The unfortunate paradox of retail energy prices

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* The opinions expressed in this presentation are those of the author alone. They do not represent the views of the Essential Services Commission, its staff or the Victorian Government. The author takes full responsibility for any errors, omissions or conjectures.

NOTE FROM THE AUTHOR

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I largely wrote this paper in late 2017 and early 2018. It was written to inform my presentation at Australian Energy Week on 11 May 2018. Unfortunately, the paper was not ready at that time and I only published my slides.[1]

Since that time, there have been several important developments. These include:

- The Victorian government's interim response to the review undertaken by an independent panel into the Victorian retail energy market.[2]
- The Victorian government announced its Power Saving Bonus which will see customers paid $50 to visit the government's comparator site.[3]
- Numerous rule change requests submitted to the Australian Energy Market Commission by the federal energy minister.[4]
- Release by the Australian Energy Market Commission of its 2018 review of retail energy competition.[5]
- The New South Wales government announcement of its 'One click energy switch' initiative to assist customer find a better energy deal.[6]
- I published a separate paper on the limits of competition in certain markets including the retail energy market.[7]

While these more recent developments are not discussed in this paper, they do not detract from its findings.

[1] https://www.esc.vic.gov.au/sites/default/files/documents/energy-week-2018-presentation.pdf
[2] https://engage.vic.gov.au/review-electricity-and-gas-retail-markets-victoria
[3] https://www.premier.vic.gov.au/helping-victorians-bust-their-energy-bills/
[4] http://joshfrydenberg.com.au/guest/mediaReleasesDetails.aspx?id=588
[5] AEMC (2018) 2018 *Retail Energy Competition Review, Final Report*, 15 June, Sydney
[6] https://www.nsw.gov.au/your-government/the-premier/media-releases-from-the-premier/nsw-budget-one-click-energy-switch-could-save-households-more-than-1000-a-year/
[7] Ben-David, Ron (2018) *Competition, Neo-paternalism and the Nonsumer Uprising*

ABSTRACT

Until recently, the retail end of the energy market was largely overlooked as public debate focussed on the generation sector and network regulation. That has now changed with the realisation that the retail component of the energy supply chain contributes substantially to customers' energy bills.

This paper briefly surveys the findings of recent reviews and analyses to develop a small model that explores the relationship between competition, retail energy costs and consumer prices. The model is calibrated using data from the Victorian retail energy market and is found to describe the evolution of prices quite well. On that basis, the model is used to peer into the future to see what await consumers.

The model suggests that default prices only increase modestly from their current levels as competition deepens, however, discounted prices will start to rise rapidly. As this occurs, the level of discounting will decline and price dispersion will narrow.

This outcome leads to an "unfortunate paradox" in which regulators feel compelled to encourage customers to shop around to avoid unnecessarily high default prices, however doing so may result in prices generally increasing.

While recent market developments may help overcome the unfortunate paradox, this is far from certain. The paper therefore examines three directions from which regulatory reform could be pursued in seeking to reverse the relationship between competition, competition costs and retail prices. These are: reducing search costs, improving contract design and altering the market structure.

A great deal of activity is already underway to reduce search costs. Altering the structure of the market is likely to be difficult and contentious. This leaves reforming the contractual arrangements as the remaining opportunity for the regulatory community to achieve the objective of reducing competition costs (and their impact on retail prices). The discussion on these reforms concludes with the observation:

"Today's retail energy market has veered so far off course there are no maps for getting back. Therefore, risks must be taken."

In this sense, regulatory risk-taking is necessary and acceptable if the unfortunate paradox of retail energy prices is to be overcome.

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1. INTRODUCTION

The road to retail energy price deregulation has not been straightforward. The road ahead will be no less difficult. Witness the steady stream of inquiries, announcements and interventions by policy makers and regulatory bodies over the past year.

Concerns about the efficacy of competition in the retail energy market first became apparent in 2011. It took another five years, and government interventions, for these concerns to receive the attention they deserved. In late 2016, the Victorian government established an independent panel in 2016 to inquire into the operation of retail energy markets in that state (the "Thwaites review"). Some months later, the federal government initiated an inquiry by Australian Competition and Consumer Commission into the retail electricity prices.

Broadly speaking, questions about the efficacy of competition in the retail energy market can be posed in one of two ways.

1) Is competition working?

2) Can competition work?

For most of the last five years, examinations of competition in the retail energy market have been predominantly focussed on the first question — with the answer to the second question presumed to be positive. This presumption has been placed under scrutiny more recently. The ACCC inquiry and the Thwaites review have acknowledged there may be a second question that needs to be asked.

This paper explores the second question. This is achieved by building a simple economic model of the retail energy market based on the findings of these two inquiries, along with other analyses released over the last few years. The model focusses on the relationship between competition, retailer costs and consumer prices. For the purposes of this analysis, all other costs are held fixed. This assumption does not pretend that there aren't other cost pressures influencing retail energy prices. Clearly, there are. Instead, this approach isolates the contribution retailers add to customers' energy bills from price pressures emanating from elsewhere in the supply chain.

The contribution retailers add to a consumer energy bill are significant and increasing. This result is driven by the structure of the market. As an essential service, the retail market for electricity and gas operates under constraints that do not exist in markets for, say, bread or cars. At the same time, competition provides

retailers with the opportunity to price their offers strategically (as do the producers of bread and cars).

The model demonstrates the relationship between competition, retail costs and retailers' strategic pricing decisions. The model generates results that reflect past market outcomes. This provides comfort that the model's descriptive qualities are sufficiently robust when it is used to peer into the future.

That future is concerning.

As competition deepens, headline discounts decline and price dispersion narrows. While default prices rise only marginally, discounted prices begin rising rapidly as more customers engage with the retail energy market.

Despite this, the regulatory community finds itself caught in an "unfortunate paradox". Interventions aimed at facilitating greater consumer engagement will always improve outcomes for customers who switch to cheaper offers. Doing so, however, risks raising overall prices. That is, the weighted average price paid by customers increases. This suggests society could be made worse-off.

This finding has obvious implications in the current environment where regulatory interventions are heavily focussed on improving consumer information, awareness and engagement with the retail energy market.

The paper proceeds as follows.

Section 2 very briefly surveys the various reviews of competition into the competitiveness of the retail energy markets, with a focus on the Victorian market. The discussion is presented in three parts, initially describing the slow realisation that the retail energy market is not living up to expectations. This is followed by a review of the literature's discussion of how retail costs and prices have increased since the advent of competition, and an examination of retailers' cost structures.

Section 3 draws on the findings of this review to develop a model of the retail energy market. Because the model focusses on retail costs only, all non-retail costs (wholesale, network and 'green' schemes) are held fixed. The assumptions underlying the model are described in full. Each assumption is simple, reasonable and justifiable. Where relevant, the implications of loosening these assumptions are also discussed. The model is calibrated in Appendix A using observations from the Victorian retail electricity market. Importantly, the general findings described in this paper are not overly sensitive to the model's underlying assumptions or calibrations.

The results of the model are presented in Section 4 which provides trajectories for retail costs and prices. Default and discount offers are found to follow very different price paths as competition in the retail electricity market deepens. The implications

for consumer welfare are explored in detail. The model is then used to peer into the future of the retail energy market.

The model is reassuringly good at describing the evolution of the market to date, suggesting it may also have useful predictive powers about the market's future. However, like all models, its greatest strength is that it provides a framework for thinking about the market and its future. The purpose of this paper is to explore the future – rather than forecasting prices.

Section 5 examines the implications for policy makers and regulators of these findings. The discussion initially reflects on assertion that shortcomings in the retail energy market are transient and will be corrected by the market's competitive dynamics. If the market won't self-correct, then customers are right to hold policy makers and regulators to account for the elevated prices they are paying. However, this presents the regulatory community with an unfortunate paradox. While regulators feel compelled to facilitate customers switching to discounted contracts, their interventions drive retail prices generally higher. The discussion then looks at innovation in the context of the retail energy market's price dynamic.

Section 6 reflects on solutions to the paradox and identifies three directions from which regulatory reform could be pursued to reverse the positive relationship between competition, retailer costs and retail prices. These are: search costs, contract design and market structure. The discussion acknowledges much work is already underway to reduce search costs but contends that this may not be enough to overcome the unfortunate paradox. The paper therefore identifies areas in contract design which ought to be addressed.

Section 7 concludes the paper.

2. REVIEW OF REVIEWS

This section describes the relationship between competition in the retail electricity market, rising electricity prices for consumers and increasing costs for energy retailers. Drawing on published reports, section 2.1 establishes the relationship between competition in the retail electricity market and increasing prices. Section 2.2 examines how and why competition causes retailers' costs to increase. Section 2.3 takes a closer look at retailers cost structures in the face of competition. This discussion is then used to inform the model developed in section 3.

2.1 The debate

When the energy sector was privatised in Victoria in the mid-1990s, retail end of the industry was seen as the least interesting or attractive – so much so, that retail licences were 'stapled' to distribution licences because they were viewed as having little intrinsic value in their own right. Before long, the market decoupled the two licences and energy retail emerged as a industry in its own right.

With the advent of National Competition Policy at about this time, opportunities were identified to:

> *"…to drive efficiency though competition in the contestable wholesale and retailer components of the market…"* ACCC (2017) p.11

By 2002, Victoria has introduced full retail competition whereby the retail market was opened to new service providers. Since that time there has been as steady increase in the number of licensed retailers operating in the Victorian market. There were about 25 active retailers selling electricity in Victoria in 2016-17.

In 2004, the State and Territory governments accepted that deregulation would and should occur when the 'time was right'. The Australian Energy Market Commission (AEMC) was assigned the task in 2004 of assessing the readiness of jurisdictional retail markets for price deregulation.

It went about this task by applying tests of the market including: whether there were signs of independent rivalry, easy of entry for new service providers, and the exercise of consumer choice. The latter analysis was based on the range of contracts offered by retailers and the rate at which customers switched between retailers.

Based on these tests, the AEMC recommended in 2007 that the Victorian retail energy market be deregulated. On 1 January 2009, all vestiges of price regulation were repealed. Henceforth, all prices would be determined by competing retailers.

The AEMC would continue to apply its tests in its annual assessment of competition in Victoria as well as other jurisdictions. There was little questioning within policy circles of the merits of competition and the inevitability of price deregulation. Indeed, the strongest advocacy for price deregulation often came from within the policy and regulatory community. As the ACCC notes:

> *"In the early stages of retail contestability, in markets such as Victoria, there were signs that retail competition was developing and that over time, an increasing number of consumers would be the beneficiaries of competitive pricing and greater choice of services and new technologies."*
> ACCC (2017) p.12

In 2011, questions began to be raised about this view of the market. Based on some emerging trends in the Victorian retail energy market, Ben-David (2011) queried whether such behaviours were consistent with the prevailing orthodoxy about the merits of the competitive market.

By late 2016, policy makers were becoming increasingly sceptical about the efficacy of retail competition. In Victoria, the government established an independent panel in November 2016 to inquire into the operation of retail energy markets in that state. The bipartisan panel was chaired by former Deputy Premier, Professor John Thwaites. The federal government issued a terms of reference on 27 March 2017 to the Australian Competition and Consumer Commission (ACCC) to inquire into the retail electricity prices.

The 'Thwaites review' published its final report on 13 August 2017 and the ACCC released its preliminary findings a month later.

In early 2017, the independent policy think-tank, the Grattan Institute, released a report on the state of competition in the Victorian retail electricity market. That report cast further doubt over the efficacy of the retail energy market to produce efficient prices for consumers.

In its preliminary report, the ACCC observed that retailers were responsible for 46 per cent of the price increase observed in Victoria between 2007-08 and 2015-16.[8] The ACCC also compared retail costs in Victoria to those in three other jurisdictions as shown in Table 1.

[8] ACCC (2017) p.41, Figure 34, shows network costs (including smart meters) contributed +66 per cent to price increase between 2007-08 and 2015-16; wholesale contributed -39 per cent, environmental accounted for +27 per cent; retail and other costs contributed +47%; and retail margin contributed -1 per cent.

TABLE 1. Retail contribution to total costs Victoria vs NSW, SA, QLD in 2015-16 [9]

	VIC	NSW	SA	QLD	3 state average
Total electricity bill (excl GST)	$1384	$1533	$1586	$1748	
Retail margin	$119	$122	$83	$109	
Retail and other costs	$267	$235	$219	$214	
Total retail component	$386	$357	$302	$323	$327
Total retail component (%)	28%	23%	19%	18%	20%

These results led the ACCC to the unequivocal conclusion:

> *"In both percentage and dollar terms, the highest [retail] costs are incurred in Victoria… The ACCC notes that Victoria is the NEM region that has had retail competition for the longest period of time and the lowest level of market concentration now, suggesting that competition has not had a significant effect in curtailing retailer costs in that state."* ACCC (2017) p.73

The Grattan Institute is somewhat more reflective.

> *"This was not the result intended when competition was introduced."* Grattan (2017) p.20

The findings of the Thwaites Review in Victoria mirror these views

> *"This was not the outcome Victorian consumers anticipated from the competitive market and the review has concluded that there is evidence of market failure that has led to this result."* Thwaites et al (2017) p.ix

It would seem that 2017 represents a turning point with the mounting brief of evidence that competition had failed to contain retail costs and that retail costs were substantially adding to customer bills.

The spotlight was now turned on to retailers and the substantial costs they impose on customers. This led the Thwaites Review to conclude:

> *"A significant failure of the competitive market has been to allow these costs to build up and increasingly be passed to consumers with little benefits to them to outweigh the costs."* Thwaites et al (2017) p.54

The following section briefly explores the role competition has played in increasing retailers' costs.

[9] Compiled from ACCC (2017) Figures 2.8, 2.12, 2.16 and 2.20.

2.2 Competition and its effect on retail costs and prices

Thwaites et al (2017) highlighted that since 2000, electricity (and gas) prices had increased by "almost 200 per cent".[10] This period encompasses the introduction of full retail competition in 2002 and full price deregulation in 2009. The ACCC (2017) found retail costs and margins were now the "second largest driver of increases in residential customers' bills over the relevant period".[11]

Some months earlier, the Grattan Institute (2017) noted that retail costs, which had been a minor contributor to retail prices at the time competitive markets were introduced, was now a significant driver of retail prices. It also noted that this was contrary to the conventional microeconomic wisdom that competition should lower prices.

> *"Recent reports and our own analysis … suggest that retail is now one of the largest components of the bill in Victoria, when historically it was the smallest. Yet, competition should reduce costs and put downward pressure on prices. The retail component of the bill should become smaller as a result of competition not larger."* Grattan (2017) p.11

The ACCC's report confirmed that the data it had collected directly from retailers was not supporting traditional expectations about the benefits of competition.

> *"Retailer costs have increased since competition was introduced, and are a significant component of costs."* ACCC (2017) p.76

This was despite the ACCC all finding that retailers appeared to be competing vigorously.

> *"Submissions from established retailers assert that there is very vigorous competition between electricity retailers. Consistent with that, the ACCC's review of internal documents produced by retailers as part of the inquiry revealed that retailers pay close attention to their competitors."* ACCC (2017) p.96

In other words, the market was doing as intended. Retailers' behaviours were comparable to those of suppliers in other competitive markets but contrary to expectations, this was driving retail costs and consumer prices higher.

Thwaites et al (2017) highlight that retailers engage in a variety of customer acquisition and retention practices including: marketing campaigns, telemarketing, discounting and one-off incentives for customers to switch retailers or offers.[12] Other costs include "win backs" which occur when a retailer is notified of a customer's intention to switch to another retailer and makes an offer seeking to

[10] Thwaites et al (2017) p.viii
[11] ACCC (2017) p.35. The "relevant period" refers to 2007-08 to 2015-16.
[12] Thwaites et al (2017) p.33

dissuade the customer from switching. Jacobs (2017) recognised the contribution these activities would make to retailers' costs.

> *"It would appear reasonable to expect that retailer costs would grow to incorporate the average additional cost of churn, should new market entrants increasingly take market share."*
> Jacobs (2017) p.10

As Finncorn (2017) noted that expenditure is not only driven by growth. Retailers must incur expenditures on customer acquisition and retention just to avoid losing market share.

> *"As a result, relatively modest churn and slowly-evolving customer numbers for the Tier 1 retailers can be misleading. In fact, retailers may be working furiously to replace lost customers with new ones and possibly even grow slightly ("acquisitions"), while also taking action to hold onto customers who have threatened or notified their intention to churn away ("retentions")."*
> Finncorn (2017) p.58

Finncorn refers to this ongoing expenditure by retailers for little commercial gain as a "hamster wheel".[13] Their logic extends beyond Tier 1 retailers. Any retailer which has established a customer base that it must protect or continuously replenish will also find itself on the "hamster wheel". In this regard, Victoria's experience, as the Australian jurisdiction that has had price deregulation for longer than any other and which has had customer switching rates amongst the highest in the world, is revealing.

> *"[T]he data indicates that costs to acquire and retail are not similarly decreasing… This would suggest that it is difficult for companies to reduce the 'costs of competition'. The ACCC also notes that the cost to compete appear to be highest in Victoria, which has had retail competition for the longest period of time."* ACCC (2017) p.74

Both the ACCC and Thwaites et observed that Victoria's greater rate of customer churn appears to have led to greater expenditure by all retailers. Both noted that Victoria had the highest retailer costs in the National Electricity Market (NEM).[14,15] The causality between customer switching rates and retailer costs was supported by an observation in the AEMC's latest assessment of competition.

> *"In Victoria, the proportion of residential consumers that were approached by an energy retailer was significantly higher than the NEM average."* AEMC (2017a)

Notionally, at least, expenditure on such activities would seem to reflect costs that were 'controllable', that is, within each retailer's discretion. However, retailers

[13] Finncorn (2017) p.60
[14] ACCC (2017) p.100
[15] Thwaites et al (2017) p.53

provided Thwaites et al (2017) with an important insight about the lack of control they felt over their marketing channels and expenditures.

> *"Many retailers indicated that while they would prefer not to use these [brokerage] services, they were necessary for attracting new customers because so many used them. One retailer said approximately 20 per cent of their sales came from third-party channels."* Thwaites et al (2017) p.34

These revealing insights, and others like them, confirm the proposition originally submitted by Ben-David (2015), and broadly denied at the time, that competition was a driver of rising retail prices. Ben-David proposed that competition in a market for an essential service (most notably, electricity) was not equivalent to competition in a 'normal' market. These differences are summarised in Box 1 and modelled in section 3.

Ben-David (2015) argues that competition in the retail electricity market, places retailers in a position well-known in game theory as the *prisoners' dilemma*. This is a situation in which purely rational parties acting in their own best interest make decisions that result in sub-optimal outcomes.[16]

In a subsequent paper, Ben-David (2017a) described how the prisoners' dilemma, which is a 'one shot game', could become an ongoing arms race between energy retailers. That paper focussed on the sub-optimal outcomes driven by retailers' competitive discounting strategies. Before long, retailers find themselves trapped in an arms race in which they must constantly be seen to be offering ever higher headline discounts to attract new customers (and possibly retain existing customers). No retailer can risk opting out of the race for risk of losing market share to those who continue to participate.

Whether it's competitive discounting, door-to-door sales, use of third party switching sites or any other marketing channel, an arms race sees retailers incurring competition costs that are ultimately borne by consumers.

> *"An arms race is a form of the Prisoners' Dilemma in which each party pursues its optimal strategy only to result in a suboptimal outcome for all parties … Arms races are futile and costly. They are futile because they rarely produce a winner; and whether they produce a winner or not, they entail the costly diversion of resources by all sides. …it is self-evident that a 'discount war' that raises industry costs can be neither efficient nor consistent with the long-term interests of consumers."* Ben-David (2017a) p.50

Herein lies the difference between an arms race and 'normal' competition. The former imposes greater cost (which are ultimately borne by consumers) whereas the latter drives prices down to the long-term efficient cost of delivering the service

[16] Viscusi et al (2005) provide a useful discussion of a prisoners' dilemma in competitive market dynamic when quantity (sales) is fixed. The example provided by Viscusi et al can be readily reframed so that price, rather than profit, adjusts in response to increasing costs.

(which ultimately benefits consumers). It is perhaps somewhat ironic that from a retailer's perspective, both scenarios can feel equally brutal and cut-throat.

The consequence of the unstoppable arms race in Victoria's retail energy market was starkly highlighted in Thwaites et al (2017). The review's confidential conversations with retailers revealed that consumers had little to which they could look forward.[17]

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BOX 1. Characteristics of a market for an essential service

The structure of a market for an essential service is fundamentally different from that of other 'normal' markets. As a result, the conduct of suppliers in competitive market for an essential service will differ from the conduct of suppliers elsewhere in the economy. Some of the main characteristics of a market for an essential service include:

- Demand is involuntary, largely inelastic and there are no viable substitute services from which consumers can choose.
- The inelastic nature of demand means that marketing activity by competing suppliers does not grow the size of the market. Rival suppliers are only able to compete over market share.
- Service providers are subject to a regulatory obligation to supply consumer other than in the most extreme circumstances.
- The service is purchased as continuous stream of supply rather than in discrete lots, with payments made at intervals not related to consumption of the service.

In addition, in the case of electricity:

- The unit of consumption is not readily observed or easily understood.
- The product is homogeneous with little scope for product differentiation (at least to date).[18,19]

[17] Thwaites et al (2017) p.24

[18] Thwaites et al (2017) comment that "[R]etail energy is not a product that can be easily innovated. Under the current retail market structure, electricity generators and gas producers provide the energy, the network operators distribute it, and retailers sell it to consumers. There is limited product innovation available to retailers other than to improve their operations and billing and efficient purchasing of wholesale electricity. Innovation in the traditional marketplace is therefore generally limited to marketing, incentives and pricing." (p.53) A customer survey commission by Thwaites et al showed that for the overwhelming majority of customers, price was the dominant consideration in their energy-related decisions.

[19] The Competition & Markets Authority (2016) in its very extensive review of the energy market in Great Britain reached the same conclusion, noting: "Gas and electricity are extreme examples of homogenous products in that the energy that consumers consume is entirely unaffected by the choice of retailer. We would expect, therefore, that price would be the most important product characteristic to a customer in choosing a supplier and/or tariff and this is supported by evidence from our survey of 7,000 customers. A further

The market for residential electricity customers reflects all these characteristics. The market for small business customers is broadly similar. The retail gas market meets most of these characteristics though electricity is a somewhat viable substitute for gas (though it may involve an upfront capital investment by the consumer which could present a significant barrier). By comparison, petrol is a homogeneous good that has some elements of 'essentiality' insofar as (domestic) demand is largely inelastic in the short term, however, service providers are not bound by an obligation to supply and consumers make purchases in discrete lots which they can readily understand. Mobile telecommunication is probably approaching the status of an 'essential service' to the extent that its usage is becoming less voluntary while food is self-evidently 'essential' for life, but there are endless substitute types of food.

When all the above characteristics express themselves in a single market – namely, the retail electricity market – they cause that market to be fundamentally different from other markets. Energy retailers vying for customers will continue to incur and accumulate competition costs (in an arms race) which they will pass through to customers with little (or no) fear of market contraction.

None of the above characteristics are unique to Victoria's retail electricity market, which invites the question: Why are retailer costs higher in that state than elsewhere in Australia? The answer is likely to be found with the market's life-cycle. Electricity prices were fully deregulated in Victoria in 2009 while other states followed some years later (South Australia in 2013, New South Wales in 2014 and south east Queensland in 2017). The passage of time will confirm whether competition costs in these jurisdictions follow the same path as in Victoria (assuming no regulatory interventions that might alter the course of competition in the meantime).

implication of homogeneity is that customers may be less interested in engaging in the markets for electricity and gas supply than in other markets, where there is quality differentiation of products."

2.3 Retailer costs structures

Different authors and reports apply different taxonomies to describe retailers' cost structures. Finncorn (2017) provides the most comprehensive description initially dividing costs between Cost of Goods Sold and Retail Gross Margins.

Cost of goods sold include:

- wholesale electricity pool purchases
- the efficient cost of hedging against wholesale market volatility
- acquittal of obligations under commonwealth and state 'green schemes', and
- network costs.

Network costs are regulated (by the Australian Energy Regulator) with all other costs market-determined. Because all retailers are price-takers of network costs and wholesale electricity pool purchases, these costs can be assumed to be passed through to consumers in their entirety.

Costs associated with hedging and green scheme acquittals, along with all other costs (described below), are treated as being within retailers' control. It is the extent to which retailers can efficiently manage these controllable costs which will determine a retailer's tariff offerings in a competitive market.

Retail Gross Margins consist of retailers' Cost to Serve (or operating costs) and their earnings before interest and tax (EBIT). The latter is further divided into the cost of capital and economic profit. These costs are briefly discussed in Box 2. Supernormal profits would be added to this category, should they exist.

BOX 2. Risk and return

Various reports refer to the factors that determine the rate of return investors would expect for the capital invested in an energy retailer operating in a competitive market. Examples include:

- "variations in customer demand and economic conditions" – IPART (2017b) p.19
- "balance sheet risks associated with the wholesale spot market" – AEMC (2017a) p.vi
- "loss of customers" – Helm (2017) p.146
- "poor hedging, inefficient billing and poor customer services, failures in their IT systems, and from cash management and bad debts" – Helm (2017) p.147

Helm notes that it does not necessarily follow that in a regulated environment all these risks should or would be compensated through the price-setting mechanism.

Finncorn (2017) divides retailers' Cost to Serve into two sub-categories: Cost to Maintain and Cost to Compete.

Cost to Maintain is defined as "the total operating costs a retailer would experience if there was no competitive market activity" or the costs associated with "serving existing customers in the normal course of affairs".[20] These costs include:

- operating billing systems
- managing customer enquiries
- risk-management activities, and
- associated management and overheads including maintaining IT systems.

Finncorn observes that some of these costs will be "effectively fixed" (such as the management team and general corporate overhead, and non-scalable elements of IT systems) while others are likely to be variable with the number of customer accounts (for example, customer service functions and paper billing).

In direct contrast to Finncorn's view about these costs being largely variable with the scale of operation, an AEMC survey of energy retailers revealed:

> "Retailers generally considered economies of scale and scope to not be large in energy retailing." AEMC (2017a) p.38

and therefore:

> *"[E]conomies of scale and scope are not seen to be significant barriers to entry."* AEMC (2017a) p.iv

This is a particularly revealing finding. It certainly runs counter to the conventional wisdom about industry costs.[21,22]

In addition to the Cost to Maintain identified by Finncorn, other reports include:

- regulatory compliance costs[23], and
- the costs of providing services to support consumers including customer hardship programs, and in managing bad debt.[24]

These costs are briefly addressed in Box 2 above.

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[20] Finncorn (2017) p.61
[21] For example, see ACCC (2017) p.105 and Jacobs (2017) pp.18 & 98
[22] If larger retailers were the predominant respondents to the AEMC's survey it may have influenced this finding. These retailers would have no interest in admitting their competitive advantages.
[23] IPART (2017b) p.19, Thwaites et al (2017) p.18 and AEMC (2017a) pp. 51-56.
[24] AEMC (2017a) p.19

Finncorn describes **Cost to Compete** as retailer costs driven by the acquisition and retention of customers in competitive markets. According to Finncorn, Cost to Compete include:

- internal costs – such as marketing and customer interactions to action enquiries, wins, losses and retains, and
- payments to external channels for acquisition such as contracted door-knockers, telemarketing, or commercial comparator sites.[25]

Based on published data, Finncorn find that:

> *"Cost to Compete is driven by the quantity of competitive activity and we examine trends here too. There are increasing numbers of competitive "events" – acquisitions and retentions – reported by AGL and Origin."* Finncorn (2017) p.56

It is reasonable to assume other retailers (who do not report publicly) would be incurring similarly rising Costs to Compete as the level of competitive activity increases.

Over the decade-or-so of publicly reported data that Finncorn analysed it found:

- Costs to Maintain are not falling under competition and are trending "mildly higher" over the longer term[26], and
- Costs to Compete is material and this is driven by "the 'hamster wheel' of roughly maintaining customer numbers."[27] Finncorn's report shows that AGL's cost to compete has more than doubled in the ten years to 2017. (AGL has the most complete and reliable publicly available data.)

Indeed, Finncorn's analysis shows that:

> *"Taken together, the long-term trend is of rising Cost to Serve. This is not consistent with expectations that an increasingly-competitive retail energy market would drive more efficient costs and lower prices for consumers."* Finncorn (2017) p.56

and that:

> *"The data we have collected in this report suggests a rising trend in both the operating costs and the profitability of retailer businesses: Gross Margins, Cost to Maintain, Cost to Compete and EBIT have all trended higher despite a roll-out of price deregulation and competition."*
> Finncorn (2017) p.4

[25] Finncorn (2017) p.59
[26] Finncorn finds that "AGL appears to be the most efficient operator, but its [Cost to Maintain] does not appear to have reduced under the heat of competition, rather it has risen by 20% over the decade. Origin's recent falls only partly reverse a longer-term trend upward." (p.62)
[27] Finncorn (2017) p.60

These general trends are consistent with those reported by the ACCC and Thwaites et al. This consistency is despite each report relying on significantly different data sources. Finncorn used data published annually by publicly listed retailers; the ACCC relied on confidential cost data it received directly from retailers; and Thwaites et al applied a building block approach to estimate retailers' costs based on regulated or market-priced inputs.

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Retail competition is propelling retail costs and consumer prices higher. On this metric alone, retail competition does not appear to be operating in consumers' interests.

The following section develops a model that describes the dynamic between competition, retail costs and consumer prices. The mathematical relationships and the assumptions made in developing the model seek to reflect the market characteristics described in this section. The model is calibrated using observations from the Victorian retail energy market and found to perform well, as described in section 4. On that basis, the model is used to peer into the future of the retail energy market and the outcomes awaiting consumers.

3. THE MODEL

The mathematical relationships and the assumptions described below draws on the findings described in the previous section. The model seeks to describe retailer conduct and market performance since the advent of retail competition.

As with any model, this one relies on a set of simplifying assumptions that draw on the market observations described in the previous section. Each assumption is simple, reasonable and justifiable. Where relevant, the implications of loosening these assumptions are also discussed. Doing so does not alter the utility of the model to describe the past and the ongoing evolution of the market. Because the model focusses on retail costs only (all other costs are held fixed), its purpose in not to predict future prices per se. The model is calibrated using publicly reported data about the Victorian retail energy market (see Appendix A).

The model seeks only to describe outcomes observed in the retail energy market in Victoria, and potentially elsewhere in Australia. Its application to retail energy markets elsewhere will depend on the characteristics of those markets and the regulatory frameworks within which they operate.

The results generated by the model are described in section 4 which is followed by a discussion about the regulatory implications of these findings in section 5.

3.1 The market

The market is described by the characteristics described in Box 1. Most importantly, this includes product is homogeneity and inelastic demand. The latter has two important implications. First, the size of the market is fixed. Retailers compete but this is for market share only. This contrasts with other competitive markets where competition between suppliers can also lead to growth in the overall size of the market. Second, the inelasticity of demand sees additional supply-side costs passed through to consumers directly and fully (that is, 'dollar for dollar').[28]

The model draws on the survey findings from the AEMC (2017a) that are economies of scale are considered "to not be large in energy retailing" (see section 2.3). The model therefore assumes that all retailers face the same average retail costs (for example, on a per customer basis) irrespective of their size. This implies there is no

[28] Loosening this assumption is unlikely to alter significantly the overall findings reported below. Were consumption to fall with increasing prices (as might normally be expected), it could result in an increase in retailers' average costs — potentially intensifying the findings of the model.

need for further assumptions about the number and size of retailers competing in the market.[29]

For the purposes of this paper, the term 'consumer' refers to small customers. In Victoria, this cohort is defined in regulation as customers whose annual consumption is less than 40 MWh per year. A broader definition might define this cohort as customers who have minimal market power (or buying power) in negotiating their electricity prices or for whom capital investment would be a non-economic alternative (due to consumers' high discount rates when making consumption decisions). Many customers are also capital constrained.

This paper does not explore the question of why some customers remain on high priced offers (sometimes described as "customer stickiness"). Whether customers remain on high-priced offers because of high transaction costs and information asymmetries[30], customer inertia and induced customer inertia[31], or other behavioural biases[32], is beyond the scope of the model.

However, once a customer switches to a lower priced offer, the potential that they will switch again is assumed to remain indefinitely. This means that as more customers switch to discounted offers, retailers need to compete even harder to retain these customers and attract other customers (just to maintain their market share – recall Finncorn's "hamster wheel" analogy). This assumption is supported by experiments by the Centre for Market Design (CMD), at the University of Melbourne, which found that retailers tend to offer more generous discounts to customers who they believe are actively shopping around for a new offer.[33] CMD's experimental data confirms that retailers compete more vigorously when they believe customers are shopping around. It appears retailers operate on the basis that customers who have switched their retailer once, will switch retailer again if they find (or are approached about) a more attractive offer. This model therefore assumes that once a customer has become 'footloose' they remain footloose.[34]

[29] Loosening this assumption would not alter the overall findings of the model. It would, however, alter the distribution of profits between retailers of different size (due to retailers' differing cost profiles). For an example of how this might operate see Finncorn (2017) figures 39 and 40.

[30] For example, ACCC (2017) noted, "the ICRC considers that price dispersion in the electricity market may only be reflecting information asymmetry and search costs. Many submissions to the ACCC inquiry support this position." p.124

[31] For example, see Ben-David (2107a,b) and Helm (2017) p.151

[32] For example, see: Gardner and Nilsson (2017)

[33] See CMD (2017)

[34] The model assumes once a customer is footloose, they remain footloose – that is, they remain on a low priced contract forevermore. The implications of loosening this assumption are discussed in section 6.

3.2 Retail prices

The model assumes there are just two types of contracts in the market: low- and high priced. High priced (H) contracts represent standard retail contracts (also called, standing offers) and market contracts which are not discounted. Undiscounted market prices arise when a previous discount has expired or customers have failed to satisfy the conditions a retailer has attached to its offer of a discount. Low priced (L) contracts consist of discounted market offers where all conditions for a discount are met – for example, bills are paid on time or issued electronically.

Following Ben-David (2107a,b), retailers are assumed to hold a portfolio of high- and low priced customer contracts. The proportion of low priced contracts is given by the parameter, α , where $0 \leq \alpha \leq 1$. As there are no other contracts in the market, the proportion of high priced contracts equals $1 - \alpha$.

The weighted average price (WAP) of contracts in retailers' portfolios (and in the market as a whole) is given by the portfolio pricing equation:

$$WAP = \alpha.L + (1 - \alpha).H$$

The weighted average price also represents a retailer's expected (or average) revenue per customer.

The parameter, α , can also be considered to be a simple and direct measure of market competitiveness – that is, more competitive markets are assumed to result in more customers paying lower prices. When there is no competition ($\alpha = 0$), there are no customers on low priced offers. Indeed, when there is no competition, there is only one price available in the market (H) and there is no discounting. Maturing competition (increasing α) reflects retailers vying to attract customers by offering them discounted prices.

Adopting α as a simple and direct measure of market competitiveness avoids the need for indirect measures of 'effective competition'.[35]

Within the model, retailers market their low priced contracts as a percentage discount off the value off their high priced offers. For example, if the undiscounted price is 100 and the discounted price is 85, the advertised discount on the lower priced offer will be 15 per cent. The model assumes retailers seek to advertise the largest discounts possible within the constraints assumed below.

[35] As pursued by AEMC in its annual assessment of market competitiveness (see section 2.1).

As discussed below, retailers must ensure the revenue generated from their portfolios of low- and high priced contracts is sufficient to meet all their costs.

Loosening the assumption that there are only two types of contracts quickly complicates the challenge of solving the model, but it does not alter its overall findings. The consequences of allowing retailers to hold multiple (and differing) priced contracts is illustrated in section 4.3.2.

3.3 Solving for alpha

The *Victorian Energy Market Report* 2016-17 (VEMR) published by the Essential Services Commission of Victoria[36] reported that the average price for standard contracts was $1,438. The average fully discounted market offer was priced at $1,172. These two prices serve as estimates of H and L, respectively. The weighted average price is unobservable so it must be represented by proxy. For the reasons explained in Ben-David (2017b), the model assumes price of unconditionally discounted market reflects the weighted average price of contracts in retailers' portfolios.[37] The VEMR finds the average price of these discounted market offers is $1,294.

Substituting these prices into the portfolio pricing equation above and solving gives a value of $\alpha = 0.54$. In other words, around half of Victorian customers are assumed to be on low priced (or discounted) market offers. The other half of customers are on high (or undiscounted) contracts.[38]

This estimate aligns neatly with the AEMC's annual consumer survey which has found the proportion of Victorian customers reporting they had switched electricity retailer or plan in the last five years to be: 57 per cent (2015), 54 per cent (2016) and 57 per cent (2017).[39]

The model can therefore be calibrated with sufficient confidence using the Victorian retail energy market around a measure of competitiveness given by $\alpha = 0.54$, see Appendix A.

[36] ESC (2017a)
[37] See Ben-David (2017b) p.36
[38] The model assumes once a customer is footloose, they remain footloose – that is, they remain on a low priced contract forevermore. The implications of loosening this assumption are discussed in section 6.
[39] AEMC (2017a) figure 6.11

3.4 Retail costs

The conventional wisdom has held that retailer's costs contribute only 12 to 15 per cent of the total price paid by customers.[40] A number of recent studies have identified that retail costs contribute a much higher proportion towards the price of electricity. These findings are summarised in Table 2 and they are remarkably consistent in their findings that retailers' costs account for around 30 per cent of a typical electricity bill.

TABLE 2. Costs contributing to customer bills (excluding GST)*

	Oakley Greenwood (2017)	CME (2017)	ACCC (2017)	Vinnies (2017)
Period	2015-17	May 2017	2015-16	Jan 2017
Usage (kWh pa)	4000	4000	4800	4800
Wholesale	22%	21%	21%	24%
Network & AMI	39%	40%	45%	42%
Retail	31%	34%	28%	29%
'Green schemes'	8%	5%	6%	5%

* Grattan (2017) concluded that retailer costs contributed 30 per cent towards the total electricity bill but its findings were not presented in a comparable manner (p.16).[41]

The model is therefore calibrated against an assumed 30 per cent contribution by retailer costs to the price of electricity in the Victorian retail market. The model divides this overall contribution between 'underlying costs' and 'competition costs'.

Underlying costs reflect average costs (or cost per customer account) that do not alter with the level of retail competition. Underlying costs can be further divided into two subcategories:

- *Non-retail underlying costs* consisting of: (i) wholesale electricity pool costs and hedging costs, (ii) network costs, and (iii) costs associated with 'green scheme'.
- *Retail underlying costs* consisting of a retailer's costs to serve a customer irrespective of the level of competition in the retail market. Finncorn (2017)

[40] For example, AEMC (2016) notes (i) competitive market costs (which consist of wholesale costs and retail costs) account for 40-50 per cent of the total price (p.ii), and (ii) wholesale costs comprise 70 per cent of competitive market costs (p.iv). Together, these figures suggest that between 12 and 15 per cent of the end price paid by customers can be attributed to retail costs.

[41] The analysis by Finncorn (2017) suggests proportionately much higher generation and network contributions, and a lower retail contribution, than other analyses. This may be an artefact of the way the publicly listed retail companies present their accounts in their annual reports.

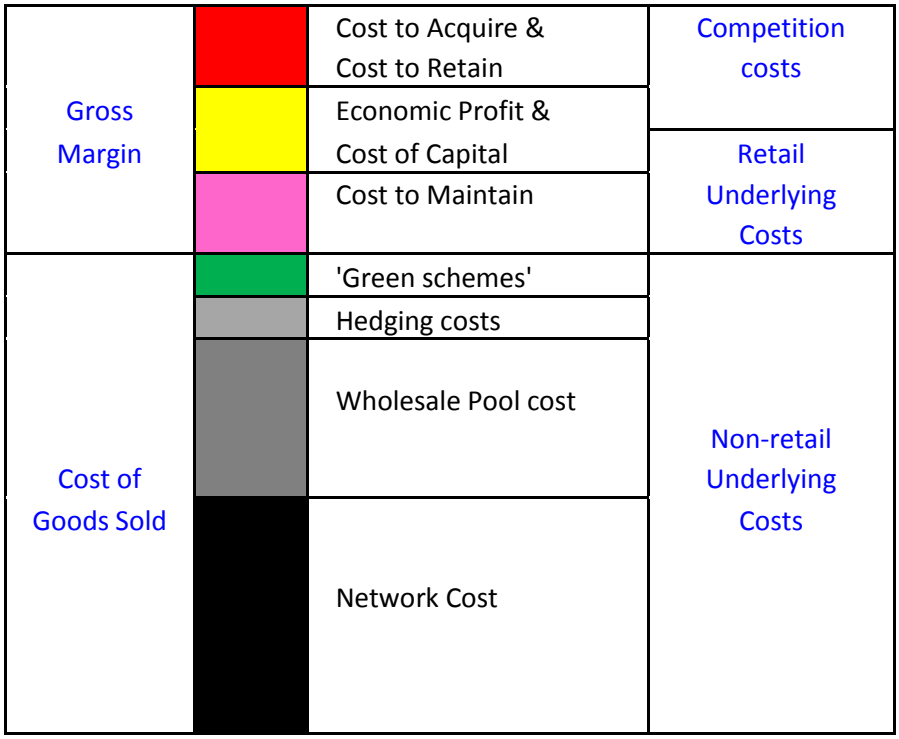
referred to these costs as ‘cost to maintain’. For the purposes of this paper, retail underlying costs are also assumed to include a share of a retailer’s profit requirement and its cost of capital.

Competition costs represent additional expenditures incurred by retailers as they compete for customers. Finncorn (2017) referred to these costs as ‘cost to acquire’ and ‘cost to retain’. As above, for the purposes of this paper, competition costs are also assumed to include a share of a retailer’s profit requirement and its cost of capital.

Figure 1 compares Finncorn’s taxonomy with the one adopted in this paper.

Different assumptions apply to each of the three types of costs assumed in this paper. These assumptions are described below.

FIGURE 1 **Comparison of taxonomies.**
Finncorn (2017) shown on left. This paper shown on right.



3.4.1 Non-retail underlying costs

Because this paper focusses on the impact of competition on retail costs, non-retail underlying costs are held fixed throughout the analysis presented below.

This assumption is loosened in Appendix B which models the effect of a wholesale price shock – that is, a sudden increase in non-retail underlying costs. This broadly models the consumer impact of the recent rise (of 60 per cent) in wholesale prices in Victoria.

3.4.2 Retail underlying costs

This paper assumes that retail underlying costs benefit from productivity gains pursued by retailers as they compete in the retail energy market. This is despite Finncorn's finding that 'cost to maintain' has been increasing in the retail energy market, however, it is consistent with ACCC (2017) which found:

> *"Drivers of this reduction may include system overhauls and automation … introduction of smart meters in Victoria, and the impact of conditional pay on time discounts and the use of direct debits reducing timeframes and costs for retailers to receive payments."* ACCC (2017) p.74

These efficiency gains from competition are assumed to lower *total* underlying costs by 5 per cent as retail competition matures. While this does not appear to be a particularly ambitious assumption, it is worth recalling that *total* underlying costs consist of retail underlying costs and non-retail underlying costs. Because the latter is held fixed, all efficiency gains must be made by retailers.

The productivity gains are modelled by the following assumed relationship between total underlying costs and the level of competition in the retail energy market.

$$UC_{\alpha} = UC_0 \times (0.95)^{\alpha}$$

where: UC_{α} represents total underlying costs for a given value of competition (as measured by α)

UC_0 represents total underlying costs when there is no competition ($\alpha = 0$)

Once the model is calibrated (see Appendix A), these assumptions mean that although total underlying costs are assumed to only decline by 5 per cent, retail

underlying costs decline by almost 30 per cent. The model assumes that retail competition sees these productivity gains passed through to customers in full.

This assumed efficiency gain from competition may be on the high side. To the extent that it is overly ambitious, it works against the general findings of the model. In other words, adopting a lower level of productivity would result in the modelled benefits of competition being even less than those modelled in this paper.

At the current level of competition in the Victorian retail electricity market ($\alpha = 0.54$), the calibrated model implies retail underlying costs represent 15 per cent of total underlying costs and total underlying costs contribute 82 per cent towards the typical total bill.

3.4.3 Competition costs

As more customers become 'footloose' (α increases) – whether in response to retailers' marketing efforts or some other influence such as changes in the regulatory environment – the spending by retailers to retain and attract customers increases.

Competition costs are assumed to be related to the level of competition in the retail electricity market according to the following function.

$$CC_{\alpha} = CC_1 \times (\alpha)^n$$

where: CC_{α} represents competition costs for a given level of competition (as measured by α)

CC_1 represents competition costs when the market is completely competitive ($\alpha = 1$)

n determines the shape of the curve. If $n = 1$ then competition costs increase linearly with the level of competition. If $n < 1$ ($n > 1$) the competition cost function is concave (convex).

When there is no competition ($\alpha = 0$) in the retail electricity market – for example, because all retail prices are fully regulated – competition costs are assumed to be zero.

Calibration of the model in Appendix A produces a value of $n = 0.91$. This implies a concave function, that is, the model displays diminishing marginal cost of

competition. This means that for every doubling in the level of competition, the cost per customer account of competition increases by less than double (or 1.88 times).

The finding of a diminishing marginal cost of competition is consistent with the recent reports. For example, Thwaites et al found that:

> *"As competition develops, retailers continually learn which marketing techniques and pricing strategies enable them to attract and retain customers."* Thwaites et al (2017) p.23

Importantly, the model does not concern itself any further with whether increasing competition costs are due to:

(i) Administrative competition costs associated with managing customer transfers — sometimes known as 'on boarding' costs

(ii) increased marketing activity, sometimes called 'customer acquisition and retention costs' (CARC)

(iii) higher capital costs due to the higher risk of operating in an increasingly competitive environment — most notably, the risk of losing customers (and therefore market share) to competitors

Whatever the cause, the result for customers is the same. Because consumer demand is involuntary, inelastic and there are no available substitutes, increasing competition costs are passed through in full to consumers. This is the consequence of the prisoners' dilemma or arms race or hamster wheel described in section 2.2. Competitors become caught-up in out-spending their rivals rather than focusing on lowering their own competition costs.

It is worth contrasting this outcome with the outcome that might be expected in other competitive markets where consumption is voluntary, elastic and substitutes are available. There are two particularly noteworthy differences. First, in such markets, competition costs are disciplined by a downward sloping demand curve. Increased supply costs cannot be passed through to customers in full. Second, marketing activity in such markets can increase the size of the market. If the market grows at a faster rate than growth in competition costs, then average competition costs (or competition costs per account) will decline.

3.5 Additional assumptions

Some additional assumptions are required to close the model and allow it to be solved.

First, for retailers to remain whole, the weighted average price (WAP) must be sufficient to cover a retailer's costs of providing services to a customer. That is, weighted average price must equal the average cost per customer account. While deviations from the portfolio pricing constraint may be possible in the short term, a retailer cannot persistently under or over price their portfolio without going broke. For ease of exposition, the model assumes that retailers' portfolios are balanced at all levels of competition. That is:

$$WAP_{\alpha} = UC\,(\text{non-retail}) + UC\,(\text{retail})_{\alpha} + CC_{\alpha}$$

Recall, non-retail underlying cost do not vary with the level of competition in the retail market.

Second, retailers' high priced offers (H) never exceed the long run costs of providing services – that is, the cost of providing electricity when the market is fully competitive ($\alpha = 0$). This assumption serves to avoid having prices in the market overshoot their long-term values and then having to correct at a later time. This assumption is loosened in Appendix B where retail prices are allowed to overshoot their long-term values in the wake of a price shock in wholesale costs.

Third, there is no time in the model; nor is there any inflation for nominal costs or prices. This is not a material assumption. The passage of time is not measured in the usual units of time (eg. days or years). Rather, it is marked by the changing competitiveness of the market.

Finally, retailers' pricing strategies produce smooth price paths as competition evolves. There are no discontinuities in the price paths for retailers' low- and high priced contracts. Alternatively stated, there are no exogenous cost or price shocks in the model. As noted above, this assumption is loosened in Appendix B.

*

Appendix A describes how the model is calibrated using observations from the Victorian retail electricity market. The model's results are presented in the following

section. The price paths generated by the model and shown below are not unique. Other price paths can be derived while satisfying the assumptions outlined in this section, however, all price paths follow the same general configuration. In other words, the price paths shown in section 4 are only one possible outcome, but they are drawn from a narrow band of other similar outcomes that also satisfy the models assumptions.

This provides comfort that the model's descriptive qualities about the evolution of the market are robust, though it does caution against trying to use the model to predict future prices.

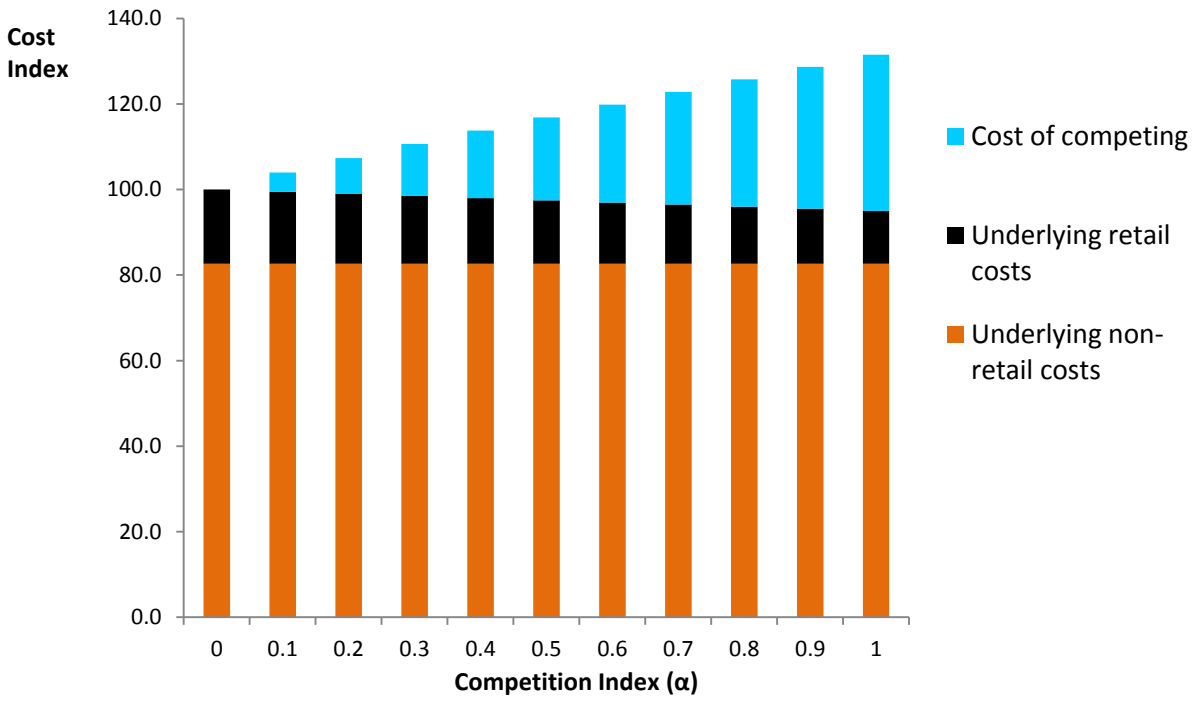
4. FINDINGS

This section reports the results produced by the model once it has been calibrated as described in Appendix A.

4.1 Cost of supplying electricity

The model produces a cost curve as shown in figure 2 for increasing levels of competition ($\alpha_{0\to1}$). Non-retail underlying costs (shown in orange) remain fixed by assumption. Retail underlying costs (black) decline with productivity gains induced by competition, these costs decline by about 30 per cent as competition matures. Competition costs (blue) increase with competition by diminishing marginal amounts, reaching a maximum of 28 per cent of the total bill when $\alpha = 1$. The retail share of the bill, consisting of retail underlying costs plus competition costs, increases from 17 per cent (when $\alpha = 0$) to 37 per cent ($\alpha = 1$). The net effect of competition sees prices increase from an indexed value of 100 to 131.5 as α increases from 0 to 1.

FIGURE 2. Cost of supplying electricity as a function of competition



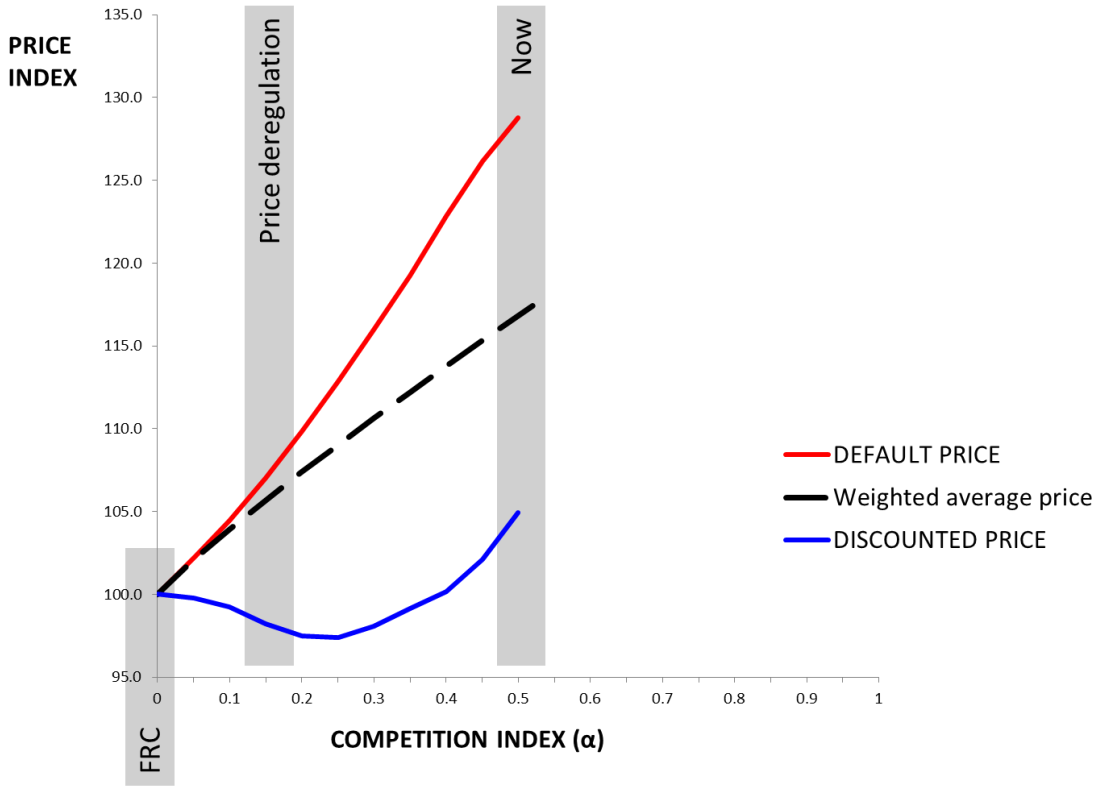
At the present value of competition in the Victorian retail electricity market (described by α = 0.54), the indexed price is 118.1. In other words, since the advent of competition, higher retail costs have added 18.1 indexed units to the original price of 100 units.

This equates to $198 in current prices. This amount reflects $228 in competition costs offset by a $30 efficiency improvement in retail underlying costs. In other words, $198 out of the present weighted average price of electricity ($1,294) is due *only* to the cost pressures created by competition.

4.2 Retail electricity prices

As noted at the end of section 3, the model does not produce a unique price path for low- and high priced contract, however, options are limited to a narrow band. The price paths shown in figure 3 are generated using the additional constraint that discounts at the commencement of competition are modest and only increase once competition is well-established. This broadly reflects the experience in the Victorian retail electricity market since 2002.[42]

FIGURE 3. Retail electricity prices as a function of competition



[42] See Ben-David (2017b) p.7-11

The relationship between low- and high priced contracts satisfies the portfolio pricing equation described in section 3.2.

For the purposes of the following discussion, high price contracts are referred to as "default contracts". These are the contracts on to which customers will be placed by their retailer if: (i) they have never entered a low priced contract, or (ii) they have previously been on a low priced contract but the discount period has expired. Low priced contracts are referred to as "discounted contracts". In this simplified model, all discounts are expressed against the price of a default contract.

With market liberalisation, retailers begin to incur competition costs as they sought to attract customers. In the initial stages, these costs are modest. This leads to a small increase in the weighted average price retailers must earn. Now that prices are deregulated, retailers tentatively offer default prices that are slightly higher than the weighted average price. This small premium then allows them to begin offering discounts to customers who might be inclined to switch retailer.

This can be seen in figure 3. As α increases from zero to 0.1, the weighted average price increases from 100 to 103.9 to account for the nascent competition costs retailers now face. Given competition is still new, retailers tentatively increase their default price only slightly above the weighted average price, to 104.5. Because 90 per cent of customers are still on default contracts, this small premium affords retailers the opportunity to offer discounted prices of 99.2. This represents a 5 per cent discount off the default price.

This is a reasonable approximation of events in the Victorian retail electricity markets in the early 2000s.

In reality, the market was deregulated in stages and the relevant government minister (rather than retailers) set the default price in the early years. To 'promote competition', the minister provided 'headroom' in the default price. In the context of this model, this headroom reflected an allowance for some competition costs plus a small premium above these additional costs. In making this allowance, the minister kick-stared a competitive retail energy market in which retailers could offer discounted prices to their Victorian customers.

As some customers were lured off their default contacts by offers of discounted prices, retailers found they needed to compete harder to attract new customers and retain their own customers. Bigger discounts ensued. For example, in figure 3 discounts increase from 5 per cent to 11 per cent as α increases from 0.1 to 0.2. With headline discounts now increasing of their own accord, policy makers declared 'mission accomplished' and the last vestiges of price regulation were removed in Victoria on 1 January 2009.

From here on, the market developed its own, internally generated dynamic whereby the presence of a few 'footloose' customers stimulated some competitive activity between retailers. These competitive efforts attracted more customers into the market which, in turn, demanded greater competitive efforts by retailers vying for custom.

While this paper does not attempt to explain the speed or scale of this dynamic, the consequences have been clear. Since prices were full deregulated increasing competition has driven ever greater expenditure by retailers as they compete for customers. These additional costs have overwhelmed retailers' efforts to become more efficient in managing their own underlying costs.

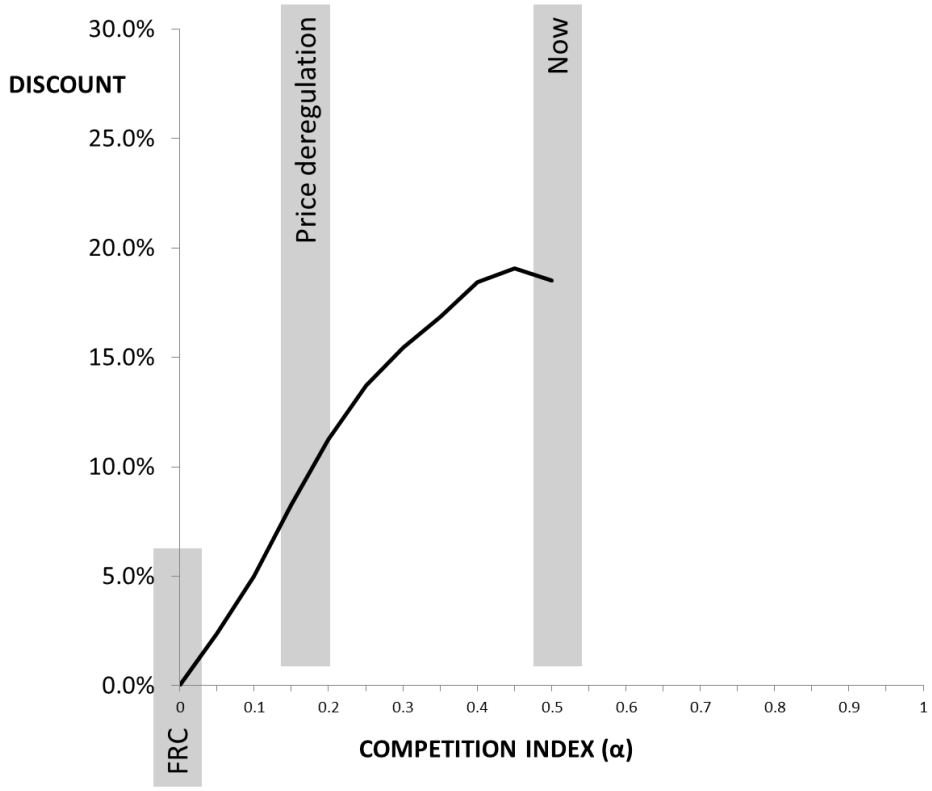
At the same time, it became clear that the most effective information device that retailers could use to effectively communicate their competitive credentials to consumers was through marketing headline discounts.

Therefore, in the years that have followed full price deregulation, the retail electricity market has been defined by retailers incurring ever increasing costs and pursuing ever higher discounts.

Pursuit of these bigger discounts has seen retailers increase the price of their default contracts at a significantly faster rate than the increase in their total costs. This can be seen in figure 3 where the price of default contracts has risen more steeply than the weighted average price. As already noted, the gap between these two lines funds retailers' capacity to offer discounted prices to footloose customers. However, the funds available to finance discounts is constrained by the diminishing number of customers are on default contracts as competition increases. As a result, the price of default contracts does not only increase faster than the rate of increase in the weighted average price, the rate of increase is accelerating.

At the same time, customers on discounted contracts found their electricity prices falling following deregulation. Not only were prices falling, the discounts from which they were benefiting were getting larger – that is, the gap between the red and blue lines in figure 3 was getting bigger. The implied value of the headline discounts produced by this market dynamic is shown in figure 4.

FIGURE 4. The value of retail discounts as a function of competition



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The increasing value of discounts and the broadening dispersion of offers have been upheld as a sign of successful market reform.

> *"Higher levels of price dispersion are often associated with markets with more effective competition, as it is linked to retailers differentiating plans to better meet consumer preferences."* AEMC (2017a) p.28

> *"We consider price variation is consistent with a competitive retail market, and that it supports innovation and dynamic efficiency."* IPART (2017b) p.35[43]

The ACCC (2017) acknowledges there are other interpretations of the observed price dispersion in the retail energy market. It cites the views of the regulator in the Australian Capital Territory.

> *"In contrast…the ICRC considers that price dispersion in the electricity market may only be reflecting information asymmetry and search costs. Many submissions to the ACCC inquiry support this position."* ACCC (2017) p.124

[43] Somewhat confusingly, it also notes though it then notes that a "lack of price variation does not indicate that a market is not competitive." IPART (2017b) footnote 54 (p.35)

In his review of the state of competition in the UK retail energy market, Helm (2017) was less equivocal.[44]

> *"Contrary to certain comments from some of the companies, price divergence for a homogeneous product is not an obvious feature of a competitive market."* Helm (2017) p.164

A closer look is warranted.

4.3 Looking behind the discounts

To date, the merits of competition have been discussed within the context of ever-higher discounts becoming available to customers who 'shop around'. The model developed in this paper provides a mechanism to peer behind these measures and examine the underlying consequences of competition.

The results of the model, as shown in Figure 3, demonstrate that discounted prices fell with the introduction of competition. This fall occurred in absolute terms with prices falling from 100 indexed units to a low of 97.5 (when $\alpha = 0.2$). This was a genuine saving delivered by competition for the 20 per cent of customers who entered the market and switched to a discounted contract at that time. In current dollars, retail competition delivered this group of customers (as 'early adopters' of competition) a saving of $27 off their pre-competition electricity bills.[45]

These early adopters were paying 12.3 indexed units (equivalent to $135) less for retail component of their electricity than customers who had not entered the competitive market and remained on default contracts.

As competition continued to mature, the price of discounted offers gradually started increasing. When competition had reached the point where about 40 per cent of customers ($\alpha \approx 0.4$) had switched to discounted contracts, the price of those contracts had risen above the price of electricity prior the introduction of competition. This can be seen in figure 3 where the blue line rises above a value of 100 and remains higher thereafter.

Once the blue line rises above 100, all customers are paying higher prices than they were paying prior to the introduction of competition. This represents a turning point in the evolution of the competitive retail energy market.

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[44] Professor Dieter Helm CBE is an economist at the University of Oxford specialising in utilities, infrastructure, regulation and the environment. In August 2017, he was asked by the UK Government to consider the whole electricity supply chain of generation, transmission, distribution and supply [retail].

[45] Retail prices may have fallen by a larger amount due to efficiencies elsewhere in the supply chain – that is, in the non-retail underlying costs (which include wholesale and network prices) – but these costs are held fixed for the purposes of this paper.

At the present level of competition in the Victorian retail electricity market ($\alpha = 0.54$), discounted prices are valued at 107.0 indexed units implying that, even for customers on discounted contracts, competition has added 7 per cent to the pre-competition price of electricity (or $77 in current dollars). Although this amount is much less than the costs competition has added to the price of default contracts (priced at 131.2 units), that does not mask the impact competition has had on electricity prices for all customers with the weighted average price having increased to 118.1.

Competition introduced discounted market contracts into the retail electricity market. While it is self-evidently true that customers are better-off paying a discounted price, the model reveals that the benefit of competition on discounted prices has not been lasting.

Moreover, as shown in the next section, as competition deepens the spread of offers may be expected to narrow as the level of discounting declines — suggesting that price dispersion may not be a particularly helpful indicator of successful competitive reform.

4.4 Peering into the future

The Victorian retail electricity market is at a stage of competition signified by $\alpha = 0.54$. As discussed above, the results of the model conform with observed past pricing outcomes for customers. In recent years, Victorian customers on default contracts – standard contracts or market contracts where the discount has lapsed – have seen the price of their electricity accelerating as competition in the market deepens. On the other hand, customers on discounted market contracts originally saw prices falling followed by comparatively modest increases more recently.

Of course, these results relate only to the impact of competition on retail costs. Changes in underlying non-retail costs (wholesale, network and 'green schemes') may have added to, or subtracted from, the impact of competition on retail costs. Likewise, there is no inflation of costs and prices in the model.

It seems that the Victorian retail electricity market is currently experiencing the impact of a price shock in the wholesale market. This is modelled separately with the results shown in Appendix B.

Setting aside price shocks from elsewhere in the supply chain, the model can now be used to peer into the future to see what consumers can expect as competition continues to deepen – that is, as more customers engage with the retail energy market and shift on to the discounted contracts offered by retailers.

The model suggests customers on default contracts can expect to see little further change to the price of their electricity as competition deepens. At present (α = 0.54), these customers are paying 131.2 indexed units for their electricity. While this is 31.2 per cent higher than what they had been paying prior to price deregulation, default prices will only increase marginally in future – peaking at 131.5 unit. The flattening of default prices can be seen in Figure 5.

As competition sees more customers switch to a discounted offer, and the proportion of customers on default contacts falls, retailers' capacity to offer discounted prices starts to diminish. Fewer funds are generated from default customers to 'cross subsidise' lower prices for customers on discounted offers. As a consequence, discounted prices start to rise. Indeed, they begin to rise quite quickly as more customers switch to this type of contract. This rapid acceleration in discounted prices can be seen in Figure 5. From their present (α = 0.54) value of 107.0 units, discounted prices will quickly rise, reaching a maximum of 131.5 units. In other words, from here on, additional competition in the retail energy market will add up to $268 (in current dollars) to the price customers on discounted offers can expect to pay for their electricity.

FIGURE 5. Retail electricity prices as a function of competition

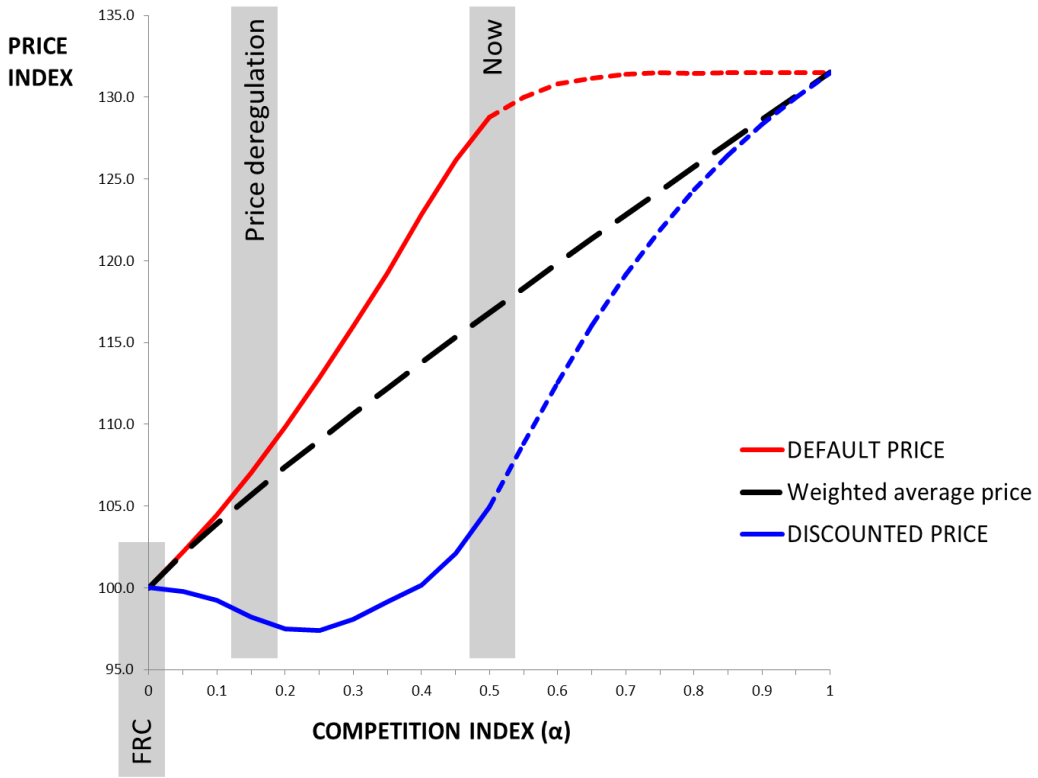
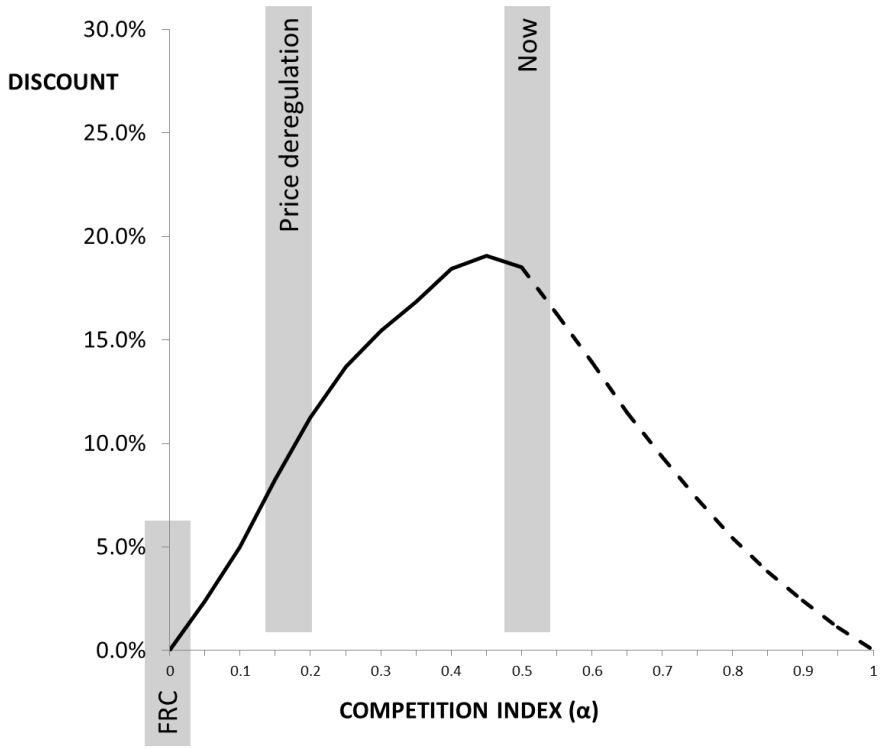


FIGURE 6. The value of retail discounts as a function of competition



As the opportunities for 'cross subsidising' between customers on default and discounted contracts declines, the price of these two contracts converges until, finally and once again, there is only one price in the market. When competition reaches its apotheosis and all customers have switched to, and remain on, discounted offers ($\alpha = 1$), there will be no need for default contracts and they will disappear from the market.

With all customers now 'footloose', retailers will need to compete very vigorously to retain existing customers or replace them with new customers. Finncorn's 'hamster wheel' will be spinning faster than ever and the arms race described in section 2.2 will be imposing very significant costs on retailers. These competition costs will exceed the efficiencies retailers have achieved in managing their underlying costs more efficiently. This can be seen in Figure 2 where growth in the blue bars is far larger than the reductions achieved in the black bars.

Retailers' share of the typical customer account, which has grown from 17 per cent at the introduction of retail competition to its present value of 30 per cent, will continue to increase as it heads toward a maximum of 37 per cent. This will be equivalent to $534 per account (in today's dollars) of which, 75 per cent will be going to cover retailers' competition costs. Retailers will only require $135 to manage their

underlying costs of delivering services to customers. This compares to the $190 per account required when the market was deregulated.

As the retail market becomes more competitive, competition costs will continue to increase while default and discounted prices will begin to converge (as shown in Figure 2). As this occurs, the value of headline discounts will decline (Figure 6).

Box 3 is more illustrates more starkly the potential impact of competition on price dispersion by loosening the modelling assumption that retailers only offer two contracts. Although the figures are illustrative only, they suggest the Victorian retail electricity market (where $\alpha = 0.54$) may have reached peak dispersion.

Retail energy markets in other Australian jurisdictions have not yet reached the competitive state of the Victorian market (they display a lower value of α). Arguably, this is because they deregulated prices later than Victoria.[46] Time will tell whether they follow a similar path (in the absence of any further regulatory actions).[47]

Advancing competition presents policy makers and regulators with challenges they did not anticipate when deregulating prices – and which are not yet fully appreciated. These challenges are discussed in the next section.

[46] See Box 1

[47] Prices were fully deregulated in Victoria in 2009. South Australia followed in 2013, New South Wales in 2014 and prices were deregulated in south east Queensland in 2017.

BOX 3 Price dispersion with multiple default and discounted contracts

Allowing retailers to hold multiple default and discounted contracts would produce price and discount spreads such as those shown in figures 7 and 8.[48] Retailers can make available a suite of discounted offers from within these ranges while ensuring that their suite of contracts satisfy the same budget constraint described in section 3.

Figures 7 and 8 are illustrative only. This paper hasn't sought to identify or model the factors that influence whether retailers offer multiple contracts. Doing so would significantly enhance the model but quickly add to its complexity without necessarily shedding greater insight on the relationship between competition and overall retail outcomes for customers.

FIGURE 7. PRICE SPREAD WITH MULTIPLE CONTRACTS

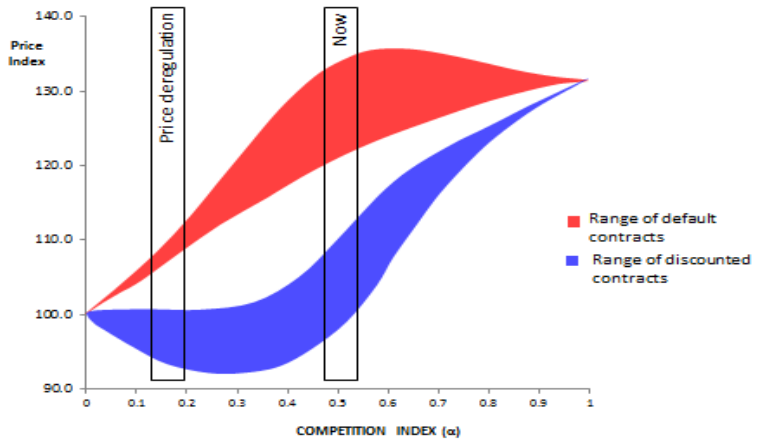
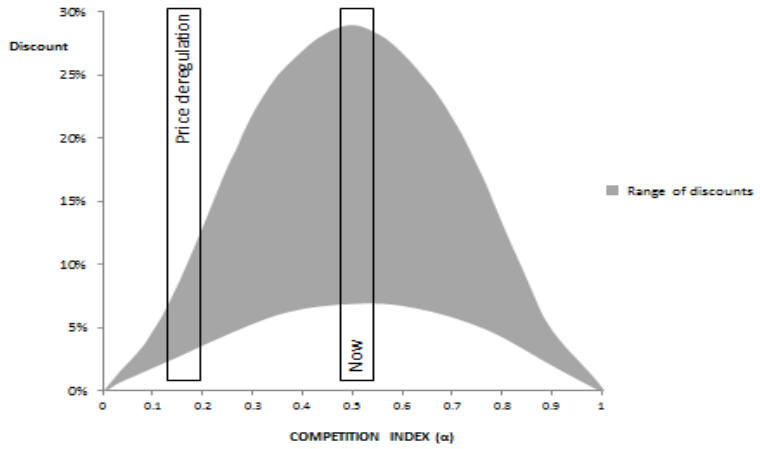


FIGURE 8. DISCOUNT SPREAD WITH MULTIPLE CONTRACTS



[48] Loosening this assumption allows retailers to also hold contracts with overlapping terms and to offer conditional discounts. It potentially also allows retailers to have different budget constraints and costs of capital in the short run.

5. IMPLICATIONS

Section 2 described concerns about the economic efficacy of competitive pricing in the retail energy market. Despite applying different approaches and relying on different data sources, numerous analyses have raised similar concerns about the customer outcomes being delivered by the retail energy market.

For most of this time, industry and the regulatory community have replied to these concerns with one (or combination) of the following responses:

1. Highlight competition is a dynamic process and that any shortcomings in the retail energy market are transient.

   This response presumes an unproven inevitability about the dynamism of the market. It demands indefinite patience from consumers, policy makers and regulators while this asserted dynamic takes its course. This response is discussed in section 5.1.

2. Emphasise the need for better customer information, awareness and engagement to improve consumer outcomes.

   This response places customers, rather than retailers, at the centre of the market's shortcomings. It has been the most ubiquitous of the three responses and it has been the most influential in guiding the policy and regulatory response to date. As discussed in section 5.2, these regulatory efforts may have been hostage to an unfortunate paradox.

3. Focus on the competitive potential of the retail energy market to innovate and produce better outcomes for consumers.

   This response relies on what might be, rather than what is. It too demands patience by customers until the arrival of the innovators. That said, hints of some possible futures are beginning to emerge. While consumers' role in the future is assured, the same cannot be said of retailers. Section 5.3 explores how innovation might manifest itself in the retail energy market.

These responses, and the implications they have for policy makers and regulators, are discussed below.

5.1 Awaiting the competitive dynamic

In response to ESC (2013a,b) showing that retail margins had been increasing following price deregulation, the AEMC cautioned against acting with haste. It noted that competitive markets have adequate self-correction mechanisms which should be allowed to operate without external interference.

> *"Periods of temporarily elevated margins stimulate new entry and give customers incentives to seek out lower-price suppliers and/or to reduce consumption. Periods of depressed margins put pressure on suppliers to exit the market and/or to seek cost efficiencies."* AEMC (2014) p.179

In its annual competition reviews, the AEMC has consistently reported that the Victorian retail energy market demonstrates competitive qualities – for example: low regulatory barriers to entry, many retailers making many offers to customers, and high switching rates. The AEMC drew reassurance from these observations that any non-competitive anomalies observed in the market would be transitory and eliminated through normal competitive dynamics.

Helm (2017) is more sceptical (in the context of a similar debate about retail competition in the UK).

> *"The case for inaction, the Austrian view, is that fat profits are needed to encourage entry. The trouble with this is that it requires customers to pay excessive costs in the interim until the arrival of a fully competitive market … It also assumes that a fully competitive market will arrive automatically."* Helm (2017) p.164

Locally, there has been little discussion about whether the "fully competitive market" will indeed arrive "automatically" or for how long customers might be expected to pay the "excessive costs" noted by Helm. It has simply been presumed that the self-correcting mechanisms of competition are present and busily at work.

Victorian customers have been waiting for the arrival of a fully competitive market since full retail competition was introduced in 2002 and prices were fully deregulated in 2009. It has been a long time to wait. Customers in other states are now also waiting.

Are customers waiting for Godot?

The competitive qualities mentioned above may well deepen with time but the modelling presented in this paper suggest this may not put an end to "temporarily elevated margins" noted by the AEMC or the "excessive costs" identified by Helm. The structural characteristics of the retail energy market described in Box 1 appear to establish an alternative market dynamic — one that invalidate assumptions about the corrective capacity of competitive markets.

If the market won't self-correct, then customers are right to hold policy makers and regulators to account for the elevated prices they are paying. It is perhaps no surprise that the Victorian and federal governments eventually initiated independent reviews to examine these matters.

What happens next is the real challenge for policy makers and regulators as they come to terms with the unfortunate paradox discussed in the following section.

5.2 The paradox of the competitive retail energy market

It seems that every review into the competitiveness of retail energy markets in the past few years has landed in the same place. More needs to be done to promote customer understanding and awareness of, and engage with, the retail market. Customers need access to more data and better information. The AEMC over many years, and the ACCC (2017) and Thwaites et al (2017) more recently, have all made recommendations covering areas such as:

- consumer awareness campaigns including promoting awareness of the government comparator websites[49]
- better product disclosure such as simpler fact sheets and comparison rates
- greater transparency of information provided on bills
- informing customers, particularly those who have not switched to a market offers, of the savings they could make by switching
- informing customers of expiring fixed benefit periods in market offers
- clearer information about customers' energy consumption and how it might be managed
- providing customers (and their agents) with easier access to usage data.[50]

This way of thinking about how to improve customer outcomes in the retail energy market has clearly been influential in guiding the Prime Minister as well. In August 2017, the Prime Minister summoned the heads of the eight largest national retailers (and their industry association) to Canberra to discuss how they might help facilitate

[49] victorianenergysaver.vic.gov.au operated by the Victorian Government and energymadeeasy.gov.au operated by the Australian Energy Regulator (AER).

[50] These reviews also made specific recommendations regarding mechanisms to support low income and vulnerable customers. These proposed mechanisms are important in maintaining equitable access to energy but they are not directly relevant to this paper which focusses on retail price outcomes.

better consumer outcomes. In its submission to the ACCC inquiry, the industry's lobbyist catalogues the efforts that have ensued since that meeting.

> *"Retailers and the AEC are currently engaged with the Prime Minister's office to implement major policy reform in the marketing of offers and in customer communications… Among other things, eight retailers (serving the vast majority of the consumers in the NEM) have committed to:*
>
> - *marketing offers in dollar terms, rather than percentage discounts, which addresses the concerns to the ACCC raised about discounting in marketing;*
> - *contacting customers on standing offer contracts and those on market contracts with elapsed fixed term benefits to advise them that better offers are available in the market (the latter was recently put through as a rule change); this addresses the concern about how the end of fixed benefit periods noted by the ACCC;*
> - *working with the AER to develop clear, user-friendly fact sheets and a comparator rate so that consumers have the basis for a standardised comparison of offers; and*
> - *improving standardised consent and verification forms as part of the switching process."*
>
> Simon (2017) p.3

Since that time, the AEMC has implemented a rule change and the ESC has amended the Victorian Energy Retail Code to require retailers to notify customers that a discount offered under a contract containing a defined benefit period, is coming to an end.[51,52] Other rule change are now being considered.

Clearly, intervening to promote customer understanding and awareness of, and engagement with, the retail market has become a priority for policy makers and regulators. And, it seems, there is more to come.

There is clearly widespread support from industry, consumers groups and regulators for measures that make it easier for customers to understand their energy needs, and identify and switch to low priced contracts that suit their needs.

> *"The answer still lies in making competitive retail electricity markets work better for customers."*
> AEC (2017b)

> *"In our view, the most important factor to enable effective competition is an easily accessible, user-friendly marketplace where consumer can easily compare offers."* CPRC (2017) p.2

> *"The pressure on retailers to offer competitive prices and services are stronger when customers are well-informed, engaged and active in the market."* IPART (2017b) p.7

Presumably, the success of such measures would indicated by more customers entering and remaining on discounted contracts.

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[51] Australian Energy Market Commission, *National Energy Retail Amendment (Notification of end of fixed benefit period) Rule 2017 No.2*.

[52] Essential Services Commission 2017, *Fixed benefit periods - notification obligations for energy retailers: Final Decision*, 21 December

This outcome can be readily represented in the model developed in section 3. More customers switching to low priced contracts is represented by an increase in the parameter 'α' (which also serves as a measure of the market's competitiveness).

At present, Victorian customers are almost evenly distributed between low- and high priced contracts with the measure of the market's competitiveness at $\alpha = 0.54$. The findings of the calibrated model highlight the extent of the excess margin being paid by customers on default contracts – which explains the imperative policy makers feel in facilitating customers switching to lower priced offers.

Herein sits the unfortunate paradox of the competitive retail energy market.

Policy makers and regulators find themselves compelled to promote customer engagement to ensure customers aren't being disadvantaged by the competitive market — but the more successful they are in facilitating customers switching to discounted offers, the higher they drive retailer costs and retail prices (shown as a rightward movement in Figures 2 and 5).

It is certainly true that customers who are encouraged to switch from a default contract to a discounted contract will be better-off than if they hadn't switched (at any value of α). However, as more customers are encouraged to engage and switch, the saving to be made from switching declines. At the same time, customers on discounted contracts will see the price of their energy increasing rapidly.

When this occurs, previous measures of competitive success will go into reverse as the value of headline discounts declines and the spread of offers (or price dispersion) narrows. Retailers' competition costs will rise. Finncorn's "hamster wheel" will spin ever faster and social welfare will decline – as measured by the rising weighted average of prices paid by all consumers.

Policy and regulatory interventions designed simply to facilitate greater consumer engagement (and switching) may succeed, but unfortunately success might not look very successful for very long. The regulatory challenge of the unfortunate paradox is discussed further in section 6.

5.3 Innovation from beyond

The third response to concerns about the economic efficacy of competitive pricing in the retail energy market has been to focus on the market's potential for innovation. Dynamic efficiency driven by a competitive market is offered as the source of better outcomes for consumers. The industry lobbyist summarised these benefits in its submissions to the reviews by Thwaites et al and the ACCC.

> *"In the physical world of customers, competition is about providing product and service choice. Competition has driven diversity of retail offers, and these choices include:*
> - *Fixed versus variable tariff mixes;*
> - *Extensive payment options;*
> - *Special and conditional discounts;*
> - *Bundled offers such as cinema tickets and discounted football club memberships;*
> - *Access to usage information;*
> - *Special feed-in tariffs; and*
> - *Environmental products."* AEC (2017) p.3

Neither Thwaites et al (2017) nor the ACCC (2017) were particularly impressed by such claims.

> *"Despite the deregulation of Victoria's energy markets, most consumers remain on old tariff structures that existed before deregulation."* Thwaites et al (2017) p.35

The ACCC noted there had been "low levels of innovation in relation to the underlying offer structures"[53] and:

> *"[T]hat for the majority of customers, retail innovation has not delivered substantial improvements that help them manage their usage or materially improve the way they access energy."* ACCC (2017) p.101[54]

Consumer groups are similarly unimpressed.

> *"…there has been little innovation in tariff design since the introduction of competition."* CALC (2017) p.9

Indeed, the widening array of parameters over which contracts are offered is often viewed as leading to customer confusion and customer non-engagement. Martin from the Centre for Market Design[55] refers to such actions by energy retailers as

[53] ACCC (2017) p.8
[54] The ACCC continues with the statement: "The ACCC acknowledges, based on its review of internal retailer documents, that some more innovative approaches are being developed and may provide further innovation in the near future." (p.101)
[55] See CMD (2017). Dr Leslie Martin (assistant professor) is from the Department of Economics at the University of Melbourne.

"strategic obfuscation" while Ben-David (2017a) suggests the consequence of these contractual developments is "induced customer inertia".

The complexity created by these multi-parametered offers also means retailers and customers have tended to focus on headline discounts, on the presumed basis that bigger must be better. However, the Essential Services Commission has noted headline discount rates have become "largely meaningless" — with little correlation between headline discount rates and the prices charged.[56]

Although the retail energy market may not have delivered new offerings of any materiality to date, this does not preclude the possibility that more genuine innovations may emerge in the future.

There are two broad directions from which the innovation may be expected to arrive. The first can be summarised as originating with Adam Smith's invisible hand.[57]

The relationship between poor pricing outcomes and this source of innovation is not self-evident. History has repeatedly shown that the 'invisible hand' is incredibly powerful, persistent and self-perpetuating. While it may be spurred by poor pricing outcomes, it is more typically motivated by the desire of existing and new suppliers to create new value propositions to which customers will be drawn. Clearly, technological developments have a very large role to play in enabling this form of innovation.

There is no shortage of such developments emerging in the energy sector. There is much talk these days about micro grids, which can combine localised generation, storage and control systems to improve the efficiency and resilience of the network. There is also much talk about network tariff reform, time-of-use retail tariffs, smart meters, solar panels, electric vehicles, virtual net metering, energy efficiency, battery storage, demand-side management, virtual power plants, digital transformation, the 'internet of things' and blockchain platforms.

Would these innovations collapse if the seemingly inexorable march of retail electricity prices suddenly ceased or even reversed? It is unlikely. In which case, it is also unlikely that any measures targeting retail energy prices will significantly dampen the entrepreneurial spirit with which these innovations are being brought to market.

[56] See: www.esc.vic.gov.au/container/energy/55729-victorian-energy-market-report-2016-17/

[57] In *The Wealth of Nations* (1776), Adam Smith referred to the 'invisible hand' of competition driving individual producers to create those things that are of most value to consumers and which provide the greatest benefit for society. Producers do so without any form of coordination among them; and without any altruistic motive guiding them. Smith wrote, "…by directing that industry in such a manner as its produce may be of the greatest value, he intends only his own gain, and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention.

The second direction from which innovation could emerge might be called the 'transactional disruptors'. These are innovators who use modern communication technologies to shorten the supply chain. These disruptors seek to lower the cost of bringing services to customers by cutting out the 'middlemen'. In doing so, they potentially redefine the service and render old channels of delivery antiquated or obsolete. This led Ben-David (2015) to ask:

> *"Is the energy market next? Is the energy industry next to be 'Ubered' ? We already know that Elon Musk and his Powerwall and PowerPack are out there. But who else is out there: lurking; waiting to pounce? What business model destroying ideas are being dreamt-up by 19 year olds in their bedrooms and garages — hidden away in suburbia, out of sight of all the incumbent players and vested interests (owners, operators and regulators)?"* Ben-David (2015) p.5

In 2015, these thoughts were mere musings. Three years later they are emerging realities. Overseas, new service providers such as Voltz and Flipper have emerged to facilitate customers switching to lower priced contracts.[58] In Australia a new service, Transformer, has been launched this year by the consumer advocacy group CHOICE. Using customer consumption data and powered by MI Retail Energy software, Transformer identifies the best deals for its customers and it can automatically initiate a transfer of a customer's account to the cheapest retailer.

If such services become widespread, their potential impact on the retail energy market-as-we-know-it is profound.

Only price will matter. Retailer brand and marketing will have little value. Possibly none. In the context of the model described in this paper, these services will drive competition costs out of market. Retailers' portfolio pricing strategies may collapse to a single 'best and final' offer that reflects the efficient costs of delivering services to customers.

Of course, the extent to which such outcomes eventuate will depend on many factors including: the uptake by consumers of such services, how retailers restructure their contracts in light of this threat, remaining transaction costs and other frictions. It may also depend on ongoing regulatory actions.

Nonetheless, the entrepreneurs may be outpacing the day dreamers — this time, in bringing to life the 'contract moratorium' scenario that could only be imagined in Ben-David (2016).[59]

*

[58] http://www.bbc.com/news/business-36683543
[59] Ben-David (2016) p.28

The usual responses to questions about the efficacy of the retail energy market in delivering consumer benefits do not inspire confidence. The characteristics of this market mean that the competitive process is not dynamic enough. Shortcomings in consumer outcomes have lingered far longer than they should. In the meantime, the focus on improving customer information, awareness and engagement is irresistible from a policy and regulatory perspective – but it potentially ensnares consumers in an unfortunate paradox that drives prices higher.

Although innovations are afoot, their impact on the 'mass market' remains to be seen. It is not clear whether they will have sufficient impact to alter the fundamental characteristics that hamper competition in the retail energy market (as described in Box 1).

In the meantime, customers on default contracts are paying 'way over the odds' for their electricity. Customers on discounted contracts face rapidly rising prices if more consumers can indeed be enticed to engage with the market. And, disappointment awaits those who measure competitive success by the size of discounts and the dispersion of offers.

The regulatory challenge present by the retail energy market is discussed in the following section.

6. THE REGULATORY CHALLENGE

For many who have been involved in the retail energy market and the reform processes of the last two decades, the response to questions about the regulatory future of the retail energy market is instinctive.

> *"In our view, [regulatory intervention] would hamper competition, stifle innovation and remove options from customers, and eventually leave customers worse off."* IPART (2017b) p.52

The legitimacy of such views would be largely beyond contest if the retail energy market was a 'normally' competitive market; but it is not a 'normally' competitive market. It does not act or react in the same way as other markets. Those markets are not constrained by the characteristics described in Box 1. Those markets are not captive to an unfortunate paradox that causally links more active levels of competition with rising prices.

However, scepticism about regulatory interventions is not wholly misplaced either. History demonstrates that there are probably more ways to mess up regulation than there are to get it right.

Critics of a regulatory response to the shortcomings of the retail energy market typically point to the unsuccessful interventions pursued by the UK energy market regulator.[60] They are right to do so, but they are wrong to infer anything further. Those regulatory missteps do not support a universal warning against all forms of regulatory intervention. They are wrong to do so because the retail energy market only exists by virtue of regulation. This means that if the current regulatory framework governing the retail energy market is failing consumers, then the regulatory community must respond.

As Ben-David (2013) concluded:

> *"Regulation may be the second best option; but there may be no first best option — at least not within current realities."* Ben-David (2013) p.13

As discussed above, for now, the regulatory community has accepted, and is pursuing with some enthusiasm, interventions aimed at facilitating improved customer information, awareness and engagement. It is not possible to argue against such interventions. The counterpoint is market ignorance.

[60] For example, see IPART (2017b) Box 7.1

However, there are a number of reasons why interventions designed to promote greater customer engagement (read: shopping around) should not be pursued to the exclusion of any other action.

First, as discussed in Ben-David (2015), doing so quietly shifts blame for the market's shortcomings on to customers. It exonerates regulators and retailers from having to explain why the invisible hand has failed to deliver the competitive dynamics and innovative improvements discussed in sections 5.1 and 5.3.

Second, a regulatory response that focusses exclusively on customers fails to acknowledge that no matter how well and thoroughly customers engage with the retail energy market, there is nothing they can do, individually or collectively, to lower retailers' competition costs. It therefore places an expectation on consumers that they cannot possibly satisfy.

Third, a regulatory response that focuses exclusively on promoting customer switching is unlikely to account for how retailers might respond to these regulatory efforts. As described in Ben-David (2017a), retailers already face strong incentives to increase the prices paid by customers who may only switch retailer or plan occasionally.[61] Any effort to increase switching rates is also likely to amplify these incentives. The net impact of regulatory action and industry reaction is not obvious.

Finally, regulatory interventions may stifle incentives for innovation. Section 5.3 acknowledged that there are nascent signs of innovation. It also identified there has been no analysis to inform consumers about how much longer they might be expected to wait until the shortcomings of the retail energy market are resolved — and how much longer they may need to pay prices inflated by competition that is not working as expected.

So where too from here?

By definition, a paradox cannot be escaped from within. It can, however, be overcome by altering the environment that has given rise to it.

[61] The model discussed in section 3.1 does not account for these pressures as customers are treated as either being on default contracts or permanently 'footloose'. It would be an interesting exercise to introduce a third category of customer who only shops around occasionally — and typically, only when the prices charged rise above a certain threshold.

6.1 The overarching objective

With the need to alter the regulatory enironemnt in mind, the following overarching objective should inform all efforts to resolve the unfortunate paradox residing within the present retail energy market:

Regulatory effort should focus on:

(i) reducing retailers' competition costs, or

(ii) reducing the extent to which retailers can pass through these costs to consumers, or

both (i) and (ii).

As described in earlier sections of this paper, the driver of higher prices has been the escalation of the competition costs incurred by retailers. This has seen the retail share of a typical energy bill rise to 30 per cent (see Table 2). Significantly lower consumer prices are unlikely unless greater competition is accompanied by a reversal of this phenomenon.

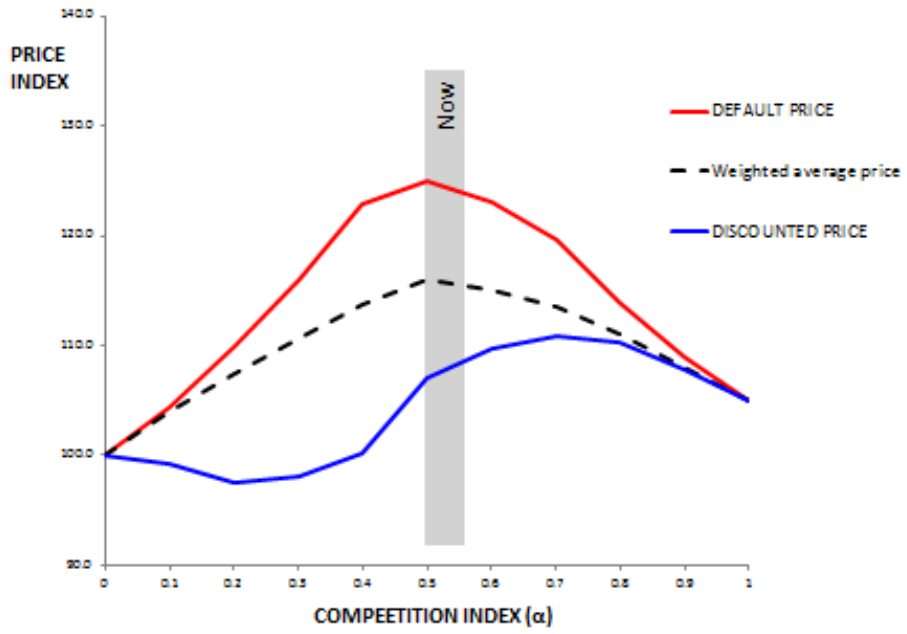
Figure 9 commences with the same price paths as shown in figures 3 and 5, but assumes an intervention takes place now. The nature of that intervention is unspecified but its effect is to stop and then reverse the course of competition costs with increased competition. This is represented by turnaround in the weighted average price.[62] This results in the default price declining rapidly with increased competition. Even though the weighted average price is falling with increased competition, the discounted price continues to rise albeit at a much slower pace than before. Eventually it too declines as it converges to the falling weighted average price. Figure 9 is illustrative of a desirable future.

While it is straightforward to identify the overarching objective as defined above and the outcome it would produce (as illustrated in Figure 9), further work is required to identify the particular regulatory interventions — or indeed, market innovations — that could produce this outcome.

There are three directions from which regulatory reform could be pursued to reverse the positive relationship between competition, competition costs and retail prices as shown in Figure 9. These are: search costs, contract design and market structure.

[62] Recall, the model described in section 3 requires the weighted average price (that is, the weighted average revenue per account) must equal retailers' total costs per account.

FIGURE 9. Retail electricity prices with competition driving lower competition costs



6.2 Search costs

As discussed in section 5.2, much of the regulatory effort to date has been targeted at reducing the search costs for customers in the event that they wish to shop around. This has included clearer marketing and billing information, greater product disclosure and investment in supporting customers' search efforts through the provision of government funded comparator websites. This has supported the message from the regulatory community over the last decade that customer should — or indeed: need to — shop around for their energy.

As outlined in earlier sections of this paper, it is not self-evident that these measures alone will achieve an outcome as illustrated in figure 9. **The impact of reducing search costs on the three competition costs described is mixed**.

Section 3.4.3 identified three components in retailers' competition costs — namely, customer acquisition and retention costs (CARC), administrative competition costs and capital costs.

To the extent that reducing information barriers encourages retailers to focus on lowering their prices rather than increasing their marketing efforts, customer acquisition and retention costs (CARC) might decline. On the other hand, if customers find it easier to engage with the market and this leads to greater customer

mobility (higher switching rates), then administrative competition costs can be expected to increase. Likewise, the increased potential for retailers' customer bases to be eroded, and possibly very quickly, could increase the cost of capital in the retail energy market. In other words, it is not obvious whether reducing search costs will self-evidently lead to reduced competition costs and lower retail prices (as illustrated in Figure 9). Indeed, it is even possible that the present focus on reducing search costs could hasten a shift to the right in Figure 5.

The two other directions for intervention are considered in reverse order.

6.3 Market Structure

The price paths shown in figures 3 and 5 are directly attributable to the structural features of the retail energy market described in Box 1. It is these features that limit the effectiveness of the competitive process leading to increasing competition cost. This invites the question: Could policy makers and regulators pursue actions that overcome, or compensate for, these structural constraints?

This paper does not explore structural reform options for the retail energy market but acknowledges the involuntary, inelastic, homogeneity and intangible nature of energy consumption cannot be overturned by regulatory decree. There may be opportunities to intervene in ways that help compensate for some of these characteristics, particularly the intangibility of energy consumption. There has certainly been increased effort in regulatory circles to present information about energy consumption and pricing in a way that is more accessible to customers. Examples include the use of comparator rates and standardised customer profiles. Market innovations are also making it possible for customers to observe in real-time the energy their appliances use.

It is unlikely such interventions will be sufficient to overcome the structural limitations of the retail energy market. It is for this reason that Thwaites et al sought to slice through the market's structural Gordian knot and recommended the introduction of a regulated price for a no frills offer that all retailers would be obliged to make available to all customers.[63] There can be no doubt that the introduction of a regulated price, even if retailers are free to make other offers available to customers, will be resisted mightily by the industry.[64]

[63] Thwaites et al (2017) recommended the introduction of a 'basic service offer' (BSO). This would be a regulated price offer that all retailers would be obliged to make available to all residential and small business customers. This BSO obligation would not prevent retailers from making other offers. It is not price regulation per se, but rather introduces a regulated price into the market and invites retailers to compete around that point on the price-value continuum.

[64] For example, see McNamara & Simon (2017) and AEC (2107a,b,c)

6.4 Contract design

This leaves the remaining direction from which possible regulatory intervention may be taken as the best opportunity for regulators to influence the impact competition costs are having on retail energy prices. This would involve interventions to alter the nature of the contracting arrangements between retailers and customers.

Retail energy contracts are a peculiar regulatory creation.

The usual purpose of contracts is to reduce uncertainty. In the retail energy market contracts entrench uncertainty.

As things stand, retail energy contracts represent an unusually level of low commitment by retailers and customers to each other. Compared to contracts formed elsewhere in the economy, retail energy contracts provide very broad discretions to the parties. This is no accident. These are the contract terms that were designed, negotiated and locked-in through regulation during the introduction of full retail competition. With the benefit of hindsight, the impact of these contractual arrangements is clear.

Some of the main contractual features that give rise to this state of low commitment include the following (in no particular order):

First, energy retailers can alter the prices they charge their *existing* customers at any time during the term of a contract and with limited obligations regarding the prior notification of a change. They can do so, as often and by any amount they decide. There would be very few, if any, other retail markets where service providers can contract on such favourable terms. It has been argued that this ensures retailers do not need to build unnecessary risk premiums into their prices.[65] However, as discussed in Ben-David (2017a, 2018) this discretion also allows retailers to attract customers with very lower offers offers in the expectation that they will be able to ratchet up their prices at a later time due to customers disinterest in continuously monitoring their prices (that is, customer inertia).[66]

Second, exit fees are capped by regulation and may not fully reflect the opportunity cost for retailers of losing a customer during the term of their contract. As a result, customers do not necessarily appreciate the external cost of their decisions to switch retailers. Likewise, a retailer who attracts a customer away from another retailer

[65] See AEMC (2014)

[66] Ben-David (2018) describes how this leads to price differentiation based on customers' willingness to shop around. Unlike price discrimination based on customers' willingness to pay, this price differentiation does not lead to improved outcomes — for example, it leads to no gains in allocative efficiency because consumption levels are largely independent of prices (i.e. inelastic).

does not incur the external costs it imposes on the other retailer. Of course, the best way for the 'losing' retailer to offset this cost is to acquire a new customer from another retailer to fill the place of the customer it has lost. This self-perpetuating poaching cycle drives competition costs ever-higher.

Third, late payment fees are prohibited. All else being equal, this would mean retailers are unable to recover their financial holding costs for outstanding payments. As a result, these costs need to be recovered from the remaining customer base (in the form of higher prices). However, all else is not equal. In light of the prohibition on late payment fees, retailers have inverted the usual payment model. Instead of charging late payment fees, they offer pay-on-time discounts. In many cases, these conditional discounts have now become so large that late payment results in enormous imposts on customers. For example, pay-on-time discounts of 33 per cent are not unusual so failure to satisfy this condition, even by one day, will see customer paying 50 per cent more for their energy. This is completely out of proportion to the opportunity cost of these funds for the retailer. And worse still, customers who are most likely to be late with their payments are also most likely to have the least financial capacity to absorb this additional impost. While it may be argued that customers who cannot afford such imposts should not enter conditionally discounted offers, there is sufficient behavioural evidence to show that such presumptions of 'rationality' are often misplaced (for example, because of overconfidence bias[67]).

Fourth, retailers have complete discretion at the end of fixed term contract to reset the customer's prices with only limited obligations to notify customers of imminent price changes. A retailer can be expected to update the customer's prices based on two factors: first, changes to the retailer's costs to serve; and second, the retailer's assessment of the customer's likely willingness to shop around if the price is reset too high. In other words, prices rises are not merely explained by increases in a retailer's input costs.

Fifth, retailers have almost unfettered discretion over the prices they charge customers on standing offer contracts.[68] Standing offers (also known as standard retail contracts) are default or deemed contracts that will be in place for all customers who have never entered a market-based contract. Sometimes retailers will transfer a customer on to a standing offer (or a price-equivalent market offer) on the expiry of a market contract. There are other circumstances where the regulations deem customers to be on a standing offer. When full retail competition was introduced, the purpose of standing offers was to provide a contractual safety net for

[67] See Ben-David (2017b)

[68] Unlike market contracts, where retailers can change the price as often and by whatever amount they wish, standing offer contracts can only be changed once in any six month period. However, they have full discretion over the magnitude of any price changes.

customers and so standing offer tariffs remained regulated. This changed when prices were full deregulated some years later. Since that time, standing offer prices have risen rapidly and broadly in line with the default prices shown in figures 3 and 5 — thereby highlighting they no longer serve as effective safety net arrangement. Rather, retailers have identified that these customers are the least likely to shop around and so can be charged the very highest prices.

The individual and combined effect of these five contractual features is significant.

Elsewhere in the economy, contracts held by suppliers serve as assets of broadly known value. This value is derived from the known revenue stream to the supplier over the life of that contract. Where a customer fails to honour the terms of that contract (most likely, payment for goods or services rendered), the customer is liable for payments to the supplier that compensate the supplier for the loss or disruption to its revenue stream.

The contractual arrangements decreed through the regulatory arrangements governing the retail energy market deny this certainty to retailers. The value of any given customer contract can only be estimated statistically, that is, based on the probability that the customer will not switch to another retailer during the term of the contract. While retailers can be expected to have developed methods for estimating the risks associated with the contracts held in their portfolios of customer accounts, such methods are only ever statistical. Uncertainty is not costless. Energy retailers will require compensation for the uncertainty in their portfolio of customer accounts — uncertainty created by the form of contracts required by the regulatory framework. These uncertainty costs contribute to the competition costs described in section 3.4.3. They add to retail energy prices and they can be presumed to increase with the level of competition as shown in figure 2.

From a customer perspective, the value of a retail energy contract is also uncertain.

Elsewhere in the economy, contracts provide consumers with certainty of service in exchange for certainty of price. Retail energy contracts only provide customers with the first of these certainties. The regulatory arrangements provide for retailers to transfer risk onto customers. This risk is then carried in household and business budgets.

If one of the general principles of economics is that risk should be borne by the party best placed to bear that risk, then that principle would seem to be violated by this transfer of risk. **The involuntary and inelastic nature of demand (see Box 1) provides customers with little (or no) capacity to manage the risks retailers are transferring to them.** This risk transfer imposes significant inefficiencies and inequalities that detract from social and economic well-being.

6.5 The role for regulators

The five regulated contractual features described above are related. The inclusion of each one reflects a deliberate settlement when the regulatory framework was designed.

Their inclusion is the consequence of a negotiation process between consumer and welfare organisations, the retail industry and the regulatory community in the early days of full retail competition. The origins of this combination of contractual arrangements can be understood when viewed through the lens of demands, concessions and counter-proposals being made by the parties through round-after-round of negotiation.

Fifteen years later, a valuable lesson emerges.

Just like good public policy, good regulation — that is, regulation that promotes the long-term interests of consumers — is rarely the product of a negotiated settlement. A strong centre, in the form of independent regulators, is required. That independent centre must ensure clear objectives are defined and it must uphold those objectives throughout the process of consulting with stakeholders. The consultation process cannot be left to define and then redefine its own objectives.

Regulators must always hold the centre. They cannot 'trade' away their obligation to pursue the long-term interests of consumers as they seek to negotiate their way to an agreed regulatory outcome. **Regulatory relativism subordinated to the pursuit of stakeholder endorsement results in regulatory frameworks such as the one governing the retail energy market today**.[69]

*

There are three directions from which regulatory reform can be pursued in seeking to reverse the positive relationship between competition, competition costs and retail prices as outlined in earlier sections of this paper. These are: reducing search costs, improving contract design and altering the market structure. A great deal of activity is underway to reduce search costs. These are worthwhile endeavours in

[69] For the avoidance of doubt, this conclusion does not deter from the value of consultation with stakeholders in the development of regulatory frameworks. But it does mean that regulators must always remain in control of *what* they are trying to achieve. Through open and honest consultation, they should be held to account for *why* they are pursuing those objectives. Consultation is, of course, also very important in informing regulators about *how* they can best achieve their objectives.

their own right, but it is far from obvious that, in the absence of other interventions, they can successfully achieve the outcome illustrated in figure 9. On the other hand, attempts to alter the structure of the market can be expected to encounter substantial resistance.

This leaves reforming the five contractual arrangements identified above as the remaining opportunity for the regulatory community to achieve the objective of reducing competition costs (and their impact on retail prices).

While it is beyond the scope of this paper to exposit on how the regulatory framework might be redesigned, 'contract normalisation' represents an important starting principle. This would see regulatory frameworks amended to undo the low commitment nature of retail energy contracts and make these contracts operate in a manner more akin to the contracts applied elsewhere in the economy. Doing so would significantly reduce the uncertainties inherent in retail energy contracts for retailers and customers. Removing these uncertainties would alter the incentives for retailers to pursue the pricing strategies observed in today's retail energy market.

As far as the sources of competition costs discussed in section 3.4.3 are concerned, the objective of 'contract normalisation' would include reducing frivolous customer switching between retailers — thereby lowering retailers' administrative competition cost. It would also reduce the need for retailers to invest in marketing that merely promotes customer churn, thereby reducing customer acquisition and retention costs (CARC). Moreover, by reducing the level of uncertainty described above, it could also lower capital costs for retailers. In other words, '**contract normalisation' would help break the nexus that currently exists between competition, retailer costs and consumer prices**.

*

Despite these potential benefits, regulatory changes seeking contract normalisation can be expected to be met with resistance. After all, today's regulatory framework consists of a collection of provisions that were hard fought and hard won in the negotiation processes described above. After so many years, the parties know no other regulatory framework and no other market — and that includes the regulatory community. But the need for change is beyond question.

The findings of the various reviews discussed in section 2.1 and the modelled outcomes described in this paper, require a regulatory response. The case for action is clear. The *a priori* case for removing uncertainty from regulated contractual

obligations is just as strong. Even so, it is unlikely that impact analysis will provide further evidence of its merits. This suggests regulatory risks need to be taken.

Today's retail energy market has veered so far off course there are no maps for getting back. Therefore, risks must be taken.

In this sense, regulatory risk-taking is necessary and acceptable. It may be the only way to discover the merits and limits of regulatory interventions in the retail energy market. But if risk must be taken then regulatory risk-taking must be conducted openly and honestly. The regulatory imperative must be to slow, halt and reverse the rising course of competition costs in the retail energy market.

None of this will be easy. Much of it will feel unnatural to a regulatory community and a regulated industry so steeped in a particular view of the market, the role of regulation and the form of contracting that now exists. It will feel unnatural to regulators and retailers alike. It will, however, feel far less unnatural to consumers who bear the uncertainties and costs of today's retail energy market.

*

The ACCC has rightly noted the need to:

> *"…be mindful of the history of interventions in this market which have too often had unintended consequences to the detriment of energy users."* ACCC (2017) p. 152

But that does not mean the regulatory community should not act for fear of unknown and unknowable outcomes. The retail energy market is already imposing substantial competition costs on consumers. These costs will increase further if more customers are prompted to engage with the market.

Competition costs of the scale observed in the (Victorian) retail energy market are the 'unintended consequence' of earlier assumptions about the market.

Just because the unintended consequences of those earlier assumptions are now longstanding, grants them no special privilege. If they are lessened at the potential expense of another unintended consequence, that will be a risk worth taking.

7. CONCLUSION

The retail energy market is not like any other market. As a market for an essential service, it possesses characteristics that make it unique. These characteristics are not just incidental points of interest. They fundamentally alter the way competition expresses itself in this market.

Competition in a market that possesses these characteristics leads to a costly prisoners' dilemma as retailers seek to maintain, or grow, their market share. These costs increase as more customers engage with the market. Higher costs flow through directly to consumer prices. At the same time, price deregulation allows retailers to engage in strategic pricing. This paper has modelled the relationship between competition, retailer costs and retail prices.

This paper opened with two questions about the efficacy of competition in the retail energy market.

1) Is competition working?

2) Can competition work?

Competition is working for *engaged* customers insofar as they are paying lower prices than if they were not engaged. This is a very low threshold for successful reform. In Victoria, even engaged customers are now paying prices that are higher than they were paying at the introduction of competitive retail energy markets.

At the same time, the constraints operating in the market have led to very large price increases being imposed on customers who do not engage with the market. This has allowed energy retailers to market ever-larger headline discounts which has seen a widening dispersion of retail offers. Higher discounts and widening dispersion have been cited as evidence that competition is benefiting consumers. However, it is now beyond dispute that customers who have not engaged in the retail market are paying far too much for their energy. Regulatory interventions are now afoot to facilitate greater consumer awareness and engagement.

The model presented in this paper suggests that the market, at least in Victoria, is approaching a turning point. As competition deepens, discounted prices will start to rise — potentially quite sharply. The headline discounts offered by retailers will decline and the observed dispersion of offers will narrow.

This places policy makers and regulators in a most unfortunate paradox. They cannot ignore the very high costs some customers are paying for their energy, but by facilitating greater engagement by those customers, general retail prices will increase.

Perhaps market innovations will emerge that overcome this paradox. Perhaps not.

The retail energy market has veered far off the course envisaged at the time of its deregulation. The community expects regulators to act in their long term interests. Regulators must therefore act to restore fairness and efficiency in the retail energy market.

While a great deal of work is already underway to ensure customers are better informed and more readily able to engage in the market — should they so choose — more needs to be done. Primarily, this would involve reforming the contractual arrangements imposed by the regulatory framework. These reforms should aim to reduce the significant uncertainties these contractual arrangements impose on customers and retailers. In so doing, this will help reduce the competition costs that are currently driving retail energy prices ever higher.

The regulatory community must act boldly and imaginatively. Measured risks need to be taken. These interventions will feel unnatural to regulators and retailers accustomed to the current regulatory paradigm. These interventions will feel far less unnatural to consumers who know that the retail energy market is failing to meet their expectations of fairness.

Blowers from the Grattan Institute recently speculated on the answer to the second question listed above, “Can competition work?”, when he wrote:

> *“History may judge the introduction of competition to the retail electricity market as an expensive mistake.”* Blowers (2018)

Blowers may be right – but he does not need to be right. It is up to the regulatory community to decide, to act and to act boldly.

— END —

APPENDIX A: CALIBRATING THE MODEL

The model described in section 3 is calibrated against observation made about the Victoria retail electricity market.

The discussion in section 3.3 used data from the *Victorian Energy Market Report* 2016-17 (VEMR) to derive: $\alpha = 0.54$.

At this level of competition, high priced contracts (H) were priced at $1438 and low priced contracts (L) were priced at $1,172. In other words, when $\alpha = 0.54$ low priced contracts are offered at an 18.5 per cent discount off high priced contracts. As noted in section 3.3, the weighted average price is set at $1,294 which is the average price of unconditionally discounted market reported in the VEMR when $\alpha = 0.54$. Also as discussed in section 3.3, the total cost per account must equal the weighted average price.

At this observed level of competition ($\alpha = 0.54$), retail costs were responsible for 30 per cent of the typical bill according to table 2. This equates to $388 per account in the model (= 0.3 x $1,294). The remaining costs represent non-retail underlying costs which are valued at $906.

Retail underlying cost is assumed to comprise 15 per cent of total underlying costs. This proportion is consistent with the approach taken by the Independent Competition and Regulatory Commission (ICRC) when regulating energy prices in the Australian Capital Territory. The ICRC makes no allowance for competition costs which means all costs are underlying costs within the taxonomy of this model.[70] Over the past four years, the regulator's allowance for retail gross margins has ranged between 11 and 14 per cent. Retail underlying cost are therefore valued at $160 per account.

This estimate is reassuringly consistent with analysis shown in Figure 21 in Jacobs (2017) which plots data on the retail allowance provided by Australian regulators wherever retail prices were regulated between 2003 and 2016. The line of best fit applied by Jacobs to this data suggests average regulated retail costs would be $160 by 2016 (and between $165 and $170 in 2017).

The resultant value of competition costs is $228 per account when $\alpha = 0.54$. This value is higher than reported elsewhere. In part, this is explained by the different

[70] See ICRC (2017)

ways costs have been reported or estimated. The most comparable estimate is implied in Thwaites et al (2017).[71]

Table A1 summarises these findings. Total retail costs, consisting of retail underlying costs and competition costs, makes up 30 per cent of the bill (as per the assumed contribution). At this level of competition, total underlying costs make up 82 per cent of the bill. These two figures are non-additive because both contain retail underlying costs.

TABLE A1. Breakdown of costs when α = 0.54

Non-retail underlying costs	$906
Retail underlying cost	$160
Competition cost	$228
Total cost per account*	**$1,294**

* Equal to the weighted average price

As noted in section 3.4.1, non-retail underlying costs are held constant (at $906) throughout the analysis – except in Appendix B which models the impact of a wholesale supply shock.

Total underlying costs are subject to productivity gains as given by the relationship assumed in section 3.4.2, namely:

$$UC_\alpha = UC_0 \times (0.95)^\alpha$$

At α = 0.54, total underlying costs equal $1,066 as shown in table A.1. Substituting these values into the above equation and solving implies a value for UC_0 of $1,096. It also implies that when competition matures fully (α = 1), total underlying costs will equal $1,041.

Excluding non-retail underlying costs (fixed at $906) sees retail underlying cost fall from $190 in the absence of competition (α = 0) to $135 when competition fully

[71] Thwaites et al (2017) compared the retail share of a typical bill in the energy and water industries – that is, 30 per cent compared to 7-8 per cent (p.53). Applying the difference between these two figures (22 per cent) to the weighted average price assumed in this paper ($1,294) implies that presently, competition costs contribute $285. Accounting for other differences between these industries would suggest a downward adjustment to this figure. Indeed, in public presentations of the report Professor Thwaites has referred to competition costs in the retail energy market adding "about $200" to a typical bill.

matures ($\alpha = 1$). That is, competition is assumed to drive efficiencies that see retail underlying costs reduce by almost 30 per cent. This appears to be a reasonable estimate of potential efficiency gains in a competitive environment.

By definition, competition costs equal zero when $\alpha = 0$ and evolve according the relationship assumed in section 3.4.3, that is:

$$CC_\alpha = CC_1 \times (\alpha)^n$$

Only two values are known in this equation, namely, competition costs equal \$228 when $\alpha = 0.54$. The values of CC_1 and the parameter 'n' remain unknown and they do not lend themselves to calibration from available data. Selecting values for CC_1 can, however, be disciplined by adopting reasonable pricing principles. The model adopts the following two principles.

- The value of CC_1 should be low enough to avoid outcomes that see competition costs 'exploding' as competition increases. This imposes the constraint that: $n \leq 1$
- The value of CC_1 should not lead to a breach of the second closing assumption discussed in section 3.5. This requires that retailers' high priced offers (H) should never exceed the cost of providing electricity when the market is fully competitive ($\alpha = 1$).

These two principles can be solved to produce lower and upper bounds, respectively, for CC_1 – namely: $399.5 \leq CC_1 \leq 421.8$

A value of CC_1 = \$400 is therefore assumed. The remaining parameter can now be solved. It has a value of n = 0.91. This implies a concave function that sees increasing competition imposing diminishing marginal costs on retailers. A value of n = 0.91 means that for every doubling in the level of competition, the average cost of competition increases by less than double (or 1.88 times) per customer account.

As a final step, all costs and prices are indexed such that: WAP_0 (= UC_0) = 100

(This implies one indexed unit is valued at \$10.95 in current dollars.)

APPENDIX B: MODELLING A WHOLESALE PRICE SHOCK

Throughout this paper, underlying non-retail costs are held fixed to focus attention on the impact of retail competition on retail costs and prices. Underlying non-retail costs include the cost of sourcing energy from the wholesale (plus hedging costs), the cost of delivering that energy to customers via the transmission and distribution networks costs and any costs associated with government initiative 'green schemes'.

This appendix describes the impact on retail prices of a price shock in the wholesale market.

The AEMC has noted the impact of consumers of a recent 60 per cent increase in wholesale costs.

> *"This outcome means that, despite any improvements in the effectiveness of retail competition in past year, wholesale contract market outcomes are likely to continue to increase retail electricity prices for consumers in the near term."* AEMC (2017a) p.15

Using the results reported in Table 2, wholesale costs are assumed to represent 22.5 per cent of a typical Victorian customer account. Increasing these costs by 60 per cent implies an increase of 13.5 per cent in the overall retail price of electricity in Victoria resulting from the wholesale price shock.[72] This equates to an increase of 15.9 indexed units or $175 per account.

This price shock has been attributed to the retirement of existing generation capacity in the National Electricity Market and the lack of policy clarity about future greenhouse gas emissions policy. On 24 November 2017, energy ministers from the Council of Australian Governments agreed to further work being undertaken by the Energy Security Board (ESB) on a National Energy Guarantee (NEG) intended to provide policy clarity.[73] At the time, modelling was presented that showed the NEG would reduce wholesale prices by $120 once fully effective.[74]

Figure B1 shows the impact of 15.9 indexed units (or $175) shock to non-retail underlying costs.[75] The shock decays linearly by 11 units (or $120) so that the long-

[72] This estimate is slightly lower than the one provided by Skinner (2017) who estimates that a 60 per cent wholesale price shock "would be expected to increase the final tariff by about 16 per cent." The difference between these estimates is explained by difference is in the assumed contribution of wholesale costs to prices. Skinner assumes a wholesale contribution of 27 per cent based on ACCC projections for 2016-17 whereas this paper applies the shock to the 2015-16 contribution (of 21 per cent). Skinner's higher baseline would appear to already include some of the shock coming from the wholesale market. That is, Skinner's estimate appears to double count a proportion of the shock.

[73] http://www.coagenergycouncil.gov.au/publications/15th-energy-council-ministerial-meeting

[74] http://www.coagenergycouncil.gov.au/publications/report-national-energy-guarantee

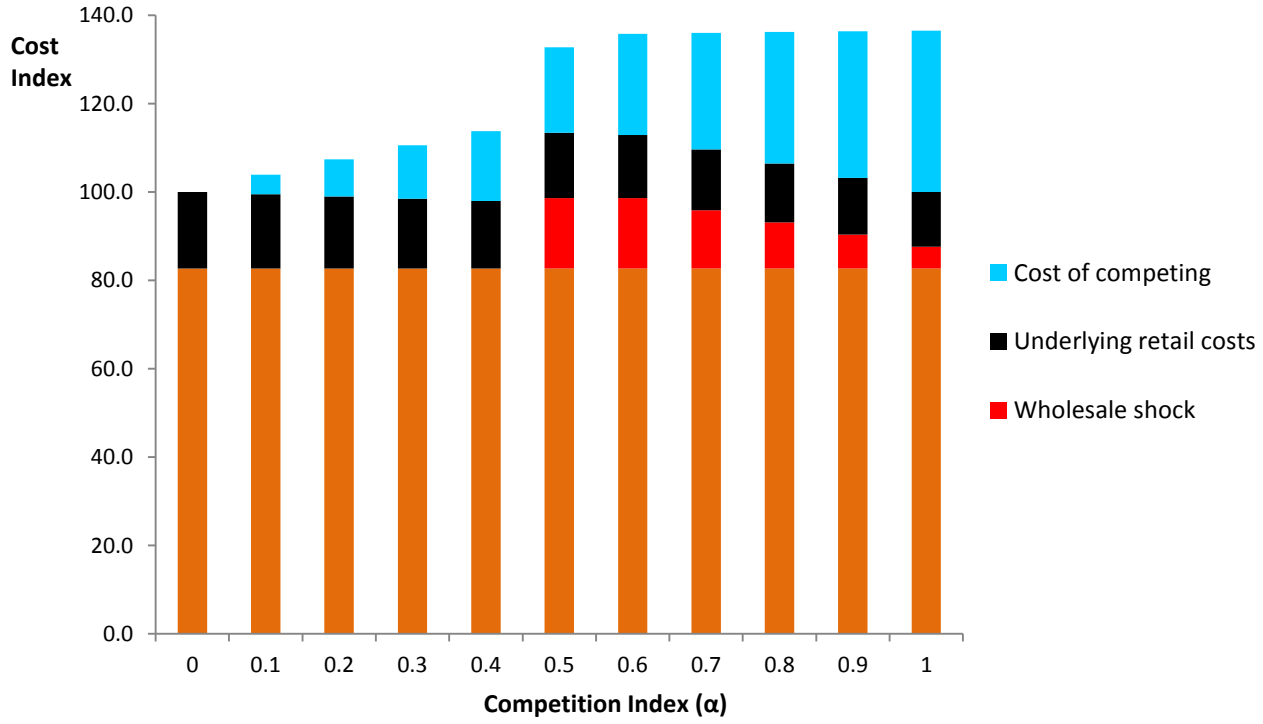
[75] This assumes that retailers do not add a 'mark-up' on their input costs. Doing so, would simply increase the value of the shock. It would not alter the nature of the findings described here.

term impact of the original price shock reduces to 5 units. The wholesale price shock is signified by the red blocks.

Because time is not measured explicitly in this model, it is assumed that this long run decay in the impact of the price shock coincides with the long run evolution of competition. Clearly, the decay could be assumed to occur more quickly or slowly - noting the AEMC (2017b) has already foreshadowed that much of this price shock will reverse by 2019-20.

All other costs in Figure B1 are assumed to remain the same as they would have been in the absence of the price shock.

FIGURE B1. Wholesale price shock impact on cost of electricity



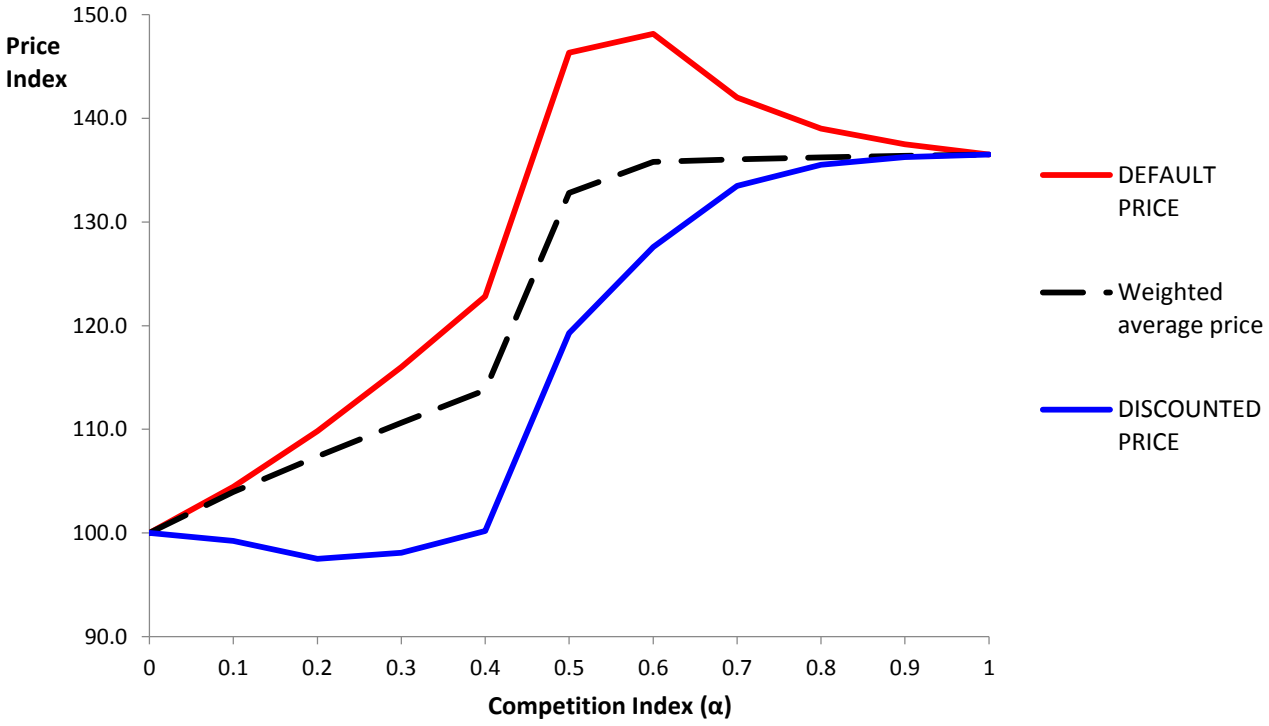
In an interesting coincidence, the impact of a price shock of this magnitude, as shown in Figure B1, is to push total cost to a level almost equivalent to its long-term value. While not shown, existing assumptions mean that the effect of this price shock would be to drive default and discount prices to their long-term values almost instantly – in which case, discounts and dispersion would almost disappear from the retail electricity market.

Clearly, this has not happened over the last 12 months, therefore, a loosening of some of the model's assumptions is required. Two assumptions are loosened. First, it

is assumed that the price of default contracts can temporarily increase above its long-term value. However, this requires a new closing assumption to solve the model. It is therefore assumed that when the price shock hits, the level of headline discounts is 'sticky'. In other words, the headline discount immediately after the price shock is assumed to equal the headline discount immediately before the price shock.

Following Dornbusch's (1976) original model of sticky prices and the exchange rate, in this case, sticky headline discounts sees the price of default contracts overshoot their long run value. Default prices gradually return to their long run value as competition deepens. This overshooting is shown in Figure B2. Note, the long run price of these contracts is slightly higher than those shown elsewhere in the paper due to the lingering effect of the price shock after the NEG has been fully operationalised.

FIGURE B2. Wholesale price shock impact on retail electricity prices



The wholesale price shock also causes discounted prices to rise even more quickly with deepening competition than they had increased in the absence of the price shock.

The overall significance of the price shock is to make the regulatory considerations discussed in section 6 even more immediate.

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