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The impacts of regulated pricing on price dispersion in Australia's retail electricity markets

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July 2019

Abstract
Price deregulation in Australia's National Electricity Market has led to increased competition and greater price dispersion in retail electricity markets. While research suggests that price dispersion is consistent with economic efficiency, increases in electricity prices have led policy makers to recommend the introduction of a 'default offer' to cap retail electricity prices. In this article, we develop a model that demonstrates the mechanism through which a price cap leads to the withdrawal of the lowest priced offers from the market, in effect reducing the benefits available to customers that 'shop around'. We argue that the important issues of inter-consumer misallocation due to relatively high 'standing offers' are best addressed through non-price regulation policy options, such as an auction for the right to serve vulnerable, disengaged consumers.

Keywords: electricity markets; price discrimination; energy policy
JEL Codes: D40; D20; D22; L11

A later version of this article was published as: Esplin, R. Davis, B. Rai, A. and Nelson, T. (2020), 'The impacts of price regulation on price dispersion in Australia's retail electricity markets', Energy Policy, Vol. 47.

Centre for Applied Energy Economics & Policy Research: Working Paper Series 2019-02

1. Introduction

Over the decade to July 2016, retail electricity prices were progressively deregulated across most of the jurisdictions that together constitute Australia's National Electricity Market (NEM)[1]. Victoria was the first jurisdiction to have deregulated prices followed by South Australia, New South Wales and most recently South East Queensland as seen in Figure 1.

Figure 1: Timeline of deregulation across the NEM

Initially, electricity retailers were government-owned monopolies. As each jurisdiction opened up to competition, the state government had in place a regulated tariff known as a 'standing offer' which protected disengaged consumers from high prices. [2] This led to entrant retailers making 'discounted' offers from the standing offer. Gradually, state governments removed the regulated standing offer once the market was deemed to be 'workably competitive' (Simshauser, 2018). Retailers were still required to provide standing offers, but they were free to set the price of the offer at a level of their own choosing.

Deregulation of retail prices has led to increased entry in the retail market and high levels of customer engagement, as measured by switching rates. However, in the past few years, there have been calls by various commentators and policy makers for retail prices to be reregulated (Ben-David, 2015). The 'reregulation thematic' gained momentum following the sharp increase in retail prices between 2016 and 2018. The culmination of such activity was the publication of a landmark report by Australia's competition regulator in relation to the operation of Australia's electricity markets. The Australian Competition and Consumer Commission (ACCC, 2018) argued for regulated retail pricing via the introduction of retail price caps. It described the retail offer at the price cap as the 'default' offer, which effectively replaces retailer standing offers. The Default Market Offer (DMO) came into effect from July 1, 2019 at a price level set by the Australian Energy Regulator (AER). In Victoria, the Essential Services Commission (ESC) has similarly developed a default offer called the Victorian Default Offer (VDO) which came into effect at the same time as the DMO.[3] A similar price cap has been in effect in Great Britain since January 1, 2019.[4]

[1] The National Electricity Market is the interconnected system extending from Queensland around the east coast to South Australia, i.e. excluding Western Australia and the Northern Territory.

[2] There are two types of retail electricity offers available to residential customers across the NEM: market and standing offers. Standing offers are typically higher priced contracts providing a basic service for consumers who have not engaged in the market.

[3] There are important differences in the methodology used for calculating the DMO and VDO. The DMO was set halfway between the median market and median standing offer for a representative consumer in each distribution area. The VDO was set using a traditional 'cost-stack' approach.

[4] See Ofgem's website for more information: https://www.ofgem.gov.uk/gas/retail-market/market-review-and-reform/default-tariff-cap

The ACCC (2018) argues that retail price caps are needed as de-regulated prices have led to large numbers of consumers being inactive or disengaged with the market. The 'Big 3' retailers benefit from the majority of these inactive customers because in most cases they purchased the customer bases of government owned retailers during privatisation. Over time, increased price dispersion between offers has meant that many of the disengaged customers are on high priced offers:

> *The gap between the best and worst offers in the market has been widening, effectively acting as a tax on disengaged customers, whether a customer is disengaged by choice or because of the unnecessary complexity.* (ACCC, 2018: p. xi)

Another review focused on the Victorian retail market found price dispersion is excessive relative to the variation in retailers' costs to serve (Thwaites et al, 2017). Furthermore, customers on the highest-priced offers include financially vulnerable, low-ability-to-pay customers, with implications for economic efficiency (Simshauser and Whish-Wilson, 2017). In the context of high and rising retail prices, this 'misallocation issue' poses affordability issues for low-income customers which, proponents argue, can be resolved via price caps.

The contribution of our article is to show a mechanism through which imposing a price cap in the retail market leads to retailers withdrawing their lowest priced offers from the market. Secondly, we present data showing that deregulated retail markets in Australia were developing with large numbers of competing retailers and high customer engagement, as evidenced by switching rates. Research from Great Britain and the United States suggests that the move to reregulating prices threatens to reverse these developments.

Our contention is that price caps are a blunt tool for addressing concerns for vulnerable, disengaged consumers and harms other consumers in the market, including vulnerable, *engaged* consumers. A preferable approach is to develop a targeted intervention aimed at helping those left behind while minimising the impact on the rest of the market.

This article is structured as follows. Section 2 provides a review of the relevant literature. Section 3 presents our stylised partial-equilibrium model which we use to assess the potential impacts of imposing price caps. Section 4 presents data on the development of Australian retail electricity markets. Section 5 provides concluding remarks, alternative policy recommendations, including our main recommendation for an auction for the right to serve vulnerable, disengaged consumers, and areas for future research.

2. Literature Review

This review provides an overview of the literature on the relationship between price dispersion and efficiency, the interaction between competition in electricity retail markets and price regulation, the drivers of switching behaviour and the relationship between competition and price dispersion.

2.1 *Price dispersion and efficiency in the retail electricity market*

In this article we will adopt the framework of Robinson (1933) who frames price discrimination as requiring firms to be able to segment customers effectively, with two

basic segmentations being *strong* (i.e. low elasticity, higher price) and *weak* (i.e. high elasticity, lower price).
There has been a long debate around the relationship between price discrimination and economic efficiency. While perfectly competitive markets under standard assumptions find that efficiency implies price equal to marginal cost, there are a number of circumstances under which markets may be efficient with differential pricing, for example the presence of significant fixed costs (Varian, 1996). It is a well-established result that a necessary condition that price discrimination is welfare enhancing is that total output is increasing (Schmalensee, 1981; Varian, 1985). Baumol and Swanson (2003) show that price dispersion can be the outcome of a competitive process, rather than monopoly power, and that if entry barriers are low, returns will be driven down to the competitive level.

Retailers in the Australian retail electricity market generally use second-degree or third-degree price discrimination when setting prices (Simshauser, 2018; Nelson et al, 2018).[5] Broadly, this involves retailers raising prices in strong segments and lowering prices in weak segments. This is possible in retail electricity markets because consumers are unable to exploit arbitrage (by purchasing electricity in the weak segment and selling in the strong segment), imperfect information on the part of consumers and the presence of search and switching costs.

Where assumptions deviate from those underpinning perfect competition, price discrimination is not necessarily detrimental to consumer welfare. In retail electricity markets where there are substantial fixed costs, it has been well established that price discrimination can be welfare enhancing (Littlechild, 2014; Simshauser and Whish-Wilson, 2017).

Corts (1998) showed that if price discriminating firms are regulated to maintain margins between weak and strong segments they will retreat to the market where they make the greatest profit. This prediction was borne out in Great Britain following the imposition of a non-discrimination clause on retailers requiring them to maintain constant margins between different regions. The result was reduced competition, an overall increase in margins and reduced consumer switching by half (Hviid and Waddams Price, 2012; Waddams Price and Zhu, 2016a; Littlechild, 2019).

Much of the literature utilises the *strong* and *weak* segmentation theory discussed earlier. The theoretical *uniform* price is positioned between a higher price for the *strong* segment and a lower price for the *weak* segment (Holmes, 1989). With such pricing in place, and assuming that firms have the capability to segment customers (see Corts, 1998), there is an ability for firms to price in such a way as to compete for new elastic customers while recovering fixed costs through existing inelastic customers on higher priced offers.
The key to price discrimination delivering efficient outcomes is the ability to segment customers on their willingness to pay. If customers are segmented on factors other than their willingness to pay, then price discrimination may lead to inefficient outcomes (Simshauser and Whish-Wilson, 2017). In the context of Australia's retail electricity markets, Nelson and Reid (2013) note that, if price discrimination is based on exploiting informational asymmetries and search costs, then price discrimination may be inefficient.

[5] As defined by Pigou (1920), first-degree price discrimination is where the firm charges each unit equal to the consumer's willingness to pay. Second-degree price discrimination is where the firm sets non-linear pricing such that the price depends upon the quantity consumed. Third-degree price discrimination is where the firm will segment customers and charge them based on their willingness to pay, for example student discounts at the cinema.

Among regulators, there is no consensus on whether the practice of price discrimination in Australia's retail electricity market is efficient. The Australian Competition and Consumer Commission (ACCC, 2018) argues it is not, with the Australian Energy Market Commission (AEMC, 2018a) holding a similar view. In contrast, academic literature finds that price discrimination in the Australian market is largely efficient, with the exception of vulnerable, disengaged consumers on high-priced offers (Simshauser and Whish-Wilson, 2017; Simshauser, 2018; Nelson et al., 2018).

The AEMC (2017, 2018a) notes that the main form of competition in Australia's retail energy markets is via price discounting. Product differentiation does not account for much of the observed price dispersion; neither does retailers tailoring tariff structures to consumer needs. Instead, price dispersion is driven largely by variations in the size of price discounts. Furthermore, there are far more offers than segmentation categories used by retailers – and certainly more than the classic two types of *strong* and *weak* customers described in the theoretical literature. While AEMC (2018a) concludes that the observed price dispersion is unlikely to be efficient, it does not compare this outcome relative to the previous price regulated market, and its recommendation for minimising this inefficiency is *not* to impose a price cap. Therefore, despite some agreement between ACCC (2018) and AEMC (2018a) on the inefficiency associated with the observed price dispersion, the policy prescriptions differ. These policy prescriptions are discussed in Section 5.

2.2 *Competition and regulation*

The United States experience provides informative examples of how competition and regulation interact. During the late 1990s 14 states opened up their retail electricity markets to competition. Of these, 13 have kept in place regulated pricing through a Standing Service (equivalent to a standing offer). In 2007, Texas became the only state to remove their price cap providing a point of comparison for how competition interacts with price regulation. Within Texas, some utilities owned by local authorities and electricity cooperatives, were given the choice of opting in to competition, providing a further point of comparison.

Overall across Texas, Kang and Zarnikau (2009) found that retail electricity prices declined following the expiry of the price cap and that this reduction could not be explained by input prices. Borenstein and Bushnell (2015) similarly found that retail electricity prices more closely follow gas prices in restructured states (including Texas), a sign of increasing competition.
Within Texas, Hartley, Medlock, and Jankovska (2019) found that residential retail electricity prices in the competitive areas reflect wholesale electricity prices with a declining gap between them over time. While retail prices in non-competitive areas do not reflect wholesale prices and the gap has not decreased.
By contrast, in Connecticut where price regulation has been maintained, retail prices were more reflective of changes to the Standard Service than wholesale prices (Tsai and Tsai, 2018). Littlechild (2018) made a similar observation, in relation to the UK, that a price cap for prepayment meter tariffs led to a 'clustering' of offers around the price cap.

2.3 *Switching and customer engagement*

Customer engagement and switching is necessary for a well-functioning retail market. Research from Great Britain suggests that the perception of gains from switching increases switching behaviour (He and Reiner, 2018; Flores and Waddams Price, 2018).

This is consistent with results from Waddams Price and Zhu (2016a) and Littlechild (2019) who found that switching rates fell significantly following the imposition of a non-discrimination clause which reduced price dispersion.
Researchers have identified several drivers of switching behaviour in retail markets. Giulietti, Waterson and Wildenbeest (2014) explain switching rates as resulting from the costs to consumers of finding and comparing offers. In a laboratory setting, Sitzia, Zheng and Zizzo (2015) find that a lack of switching is due to inattention to the task of comparing offers and the complexity of choosing between them. Hortaçsu, Madanizadeh and Puller (2017) attribute low levels of switching to consumer inertia and brand loyalty.

Flores and Waddams Price (2018) undertook a survey of searching and switching behaviour in Great Britain which revealed a more nuanced picture. They identified three groups of consumers: 'Shoppers' who are engaged; 'Time-poor' who are semi-engaged and; 'Loyal' who are not engaged. The authors found that the drivers of switching varied between these groups. For example, internet use is only correlated with switching for 'Shoppers' and while education is positively associated with switching for all groups, the association is weaker for 'Loyal' consumers.

There is a risk that by reducing the returns (real or perceived) to switching, price caps may lead to a dampening of consumer engagement in the market. An understanding of what drives switching should inform the development of policy alternatives to price regulation. We outline alternative policy options in Section 5.1.

2.4 *Price dispersion increases as markets become more competitive*

Stole (2007) shows that under third-degree price discrimination, the effect of competition on the level of price dispersion depends upon the cross price elasticities in the market. In a situation where the consumers in the weak segment of the market consider the goods to be close substitutes while consumers in the strong segment exhibit strong brand loyalty, then firms will choose competitive prices in the weak segment and near-monopoly prices in the strong segment (Stole, 2007: p 2235-6). In these circumstances it can be expected that greater competition leads to greater price dispersion.

Evidence from Australian retail electricity markets is consistent with the theory. There has been an increase in price dispersion in retail electricity markets as competition has increased. This is apparent across states, for example Victoria exhibits the greatest degree of price dispersion and has had the longest experience of price deregulation and has the highest residential switching rates in the NEM (AEMC, 2018a). It is also apparent over time, as shown later in this article in Figure 5 which shows price dispersion since deregulation in four deregulated regions of the NEM.

The imposition of a price cap in the retail market reflects a degree of reregulation of electricity prices. Under a price cap we would expect to see a reversal of the dispersion observed since retail price deregulation across the NEM. Some early indications are that there has been a compression of offers in the UK since the announcement of reregulation (KPMG, 2017; AEMC 2018a). We present some further evidence of this in Section 4.4. Waddams Price (2018) argues that price caps are likely to raise the prices on the lowest priced offers and harm those that are most active in the market. The author does not specify a mechanism through which this occurs. In Section 3 we suggest a mechanism through which a price cap results in higher prices among the lowest priced retail offers.

3. A stylised model to investigate the impacts of a price cap

An important feature of the Australian retail market is that tariff offerings are often heavily discounted from a headline rate (either on the usage component or on the total bill). This discount typically only applies for the 'benefit period', usually the first 12 months from when a customer signs up to the offer. After the benefit period ends the discount ceases and the customer often begins paying a higher rate. This has led to retailers offering aggressive discounts with the aim of gaining market share in the expectation that some customers will remain beyond the benefit period. We show that this behaviour provides a channel through which a price cap may lead to an increase in price among the lowest market offers.

Following the work of Robinson (1933), we segment customers into two groups, strong and weak, with low and high elasticity of demand, respectively. We consider a two-period model where there is a probability $0 < d < 1$ that a customer in the weak segment (on a competitive discounted offer) in period 1 becomes a customer in the strong segment in period 2 (after their benefit period expires). We will refer to these customers as 'staying customers'. We assume an interest rate of $\theta \geq 0$ to account for the time value of money.[6] The retailer attempts to maximise the sum of profit in each market segment.

Assume the demands the retailer faces in the strong (Q_s^d) and weak (Q_w^d) segments are given as:

$$Q_s^d = a_s - b_s P_s \quad (1)$$
$$Q_w^d = a_w - b_w P_w \quad (2)$$

where $a_s > a_w > 0$ and $b_w > b_s > 0$.

To simplify the model we assume that fixed costs are zero and that marginal costs, $c > 0$, are constant and equal across both markets.[7] The profit in each segment in the first period can be written as:

$$\pi_s = a_s P_s - b_s P_s^2 - c Q_s^d \quad (3)$$
$$\pi_w = a_w P_w - b_w P_w^2 - c Q_w^d + \frac{\mathrm{d}Q_w^d (P_s - c)}{(1+\theta)} \quad (4)$$

From (3) we get the standard result under monopolistic competition where the profit in the strong segment, π_s, depends only on the price in that segment, P_s (or equivalently, the quantity Q_s^d).

By contrast, from (4) it is seen that profit in the weak segment, π_w, involves a tradeoff between restricting output to increase price, and expanding output to increase the number of staying customers, dQ_w^d, that become strong segment customers in the following period.

It follows from (3) and (1) that the profit maximising price in the strong segment is given by the following condition:

$$\frac{\partial \pi_s}{\partial P_s} = a_s - 2b_s P_s + b_s \mathrm{c} = 0 \quad (5)$$

[6] We use the term 'interest rate' rather than 'discount rate' to avoid confusion with discounted tariffs during the benefit period.

[7] Assuming zero fixed costs does not affect the pricing decision for the retailer; however it may have implications for retailer entry/exit decisions in the long run. In particular, our model shows that the imposition of a price cap will reduce profit (or increase losses) which may lead to some retailers exiting the market thereby reducing competition.

Resulting in the following optimal price function:

$$P_s^* = \frac{a_s + b_s c}{2b_s} \tag{6}$$

In the weak segment, the retailer takes into consideration the strong segment price, P_s^*, that will be paid by the staying customers in the next period. From (4) and (2), the condition for profit maximisation in the weak segment is given by:

$$\frac{\partial \pi_w}{\partial P_w} = a_w - 2b_w P_w + \frac{d b_w (c - P_s^*)}{(1+\theta)} = 0 \tag{7}$$

Resulting in the following optimal price in the weak segment:

$$P_w^* = \frac{a_w}{2b_w} + \frac{d(c - P_s^*)}{(2+2\theta)} \tag{8}$$

so that the optimal price in the weak segment depends:

i. negatively on the price set in the strong segment;
ii. negatively on the proportion of staying customers (because $P_s^* > c$); and
iii. positively on the interest rate.

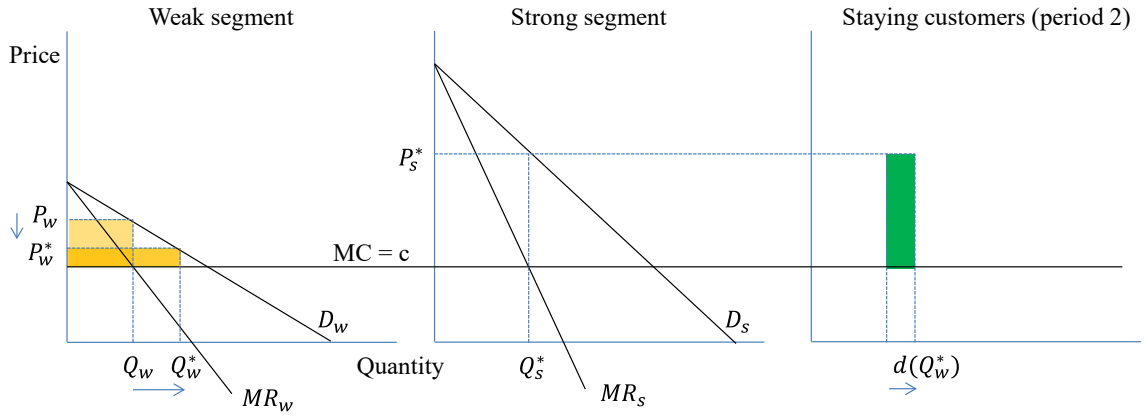
The retailer will lower the price in the weak segment to the extent that the reduction in profit in the first period is less than the (discounted) increase in profit from staying customers in the next period.

A larger proportion of staying customers (i.e. a higher d) would mean that the retailer is willing to lower the price further in the weak segment as each additional customer is more likely to become a strong segment customer in the following period. On the other hand, a higher interest rate will decrease the present value of profits from staying customers leading to the retailer preferring to raise the price in the weak segment.
The trade off (i) is illustrated in Figure 1, assuming an interest rate $\theta = 0$ for ease of demonstration.

Under an assumption that no customers stay beyond the benefit period (i.e. $d = 0$), the optimal quantity set in each segment would be where marginal revenue equals marginal cost, $MR_s = MR_w = c$, giving optimal prices in Figure 1 of P_w and P_s^* in the weak and strong segments respectively.

However, because we are assuming that some proportion, $d > 0$, of weak segment customers stay beyond their benefit period and become strong segment customers in the following period, the retailer is willing to reduce the price in the weak segment to gain market share. This means that the optimal price in the weak segment is set at P_w^* which is the point at which the marginal loss in profit in the weak segment is equal to the marginal increase in profit from those staying customers in period 2. We can think of this as being the price at which the reduction in area from the light to dark orange rectangle is equal to the size of the green rectangle representing the increase in profit from expanding market share in period 2.

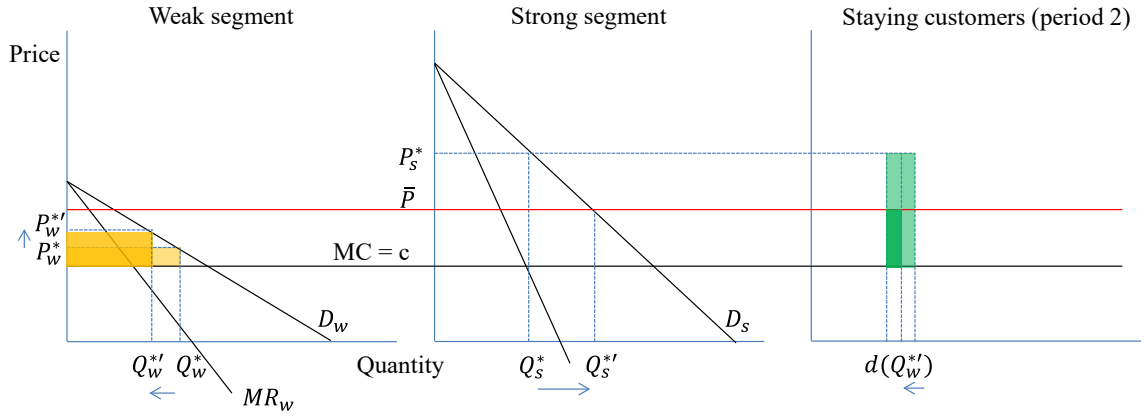
Figure 2: Profit trade-off between weak and strong segments



3.1 *Price cap*

Consider the effect of a price cap, $\bar{P}$, set below the current optimal price in the strong segment, $\bar{P} < P_s^*$. From (8) we can see that this will result in a higher optimal price in the weak segment, $P_w^{*\prime} > P_w^*$. The price cap binding in the strong segment reduces the marginal profit earned on a staying customer so that P_w^* no longer maximises the profit for the retailer. The retailer responds by restricting output in the weak segment until the increase in profit is equal to the reduction in discounted profit from staying customers. The new trade off is demonstrated in Figure 2.

Figure 3: Profit maximisation under a price cap



In Figure 2, the retailer forgoes some market share to increase the profit in the weak segment in period 1. The new optimal output, $Q_w^{*\prime}$, maximises the sum of the area of the dark orange and green rectangles. In the strong segment, the price cap reduces the price to $\bar{P}$, expanding output to $Q_s^{*\prime}$.

This partial equilibrium analysis illustrates a mechanism through which a price cap can lead to retailers increasing prices on their lowest offers in the market. While a price cap set below high priced offers will benefit customers on these offers, it will also reduce the profit earned by retailers on 'staying customers'. A price cap therefore changes the optimal trade-off between expanding the number of staying customers and increasing the profit earned on strong segment customers in the short term. At the margin, a retailer will seek

to increase prices among lowest priced offers, thereby harming those that are most active in the market.

4. Empirical observations of price dispersion and price discrimination

While there are no historical cases of *re-regulating* retail electricity prices in Australia, there is significant empirical evidence on the impacts of *deregulating* retail electricity prices. This evidence is useful to draw conclusions about what price dispersion outcomes may be if price regulation was reimposed. There are also a few limited international examples where reregulation has occurred. This section explores these empirical observations.

4.1 *Increased customer engagement and competition*

Retailers in Australian electricity markets must publish on their websites a standard retail contract (standard contract) for all distribution zones in NEM regions that they operate in. Retailers' standard retail contracts must adopt the model terms and conditions in the National Energy Retail Rules (NERR). Each consumer has a designated retailer (known as the Financially Responsible Market Participant or FRMP) that is required to offer to supply them under the retailer's standard retail contract. When full retail contestability was introduced, retailers could also offer retail market contracts (market contracts) which allow them to determine most of the terms and conditions in the contract, including price. The first form of price dispersion displayed post deregulation was the introduction of market offers, typically at discounts from standing offers. Figure 3 displays electricity bills for the *average* market and *average* standing offers over time. Notably, on average, market offers are significantly cheaper than standing offers following deregulation, and the differential increases with time.

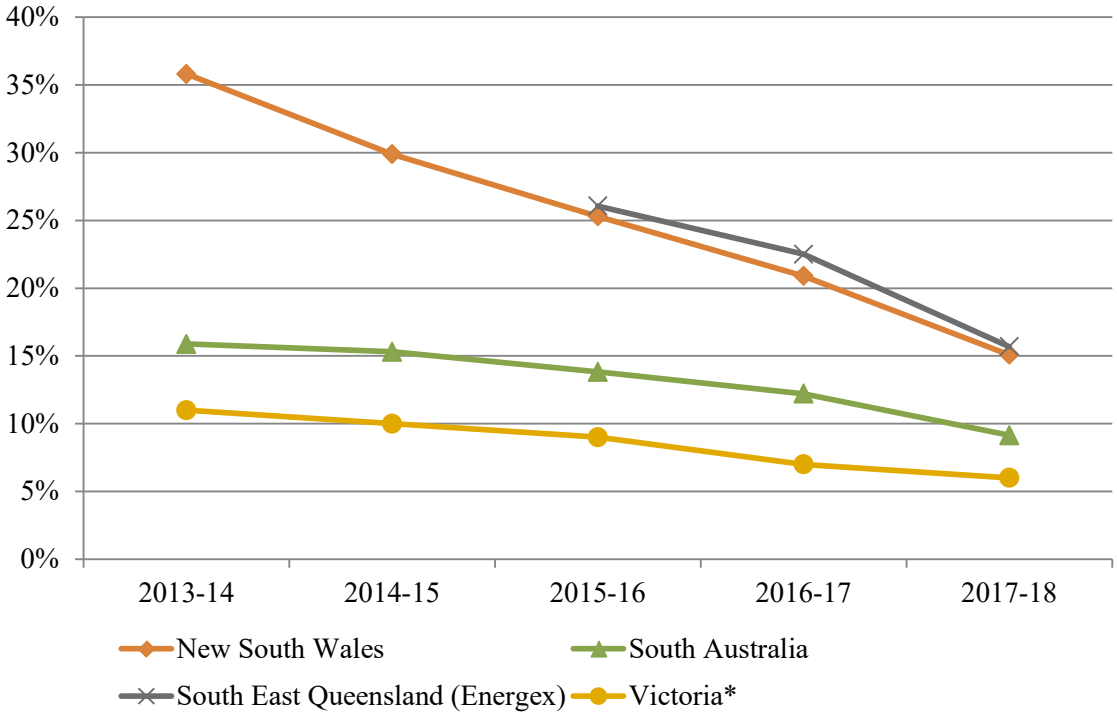
Figure 4: Comparison of average standing and market offers

Source: Analysis of data provided by St Vincent de Paul and Alvis Consulting

Figure 3 shows that price dispersion, reflected through total average bills for market and standing offer customers, increased in each jurisdiction when price deregulation occurred. Victoria was the first state to deregulate electricity prices in January 2009, followed by South Australia in January 2013, New South Wales in July 2014 and South East Queensland in July 2016.

In a sign that consumer engagement in the market is increasing, the proportion of customers on standing offers has progressively decreased over time in all four jurisdictions where prices are deregulated. This is demonstrated in Figure 4.

Figure 5: Percentage of residential customers on standing offers

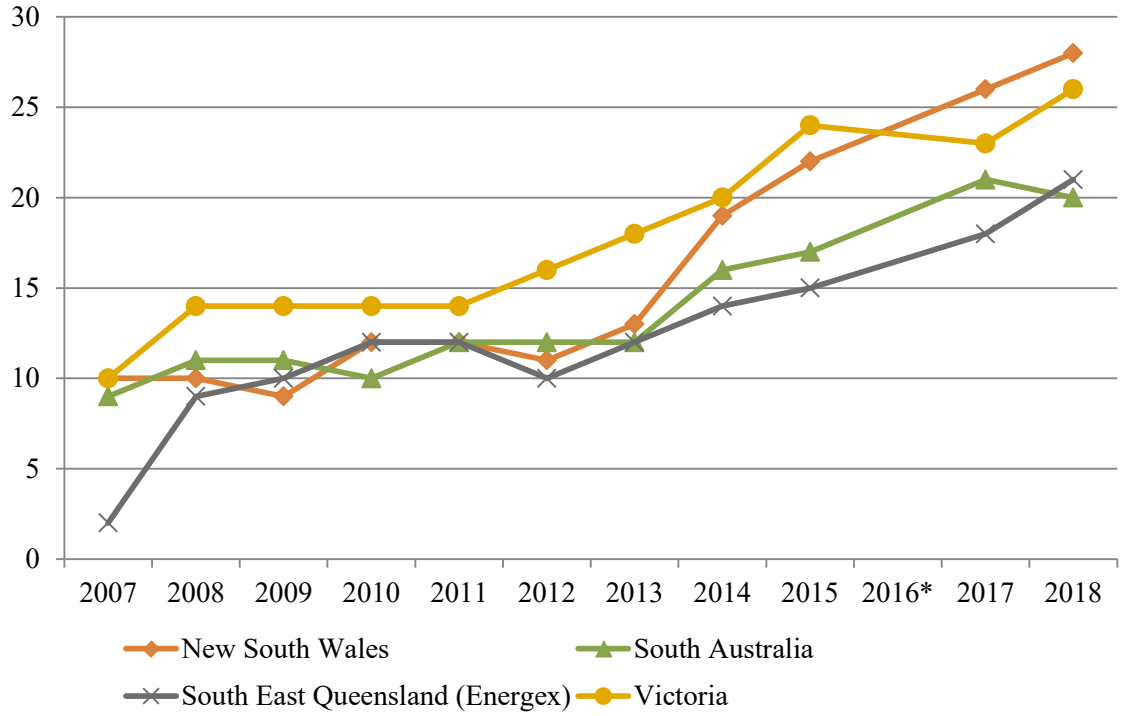


Source: Data from AEMC (2018a), AER (2019) and ESC (2018).
**Victorian data estimated from AEMC (2018a) analysis and the ESC (2018) report.*

Meanwhile, jurisdictions with full retail contestability but regulated prices have a much higher proportion of customers remaining on standing offers. In the Australian Capital Territory, over 50% of customers remain on standing offers, and in Tasmania, over 90% of customers are on standing offers.

Since deregulation there has been significant retailer entry and increasing competition in retail markets. There are now around 30 retailers offering products across the NEM, and at least 20 in each deregulated region in the NEM, as seen in Figure 5.

Figure 6: Number of active retailers for small customers



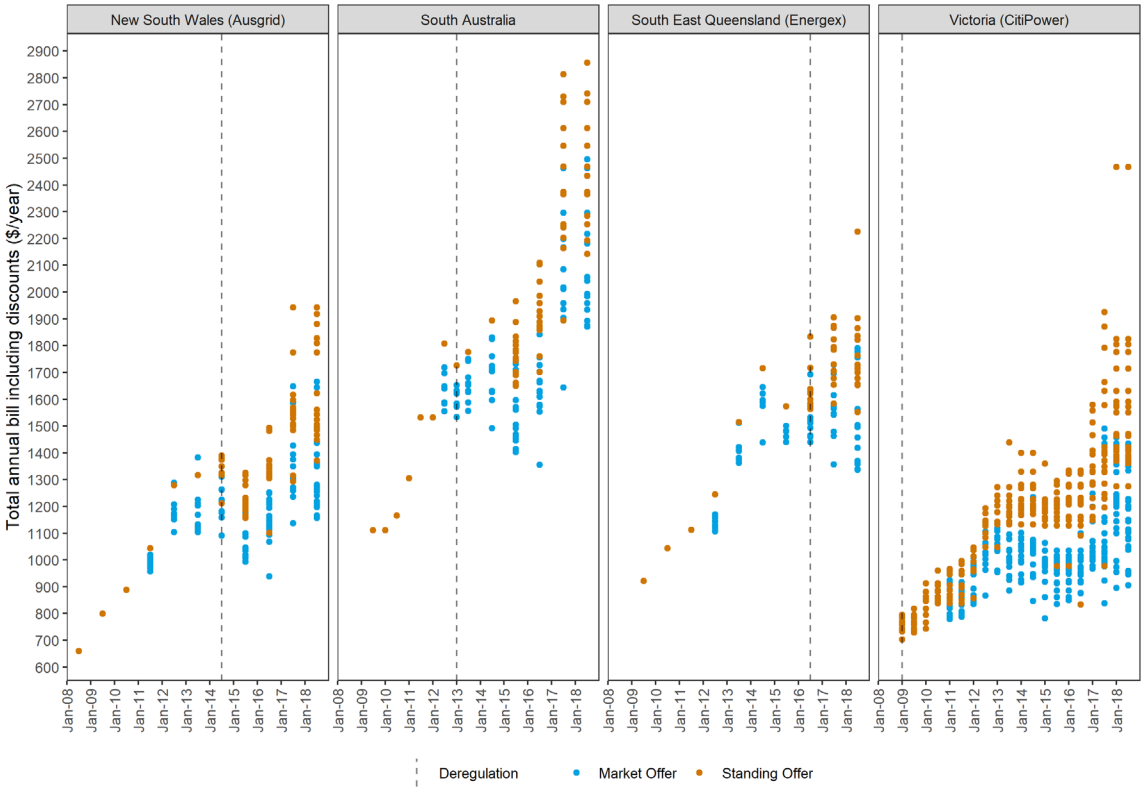
Source: Data from AER 2007-18.
*The AER did not publish data on active retailers for 2016.

4.2 *Price dispersion*

Many retailers utilise both second and third degree price discrimination to provide relatively unique and tailored product offerings (see Nelson et al, 2018 for the Australian experience; and Waddams-price etc for the UK experience). These include price discounts targeted at higher consuming customers and lower pricing for customers that utilise particular payment channels (e.g. direct debit). Figure 5 shows that since the removal of price regulation in Australian retail electricity markets there has been a strong and consistent trend of increasing price dispersion.[8]

[8] While the figure only displays dispersion in one DNSP area in each state, this trend is evident across all distribution areas. For more details, see AEMC (2018a).

Figure 7: Price dispersion in selected Australian capital cities[9]



Source: Analysis based on data provided by St Vincent de Paul and Alvis Consulting

Figure 5 shows that since prices have been deregulated there has been a significant widening of price dispersion. This is consistent with the economic literature and the earlier findings specific to the Australian context (Simshauser and Whish-Wilson, 2017; Nelson et al, 2018 and Simshauser, 2018). It follows that if the reverse were to occur through reregulation, then the price dispersion would be likely to reduce with a compression of offers (see Waddams Price and Zhu, 2016a, for evidence in relation to the UK market). The imposition of a default offer may result in retailers changing their strategies in a manner consistent with that proposed by our partial equilibrium model in Section 3.

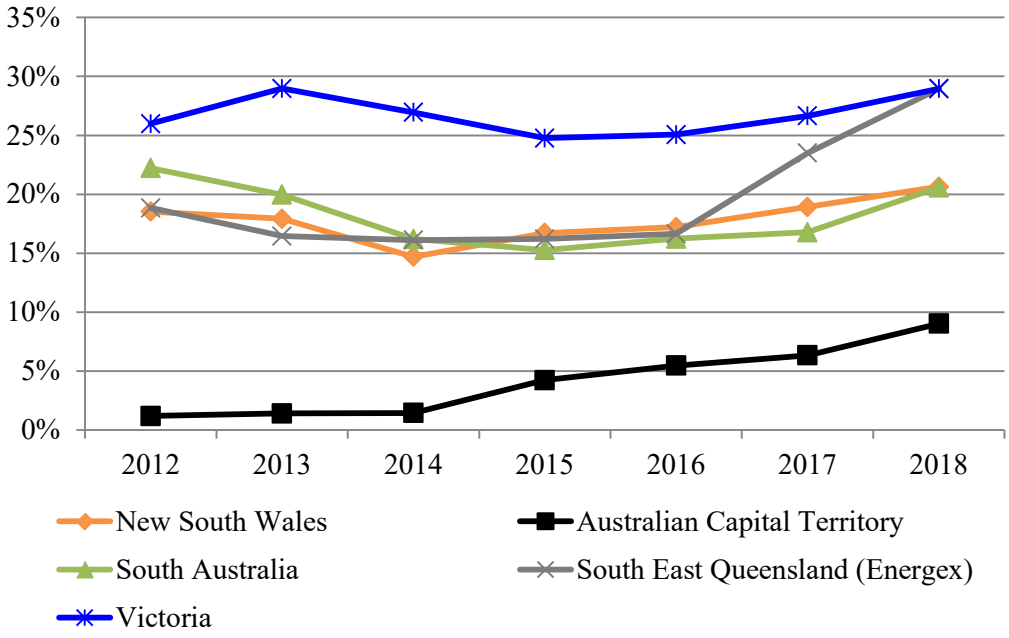
4.3 *Customer switching behaviour*

Another concern with imposing a default offer is the impact that it may have upon customer switching between retailer offers. As the benefit period for competitive offers is often only 12 months, customers benefit most by regularly comparing offers and regulators have made efforts to encourage customers to actively engage in the retail market.[10] Switching rates have generally increased in jurisdictions that have deregulated across the NEM. The AER (2018) finds that the level of switching 'is strong, [but] activity is uneven across the customer base'.

[9] See Figure 4.16 in AEMC (2018a). A shortcoming of this analysis is that we do not have information on the number of customers on each of the offers. One of our key policy recommendations presented in the subsequent section of this article is for retailers to be required to annually disclose the number of customers (and potentially the average consumption of these customer cohorts) on each offer.

[10] For example, the Victorian Government offers a $50 incentive for residential customers that compare offers through their comparator website *Victorian Energy Compare*.

Figure 8: Residential switching rates across NEM jurisdictions



Source: Data from AEMC (2019).

The empirical observations presented in this section reveal an increasingly competitive market with benefits for engaged consumers. However, the move towards reregulating electricity prices threatens to throw these developments in reverse. There is a risk that under a price cap, customers may perceive that the returns from 'shopping around' are reduced and the level of active engagement in the market may be reduced (He and Reiner, 2018).[11] Retailers have an incentive to endorse the perception of protection of a price cap to their existing consumers as it may encourage them not to switch.[12]

A systematic reduction in switching behaviour would have negative implications for the level of competition in the market, could possibly re-establish the dominance of the three largest retailers (known as the Big 3, a similar term to the Big 6 in the UK), and reduce the incentive for innovation in the sector.[13]

4.4 *International observations*

The preceding analysis is largely theoretical in that there is no observed history of reregulation in Australian electricity markets. But other jurisdictions have undergone processes of reregulation which allow us to draw conclusions about the robustness of our hypothesis. Great Britain has recently reintroduced price regulation through a temporary 'default tariff cap'.

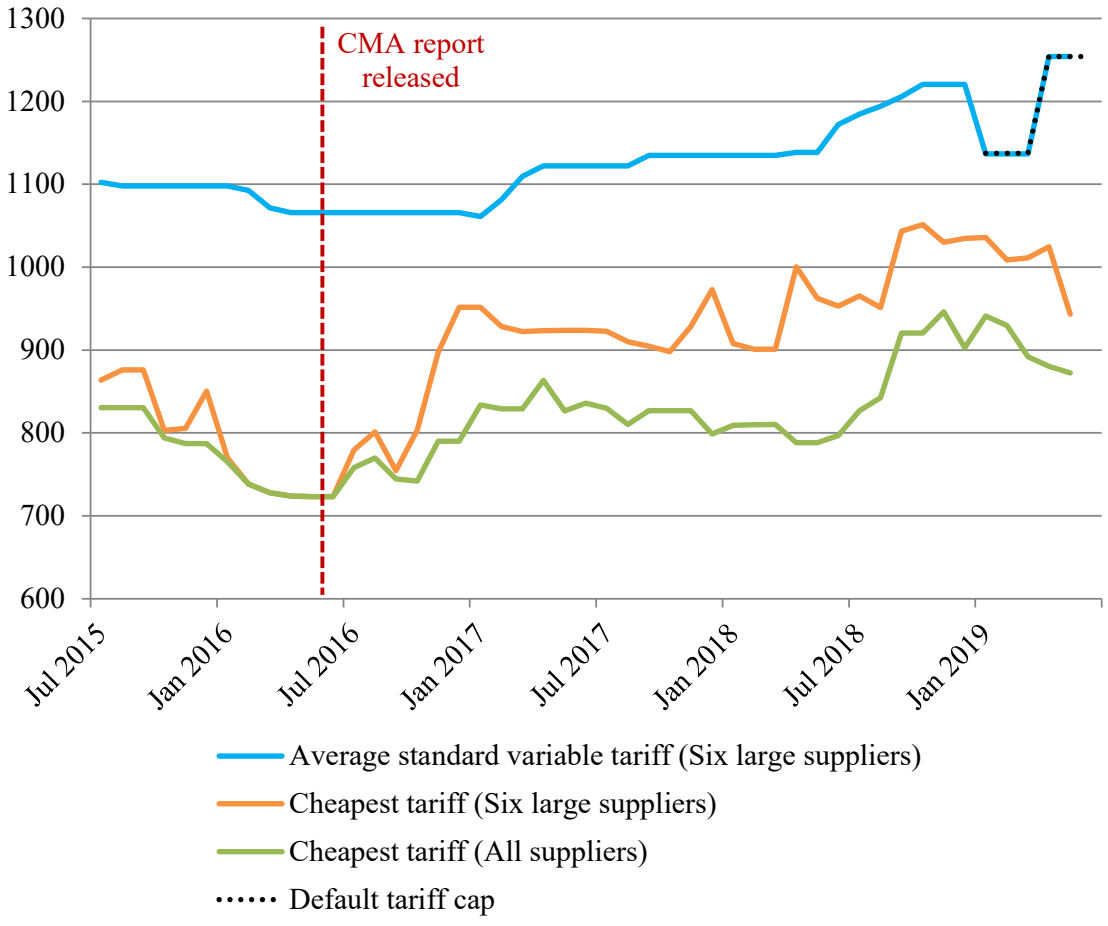
[11] Survey research from 2015 found that Australian households would require, on average, minimum savings of between $194 and $234 per year to switch to another offer (Newgate Research, 2015).

[12] In the lead up to the DMO, one retailer sent an email to their customers including the following quote: "The Federal Government has introduced a Default Market Offer which they've deemed is a *fair* price for energy consumers to pay per year." (emphasis added).

[13] As noted in AEMC (2019), there has been an increase in innovation in the retail electricity sector. For example, aided in part by the rollout of interval meters, Amber Electric has recently entered the New South Wales and South Australian retail markets offering a dynamic pricing plan that passes through 30-minute wholesale spot prices to end consumers and provides them with real-time electricity price forecasts for consumers to manage their usage.

Following the announcement of the default tariff cap in June 2016, there was an increase in the price of the cheapest offers in the market. The increase was larger for the six largest retailers (known colloquially as 'the Big Six") than for the market as a whole (KPMG, 2017). Figure 8 shows the increase in the price of the cheapest offers following the announcement of the default tariff cap in June 2016 (CMA, 2016). This was followed by a further sharp increase in the cheapest tariffs in the months leading up to the start of the tariff cap on January 1, 2019.
Shortly after the start of the tariff cap, Ofgem announced that the cap would be increased from April 1 citing high wholesale costs.[14] Despite this increase in costs, the cheapest offers in the market *decreased* both across the Big 6 and overall, consistent with our theory that the optimal price in the weak segment of the market depends negatively on the price set in the strong segment.

Figure 9: Great Britain tariffs over time (£/year)



Source: Ofgem retail market indicators

4.5 *Customer segment composition*

The most cited policy rationale for introducing a default offer relates to the protection of customers prone to energy-related financial hardship. Simshauser and Whish-Wilson (2017) noted that there are issues of inter-consumer misallocation due to relatively high

[14] For the Ofgem announcement see: https://www.ofgem.gov.uk/publications-and-updates/higher-wholesale-costs-push-default-and-pre-payment-price-caps-april

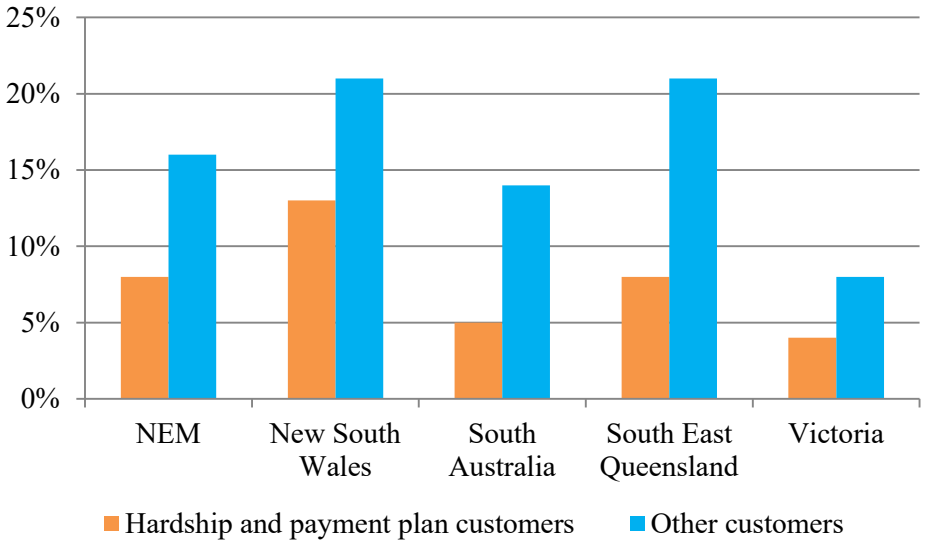
standing offers. In other words, they expressed concern that there may be some customers who are vulnerable to financial hardship that remain on higher priced standing offers. This sub-section seeks to explore the types of customers who are on both standing offers and high discount products.

Nelson et al (2018) found 'that customers on 'standing offer' tariffs use 18% less electricity than customers on 'high discount' products, indicating the presence of market segmentation and implicit second-degree price discrimination.' Simshauser and Nelson (2014) have concluded that the family formation demographic is most at risk of financial hardship due to higher than average consumption and lower per person household income. It can therefore be inferred that price dispersion is facilitating savings for those customers most in need (due to financial vulnerability) as higher discount products are generally targeted at customers with higher consumption. Nelson *et al* (2019, p. 262) established that, 'energy related financial hardship is likely to be related to a combination of the following: family formation demographics; low-income (often reliant upon government income support); higher household size; and higher than average consumption.' The study also noted that 'shopping around' was a key way in which households could minimise energy bills due to the opportunities available through second degree price discrimination.

Australian regulators have made similar conclusions in relation to this issue. The ACCC (2018) and AEMC (2018a) have also considered the heterogeneity of household consumption and the incidence of customers on 'standing offers'. The AEMC (2018b) demonstrated there is a correlation between a postcode having a higher proportion of standing offers if the customers: have a lower proficiency in English; occupy a property rent-free (such as being a home-owner); have the property as an unoccupied private dwelling and are in rural areas.

The ACCC (2018) found that there was a particularly strong relationship between customers selecting market offers and them being part of a hardship program or payment plan. Figure 8 presents the findings of the ACCC (2018). Customers on hardship plans are far less likely to remain on a standing offer because they have the greatest incentive to find better offers. AEMC (2018b), without drawing conclusions on the efficiency of price discrimination within the overall market, noted that the lower presence of hardship and payment plan customers on standing offers would likely mean a reduction in price dispersion in the market and would therefore result in the greatest detriment to these customers. This reinforces the findings of Nelson et al (2019) around hardship and financially vulnerable customers having up to 40% higher than average consumption and thus a disproportionately high incentive to be on the best available market offer.

Figure 10: Percentage of standing offer customers in hardship



Source: ACCC (2018, p. 245)

This summary of customer segmentation demonstrates that introducing a default offer is likely to be counterproductive if the policy rationale is to improve overall outcomes for the consumer segments most at risk of financial hardship: those on hardship programs and those in the family formation demographic. As consumers with higher than average consumption, they are more likely to be on heavily discounted products, due to the higher marginal benefit to them of 'shopping around'. The introduction of a price cap is likely to result in a compression of offers and reduce the potential savings available to such households through engagement with the market.

5. Concluding Remarks

This article has outlined a mechanism through which a retail price cap may lead to retailers withdrawing the cheapest offers from the market. If some customers are 'sticky' and stay beyond the discounted benefit period, then profit maximising retailers have an incentive to aggressively compete by offering generous discounts for new customers. A price cap set below the profit maximising price for staying customers reduces the profitability these customers and so changes the trade-off faced by retailers. This results in a higher optimal price (smaller discount) for new customers. Overall, this results in a redistribution of consumer surplus from more active to less active customers in the market.

Our analysis, presented as theory in Section 3 and empirical evidence in Section 4, demonstrates that the lowest prices in the market are likely to rise due to the introduction of a default offer. This will result in customers on heavily-discounted plans being worse off. In effect, this would be redistribution from vulnerable and comfortable engaged customers on low priced offers to vulnerable and comfortable disengaged customers on high standing offers.

5.1 *Policy recommendations*

We do not contend that the retail electricity market in Australia is operating as efficiently as it could. Instead, we are of the view that price dispersion is welfare enhancing relative to the alternative of price regulation. The introduction of a default offer is, therefore, likely to

be counterproductive and other policy solutions are preferable. We agree with the ACCC (2018) that a common price benchmark such as the default offer would reduce the *discount off what?* problem for consumers. In practice, price dispersion in the NEM occurs through the application of different price discounts to reference prices that vary across retailers. This has created some customer confusion about the actual prices charged for different offers, leading to inefficient price discrimination, with some vulnerable customers remaining on high-priced offers.

The preceding analysis may suggest that we are against intervening to protect vulnerable consumers. On the contrary, our very concern is with protecting consumers in the short *and* long-term. The challenge is to develop interventions that protect vulnerable and disengaged consumers while preserving the benefits for other consumers to remain active and engaged. As an alternative to a default offer, we recommend policy makers create an auction for the right to serve vulnerable, disengaged consumers.

In Figure 11 we provide a schematic to help think about optimal policy development in deregulated retail electricity markets. Broadly we can think of there being four groups of consumers, represented in quadrants *a*, *b*, *c* and *d*. Those in the first row (*a* and *b*) are actively engaged in the market and regularly 'shop around' for better offers, while those in the second row are disengaged either by rational choice (quadrant *c*), or due to some inability to exercise choice (quadrant *d*). Consumers in the first column are financially well-off while those in the second column are financially vulnerable.

In a competitive retail market, quadrant *a* and *b* consumers will tend to be on low-priced offers, while quadrant *c* and *d* consumers tend to be on high-priced market or standing offers. As shown by Simshauser and Whish-Wilson (2017), the outcomes for *a*, *b* and *c* are efficient. The allocation of quadrant *d* consumers to high-priced offers however is a potential source of inefficiency.

Figure 11: Consumer engagement and vulnerability quadrants

		Financial situation	
		Comfortable	Vulnerable
Engagement with market	Engaged	*a*	*b*
	Disengaged	*c*	*d*

In developing policy to protect vulnerable disengaged consumers we need to be careful to preserve incentives for consumers to be engaged in the market (Waddams Price and Zhu 2016b; Walker, 2017). The central difficulty facing policy makers is that measures intended

to benefit consumers in quadrant *d*, such as a price cap, tend to do so at the expense of consumers in *a* and *b*. Instead, policy-makers should focus on developing interventions to target quadrant *d* consumers while minimising the impacts on consumers in quadrants *a*, *b* and *c*.

Our main policy recommendation is that policy makers should determine an appropriate length of time for consumers to be on standing (or high market) offers. After this period of time, say two years, vulnerable consumers (for example, pensioners, those receiving government benefits or low-income cardholders) would be automatically transitioned to a basic retailer offer that is determined through an auction in each distribution area.[15] The auction could be conducted annually and would involve retailers competing within each distribution area to supply these inactive customers. The auction would be decided by the lowest proposed offer to supply these customers and the winning retailer would pay for the cost of administering the auction.

This approach would have the benefit of not reducing the incentive for active customers to be engaged in the market, while protecting vulnerable, disengaged consumers who would otherwise be sitting on high priced offers. In the schematic of Figure 11, the auction would protect quadrant *d* consumers from high prices, while not impacting upon the incentives for quadrant *a* and *c* consumers (because they are not eligible) and would limit the disincentive for *b* to remain engaged (because of the two year waiting period). This would lead to a preferred outcome to a price cap which is a blunt redistribution from quadrant *c* and *d* to quadrant *a* and *b* consumers.

The auction may also provide a way for entrant retailers to establish themselves in the market.

In addition to our main policy recommendation, we believe there are some straightforward policies that may stimulate engagement among vulnerable, disengaged consumers.

Firstly, policy makers could require that retailers contact their longstanding customers on high priced offers annually, directing them to *Energy Made Easy* and informing them that they could make substantial savings from switching.[16] In Great Britain, Ofgem conducted a similar trial which involved sending a 'Cheaper Market Offer Letter' to disengaged consumers on the equivalent of standing offers. The trial resulted in a tripling of switching rates among these consumers from 1 per cent to 3.4 per cent (Tyers, Sweeney and Moon, 2019). Other research from the US has likewise suggested that low-cost interventions such sending a flyer to households providing them with information on how to switch may help them to overcome their inertia (Hortaçsu, Madanizadeh and Puller, 2017).

While we contend that the ACCC (2018) default offer policy recommendation is likely to be counterproductive, it is important to note that many of the other recommendations made by the ACCC (2018) could be prioritised by policy makers to improve consumer outcomes. In our view, the most important of these is the reference bill component of the DMO. This overcomes the *discounts off what?* problem by requiring retailers to advertise discounts from the DMO.

[15] The authors note that switching consumers between offers would require a change to the National Electricity Retail Law, in particular the provisions for Explicit Informed Consent.

[16] The authors note that there is a pending rule change at the AEMC making a similar recommendation.

Other welcome measures from ACCC (2018) include: accelerating the take-up of cost-reflective network pricing[17]; increasing the uptake of digital meters to facilitate more efficient pricing; development of a mandatory code of conduct for third party intermediaries offering comparison advice; commitments to ongoing funding of government-run comparator sites; and funding for community organisations to improve energy literacy.

5.2 *Further research*

Our main policy recommendation outlined above is an auction for the right to serve vulnerable, disengaged consumers. An area of future research would be to consider the optimal amount of time that vulnerable consumers should be left on standing (and high market) offers before they are switched. The key trade-off is how to protect vulnerable, disengaged consumers while preserving the incentive for other consumers to engage actively in the market.

The implementation of the Default Market Offer and the Victorian Default Offer will provide opportunities for empirical testing of the theory presented in Section 3 of this article. Price dispersion and switching rates in the states impacted by the regulation can be compared with those of the other jurisdictions before and after the regulation comes into effect.This article has outlined a mechanism through which a retail price cap may lead to retailers withdrawing the cheapest offers from the market. If some customers are 'sticky' and stay beyond the discounted benefit period, then profit maximising retailers have an incentive to aggressively compete by offering generous discounts for new customers. A price cap set below the profit maximising price for staying customers reduces the profitability these customers and so changes the trade-off faced by retailers. This results in a higher optimal price (smaller discount) for new customers. Overall, this results in a redistribution of consumer surplus from more active to less active customers in the market.

Our analysis, presented as theory in Section 3 and empirical evidence in Section 4, demonstrates that the lowest prices in the market are likely to rise due to the introduction of a default offer. This will result in customers on heavily-discounted plans being worse off. In effect, this would be redistribution from vulnerable and comfortable engaged customers on low priced offers to vulnerable and comfortable disengaged customers on high standing offers.

[17] To protect against bill shock, there should be a compulsory data sampling period for customers, a requirement for retailers to provide a flat rate tariff offer, and additional targeted protections for vulnerable consumers.

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