Journal of Retailing and Consumer Services 47 (2019) 87–93

Contents lists available at ScienceDirect

Journal of Retailing and Consumer Services

journal homepage: www.elsevier.com/locate/jretconser

The impact of payment method on shopping behaviour among low income consumers

Luke Greenacre[a,*], Skye Akbar[b]

[a] Monash Business School, Monash University, Caulfield Campus, Victoria, Australia
[b] University of South Australia, Australia

A B S T R A C T

Purpose: It is well known that certain payment methods, such as credit and debit cards, can increase consumer spending. For many low income consumers, who cannot typically increase their spend, the relationship between payment method and spending has not been empirically examined. Using grocery store sales data, this research takes advantage of the introduction of a geographically-targeted Cashless Debit Card for welfare recipients in Australia to investigate the impact of payment methods on spending behaviour.

Design/methodology/approach: Recipients of government welfare and support payments were automatically enrolled into the Cashless Debit Card program, with 80% of their support payments deposited onto the card. The card prevented the withdrawal of cash money. The sales data from the local grocery store from the region where this program was implemented were obtained, as well as the data from two grocery stores from a control community in a similar region where the program was not implemented. The change in price elasticities of demand was then assessed.

Findings: The overall grocery market became more inelastic as a consequence of the introduction of the Cashless Debit Card, while total spend in-store remained stable.

Research limitations/implications: Prior research has shown that consumers spend more when using card versus cash payments. We extend that research to show that low income consumers do not spend more, but do become less responsive to price cues when grocery shopping with a card. The advantage of our research was the ability to identify a 'moment' when there was a switch from cash to card payments due to the introduction of the Cashless Debit Card program, and compare it with a similar location that was not subject to the program. However, limiting the research to only recipients of support payments may increase the effect size, and the true size of the change may be unique to different research contexts.

Practical implications: The findings highlight to businesses that their current sales and promotions strategies may be less effective following the adoption of card payments by consumers. Campaigns will need to be more prominent or discounts deeper to produce the same uplift in sales as previously experienced. Policymakers encouraging the use of card payments will also need to accommodate this change in consumer behaviour, which may slightly reduce the amount of product consumers obtain for their dollar.

Originality/value: The impact of payment method on typical consumers has been considered; however, this research focuses on low income consumers whose more limited resources make them more vulnerable to changes in market conditions.

1. Introduction

The switch from using cash to using cards for shopping transactions is one of the biggest trends in the consumer financial system (Doyle et al., 2017; Fish and Whymark, 2015; USFed, 2016). One of the consequences of this move to card payments is an increase in consumers' willingness to spend their money. Some of this increase has been attributed to improved access to lines of credit associated with card payments, and misunderstandings regarding the need to repay the debt incurred (Besharat et al., 2014; Durkin, 2000; Hawes, 1987; Soll et al., 2013). However, there is substantial evidence to suggest that a portion of the increase also comes from changes in the psychology of money. People experience less pain, or sense of loss, when parting with money to buy goods when that money is stored in a card format; this diminishes loss aversion and increases willingness to pay (Prelec and Loewenstein, 1998; Prelec and Simester, 2001).

This study presents a unique case: how changing from cash to card payments impacts purchasing by low income consumers. Most low income consumers do not have sufficient wealth or disposable income to increase their spending in the way prior research describes (ABS, 2017a; Saez and Zucman, 2016), but this is not to say that no changes in spending patterns should be expected when low income earners switch to heavier use of card payments. The decreased pain of payment experienced when using card payments may change their price elasticities of demand (Finkelstein, 2009); while they will not spend more money, they may become less responsive to price cues in their spending.

The importance of low income consumers to marketers should not be underestimated. Low income consumers account for approximately

* Corresponding author.
E-mail address: luke.greenacre@monash.edu (L. Greenacre).

https://doi.org/10.1016/j.jretconser.2018.11.004
Received 13 April 2018; Received in revised form 30 October 2018; Accepted 12 November 2018

55% of the global population, with that number reaching closer to 70% when the poor and working poor are included (Kochhar, 2015). They make up a large percentage of existing or potential consumers. Low income consumers are also growing in number as poverty rates decrease and people transition to being low, and in some cases middle, income (Kochhar, 2015; Sinding, 2009). Low income consumers are thus a large presence in the retail economy.

The aims of this paper are to (1) identify overall spend changes when low income consumers switch from cash to card payments, and (2) assess whether the price elasticity of demand changes when low income consumers switch to card payments. We do this by evaluating the impact of a policy trial in Australia on the consumer grocery market. In this trial, recipients of welfare and support payments in a local government area stopped receiving their payments as direct cash transfers to their bank accounts, and instead were paid the majority of each payment (80%) via a Cashless Debit Card (DSS, 2017b). This trial was undertaken in a regional area where access to alternate shopping outlets (including online outlets) was limited, particularly for low income consumers.

2. Literature

Low income consumers may respond differently than other groups to the change from cash to card payments. The literature brings together three main reasons for this: the decision making and profile of low income consumers; the impact of the form of money on how it is perceived and spent by consumers; and the role of price elasticity in consumers' responses to changes in prices.

2.1. The dominance of low income consumers

Low income consumers represent a large proportion of the consumer base in many developed and developing countries. The definition of low income varies considerably between research and government institutions. Despite this variation, most agencies report relative stability in the percentage of people classed as low income; however, with populations growing, this stable percentage means a growth in the absolute number of people classed as low income. For example, in the US the poverty rate is approximately 12%, meaning that 40 million people are in poverty. Those considered low-income earn twice the poverty rate. The total of the two groups is close to 30% of the US population (Foundation, 2016; Semega et al., 2017). The number of people living in poverty or on a low income varies widely between regions and fluctuates considerably based on economic trends. For example, in Western Europe, low income earners are typically 15–40% of the national population, depending on the definition being used for 'low income' (Pew, 2017); in Canada it is around 15% (StatisticsCanada, 2017); and in Australia and New Zealand the numbers are closer to 10–15% (AIHW, 2018; StatsNZ, 2016). No matter the circumstance, these people make up a large group of consumers visiting stores.

The value of understanding the behaviour of these consumers is two-fold. Firstly, low income consumers are a large group within the economy, and secondly, there is the potential for small changes in market conditions to have substantial impacts on their lives. Previous research supports the relationship between present household income, disposable income and available wealth, with lower income people having both less disposable income and less capital and general wealth on which to draw (Barba and Pivetti, 2009; Lusardi et al., 2011; Shlay, 2006). The combination of lower incomes and less of a 'cushion' of wealth and capital makes smaller changes in finances more consequential. Understanding how changes in market conditions influence this group is of paramount importance.

From a business perspective, there is a need to be adept at catering to the needs of the low income consumer. As noted, they are a large proportion of the consumer base in many markets, and they can be more susceptible to competitive actions by businesses. For example, low income consumers are often more sensitive to price changes (Jones et al., 1994; Park et al., 1996), and less likely to be loyal to existing brands and products as a consequence (Krishnamurthi and Raj, 1991). More research is needed on low income consumers because of their large presence and the impact businesses can have on their lives.

2.2. Monetary form and elasticity

The core function of any form of monetary value is the facilitation of purchase transactions. Traditional economic models of monetary transfer and value, such the Turnpike Model (Townsend, 1980), indicate that as long as the units of account are the same and the value is equivalently stored, the form of the money is largely irrelevant. This theory asserts that from a consumer's perspective, currency stored in the form of a debit card is completely fungible with currency stored in cash, as the transaction costs are identical. Under this type of rational model, the transition to a Cashless Debit Card should have no impact on people's purchasing behaviour.

Experiments to establish that cash and non-cash alternatives are fungible have found that psychological processes dominate over this rational account. Often people shift their purchasing behaviour in response to changing monetary forms (Hafalir and Loewenstein, 2009; Hirschman, 1979). Consumers feel that the non-cash form of money is more psychologically abstract than the physical coins and notes of cash money. The psychological pain that is normally associated with a loss, even one as simple as the loss of money during a normal grocery store purchase, is lessened when the form of money is more abstract (Raghubir and Srivastava, 2008). Such psychological abstraction parallels that of distance, and in particular hypotheticality, as described in construal theory (CLT). CLT posits that the more distant an object or process is from an individual, the more likely it is that object or process will be thought of abstractly (Trope and Liberman, 2010). The distance may be physical, temporal or social distance, or hypotheticality. Hypotheticality refers to how real or how imaginary an event or process is (Trope and Liberman, 2010). We argue that the use of a card leads a transaction to be more highly construed than an equivalent transaction using cash. A person does not witness the reduction and physically real disappearance of notes and coins from their purse; the loss is merely the reduction of the balance on an electronic card, and they still retain the card. The use of a card removes important contextual cues that help make the transaction feel more concrete and 'real'. We propose that it is this type of mechanism that circumvents the loss that people naturally experience when paying, leading to people spending more (Prelec and Simester, 2001). While the natural experiment we draw on in this research cannot test this mechanism, it assists us in making predictions regarding the anticipated changes in the behaviour of low income consumers.

For low income consumers, this predicted increase in overall spending is a far less likely outcome when transitioning to card payments because they do not have the additional money to spend. We assert that the previously-seen increase in spend is merely a reflection of a change in the price elasticity of demand among consumers. As prices increase naturally in a market, the demand remains the same for the typical consumer – there is essentially more inertia in what people purchase when grocery shopping with cards.

A low income consumer cannot afford to completely ignore price increases. However, based on the literature reviewed, we would still anticipate that low income consumers would experience the same lessening of the psychological pain of spending, and experience a parallel increased construal for the transaction. Rather than seeing an increase in overall spend, we will see spend remain constant but the market become more inelastic. We anticipate that low income shoppers will not follow price decreases to the same extent as they normally would, and, within budgetary constraints, will be less inclined to notice small price increases. Establishing that low income consumers are equally susceptible to the influence of changes in payment form, albeit presenting that

change in a very different way, establishes that this consumer group may be negatively impacted by the push for the use of card payments. It would also allow us to clarify in the literature that the mechanism that leads to increased expenditure is likely to be that of a change in elasticity, rather than just a broad increase in willingness to pay for goods.

3. Data and context

3.1. Procedure

One of the challenges of assessing the impact of the move from cash to cards on purchasing is the lack of data available regarding long term and large scale purchasing. Most research in this area has only been able to consider narrow purchase situations, or has considered only one-off transactions (Hafalir and Loewenstein, 2009; Runnemark et al., 2015). It is difficult to manipulate the form of money available to a large group of people for a prolonged period of time (Falk and Heckman, 2009); hence the uniqueness of the natural experiment arising from the Cashless Debit Card program.

Two areas were selected for analysis: the trial area in which this government program was implemented, and a geographically proximate control area selected by the researchers. In both areas, the local grocery stores were approached to provide daily transaction data, including product prices and quantities sold, from just before the launch of the card trial to after. The research approach was to compare the price elasticity of demand in the trial and control areas from before the launch of the card to after.

3.2. Sample

The trial area (i.e. treatment group) for the Cashless Debit Card selected by the Australian Government had a total population of 4220, with 785 adults enrolled into the program. This enrolment comprised 26% of adults in the area. As a part of the introduction of the program, local stores were either confirmed as having an EFTPOS terminal or were supplied with such a device to facilitate card transactions. The only other notable feature of the card was that it prevented the purchase of alcohol and gambling products by blocking such merchants using the technology built into merchant systems (Indue, 2018). Our data comprised transaction data from one of only two grocery stores in the trial area.

It is important to note that low income earners in Australia typically derive the majority of their income from government welfare and support payments (ABS, 2017a). This is common in any country with a strong social support system (Andrews et al., 2012; Raffalovich et al., 2009).

The control area (i.e. control group) was approximately 65 miles outside of the trial area; data were obtained from both of the two grocery stores in the control area. The trial and control areas are quite isolated; to illustrate, the only other town in the region with a grocery store was approximately 130 miles away from the trial area, with that same town being approximately 85 miles from the control area. Only very small general stores and gas stations were dotted along roadways between these areas. This isolation adds to the power of the research, as economic leakage of purchasing to stores outside of the trial area is unlikely.

The control area was chosen due to its relative proximity to the trial area. Although smaller in size, the control town's proximity allowed for equivalence in economic and environmental conditions unique to the region (Isserman and Merrifield, 1982). Economic and environmental conditions are critical in rural and remote research, due to the limited and highly seasonal industries (mostly agriculture and tourism) that are present. Without a geographically proximate control area, these seasonal effects will likely dwarf the effect being measured. This equivalence became particularly important in this research due to coincidental extreme weather conditions during the data collection period, which caused substantial power outages: these power outages were experienced equivalently in both the trial and control areas due to their proximity. The power outages prevented stores from opening, which dramatically altered sales patterns.

The control area had half the population of the trial area, with approximately 2200 people, but also had a corresponding 46% of the number of welfare and support recipients as the trial area, so the relative prevalence of recipients remained the same compared to the trial area (DSS, 2017a).

The stores in the trial and control areas were independently owned but had shared branding and marketing activities under a form of co-operative agreement, further improving the comparability of the areas. That shared marketing was independently controlled by a third party organisation, which lowered endogeneity risk. The larger of the two stores in the control area had further opted to have the same weekly promotions catalogue as that used by the store in the trial area; the catalogue was delivered to the majority of households in both the trial and control areas, and was available to all customers in-store. Both areas having the same catalogue ensured that discounts and promotions in the trial and control areas were largely the same.

To assess the demographic equivalence of the trial and control areas, we obtained Australian Census information regarding the corresponding Local Government Areas (ABS, 2017b). The trial area comprised 50.3% females, a median age of 39 years, an average 1.9 children for families with any children, an average 2.4 people per household, and a median weekly household income of $1254. The control area comprised 47% females, a median age of 45 years, an average 2.0 children for families with any children, an average 2.3 people per household, and a median weekly household income of $1069.

3.3. Data and measures

The transaction data for the stores in the trial and control areas was limited to only that which covered the same time period to prevent issues in seasonality differences. The data is for all transactions in the store and does *not* differentiate between transactions for those enrolled into the Cashless Debit Card program and the rest of the population. The available data is from 24 January 2016 to 23 February 2017. Being small independent stores, not all sites retained longer-term sales data at the daily level; hence this was not available for analysis. The total daily (non-zero) sales for each product and the price of that product were obtained for the categories of apples, bananas, eggs, pasta and sauces, potatoes, toilet paper, and oral hygiene products (such as toothpaste). The categories were chosen prior to any analysis and were the only categories obtained from the stores – data on a further category of 'baby foods and baby products' were sought from the stores but could not be obtained from one store for operational reasons, and were thus excluded from use. The choice of these categories was a compromise between their popularity at the national level (McCabe, 2014), their anticipated popularity among low income earners who have limited disposable income for more expensive grocery items, and store managers' opinions regarding which categories experience regular price fluctuations and have high trading volume. Net negative daily purchase quantities and sales values (where daily totals are driven by product returns) were removed from the dataset prior to analysis as their logarithmic transformation is not rational – only 10 rows of data were lost, with these having a total dollar value of approximately $60. The sales of the trial and control area for the chosen product categories totalled ~AUD $1.6million.

Both stores in the control area tended to have a smaller range of products than the trial store, in line with the differences in the size of the local population (Table 1). The smaller of the stores in the control area had a 27.8% overlap in products stocked with the trial store, with the larger store having 52.4% overlap. This degree of overlap (especially for the larger store) was expected, as the stores in the control area

Table 1
The number of unique products stocked by each store during the study period.

	Trial store	Control store(smaller)	Control store (larger)
Apples	21	20	17
Bananas	5	5	2
Eggs	24	6	10
Oral hygiene	250	103	159
Pasta/sauce	258	66	188
Potatoes	23	10	14
Toilet paper	90	46	74

serve a community approximately half the size, have proportionately lower square footage, and hence have a proportionately smaller range. Unlike vastly larger stores in urban areas, products in these regional grocery stores do not typically have multiple facings on the shelf (with some exceptions for major brands); hence the smaller size means the range itself has to be smaller. It must be noted that there is a statistical difference in the number of products in each category between the stores ($\chi^2 = 32.67$, $df = 12$), but when examined, there were few differences of practical significance across the categories, particularly when the population differences are considered.

Comparing sales of product volume and total transaction value (in $), the smaller store in the control area only experienced 14.8% and 15.7% of the trial store's trade, suggesting it serves a niche community, with the larger store experiencing 47.0% and 45.6% of the trial store's trade. Our research focused on comparisons of the store in the trial area to the stores in the control area.

4. Analysis

Cash payments in the six months leading up to the card roll-out accounted for 20.75% of the average monthly value of transactions in the store in the trial area, compared to 15.71% in the six months under trial that were analysed (Fig. 1); this establishes that a substantive 24% reduction in the use of cash occurred. Comparing the data from the six months leading up to the change with the data from the six months post completion of the card roll-out showed an increase in total sales of 0.79% (broadly in line with inflationary pressures), indicating considerable stability in the purchasing power exercised by the trial community. Consumers were using cash less, but still spent approximately the same amount in store.

To establish whether the introduction of the Cashless Debit Card led the grocery market to become more inelastic, the impact of price changes on the quantity sales of products was modelled with multiple linear regression. The dependent variable in this case is the natural logarithm of the non-zero quantity sold (Q) of each individual product (i) for each calendar day (t) in the data collection period. The model has the following specification:

$$\ln(Q)_{it} = \beta\ln(P)_{it} + \gamma C_{it} + \delta T_{it} + \zeta(\ln(P)\times C)_{it} + \eta(\ln(P)\times C)_{it} + \theta(\ln(P)\times C\times T)_{it} + \Lambda D_{it} + \epsilon_{it}$$

The independent variables are the natural logarithm of price (P) of the individual products that day, whether the purchase was made before or after the introduction of the cashless card (C), whether the purchase was in the trial or control area (T) and the interactions of price with the introduction of the card and area. It is the coefficient θ for the three-way interaction that shows the impact of an increase or decrease in price on purchase quantity, a measure of the price elasticity of demand both before and after the introduction of the card, and for the trial versus control areas. Control variables (D) for the day of week in the seven-day cycle, and month of year in which the purchases took place, were included to accommodate the natural demand cycles present in grocery purchasing. A further control variable for the product category was included to accommodate any category level differences.

The coefficient for the interaction θ in Table 2 shows a change in elasticity arising from the introduction of the Cashless Debit Card impacting purchasing at the store in the trial area ($\theta_{\text{full}} = 0.022$, $p = .000$). As shown in Fig. 2, the marginal effect of a ln($1) change in price on purchase quantity increased from −0.079 to −0.013; the quantity of product purchased by consumers in the trial area became substantially less sensitive to the impact of price changes. The effect suggests that the low income earners enrolled into the Cashless Debit Card program did not stock up on product as much as they used to when prices were decreasing, and did not reduce purchasing as much when prices were

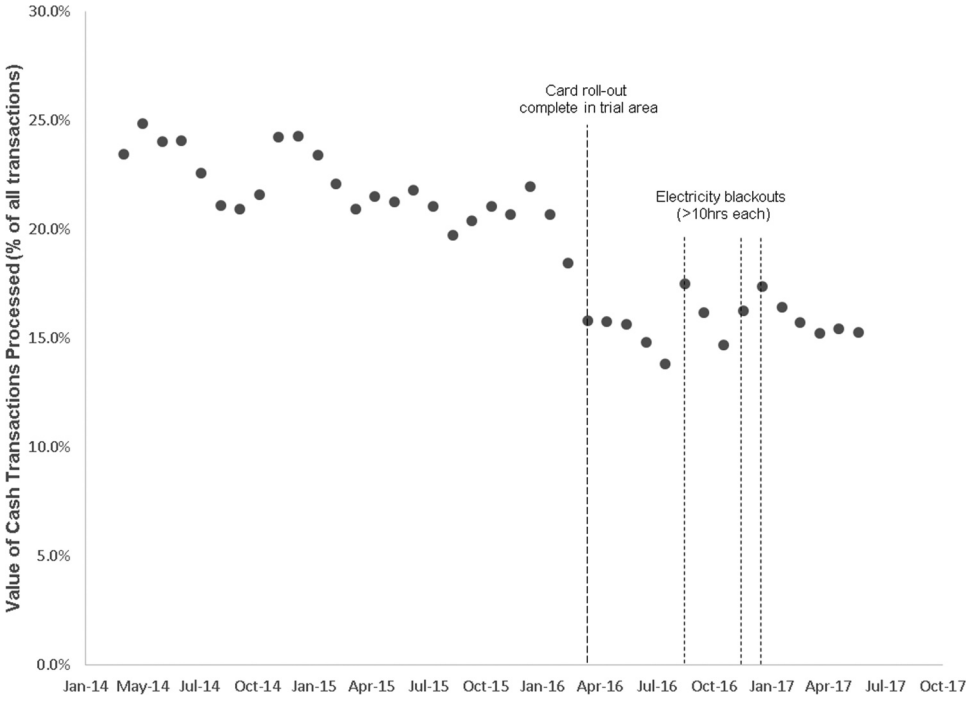

Fig. 1. Change in Cash Transactions. Note. Monthly total value of cash transactions as a percentage of the value of all transactions recorded in the trial store. Data includes three periods during which large-scale blackouts were experienced in the trial and control areas, ranging from about 10–30 h in length each. These blackouts disabled EFTPOS terminals for periods of time, leading people to use cash, delay purchasing, or use a small informal line of credit offered by stores until power was restored.

Table 2
Estimates of price on demand.

	Full Model		*Per KG Model*	
Variable	**Standardized coefficient**	***P* value**	**Standardized coefficient**	***P* value**
Logarithm of price of product (*P*)	−.142	0.000	−0.163	0.000
Before or after card introduction (*C*)	0.038	0.000	0.071	0.019
Purchased at Trial Store (control) (*T*)	0.115	0.000	0.501	0.000
(*P* × C)	−0.027	0.000	−0.051	0.104
(*P* × *T*)	−0.019	0.003	−0.343	0.000
(*P* × *C* × T)	0.022	0.000	0.028	0.008
Purchased on Monday (*D*-D1)	0.033	0.000	0.046	0.000
Purchased on Tuesday (*D*-D2)	0.033	0.000	0.048	0.000
Purchased on Wednesday (*D*-D3)	0.042	0.000	0.051	0.000
Purchased on Thursday (*D*-D4)	0.042	0.000	0.042	0.000
Purchased on Friday (*D*-D5)	0.069	0.000	0.083	0.000
Purchased on Saturday (*D*-D6)	0.023	0.000	0.023	0.008
Purchased during January (*D*-M1)	0.005	0.132	−0.001	0.907
Purchased during February (*D*-M2)	0.002	0.640	0.005	0.626
Purchased during March (*D*-M3)	0.006	0.103	−0.002	0.796
Purchased during April (*D*-M4)	0.001	0.723	−0.003	0.742
Purchased during May (*D*-M5)	−0.003	0.309	−0.022	0.019
Purchased during June (*D*-M6)	−0.019	0.000	−0.046	0.000
Purchased during July (*D*-M7)	−0.018	0.000	−0.052	0.000
Purchased during August (*D*-M8)	−0.014	0.000	−0.047	0.000
Purchased during September (*D*-M9)	−0.012	0.000	−0.028	0.002
Purchased during October (*D*-M10)	−0.008	0.021	−0.019	0.035
Purchased during November (*D*-M11)	−0.007	0.046	−0.011	0.207
Product category is apples (*D*-C1)	0.285	0.000	−0.225	0.000
Product category is bananas (*D*-C2)	0.387	0.000	0.168	0.000
Product category is eggs (*D*-C3)	0.417	0.000		
Product category is pasta/sauce (*D*-C4)	−0.028	0.000		
Product category is potatoes (*D*-C5)	0.396	0.000		
Product category is toilet paper (*D*-C6)	0.123	0.000		

Note. The dependent variable is the logarithm of the quantity of a product sold. N (full model) = 96,406; N (kg model) = 14,050. Both regression models were significant overall, with *F* statistics of 2416.75 and 179.53, and produced coefficients of determination of 0.421 and 0.192. The categorical variables were effects coded with + 1 as presence and −1 as absence to retain information in interaction terms (Kugler et al., 2012). The excluded reference options were set as Sunday, December and Oral Hygiene (or Potatoes) for the full (or per KG) model for the day, month and category variables respectively. In the full model, all VIFs were less than 10. In the per KG model the variables (C), (T), (P × C) and (P × T) had VIFs ranging from 21.44 to 29.08.

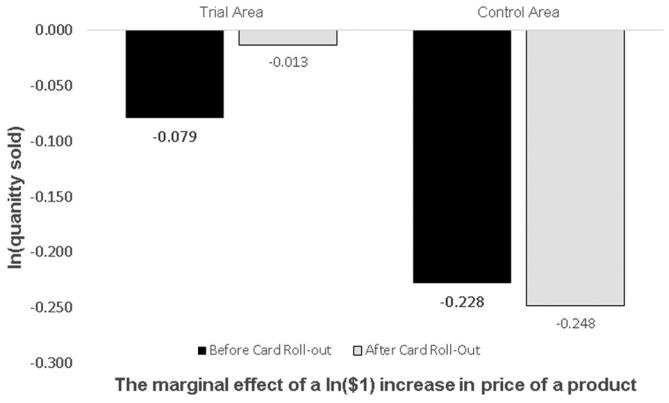

Fig. 2. Change in Elasticity. Note. The marginal effect on ln(quantity of items sold) of a ln($1) increase in price before and after the card was introduced. The standardized coefficients were used, and day of week, month of year and category were excluded from the calculations used in this graph, although they were included in the original regression.

increasing, with this effect being substantial enough to impact our measures of overall market elasticity. The same pattern was seen in just the categories of apples, bananas and potatoes ($\theta_{kg} = 0.028$, $p = .008$) after all the units were standardized to be per kilogram sold rather than per product unit, which could include pre-packaged products of various sizes. This similar result for 'per kilogram' shows that the result is not a feature of the varying units and characteristics of each product. Consumers are less price sensitive when using only a card for payment, and thus we can conclude that the grocery market is more inelastic.

5. Conclusions

5.1. Theoretical and practical implications

Prior research has demonstrated that for the majority of consumers, the transition from cash payment to card payment increases overall shopping expenditure (Hafalir and Loewenstein, 2009; Hirschman, 1979). The primary mechanism for this is likely the abstraction of the form of money lessening the pain associated with payment, as a card increases the construal level of the transaction, making it feel less real or concrete. This higher construal increases overall willingness to pay (Prelec and Loewenstein, 1998; Prelec and Simester, 2001; Raghubir and Srivastava, 2008; Trope et al., 2007). For lower income consumers there is a far lower probability of increased expenditure as a consequence of transitioning to card payments, simply because they do not have the disposable income or wealth to be able to accommodate such an increase. Our results confirm this intuition, as overall consumer expenditure in the trial area remained incredibly stable both before and after the introduction of the cashless card.

As suspected, however, this does not mean that the transition to card payments has no influence on the purchasing of lower income consumers. Rather than just a general increase in the willingness to pay for goods, leading to increased expenditure, our study shows that there is an effect on consumer price elasticity. It was proposed using CLT that the likely increase in abstraction/hypotheticality of money from the consumer's perspective when moving to predominantly card payments (Finkelstein, 2009; Trope and Liberman, 2010) would lead the grocery market to become more inelastic, and our results find this change in elasticity. Lower income consumers became less responsive to price

cues when they moved to card payments. This finding also suggests that the results from prior research involving higher income consumer groups may also have arisen due to changes in market elasticity, rather than general increases in willingness to pay. In the case of higher income consumers, they likely became less sensitive to prices and thus used other cues, such as quality and brand, which are both associated with higher priced goods, to guide their purchases, leading to increased spend. Changes in market elasticity explain both the phenomenon of increased expenditure for high income consumers and our more subtle changes in low income consumers' responses to price cues.

Overall, our results show that the move to card-based payments is not costless for low income consumers, and we reiterate that low income consumers are typically the ones most impacted by even small market changes. Ongoing improvements in payment technologies are giving people and businesses more security when buying and selling. However, while merchant fees businesses face are transparent and easily accommodated into prices (Wright, 2012) the costs to consumers, particularly lower income consumers, are harder to account for. These consumers do not spend more, but they use price information less. The consequence of this more inelastic market is the likely decrease in total product each person gets per dollar spent; the loss of product due to lower price sensitivities is distributed across a large number of people and a large number of purchases.

Governments encouraging the move to cashless payments need to reflect on such costs when formulating policy. Multiple governments and banking institutions are pushing for the widespread adoption of card payments. The reasons for this include encouraging people with low incomes to better engage with financial systems, mainly with the aim of improving credit-risk ratings and assisting people with savings plans (Caskey, 2002; Fitzpatrick, 2015; Karlan et al., 2016), restricting transactions in the black and grey economies (RBI, 2017), and for income management, as was the case for this research. Striking a balance between the benefits and costs of changing the format of money for consumers will take careful analysis for each usage case. Our research has shown that such analysis is possible.

5.2. Limitations and future research

Our data has some unique characteristics that need to be considered when extrapolating our findings to other contexts. In most previous cases where low income consumers have been encouraged to adopt card payments, they retained the option to return to cash for any and all transactions. Earlier research has demonstrated substantial inertia when trying to encourage adoption of formal banking tools like card payments. People tend to stick to their current (cash based) behaviour unless there are substantial benefits to the switch (Karlan et al., 2016). Such inertia was not a feature of our data, as consumers had no option to use cash beyond the 20% of payments deposited into their regular bank account. The 80% of their payments deposited into the Cashless Debit Card account could not be converted to cash. While this provided a useful experimental case, the transition to cards may be more gradual in other markets as consumers respond to the incentives to switch to cards, such as convenience and security. Because of this difference, extrapolation of our findings to other contexts should be done with some caution.

Replication of the findings in this study with additional forms of cashless payment and across other settings would give us the opportunity to establish when elasticities are most and least affected. Where possible, such replications should account for the unique features of the local banking system, giving us insight into how the system itself could be modified to maximise the benefits to consumers while minimising the costs. There are also opportunities to examine whether similar benefits and costs arise in the mobile payment context (de Kerviler et al., 2016). Differences in price elasticities may arise for the different payment technologies available; such payment technologies include customers' cell phones, smart watches, wearables such as smart rings, and even dermally implanted chips. Each of these may lead to different levels of abstraction, or construal, compared to cash payment, and have differing consumer perceptions for adoption (de Kerviler et al., 2016; Shaw, 2014).

Our research also made use of population level data that included both lower and higher income consumers. Being able to further isolate the lower income consumer group would provide better estimates of the impacts of payment type on purchasing behaviour; such data collection would require substantial effort, but could offer substantial improvements in model estimation.

In our research, the comparisons of consumer responses between the trial and control areas has relied on retail management having made similar pricing decisions. Should the pricing decisions by managers vary excessively, the endogeneity in the model may differ between the two communities, impacting the interpretation of the data. In this case, the trial and control stores shared marketing activities due to their co-operative agreement; in particular, their weekly catalogue for sale items was shared. The most prominent discounts in each store were in common. This lessens any concerns about endogeneity difference, but only with further investigation of the switch to card payments in more contexts can we refine our estimates of the size of the move toward market inelasticity and understand how managers may respond to such changes.

Acknowledgements

We would like to thank the grocery stores that kindly provided data to support this research. We would also like to thank our colleagues Peter Danaher and Harmen Oppewal for the comments on drafts, and Julie Brimblecombe, Larry Lockshin and Johan Bruwer for their advice during the project. The ethics approval for this project is through the University of South Australia (HREC: 35557). The data used in the project remains the property of the individual stores involved in the research. Research and material support for this project was solely provided by the University of South Australia and Monash University.

References

ABS, 2017a. 6523.0 - Household Income and Wealth, Australia, 2015-16. Australian Bureau of Statistics, Australia. 〈http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/6523.0~2015-16~Main%20Features~Household%20Income%20and%20Wealth%20Distribution~6〉.

ABS, 2017b. Census QuickStats. from 〈http://www.abs.gov.au/websitedbs/D3310114.nsf/Home/2016%20QuickStats〉.

AIHW, 2018. Australia's health 2018. from 〈https://www.aihw.gov.au/reports/australias-health/australias-health-2018/contents/indicators-of-australias-health/proportion-of-people-with-low-income〉.

Andrews, C., Das, M., Elder, J., Ovadiya, M., Zampaglione, G., 2012. Social protection in low income countries and fragile situations: challenges and future directions. World Bank Discussion Paper 1209, 67607.

Barba, A., Pivetti, M., 2009. Rising household debt: its causes and macroeconomic implications—a long-period analysis. Camb. J. Econ. 33 (1), 113–137. https://doi.org/10.1093/cje/ben030.

Besharat, A., Carrillat, F.A., Ladik, D.M., 2014. When motivation is against debtors' best interest: the illusion of goal progress in credit card debt repayment. J. Public Policy Mark. 33 (2), 143–158.

Caskey, J.P., 2002. Bringing unbanked households into the banking system. Capital Xchange (January).

de Kerviler, G., Demoulin, N.T.M., Zidda, P., 2016. Adoption of in-store mobile payment: are perceived risk and convenience the only drivers? J. Retail. Consum. Serv. 31, 334–344. https://doi.org/10.1016/j.jretconser.2016.04.011.

Doyle, M.-A., Fisher, C., Tellez, E., Yadav, A., 2017. How Australians Pay: New Survey Evidence. Research Bank of Australia Bulletin, Australia. https://www.rba.gov.au/publications/bulletin/2017/mar/pdf/bu-0317-7-how-australians-pay-new-survey-evidence.pdf.

DSS, 2017a. Department of Social Service Payment Demographic Data. Australian Government, Australia. 〈https://data.gov.au/dataset/dss-payment-demographic-data〉.

DSS, 2017b. Department of Social Services Cashless Debit Card – Overview. Australian Government, Australia. 〈https://www.dss.gov.au/families-and-children/programmes-services/welfare-conditionality/cashless-debit-card-overview〉.

Durkin, T.A., 2000. Credit cards: use and consumer attitudes, 1970–2000. Fed. Reserve Bull. 86, 623.

Falk, A., Heckman, J.J., 2009. Lab experiments are a major source of knowledge in the

social sciences. Science 326 (5952), 535–538. https://doi.org/10.1126/science.1168244.
Finkelstein, A., 2009. e-z tax: tax salience and tax rates. Q. J. Econ. 124 (3), 969–1010. https://doi.org/10.1162/qjec.2009.124.3.969.
Fish, T., Whymark, R., 2015. How has cash usage evolved in recent decades? What might drive demand in the future? Bank Engl. Q. Bull. 55 (3), 216–227.
Fitzpatrick, K., 2015. Does "banking the unbanked" help families to save? evidence from the United Kingdom. J. Consum. Aff. 49 (1), 223–249. https://doi.org/10.1111/joca.12055.
Foundation, K.F., 2016. Distribution of the Total Population by Federal Poverty Level (above and below 200% FPL). 2018, from 〈https://www.kff.org/other/state-indicator/population-up-to-200-fpl/〉.
Hafalir, E.I., Loewenstein, G., 2009. The impact of credit cards on spending: a field experiment. SSRN eLibrary.
Hawes, D.K., 1987. Profiling visa and MasterCard holders: an overview of changes − 1973 to 1984, and some thoughts for future research. J. Acad. Mark. Sci. 15 (1), 62–69. https://doi.org/10.1007/bf02721955.
Hirschman, E.C., 1979. Differences in consumer purchase behavior by credit card payment system. J. Consum. Res. 6 (1), 58–66.
Indue. (2018). Blocked and Excluded Merchants. 〈https://indue.com.au/dct/merchants/excluded/〉.
Isserman, A.M., Merrifield, J., 1982. The use of control groups in evaluating regional economic policy. Reg. Sci. Urban Econ. 12 (1), 43–58. https://doi.org/10.1016/0166-0462(82)90014-X.
Jones, E., Chern, W.S., Mustiful, B.K., 1994. Are lower-income shoppers as price sensitive as higher income ones? A look at breakfast cereals. J. Food Distrib. Res. 25 (1), 82–92.
Karlan, D.S., Dupas, P., Robinson, J., Ubfal, D., 2016. Banking the Unbanked? Evidence from Three Countries. SSRN eLibrary.
Kochhar, R., 2015. A Global Middle Class Is More Promise than Reality. From 〈http://www.pewglobal.org/2015/07/08/a-global-middle-class-is-more-promise-than-reality/〉.
Krishnamurthi, L., Raj, S.P., 1991. An empirical analysis of the relationship between brand loyalty and consumer price elasticity. Mark. Sci. 10 (2), 172–183.
Kugler, K.C., Trail, J.B., Dziak, J.J., & Collins, L.M., 2012. Effect coding versus dummy coding in analysis of data from factorial experiments, Working Paper #12-120. The Methodology Center, The Pennsylvania State University.
Lusardi, A., Schneider, D.J., & Tufano, P., 2011. Financially fragile households: Evidence and implications. NBER Working Paper Series, 17072.
McCabe, M. (2014). Aussies Go Bananas for Bananas. Nielsen Insights - Homescan Shopper Panel. 〈http://www.nielsen.com/au/en/insights/news/2014/aussies-go-bananas-for-bananas.html〉.
Park, J.L., Holcomb, R.B., Raper, K.C., Capps Jr, O., 1996. A demand systems analysis of food commodities by US households segmented by income. Am. J. Agric. Econ. 78 (2), 290–300.
Pew, 2017. Middle Class Fortunes in Western Europe. from 〈http://www.pewglobal.org/2017/04/24/middle-class-fortunes-in-western-europe/st_2017-04-24_western-europe-middle-class_d-01/〉.
Prelec, D., Loewenstein, G., 1998. The red and the black: mental accounting of savings and debt. Mark. Sci. 17 (1), 4–28.
Prelec, D., Simester, D., 2001. Always leave home without it: a further investigation of the credit-card effect on willingness to pay. Mark. Lett. 12 (1), 5–12. https://doi.org/10.1023/A:1008196717017.
Raffalovich, L.E., Monnat, S.M., Tsao, H.-s., 2009. Family income at the bottom and at the top: income sources and family characteristics. Res. Social. Stratif. Mobil. 27 (4), 301–309. https://doi.org/10.1016/j.rssm.2009.09.001.
Raghubir, P., Srivastava, J., 2008. Monopoly money: the effect of payment coupling and form on spending behavior. J. Exp. Psychol.: Appl. 14 (3), 213–225. https://doi.org/10.1037/1076-898X.14.3.213.
RBI, 2017. Withdrawal of Legal Tender Character of the Old Bank Notes in the denominations of ₹ 500 and ₹ 1000 and The Specified Bank Notes (Cessation of Liabilities) Act 2017 & Specified Bank Notes (Deposit of Confiscated Notes) Rules 2017 (FAQ). Reserve Bank of India, India. 〈https://www.rbi.org.in/scripts/FAQView.aspx?Id=122〉.
Runnemark, E., Hedman, J., Xiao, X., 2015. Do consumers pay more using debit cards than cash? Electron. Commer. Res. Appl. 14 (5), 285–291.
Saez, E., Zucman, G., 2016. Wealth inequality in the United States since 1913: evidence from capitalized income tax data. Q. J. Econ. 131 (2), 519–578.
Semega, J.L., Fontenot, K.R., Kollar, M.A., 2017. Income and poverty in the United States: 2016. US Government, USA. 〈https://www.census.gov/library/publications/2017/demo/p60-259.html〉.
Shaw, N., 2014. The mediating influence of trust in the adoption of the mobile wallet. J. Retail. Consum. Serv. 21 (4), 449–459.
Shlay, A.B., 2006. Low-income homeownership: American dream or delusion? Urban Stud. 43 (3), 511–531. https://doi.org/10.1080/00420980500452433.
Sinding, S.W., 2009. Population, poverty and economic development. Philos. Trans. R. Soc. B: Biol. Sci. 364 (1532), 3023–3030. https://doi.org/10.1098/rstb.2009.0145.
Soll, J.B., Keeney, R.L., Larrick, R.P., 2013. Consumer misunderstanding of credit card use, payments, and debt: causes and solutions. J. Public Policy Mark. 32 (1), 66–81. https://doi.org/10.1509/jppm.11.061.
StatisticsCanada, 2017. Income highlight tables, 2016 Census. from 〈https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/hlt-fst/inc-rev/Table.cfm?Lang=Eng&T=301&S=99&O=A〉.
StatsNZ, 2016. Population with low incomes. from 〈http://archive.stats.govt.nz/browse_for_stats/snapshots-of-nz/nz-progress-indicators/Home/Social/population-with-low-incomes.aspx〉.
Townsend, R.M., 1980. Models of money with spatially separated agents. In: Kareken, J., Wallace, N. (Eds.), Models of Monetary Economies. Federal Reserve Bank of Minneapolis, pp. 265–303.
Trope, Y., Liberman, N., 2010. Construal-Level Theory of Psychological Distance. Psychol. Rev. 117 (2), 440–463. https://doi.org/10.1037/a0018963.
Trope, Y., Liberman, N., Wakslak, C., 2007. Construal levels and psychological distance: effects on representation, prediction, evaluation, and behavior. J. Consum. Psychol. 17 (2), 83–95. https://doi.org/10.1016/S1057-7408(07)70013-X.
USFed, 2016. The Federal Reserve Payments Study 2016. Federal Reserve System Publication, USA. 〈https://www.federalreserve.gov/newsevents/press/other/2016-payments-study-20161222.pdf〉.
Wright, J., 2012. Why payment card fees are biased against retailers. RAND J. Econ. 43 (4), 761–780.