calculations are presented in Table 1 below.

This demonstrates that the Commission's point estimate of Tobin's q based on Z Energy's share price as of 31 March 2019 is an unreliable measure of expectations of Z Energy's future profitability. Moreover, Z Energy's share price has been trending down each year since 2016, which, absent any significant changes in replacement cost, suggests that the Tobin's q for Z Energy has been falling year on year for the last three years.

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[36] The Commission estimates a Tobin's q range of between 1.6 and 1.7 for Z Energy based on full replacement cost for specialised assets. This implies an estimated replacement cost range of $2,406 million to $2,265 million. The contracts that Z Energy acquired from Chevron that it did not divest were estimated to have a value of $426 million. Using a revised replacement cost range of $2,832 million to $2,691 million, the Tobin's q for Z Energy would be 1.4.

Figure 2: Z Energy Share Price in $NZ, January 2018 to September 2019
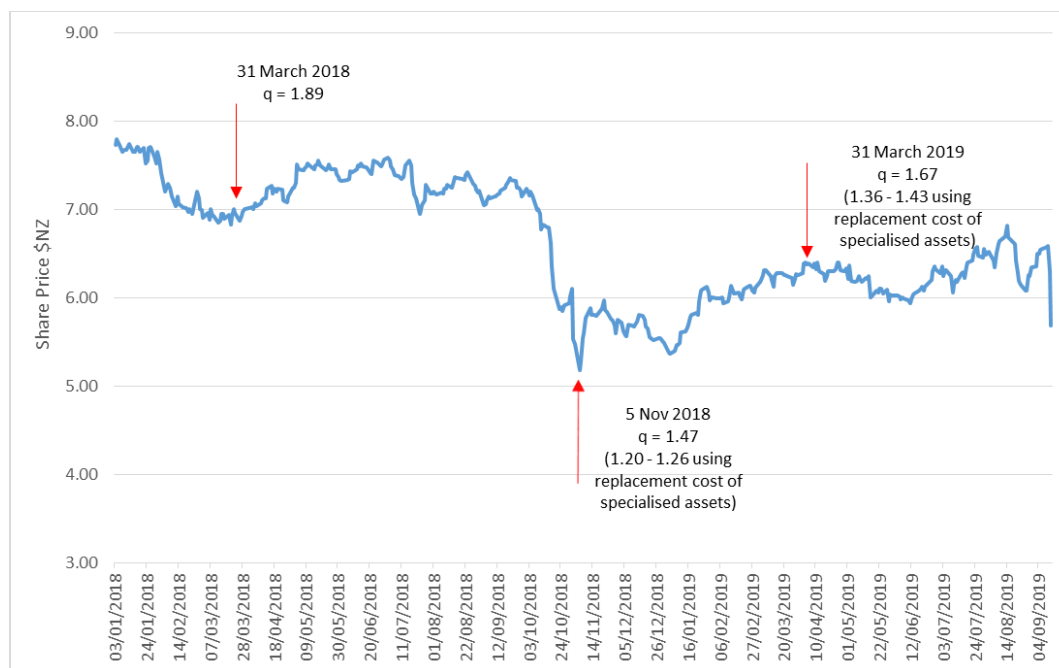
Source: Z Energy Website at https://investors.z.co.nz/share-information/share-price-chart

Table 1: Estimates of Tobin's q for Z Energy, March 2018 to March 2019

	31-Mar-18	05-Nov-18	31-Mar-19
Share Price	$7.00	$5.18	$6.26
Shares Outstanding	430	429	429
Market Capitalisation of Z Energy	3,010	2,222	2,686
Plus:			
Long term borrowings	736	803	803
Short term borrowings	150	135	135
Short term financial derivatives	17	13	13
Capitalised Lease Commitments [1]	290	290	290
Deferred tax liabilities (50%)	78	71.5	71.5
Less:			
Investment in other ventures	110	148	148
Implied market value of Z Energy's fuel business	**4,171**	**3,850**	**3,850**

	31-Mar-18	05-Nov-18	31-Mar-19
Depreciated Replacement Cost			
Storage terminals	172	172	172
Land and improvements	317	301	301
Buildings	105	100	100
Plant and Machinery	243	232	232
Construction in Progress	33	25	25
Other non-current assets	3	3	3
Right to use leased assets	290	290	290
Software in progress	15	37	37
Working capital	277	496	496
Brands	97	97	97
Emissions Units	128	8	8
Other intangibles	100	119	119
Depreciated Replacement Cost (excluding contracts acquired)	**1,780**	**1,880**	**1,880**
Tobin's q	**2.34**	**1.80**	**2.05**
Contracts acquired	426	426	426
Depreciated Replacement Cost (including contracts acquired)	**2,206**	**2,306**	**2,306**
Revised Tobin's q	**1.89**	**1.47**	**1.67**
Depreciated Replacement Cost with full replacement cost of Specialised Assets (including contracts acquired)		**2,832 - 2,691**	**2,832 - 2,691**
Revised Tobin's q		**1.20 – 1.26**	**1.36 – 1.43**

Source: Share prices are daily closing prices obtained from Z Energy website; replacement cost estimated derived from Z Energy Annual Reports for 2007, 2008 and 2009 and capitalised leases and right to use leased assets derived from Z Energy "2019 Results Presentation for the year ended 31 March 2019", p. 30.
Notes: Estimates for capitalised leases and right to use leased assets is not available for other years and so the value of $290 million as applied in 2019 has been applied in all other years.

2.4. Gross margins

The Commission asserts that although MBIE's reported estimates of importer margins for petrol and diesel are not a measure of profitability, they provide valuable insights into trends

in industry profitability because importer margins are "a key driver of industry returns".[37] The Commission also asserts that importer margins reported by MBIE "show sustained growth since 2010 and continue to remain at levels above recent historic averages".[38]

As explained in BPNZ's response to the Commission's Profitability Working Paper, margins are not economic measures of profitability. In particular, relatively high margins for a period of time do not, on their own, indicate that profits are excessive or that competition is ineffective. From an economic perspective, investment required for a business activity will only be considered profitable when the value of the cash flows generated, in net present value (NPV) terms, result in an economic return over the life of that investment that exceeds the cost of capital. As a result, in the context of long-term investments, profitability cannot be assessed on an annual or other short-term basis: it can only be assessed over the life of the investment.

An observation that margins have been relatively high from 2014 to 2019 therefore has little information value for an assessment of profitability in the context of an industry with long investment lives and long business cycles. The Commission recognises that, following the entry of Challenge and Gull in the late 1990s, margins declined in the 2000s to a point where several players viewed margins as insufficient to attract investment and divestments followed.[39] As can be seen in Figure 2.4 of the Draft Report, importer margins for regular petrol were indeed extremely low by historical standards from the late 1990s until around 2012, a period of more than a decade. In our opinion it would be unsafe to draw conclusions regarding competition issues in the industry based on importer margin levels in recent years, without due recognition that the very same industry experienced considerably lower margin levels for an extended period in the not too distant past.

The Commission appears to view the higher margins earned in more recent years (from 2014 to 2019) as consistent with its view that profits have been "persistently high over the last decade"[40] and as a basis for its preliminary conclusion that "the New Zealand retail fuel industry appears to be earning […] significant excess returns on a persistent basis".[41] This is one interpretation of the relatively high recent margins; however we view it as a short-sighted one. An alternative interpretation is that margins were unsustainably low throughout the 2000s, and in recent years they have recovered to levels that are sustainable yet are not above the levels that they achieved in the late 1990s prior to entry of Gull and Challenge. Figure 2.4 suggests that the retail fuel industry in New Zealand has a long cycle, in which periods of relatively high margins attract entry that leads to periods of relatively low margins. The Commission might therefore consider that, rather than retailers earning persistent excess returns, the margins realised in recent years reflect the peak of the cycle, with entry and expansion (which is occurring, in the form of independent retailers such as Gull, NPD, Waitamo and Allied, as well as in the form of a new importer with terminal infrastructure in the South Island) likely to erode those margins again, as it did in the late 1990s and early 2000s. As the Commission has acknowledged, importer

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37   Draft Report, para D139, p. 319.

38   Draft Report, para D124, p. 316.

39   Draft Report, para D125, p. 316.

40   Draft Report, para 3.51.

41   Draft Report, para 3.67.

margins have been largely flat since 2016,[42] and our reading of Figure 3.5 of the Draft Report is that they appear to have peaked in 2017 and are now declining.

A more technical observation on importer margins is that the importer margins presented by the Commission do not reflect the net margins that retailers generate on sales of fuel, as they are gross margins before retail costs.[43] We understand that retail costs have been increasing over time, along with the gross margins, so that net margins after retail costs have not increased to the same extent as gross margins. The charts of importer margins that the Commission presents therefore overstate the increase in margins that retailers have realised on sales of fuel.[44]

2.5. Return on Average Capital Employed (ROACE)

The Commission goes on to estimate the ROACE for New Zealand fuel firms with a significant retail presence, or which primarily supply fuel to retail outlets, for the period 2001 to 2018.[45] It calculates the ROACE for each firm, including their retail operations and all other lines of business in which they are involved. The Commission calculates a rolling three-year geometric average[46] ROACE for these firms for the period 2004 to 2018 and compares this with:

- its estimate of the WACC for the period 2014 to 2019;

- the rolling three-year geometric average ROACE for international comparators; and

- the rolling three-year geometric average ROACE for companies included in the NZX50 (excluding three banks).

The Commission also compares the three year average ROACE for Z Energy, BPNZ, Mobil, Gull and other smaller retailers for the period 2016 to 2018.

Although the Commission recognises that ROACE is not an accurate measure of excess returns,[47] it concludes from its analysis that the New Zealand fuel industry has enjoyed

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[42] Draft Report, para 3.52.

[43] The gross margins reported by the MBIE account for the cost of purchasing fuel in Singapore, shipping it to New Zealand, insurance, losses, wharfage and handling, as well as taxes, duties and the New Zealand Emissions Trading Scheme (ETS), but do not account for costs associated with land transport to retail sites or costs associated with the operation of retail sites. See: https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-statistics-and-modelling/energy-statistics/weekly-fuel-price-monitoring/.

[44] ███
     ████████

[45] This includes BP, Chevron (until 2015), GAS, Gull, Mobil, NPD, Shell (until 2010), Waitomo, and Z Energy (from 2010).

     The Commission defines ROACE to be operating earnings as a percentage of average capital employed. [Insert detail of what is included as operating earnings and capital employed].

[46] The geometric average differs from an arithmetic average as it accounts for compounding from one year to the next. It is calculated as $[(1+R1) \times (1+R2) \times (1+R3)\ldots \times (1+Rn)]^{1/n} - 1$.

[47] Draft Report, D183, p. 332.

excess returns since the early years of this decade, with both the majors and smaller firms benefitting from retail fuel prices above competitive levels.[48]

In the following sub-sections we first discuss some methodological issues associated with the Commission's approach to assessing ROACE and then (putting those methodological issues to one side) we comment on each of the Commission's ROACE comparisons.

2.5.1. Problems with the use of ROACE measures to infer pricing in excess of competitive levels

In our opinion, the Commission's ROACE analysis cannot support a conclusion that New Zealand retailers have been making persistent excess returns as a result of some impediment to effective or workable competition. First, for each of Z Energy, BPNZ and Mobil, the Commission estimates the ROACE for its business as a whole, including activities unrelated to the supply of motor fuel such as the supply of aviation fuel, bitumen and lubricant products as well as activities unrelated to the supply of fuel to New Zealand motorists, such as the sale of motor fuel to large corporate customers. The Commission cannot assume that markets for the supply of these other products are more competitive than the market for the supply of retail fuel and so their inclusion in the analysis may understate a retail-fuel specific ROACE.

Second, for all retailers except Z Energy, the Commission has calculated ROACE based on historic cost (with the ROACE for Z Energy based on *depreciated* replacement cost). As acknowledged by the Commission in Attachment B, a measure of ROACE based on replacement cost focusses directly on the economics of new entry and by indicating whether new entrants would have an incentive to enter the market and increase output at current prices it can inform the Commission on whether competition is working effectively.[49] Measures based on historic cost do not have the same focus and therefore cannot inform the Commission in the same way. As a result, the Commission cannot conclude from its analysis of historic cost ROACE estimates that retailers have been persistently pricing above competitive levels and persistently making excess returns or profits.

Third, as discussed in section 2.1.2 above, the Commission's assertion that estimates of ROACE based on historic cost will tend to underestimate firm's returns (with the implication being that an analysis of ROACE based on historic cost may be viewed as a lower bound estimate of ROACE based on replacement cost) is also unfounded.[50]

Putting these methodological issues to one side, in the sub-sections below we comment on the Commission's various ROACE comparisons.

2.5.2. Comparison of ROACE estimates for NZ fuel retailers with WACC

The Commission calculates a rolling three-year average ROACE for the New Zealand fuel businesses for the period 2004 to 2018, weighting each firm according to its capital employed. The Commission compares this rolling three year average ROACE with the

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48 Draft Report, D225, pp. 341 – 342.

49 Draft Report, B67 – B68, p. 263.

50 Draft Report, B76 – B79 and D225.10, p. 265 - 266 and 342.

upper bound of its estimated WACC and claims that its analysis implies that these firms have been earning excess returns since 2010.[51]

In our opinion, the Commission's rolling three year average ROACE measure is not an insightful measure of returns. This is because the ROACE differs markedly from one retailer to the next and from one year to the next, as demonstrated in Figure 3 below. While a three year average "smooths" some of the volatility, the volatility itself suggests that great caution is needed in interpreting the ROACE estimates, smoothed or otherwise.

Figure 3:   ROACE for the major New Zealand retailers, 2004 to 2018
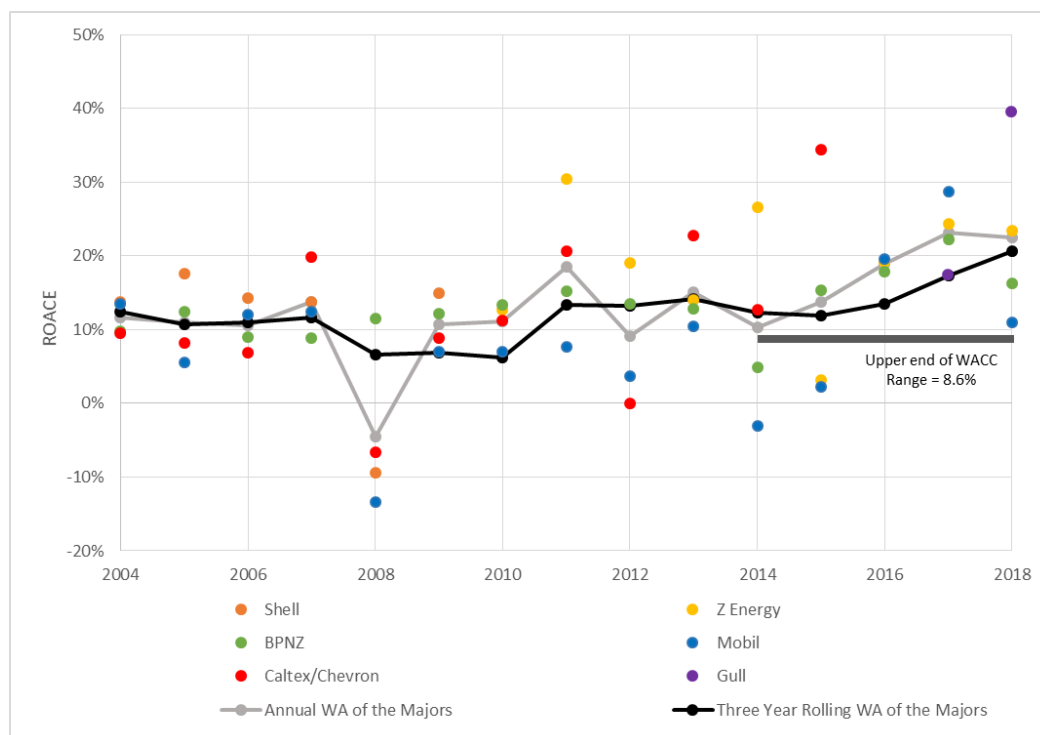
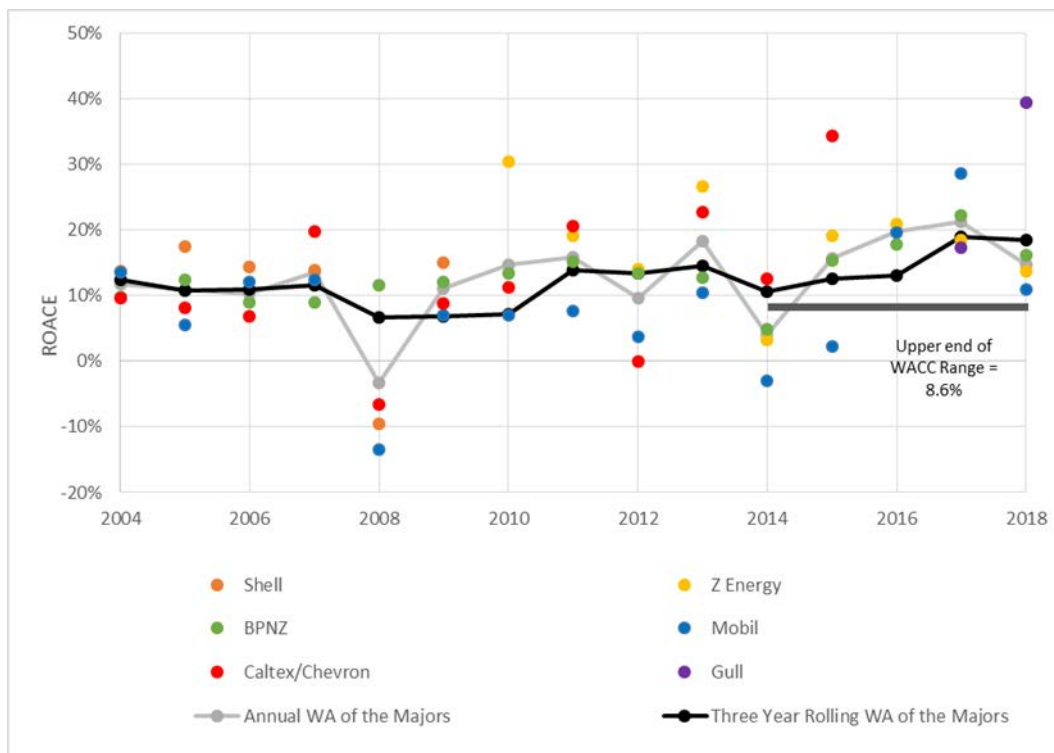Source: NZCC analysis provided to BPNZ on Wednesday 11 September 2019.

The Commission also overstates industry returns due to its treatment of Z Energy. First, the Commission's ROACE for 2018 includes Z Energy's ROACE for the year ended 31 March 2018 along with that for BPNZ, Mobil and Gull for the year ended 31 December 2018. Given the timing of Z Energy's year end, we consider it more appropriate to include Z Energy's results for the year ended 31 March 2019 in the same "year" as the results of the other majors for the year ending 31 December 2018. Second, the Commission excludes from Z Energy's capital employed the value of contracts it acquired, primarily as a result of the purchase of the Chevron business in 2016. As discussed in section 2.3.1 above, there is no good basis for excluding the value of the contracts that Z Energy acquired from Chevron from Z Energy's capital employed.

In Figure 4 below, we present the annual average ROACE for the major New Zealand retailers and their three-year rolling geometric average ROACE correcting for these two issues. As can be seen there, when Z Energy's results are brought forward by a year and acquired contracts are treated as part of capital employed:

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51   Draft Report, para D168, p. 327.

- the annual weighted average ROACE for the major retailers (the grey line) is even more volatile and below the Commission's estimate of the WACC in 2014, and demonstrates a much sharper fall in 2018; and

- the rolling three-year geometric average ROACE (the black line) trends downward in 2018 rather than continuing on an upward trajectory.

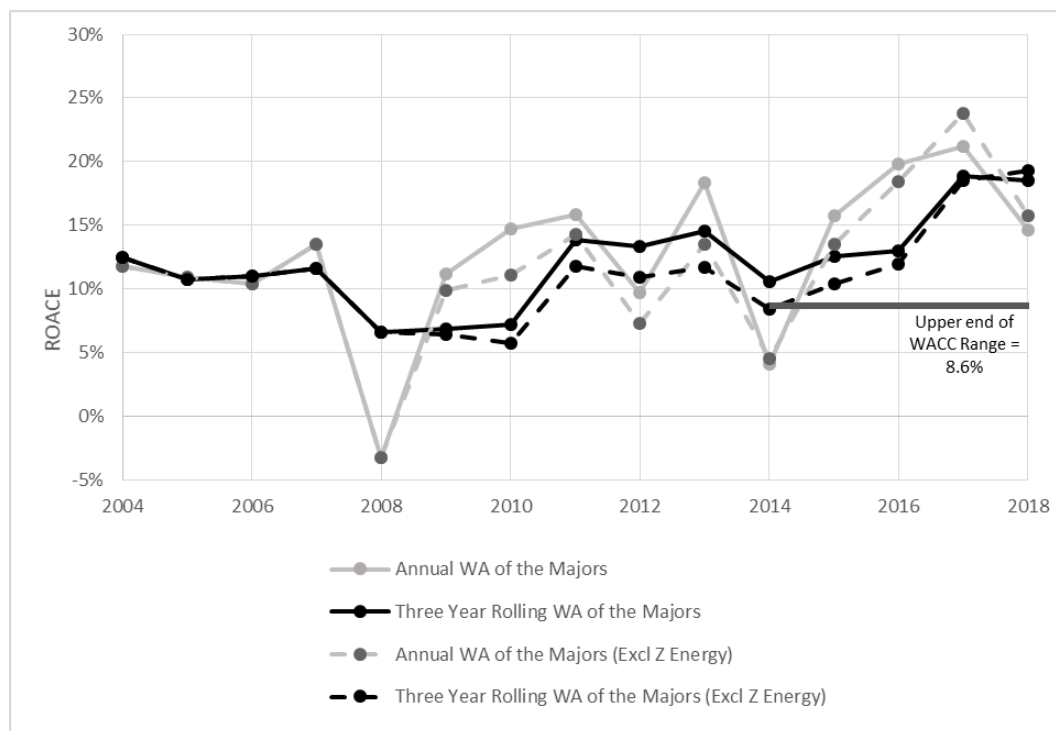**Figure 4:   Adjusted ROACE for the major New Zealand retailers, 2004 to 2018**

Source: CRA calculations based on NZCC analysis provided to BPNZ on Wednesday 11 September 2019 and CRA analysis.

In Figure 5 below, we present the annual average and rolling three-year geometric average ROACE for New Zealand retailers, excluding Z Energy. In addition to the issues identified above, the inclusion of Z Energy tends to inflate the industry ROACE around the time of its entry as a result of it having purchased the assets of Shell for less than their estimated fair value.[52] When Z Energy is excluded, we see lower average returns for BP, Mobil and Caltex/Chevron from 2010 to 2016, much closer to and sometimes below the WACC for these years.

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[52]   Aotea Energy Limited Financial Statements for the year ended 31 March 2011, Note 4, p. 10.

Figure 5: **Annual and rolling three-year ROACE for the major New Zealand retailers, 2004 to 2018**

Source: CRA calculations based on NZCC analysis provided to BPNZ on Wednesday 11 September 2019.

2.5.3. Comparison of ROACE estimates for NZ fuel retailers with international comparators

The Commission compares its rolling three-year geometric average ROACE for New Zealand fuel retailers with the same metric for the set of international fuel companies that it considers to be suitable comparators. The Commission observes that the average New Zealand fuel sector ROACE has increased markedly over the period from 2004 and began to exceed the average returns made by the international peers in 2011. It estimates that the average ROACE for the New Zealand fuel firms is around 15% per annum higher than the average of ROACE for the international firms in the three years to 2018.[53] The Commission refers to this finding throughout its report in support of its view that industry-wide returns are excessive.

Our review of the Commission's analysis has revealed that its rolling three-year average ROACE of international comparators is not a good measure of the returns generated by comparable retailers in other countries due to excessive weighting on a small number of firms in the sample.

Figure 6 below presents the ROACE for each of the international peers included in the Commission's analysis. This demonstrates that the ROACE estimates for these firms vary markedly. Many of the international peers report returns in excess of the upper bound of the Commission's estimated WACC in each year of the analysis, and the Commission's

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[53]   Draft Report, para D165, p. 326.

ROACE estimates for the New Zealand retailers over the last decade are consistent with the returns earned by many of the international peers over the same period.

Figure 6:   Annual average ROACE for each international peer, 2004 – 2018
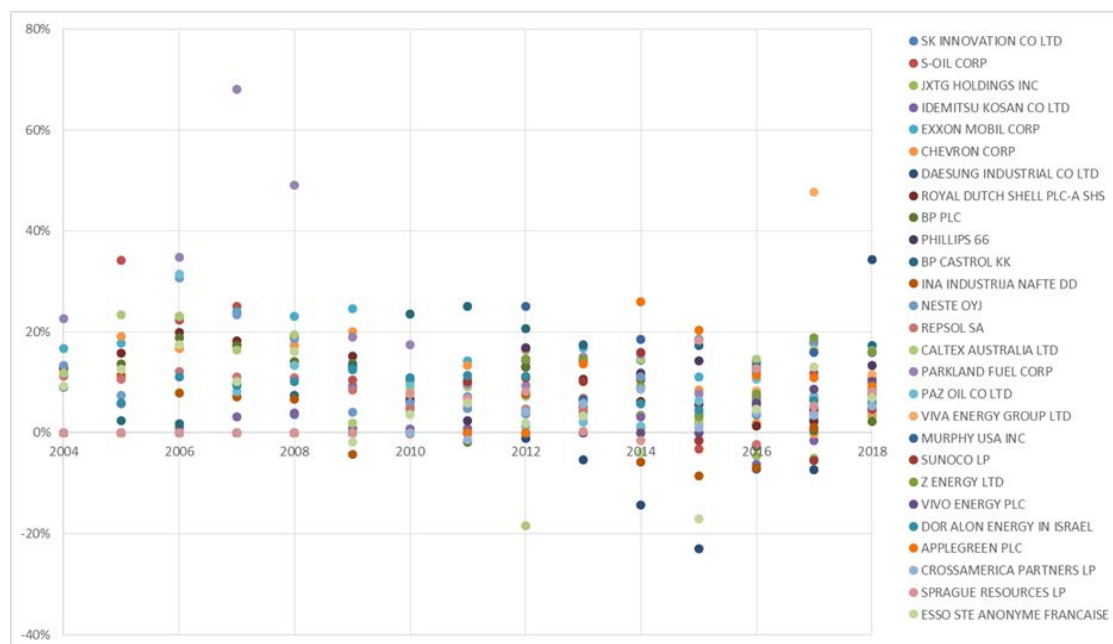
Source: NZCC analysis provided to BPNZ on Wednesday 11 September 2019.

The Commission however gains a misleading impression of the ROACE experience of the international peers due to observing, in Figure D5 of the Draft Report, only a weighted average measure. This weighted average measure is misleading because it is dominated by just two of the international peers. Both of these are South Korean firms. As demonstrated in Figure 7 below, these two firms account for over 80% of the total capital employed of all firms included in the Commission's rolling three-year average ROACE for 2017 and 2018 and even greater percentages in other years. These firms experienced relatively low returns during the latter part of the period, and so the low level of the Commission's three year rolling average measure of ROACE for the international peers in Figure D5 in the latter part of the period is largely driven by these two firms alone.

Figure 7: **Weighting of international peers in the Commission's rolling three-year average ROACE based on value of capital employed, 2004 – 2018**
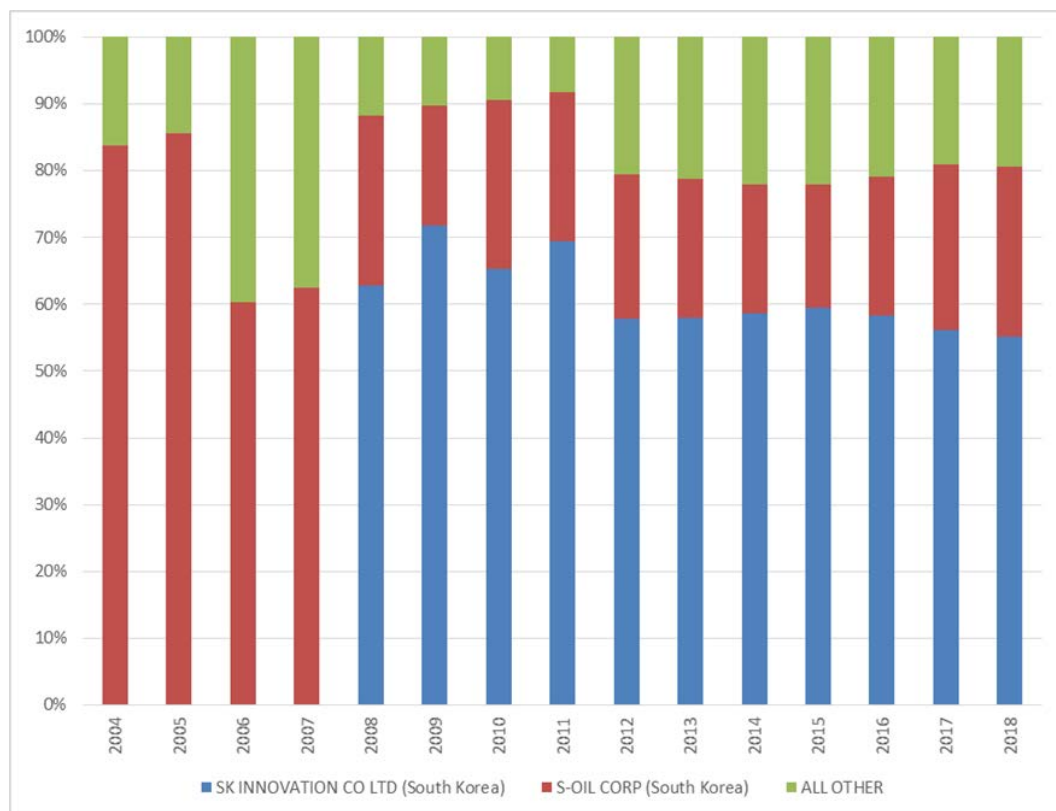
Source: NZCC analysis provided to BPNZ on Wednesday 11 September 2019

Even if these two firms were removed, the weighted averages of the international peers would remain dominated by one or two of the remaining firms. To address these weighting issues, we present below a figure that shows the simple average of annual ROACE estimates for the international peers and the simple rolling three year average. We suggest that these simple averages would provide a better basis for comparison to the estimated ROACE of the New Zealand firms.

Figure 8:   Simple averages of ROACE of the international comparators
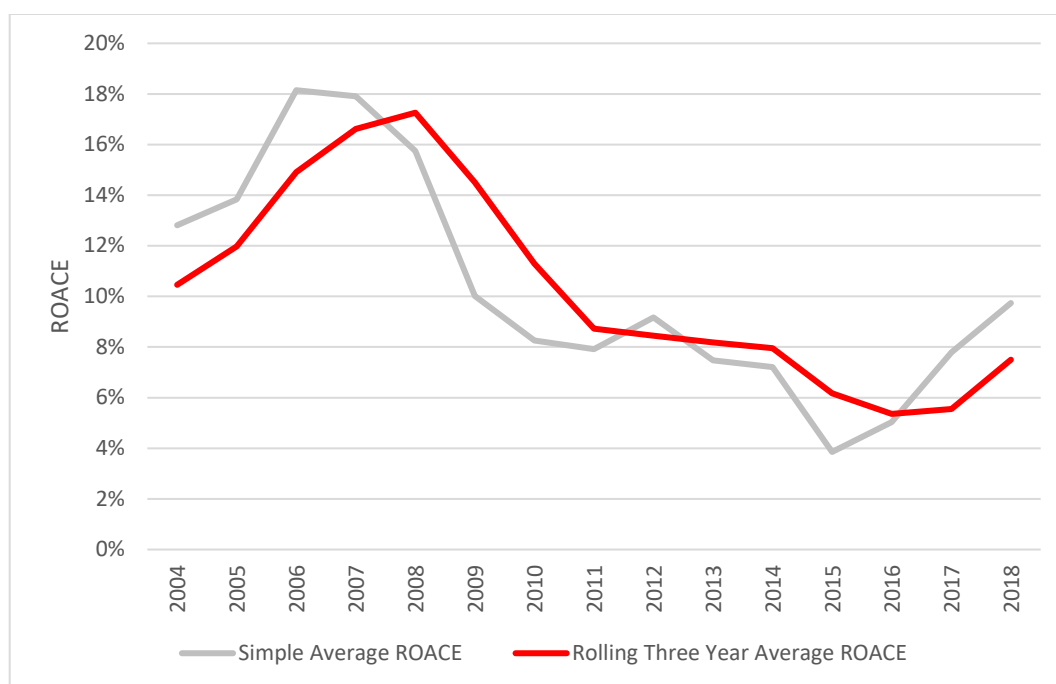
Source: NZCC analysis provided to BPNZ on Wednesday 11 September 2019

2.5.4.   Comparison of ROACE estimates for NZ fuel retailers with NZX50 firms

The Commission also compares its rolling three-year average ROACE for New Zealand retailers with the same metric for companies included in the NZX50. It excludes from this analysis the returns of three New Zealand banks given their very low annual ROACE. The Commission concludes from its analysis that the average ROACE for fuel firms has been well ahead of the average ROACE for the NZX50 firms for the last ten years and that the gap appears to be growing steadily.[54]

Again, a review of the ROACE for the constituent companies included in the Commission's analysis shows that many have realised ROACE greater than the upper bound of the Commission's estimated WACC over the last ten years and many have realised ROACE well above 15%. This is demonstrated in Figure 9 below. The ROACE estimated for New Zealand retailers over the last decade are consistent with the returns earned by many of the companies in the NZX50 over the same period.

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54   Draft Report, para D172, p. 328.

Figure 9: **Annual average ROACE for companies in the NZX50 (excluding banks), 2004 – 2018**
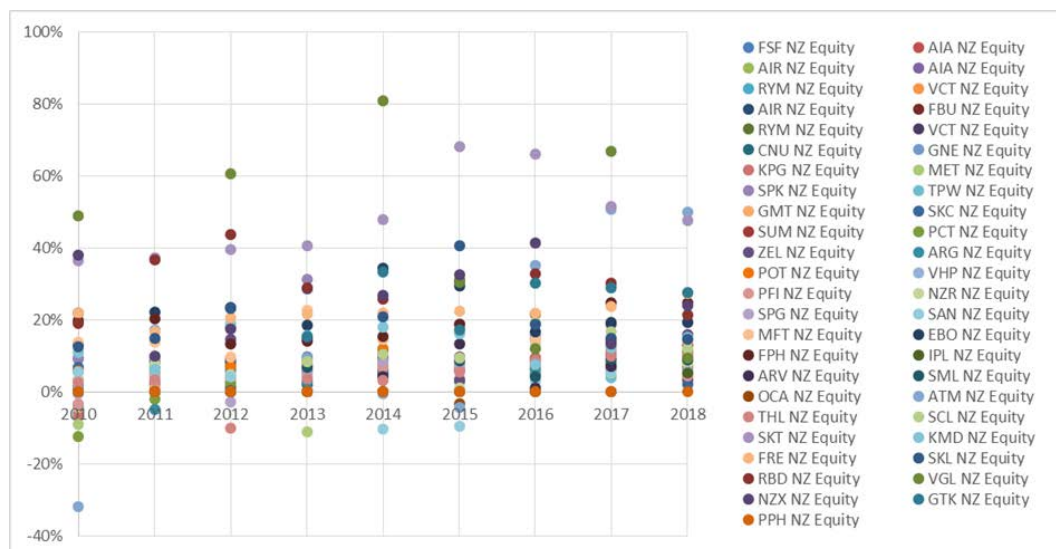
Source: NZCC analysis provided to BPNZ on Wednesday 11 September 2019
Notes: Excludes observations above 100% and below -100% for ease of viewing.

2.5.5. Comparison of ROACE estimates for the majors vs Gull and smaller retailers

The Commission compares its average ROACE for each of the majors for the three-year period 2016 to 2018 with that of Gull and smaller retailers, which, on average, experienced higher returns than the majors over this period. The Commission suggests that the results could be interpreted as indicating that retail fuel activities generate greater returns on capital than the more diverse mix of activities which the majors undertake.[55] It also notes that in a workably competitive market, it would not expect the marginal seller, which it considers to be Gull, to be earning material excess returns.[56]

Although Z Energy, BPNZ and Mobil are involved in a wider range of activities than either Gull or smaller retailers (that may or may not involve a greater degree of competition than retail fuel markets), we consider there to be other potential reasons for the difference in the average ROACE of the majors and these other smaller players.

▪ First, each of the majors supplies fuel to dealers and distributors at the wholesale level of the supply chain. If wholesale margins are lower than retail margins, this would act to lower the average ROACE for the majors relative to Gull and smaller retailers. We note that the Commission's concerns with competition at the wholesale level appear to be at odds with the results of the Commission's analysis here, which suggests firms that are focussed on retail operations are earning higher ROACE than the three main wholesalers.

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55   Draft Report, para D174, p. 330.

56   Draft Report, para D175, p. 330.

- ▪ Second, it is far from clear that Gull is the marginal supplier. Although Gull imports fuel, so do the majors, so that their marginal costs of fuel are similar. We also understand that Gull's retail strategy is based on a low cost retail network. This suggests that it may in fact be an infra-marginal supplier with possibly the lowest retail cost, rather than a marginal supplier. If Gull is not the marginal supplier, the Commission should expect it to be making higher returns than those that are, and the Commission should place less weight on the returns of Gull than on the returns of others if it is interested in understanding if returns are excessive.

2.6. Returns made by Z Energy vs Australian comparators

In addition to the four primary measures of profitability discussed in the sections above, the Commission also considers a range of other potential measures on which it places less weight. One such measure is a comparison of the three-year average net profit per litre for Z Energy with that of two Australian retailers: Viva Energy and Caltex Australia.

Although we have not attempted to replicate this aspect of the Commission's analysis, we recommend that the Commission exercise caution when making any such comparisons. First, Z Energy, Viva Energy and Caltex Australia likely have different mixes of business interests and so not all of their revenues or expenses will relate to the sale of motor fuel. Even if they were all focused on the sale of motor fuel, they likely have different mixes of wholesale and retail sales volumes, which will likely attract different margins. In particular, we understand that until recently, Viva was primarily a wholesaler of fuel as the sole supplier to the Coles network of service stations.[57] We also understand that Caltex is likely to have had a much larger proportion of wholesale fuel sales than Z Energy, as it has been a supplier to the Woolworths network of service stations.[58]

The results of this analysis are also inconsistent with other information available to the Commission. For example, the Commission's own analysis of the ROACE for each of Z Energy, Viva Energy and Caltex Australia demonstrates that Viva Energy and Caltex Australia have had a higher or comparable annual ROACE to Z Energy over the period 2014 to 2018. Given this, in our view the Commission should not place any weight on or take steps to extend this analysis.

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[57] Viva Energy, Analyst Management Presentation, 22 November 2018, p. 10.

[58] Caltex Australia 2018 Full Year Results, 26 February 2019, p. 20.

Figure 10:   **Annual ROACE for Z Energy, Viva Energy and Caltex Australia, 2012 - 2018**
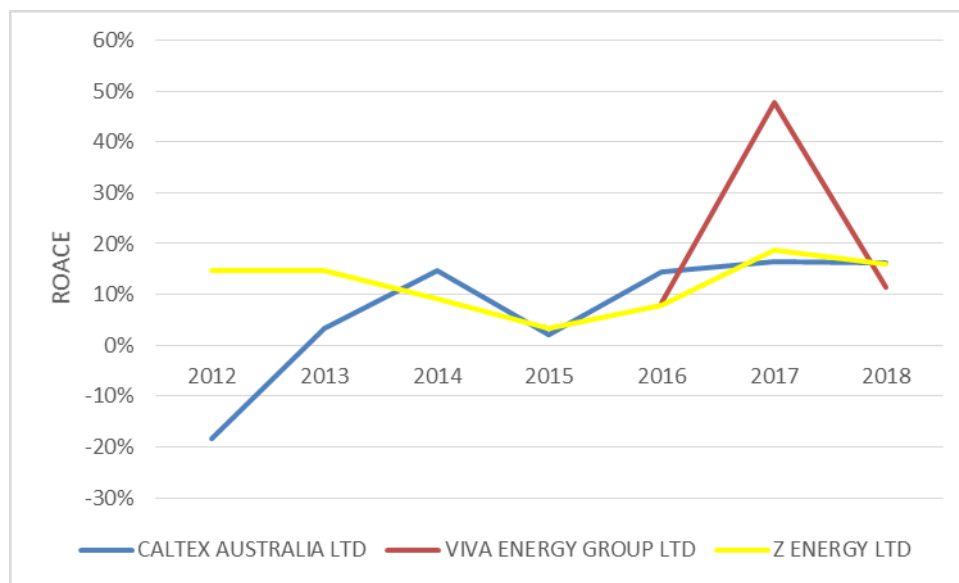
Source: NZCC analysis provided to BPNZ on Wednesday 11 September 2019
Notes: Note that the Commission's annual estimates of the ROACE for Z Energy in the context of its international comparison differ markedly from its primary estimate of the ROACE for Z Energy presented in Figure 9 above.

3. ECONOMETRIC AND EMPIRICAL MODELLING

3.1. Cost pass through analysis

3.1.1. Theoretical expectations for pass-through rates

The draft report states that "[i]n a competitive market [the Commission] would not expect to observe any pass-through rates significantly greater than one" (para F6), but the Commission does not provide any explanation for this statement, either in para F6 or later in its theoretical discussion of pass-through rates (paras F51-F54). This statement is at odds with our understanding of the economic theory of pass-through rates.

As the Commission has observed, perfectly inelastic demand and constant marginal cost would give an industry pass-through rate of one. However, the industry demand curve for retail fuel is not perfectly inelastic (the Commission refers in footnote 15 to an estimate of short run demand elasticity between 1978 and 2006 of -0.15)[59] and its curvature might be such as to result in pass-through rates above one in an effectively competitive market. In general, industry pass-through will be greater, the more that demand becomes less sensitive to price when the price of a product rises (i.e. the more that the demand curve becomes steeper as the price increases).[60] Moreover, in a differentiated products Bertrand

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[59]   It should also be recognised that this elasticity estimate reflects the period from 1978 to 2006 and may be lower than short run demand elasticity today.

[60]   See RBB Economics, *Cost pass-through: theory, measurement, and potential policy implications*, Report prepared for the UK Office Of Fair Trading, February 2014, pages 14-17. As explained there, pass-through is greater when the demand curve is locally convex than when it is locally concave. Many commonly used demand forms are convex in shape (e.g. the constant elasticity of demand function).

price competition setting, where differentiation is limited, convex demand can result in industry pass-through rates greater than one.[61] Since the curvature of the demand curve may differ at different price levels, industry pass-through rates may also vary locally around different price levels.

As the draft report acknowledges (see para F54), in general greater competition tends to be associated with higher pass-through rates. Pass-through rates close to one or above one are therefore entirely consistent with a competitive market. A hypothesis of a lack of effective competition would only be supported if pass-through rates were found to be *significantly less than one and closer to 0.5*.[62]

We therefore do not understand why the Commission includes the parenthetical qualifier in para 54: "it is generally accepted that higher rates of pass-through (up to one) are indicative of stronger competition and vice versa". The Commission has not explained any reason for this qualification and why, once pass-through rates exceed one, there should suddenly be a switch from an indication of stronger competition to an indication of a competition problem.

In para F66, the Commission observes that it has estimated pass-through rates to be most above one in 2015 and asserts that costs were increasing at this time. The Commission appears to suggest that pass-through rates at their highest when costs are increasing is not consistent with a competitive market. We offer several comments on this part of the Commission's analysis.

- First, as explained below, the Commission's estimated pass-through rates may be close to one even in 2015, once GST is accounted for.

- Second, even if pass-through rates were above one in 2015 and/or in other years, this is not inconsistent with a competitive market, for the reasons explained above.

- Third, the Commission speculates that pass-through may have been greater in 2015 because costs were rising around that time, however this is not apparent from Figures 3.5, 3.6 and 3.7, which all suggest that, if anything, costs were declining or at least up and down at that time.

Fourth, Figures 3.5, 3.6 and 3.7 suggest that costs were rising in 2018, yet the Commission's main model estimates the lowest cost pass-through rates in 2018.

3.1.2. The Commission's estimated pass-through rates may actually be close to one

In its main model, the Commission finds pass-through rates significantly greater than one (see paras F64-F66 and Table F3). For the reasons explained above, the assertions in the

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[61]   See RBB Economics, *Cost pass-through: theory, measurement, and potential policy implications*, Report prepared for the UK Office Of Fair Trading, February 2014, pages 77-78 and 90, where the authors refer to Anderson, S. P., Á. de Palma, and B. Kreider (2001): "Tax incidence in differentiated product oligopoly", *Journal of Public Economics*, 81, pages 173-192.

[62]   As the draft report recognises (at para F53), a monopolist with linear demand will pass-through only 50% of a cost increase or decrease. While pass-through rates for a monopolist could be greater than one if demand is sufficiently convex, as explained in the text pass-through rates greater than one are also consistent with a competitive differentiated products Bertrand setting with convex demand. Pass-through rates greater than one therefore do not indicate a lack of competition.

draft report that this is "difficult to reconcile with the theory of pass-through in competitive markets" (para F7.1) and "not an expected observation in a competitive market" (para F66) are not consistent with our understanding of the economics of pass-through, and, again, the Commission has not provided any basis for its view that pass-through rates above one are not consistent with competitive markets.

In any event, the Commission's finding of pass-through rates greater than one may be an artefact of a mis-specification of the main regression, and correcting for this mis-specification may result in the Commission finding pass-through rates *close to and not significantly different from one*. To elaborate, the Commission appears to have regressed retail prices *including GST* on spot market costs that do not include GST. Since a one for one increase in the retail price excluding GST in response to a $1 increase in cost will attract additional GST of $0.15, the Commission should expect a pass-through rate of 1.15 in a perfectly competitive market or in a market with perfectly inelastic demand and perfectly elastic supply. As can be seen in Table F3, most of the estimated pass-through rates are in the region of 1.15.[63]

If the Commission has overlooked this GST effect, it can easily correct for it by re-specifying its main model using retail prices *excluding GST* as the dependent variable. To illustrate the effect that such a re-specification should have, the box and table below show the effect of correcting the Commission's estimated cost pass-through coefficients for 15% GST. As can be seen, once corrected for GST, pass-through rates are generally close to one, consistent with the Commission's expectation for a competitive market (although without access to the data and model, we are unable to identify whether the adjusted coefficients are significantly different from one).

Illustration of effect of a GST adjustment on the main model's estimated pass-through rates

The left panel reproduces the CC's estimated overall pass-through impacts from Figure F3 of the draft report. For most year/fuel combinations, the value is larger than one and for some the value is substantially larger than one (mostly in 2015-2017). Stars give p-values for the null hypothesis that the impact equals one, which is almost always rejected. The right panel is the same table, but with an adjustment for 15% GST. With this adjustment, the impacts are generally above or below, but close to one. P-values are not shown as it is not possible for us to perform a significance test without the data and model.

Table F3: impact per year

Years	91-octane	95-octane	98-octane	Diesel
2011	1.034	0.946	1.023	1.090**
2012	1.125***	1.041	1.077*	1.112**
2013	1.093**	1.086**	1.091**	1.012
2014	1.087***	1.082***	1.157***	1.149***
2015	1.260***	1.191***	1.313***	1.441***
2016	1.070***	1.132***	1.273***	1.167***
2017	1.198***	1.247***	1.230***	1.186***
2018	0.920**	1.063	0.961	0.876***

Table F3: impact per year (correct for 15% VAT possibly included)

Years	91-octane	95-octane	98-octane	Diesel
2011	0.899	0.823	0.890	0.948
2012	0.978	0.905	0.937	0.967
2013	0.950	0.944	0.949	0.880
2014	0.945	0.941	1.006	0.999
2015	1.096	1.036	1.142	1.253
2016	0.930	0.984	1.107	1.015
2017	1.042	1.084	1.070	1.031
2018	0.800	0.924	0.836	0.762

3.1.3. Contemporaneous pass through

The draft report expresses surprise that a portion of cost pass-through occurs contemporaneously with spot market cost changes. Contemporaneous pass-through should not be surprising, given that as soon as the spot market cost changes, the value of

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[63] BPNZ notes that this might also explain the findings of pass-through greater than one in relation to other non-GST taxes, levies and ETS.

the entire stock of fuel held by a retailer should change. Once the spot market price changes, the price paid for that stock (an historical spot market price) should no longer be relevant: if the price paid was higher, the difference is a sunk cost that cannot be recovered unless the price recovers; if the price paid was lower, the difference is a windfall gain, since the stock that is now held can be sold at the current higher spot market price. If the Commission were to buy a litre of fuel today at a price of $2, and hold it for some time, before trying to sell it when the price has halved, it will not make any sale at $2. It will have to price the fuel at the current price, and what was paid to purchase the fuel sometime in the past is irrelevant. The same principle likely underlies the pricing of retail fuel suppliers. Historical spot market costs are, for this reason, likely to be just history.

We are not aware of any basis for a concern regarding contemporaneous pass-through and the Commission has not specified any. However, even if there were a basis for a concern, the Commission's model only finds around 18% to 20% of costs are passed through contemporaneously and the rest is passed through subsequently (para F7.3).

3.1.4. Modelling observations

We offer the following observations on the Commissions modelling of cost pass-through.

- The Commission's main model produces inconsistent estimates across fuel types and across years. In particular, estimated overall effects for 2015 and 2018 are very different from other years, but the Commission has not provided any clear theoretical basis for these differences. A possible reason for these differences is that the model is not well specified. Estimates of pass-through also differ by fuel type, but the Commission has not provided any motivation for why this would be. Other oddities in the estimated coefficients include the following:

    - The coefficients on "other non-GST taxes, levies and ETS" are well-above one (and well-above even 1.15) for all fuel types except diesel, where the coefficient is less than one. It is not clear why these taxes are passed-through in relation to some fuel types much more than others.

    - Coefficients on the "demand" variable and CPI are both negative and significant. The Commission has not motivated why an increase in demand would result in lower prices, however it is plausible that lower prices would result in greater demand. For CPI, the Commission does not explain why higher consumer price inflation would result in lower fuel prices.

- If the Commission has not already done so, we recommend charting the dependent and independent variables of interest and reviewing summary statistics to help understand the data better and identify patterns and anomalies. The draft report does not include charts or summary statistics that would help in understanding whether the model specifications chosen by the Commission are sensible and making sense of the estimated coefficients. A chart might, for example, help to understand the finding of relatively high pass-through rates in 2015 and relatively low pass-through rates in 2018. Pass-through rates of 1.2 to 1.4 (as found for 2015 in the Commission's main model) should be visible in a chart of the data.[64]

- When observations are missing or implausible, we consider it generally preferable to treat them as missing, rather than create data as the CC has done (the Commission has replaced these observations with the most recent value: see paras F39.3 and F39.6). However, if the number of observations where this has been done is small, it should not have a significant effect. If the number of observations where this has been done is large, the Commission could conduct a sensitivity test in which these observations are treated as missing observations to understand if the use of created data has any effect.

- The Commission should test its main model using effective price as the dependent variable (in the draft report the Commission only reports using effective price as the dependent variable in its base model).

- The Commission's approach to dynamically model daily prices with a limited set of specified weekly lags of costs (7 day, 14 day, 21 day and 28 day) and without any lags of prices is unusual and raises a number of issues and odd findings. For example:

  - The weekly lag structure gives a peculiar predicted effect of cost on prices: there is an effect on day t; there is then no effect on days t+1 to t+6, but then another effect on day t+7; there is then again no effect on days t+8 to t+13, but then a further effect on day t+14; and this pattern continues until day t+28, when suddenly the long run effect is reached.

  - The estimated impact of 28-day lagged costs is consistently greater than the estimated impact of 21-day lagged costs, for many years. It is not clear why this would be so.

3.2. Analysis of the effects of loyalty schemes

3.2.1. Discounting has ambiguous welfare effects

In para 3.83 the Commission notes that "the size of discounts has increased significantly in the past decade, in line with increasing importer margins". The Commission should not assume from this correlation that there is a causal effect from increasing discount sizes to increasing importer margins, since there may be an endogenous relationship (or no relationship at all) between importer margins and discount sizes.

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[64] Figures 3.5, 3.6 and 3.7 do not suggest pass-through rates of that magnitude. For example, according to Figure 3.7, between about 2013 and 2016 the cost of diesel decreases by almost 60 cents per litre (from 100 cents to just over 40 cents). If the pass-through rate were truly around 1.4, as estimated by the CC's main model for 2015, diesel margins should decrease by around 24 cents (40% of 60 cents). However, no such decline in diesel margins is evident in Figure 3.5.

We understand that the Commission is interested in whether discounting represents price-discrimination, whereby discounting results in higher board prices paid by consumers that do not take advantage of discount offers and lower effective prices paid by consumers that do.

Before discussing the findings of the Commission's analysis of the effects of discounts, a few comments on discounting and price discrimination are in order. In principle, discounting might have any one of the following five effects on consumers.

1. The discount might reduce the effective price paid by consumers that take advantage of the discount, while leaving board prices the same. In this case, consumers that avail themselves of the discount will be better off, while those that don't will be unaffected.

2. The discount might cause board prices to decrease, in which case both types of consumers will be better off.

3. The discount might cause board prices to increase by the full amount of the discount, in which case consumers that take advantage of the discount are unaffected, but consumers that do not will be worse off.

4. The discount might cause board prices to increase by more than the full amount of the discount, in which case both types of consumers will be worse off.

5. The discount might cause board prices to increase by less than the full amount of the discount, in which case consumers that take advantage of the discount will be better off (as effective prices after the discount will be lower than board prices in the counterfactual) and consumers that do not will be worse off (as board prices will be somewhat higher than in the counterfactual).

In paras 3.89-3.90, the Commission summarises the findings from its econometric analysis of whether changes in board prices can be explained by changes in discount sizes. Further details of this analysis are contained in Attachment F from para F88 onwards. The Commission reports that "changes in discount size […] are associated with slight changes in the advertised broad price in the same direction for the years between 2016 and 2019" (para 3.89, emphasis added) and "[s]pecifically, a 10 cent increase in discount size per litre in these years is associated with an estimated board price increase of 0.96 cents to 2.73 cents (10% to 27%) for 91-octane petrol and 2.43 cents to 4.89 cents (24% to 49%) for diesel, depending on the year in question within the period 2016 to 2019" (para 3.90). The Commission's findings therefore suggest that the effect of discounting on consumers is the fifth of the five possible effects outlined above, in which board prices increase by less than the full amount of the discount, and *some consumers are better off while others are worse off*.

In light of the ambiguous consumer welfare effects of discounting, and the Commission's findings from its econometric analysis that suggest that the effect of discounts is the fifth of the possible effects outlined above, the draft report's discussion of discounting appears rather one-sided.

- For example, in para 3.91 the draft report describes board prices that are higher when discounts are higher as consistent with price discrimination, and then describes that price discrimination as a situation "where higher prices are charged to less price sensitive customers that do not use discounts". This is a partial description that neglects to mention that, at the same time, lower prices may be

charged to more price sensitive customers that do take advantage of discount offers.

- Similarly, in para 3.92 the draft report states that "[c]ustomers paying board prices would be better off if discounts were not present and retailers charged a lower, uniform price to all consumers". This is also a partial description that neglects to mention that customers receiving discounts would be *worse off* if those discounts were not present and retailers charged a uniform price that is higher than the effective price after discounts.

Indeed, the Commission's findings suggest that the benefit to each consumer that takes advantage of the discounts exceeds the harm experienced by each consumer that does not. In particular, the Commission's finding that a 10 cent per litre increase in discount size for 91-octane petrol is associated with an estimated board price increase of between 10% and 27% implies that effective prices paid by consumers that took advantage of the discount size increase *fell by between 73% and 90%*.[65] We understand that at least ▮ of BPNZ's sales attract AASF discounts (and that the percentage is greater on "promo" days when the AASF discount increases, typically from 6c to 10c per litre) and only ▮ do not attract either AASF discounts or fuel card discounts. These figures, together with the Commission's estimated board price uplift percentages, suggest that BPNZ customers are better off overall.

3.2.2. The suggestion that retailers raise prices in advance of increasing discounts is inconsistent with BPNZ's practice and experience

The Commission reports that its "analysis so far suggests that board prices anticipate a change in discounting for 91-octane, 98-octane and diesel fuel" (para F10.1) and that "a 10 cents change in the discount size was preceded 14 days earlier by a price change in the same direction of 0.4 to 1.1 cents per litre, depending on the fuel type" (para F10.2).

Our understanding is that this suggestion of prices anticipating discounts does not accord with BPNZ's practice and experience. We are informed that BPNZ's board pricing is not linked to its discounting strategy. We understand that there are some weekly board price and discounting patterns that the Commission should be aware of,[66] however these do not obviously explain the Commission's findings of relationships between discounts and prices 7 and 14 days in advance of those discounts. If this is the case, the Commission's findings of relationships between discounts and prices 7 and 14 days in advance of those discounts may be an artefact of mis-specification of the Commission's econometric model, such as the arbitrary lag structure that the Commission has imposed and the potential for the relationship between board prices and discounts to be the opposite of what the Commission assumes (e.g. larger discounts might tend to be offered when board prices are higher). These modelling issues are discussed further below.

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65   For diesel, a 10 cent per litre discount increase is associated with an increase in the board price of between 24% and 49%, which implies that effective prices paid by consumers that took advantage of the discount increase *fell by between 51% and 76%.*

66   ▮▮▮

3.2.3. Modelling observations

The draft report contains insufficient detail on the Commission's model specification for us to be able to comment in detail.[67]   Even if greater detail were provided, it would be difficult for us to provide detailed comments on the Commission's modelling of the effects of loyalty schemes without access to the underlying data and modelling code. However, on the basis of the limited information in the draft report, we offer the following limited observations.

- If the Commission has not already done so, we again recommend charting the dependent and independent variables of interest and reviewing summary statistics to help understand the data better and identify patterns and anomalies. The draft report does not include charts or summary statistics that would help in understanding whether the model specifications chosen by the Commission are sensible and that would also help to make sense of the estimated coefficients.

- We also suggest that the Commission's modelling of the effect of loyalty discounts would be better informed and may end up better specified if the Commission were to present a detailed discussion of how discount levels are determined by each of the retailers whose discounts are modelled and how those retailers understand discounts and board prices to be related (if at all). This may vary from retailer to retailer. For example, as explained above, our understanding is that BPNZ does not raise its prices in anticipation of future discounts, however it may be that other retailers do, and that the effect that the Commission finds is driven by the behaviour of those other retailers.

- The Commission's modelling may be affected by endogeneity. The Commission's modelling assumes that changes in discounts are exogenous to changes in board prices, however it may be that larger discounts occur when board prices are higher. If there is endogeneity, the coefficients cannot be given a clear interpretation.

- The Commission's modelling of the effects of discounts omits a potentially important explanatory variable of changes in board prices: lags of changes in costs. The Commission finds in its pass-through analysis that lags in costs are an important explanator of board prices, yet the Commission omits lagged cost changes when seeking to explain changes in board prices.

The Commission reports that its base model with leads and lags finds a leading effect in relation to diesel (i.e. board prices change 7 and 14 days *before* a change in discount), but not for other fuel types. It is not clear why the Commission does not present the results of this model in detail. The Commission also does not explain why there would be a leading effect for diesel and not other fuel types. The inconsistent results across fuel types suggests that either the theory of prices leading discounts is wrong or the model is mis-specified. The Commission then reports on a "simplified" model, without exploring if the base model is incorrect and what might be wrong with it. It is not clear what the basis for the Commission's "simplified" model is, other than that it is simpler. It likely suffers from the same endogeneity issues as the base model.

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[67]   For example, the draft report does not clearly state that the model of the effects of loyalty programs is a model of first differences, however, since the draft report suggests that the CC is investigating the effects of changes in discounts on changes in board prices, we assume this to be the case.

3.3.   New site event analysis

We understand that the Commission wants to use a new site event analysis to "test how new retail sites and rebranded sites have affected competition in local markets with the majors" (para F129). For this purpose, the Commission has:

- assessed whether 56 new or rebranded sites (between January 2017 and February 2019) are close to the sites of majors; and

- assessed whether the board price, discounted price and volume of sites of majors close to the 56 new or rebranded sites decreased after entry.

The Commission finds that Gull is more likely to locate close to a major than dealers and distributors (para F139.1) and that in only some cases did board price or volume clearly fall after entry (in "almost all" cases the board price did not change or the change was not clear) (para F139.2). However, in "quite a few instances" the effective price after discounts fell following an NPD site opening, and where the volumes of majors fell materially after entry this was most commonly when an NPD site opened (para F139.3). The Commission has also not found many examples of a "Gull effect" of entry on prices or volumes of the majors.

There are at least two good reasons why the Commission may not be finding much effects of entry on the prices and volumes of the majors. First, entry is not random and is most likely to occur in locations that are most sheltered from direct competition and that consequently do not divert much demand from existing sites. The Commission considers this in paras 7.91.2.5 and 7.91.2.6. This will bias the Commission's analysis towards findings of limited effects of entry on existing nearby sites. Second, where entry does occur close to existing sites, while volume effects should be expected (provided that "close" means close from a driver's perspective, rather than simply as the crow flies), there may be little effect on prices if competition among existing sites is already effective at constraining prices.

We offer the following further comments on the Commission's analysis of site entry and rebranding events.

- First, it is not clear why the Commission only focuses on effects of entry and rebranding on existing sites of the major firms (BP, Mobil and Z Energy). It might be that the Commission finds only limited effects of entry and rebranding because it does not look at the closest competing sites. The Commission should investigate the effects of the entry and rebranding events on prices and volumes at all existing sites, as it proposes to do (para F142).[68]

- Second, it is not clear why the Commission does not consider the impact of new sites of majors and whether this is substantial.

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[68]   A related point here is that it is not clear which sites the CC considers to be "major" sites for its analysis. Para F141 says that there is no data for independently operated sites with the brand of a major and para 2.96 says that these include BP2GO stations and almost all Caltex stations. However, para F134 says that in the analysis the CC labels BP2GO and Caltex stations as major sites and Table 3.2, which contains some results of the analysis, includes Caltex stations.

- Third, an implicit assumption of the Commission's analysis is that in the counterfactual without entry, volumes and prices would not change. However, again, entry is not random. Entry is most likely to occur in areas where volumes are expected to increase, such as in a newly built neighbourhood along a newly built road, or close to a new shopping centre. It is therefore possible that volumes and prices would have increased in the absence of entry (i.e. in the counterfactual), and so a finding that volumes and prices do not decrease following entry may not justify a conclusion that entry has not had an effect.

- Fourth, the Commission should report the effects of rebranding and newly built sites separately, as the effects on volume and prices are likely to differ between these two types of events. Rebranding is less likely to affect volumes of existing sites, as the number of sites will not change. By contrast, newly built sites are more likely to impact volumes of existing sites that are genuinely alternatives for motorists.

- Fifth, and related to the previous point, the Commission should recognise that there are different kinds of rebranding. If a site switches to a brand that consumers consider to be similar to the old brand and there is no change in the service level of the station (e.g. from manned to unmanned or vice versa) then the Commission should not expect much impact on volumes and prices of existing sites. By contrast, if a site's branding changes significantly or if a site goes from being manned to unmanned, or vice versa, larger effects might be expected. The Commission should therefore consider reporting its findings regarding rebranded sites separately for minor rebrands and major rebrands.

- Sixth, the Commission might extend its analysis to consider the effects of site closures (temporary and permanent). The Commission should also identify whether any of its entry events are contemporaneous with a site closure nearby, as this might explain a finding of no significant volume differences between the pre-entry and post-entry periods for the remaining existing sites.

- Seventh, the Commission uses distance to define sites that compete with each other (para F133), however distance is an imperfect measure of competitive intensity and it may be that in many cases the reason that the Commission does not find significant volume effects of entry is because the existing sites the Commission is observing are not close competitors.

  - A site on a highway and a site just off the highway may be close in distance, but not compete with each other, while two sites a much greater distance apart, but on the same highway, may complete closely.

  - Distance is not always the same: driving 5km in a city takes much more effort than driving 5km on a highway.

- Eighth, in Attachment F the Commission suggests that entry may have increased discounts. However, in para 7.91.2.3 the Commission acknowledges that it may simply be picking up a broader long-term trend of increasing discounts.

Finally, in relation to the Commission's proposal to examine longer periods before and after an entry or exit event (para F144), the longer the period, the greater the chance of capturing spurious effects of other factors (e.g. the entry or exit of other sites or long-term discounting trends). Moreover, if entry is to have an effect it is likely to show up relatively quickly, so

there is likely to be little benefit from extending the analysis to longer periods even if spurious effects could be controlled for.