



Scanning for discounts: examining the redemption of competing mobile coupons

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Abstract

Coupons research has typically focused on single-coupon redemption, with scant attention devoted to multiple, competing coupons. To bridge this gap, we observe supermarket shoppers who used their smartphones to scan products in-store, receiving both coupons for the scanned product and several others as a result. We model the determinants of redemption in this context, particularly net price range (NPR), coupon value, brand loyalty, and number of coupons. Latent class analysis uncovers two consumer segments: brand-focused shoppers (79.9%), who use internal reference prices, and deal-prone shoppers (20.1%), who use stimulus-based reference prices. Targeting by means of segment membership, NPR, and loyalty is indispensable: the same \$0.50 coupon can have a redemption probability as low as 30% and as large as 80%, depending on these characteristics. Overall, the study sheds light on drivers of redemption under competition and provides managers with a blueprint to improve redemption rates by targeting shoppers with customized coupons.

Keywords Mobile coupons · Redemption · Competing coupons · Reference price · Range theory

In 2016, nearly 308 billion print or “traditional” coupons were distributed in the United States (Inmar.com 2017), with 81% of consumers using coupons regularly (Carter 2016). Given their ubiquity, traditional coupons have inspired a wealth of marketing literature (Blattberg and Neslin 1990). With coupons now delivered directly to consumers’ mobile devices, marketers face new challenges and opportunities. Mobile coupons are used by 33% of millennials, who constitute the fastest-growing

coupon segment (emarketer.com 2016). Thus, firms are increasingly likely to issue mobile coupons given their growing popularity (Shankar et al. 2016).

A key performance indicator for mobile coupons is redemption rate, which is associated with sales conversion (Blattberg and Neslin 1990). Prior research has investigated redemption drivers such as consumer characteristics (Im and Ha 2012), the form and content of the coupon (Banerjee and Yancey 2010), the timing and location of delivery (Danaher et al. 2015), and the environment of the recipient (Andrews et al. 2015). Table 1 summarizes representative studies that investigate determinants of mobile coupon redemption.

To date, coupon research has focused on redemption of individual coupons, with little attention paid to the notion of competing coupons—that is, the redemption of a given coupon when others are also available for redemption (Conover 1989). One reason is that consumers tend to find the effort to gather and compare competitive paper coupons unappealing (Fortin 2000). Mass-produced paper coupons also make it impractical to vary the discounts offered to prospective versus loyal customers. Thus, firms have refrained from issuing coupons at the same time as competitors to avoid a coupon war that could result in an unprofitable prisoner’s dilemma (Shaffer and Zhang 1995).

While these obstacles make competitive couponing infeasible using paper coupons, mobile platforms incorporate

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Table 1 Major articles in the mobile coupon literature

Authors/ Date	Outcome	Independent variables	Method and data details	Key managerial takeaways
Dickinger and Kleijnen (2008)	<ul style="list-style-type: none"> • Intention to redeem • Attitude toward mobile coupons 	<ul style="list-style-type: none"> • Economic benefit • Redemption effort • Perceived control • Fear of spam • Social norms • Past coupon use 	<p>Online survey</p> <ul style="list-style-type: none"> • $N = 370$ Austrian mobile phone users • Fast-food, retail store mobile coupons 	<ul style="list-style-type: none"> • Major reason for potential new users of mobile coupons is perception of economic benefit; major barriers are redemption effort and lack of control. • Successful deployment of mobile coupons for new users should (1) stress economic benefit; (2) explain that benefit, in relation to effort, is a net positive; and (3) clarify that the user will be in control, minimizing spam. • Intention to redeem mobile coupons not associated with redemption of traditional coupons. Therefore, these two coupon types may attract different market segments, and managers should not assume that heavy traditional coupon users will adopt mobile coupons.
Banerjee and Yancey (2010)	<ul style="list-style-type: none"> • Redemption rate 	<ul style="list-style-type: none"> • Coupon value (Hi/Lo) • Discount framing (discount/free items) • Product category (utilitarian [meals] /hedonic [desserts]) • Delivery timing (noon and earlier/afternoon) 	<p>Observational secondary data</p> <ul style="list-style-type: none"> • $N = 74$ mobile coupon campaigns • SMS (smartphone text message) mobile coupon campaigns from a Midwestern mobile marketing firm 	<ul style="list-style-type: none"> • For utilitarian products, highest redemption rate occurs with high-value coupons framed as a free item (e.g., a BOGO coupon). Timing is not significant. • For hedonic products, timing determines redemption, with redemption rates being four times larger when the coupon is delivered no later than noon. • Managers should not make timing, value, and framing decisions independently, especially for utilitarian coupons. The study's small sample size also suggests carrying out testing of hedonic coupon designs in particular before deployment.
Banerjee et al. (2011)	<ul style="list-style-type: none"> • Intention to redeem • Recognition (product, attribute, price) • Purchase intention (actual/future) 	<ul style="list-style-type: none"> • Ad claims (objective/subjective) • Gender • Situation (work vs. leisure viewing of coupon) 	<p>Field experiments</p> <ul style="list-style-type: none"> • Two studies with two waves each ($N_1 = 196$; $N_2 = 81$; $N_3 = 180$; $N_4 = 114$) • Midwest fast-food chain coupons 	<ul style="list-style-type: none"> • Mobile coupons create lagged positive effects for non-redeemers. • Customers may have higher memory, associated with higher purchase intention, and actual increases in future purchases. • These effects are moderated by gender, age, and possibly distance to/availability of the product. • Managers can use mobile campaigns to boost new product trials and build awareness and knowledge of new product features, attributes, and specifications.
Im and Ha (2012)	<ul style="list-style-type: none"> • Intention to redeem • Adoption clusters • Attitude toward mobile coupons 	<ul style="list-style-type: none"> • Coupon use frequency • Mobile phone use behaviors • Personal Innovativeness in IT (PIIT) • Perceptual variables: usefulness, ease of use, enjoyment, subjective norm, risk, compatibility • Demographics 	<p>Survey study</p> <ul style="list-style-type: none"> • $N = 623$ U.S. adult consumers • Traditional and mobile coupons 	<ul style="list-style-type: none"> • Consumer segments based on their personal innovativeness in information technology (PIIT) were found (innovators, early majority, late majority, and laggards). • Perceived ease of use and enjoyment of mobile coupons are not different across segments. However, these segments are different in terms of usefulness, attitudes, and intentions to use mobile coupons, with more innovative segments exhibiting a higher level of these traits. • If available, managers deploying coupons to new prospective users can preemptively gather PIIT data to identify and target consumers more likely to adopt mobile coupons (i.e., those with a higher PIIT).
Reichhart et al. (2013)	<ul style="list-style-type: none"> • Redemption rate • Conversion rate 	<p>Channel (e-mail/SMS)</p>	<p>Observational secondary data</p> <ul style="list-style-type: none"> • $N = 37,382$ German mobile and computer users • Campaign with a 67% discount for a downloadable PC software 	<ul style="list-style-type: none"> • Coupons delivered via SMS underperform e-mail in response rate (visiting the website that the coupon links) by -20.43% However, coupons delivered via mobile outperform e-mail in conversion rate (purchasing the product after visiting the website) by $+81.96\%$. • Therefore, deployment of mobile coupons in different channels may serve a strategic purpose: managers interested in boosting visits should deliver

Table 1 (continued)

Authors/ Date	Outcome	Independent variables	Method and data details	Key managerial takeaways
Luo et al. (2013)	<ul style="list-style-type: none"> Field experiment Redemption rate Survey study Purchase intention 	<ul style="list-style-type: none"> Field experiment Distance Time Survey study Construal level SMS intrusiveness Purchase impulsiveness Price consciousness 	<p>Field experiment</p> <ul style="list-style-type: none"> $N = 12,625$ mobile phone users 50% off movie ticket SMS coupons <p>Survey study</p> <ul style="list-style-type: none"> $N = 414$ smartphone users SMS message scenario 	<p>mobile coupons via e-mail and, if interested in boosting sales, should deliver mobile coupons via SMS.</p> <ul style="list-style-type: none"> Near-distance and same-day mobile coupons are more likely to result in purchases. For mobile coupon deployment for users close to a movie theater, a same-day coupon results in a 76% increase in the odds of purchasing as compared with a two-day prior coupon. However, for users far from the theater, a one-day prior coupon results in a 9.5 times increase in the odds of purchasing when compared with a same-day coupon, or a 71% increase when compared with a two-days prior coupon. Thus, managers should deploy mobile coupons that are strategically timed depending on consumers' distance to a target location, if known. Consumers redeem mobile coupons on the basis of a tradeoff between distance and coupon value: an increase of 100 m in walking distance to the store must be offset by an 11% increase in coupon value. A higher minimum price threshold, a bundled discount format, shorter expiration lengths, and coupons placed at the top of a coupon list increase the probability of redemption. Consumers who have redeemed a mobile coupon previously are 21% more likely to redeem in the future as compared with those who have not. Deployment of mobile coupons in environments with walking travel distance can be optimized given the previously listed determinants and should focus on motivating consumers to redeem once, at which point further redemption is more likely.
Danaher et al. (2015)	<ul style="list-style-type: none"> Redemption rate 	<ul style="list-style-type: none"> Walking distance to store Coupon value Format (dollar, percentage) Expiration length Product type (snack foods, menswear, shoes) Redemption history Coupon display order Price threshold 	<p>Field experiment</p> <ul style="list-style-type: none"> $N = 8534$ mall shoppers in large Western country 3 randomly selected mobile coupons among a possible total of 134 delivered per mall visit Coupons from 38 stores 	<ul style="list-style-type: none"> When deploying mobile coupons in a competitor's location, the larger the discount depth, the larger the redemption rate, with 60% depth exhibiting the largest increase. Interaction between locational targeting and discount depth: high discounts are optimal for the competitive location, medium discounts for the focal location. Competitive locational targeting generates incremental sales without cannibalizing profits. Increasing distance to store by 1 km decreases response rates between 2.0 and 4.7%. Scrolling down one rank leads to a reduction in response rates from 4.4 to 5.2%. Consumers make tradeoffs between distance and coupon value: a value increase of 1% is equivalent to a distance reduction of 92–230 m. Managers deploying mobile coupons should establish coupon values that make transportation costs worth it. This decision is most important when coupons are ranked randomly, and thus distance differences can be exacerbated.
Fong et al. (2015)	<ul style="list-style-type: none"> Redemption rate 	<ul style="list-style-type: none"> Location (focal, competitive, benchmark) Discount depth (20%/40%/60%) Timing (delayed/real time) 	<p>Field experiment</p> <ul style="list-style-type: none"> $N = 18,000$ coupon recipients Movie theater coupons 	<ul style="list-style-type: none"> When deploying mobile coupons in a competitor's location, the larger the discount depth, the larger the redemption rate, with 60% depth exhibiting the largest increase. Interaction between locational targeting and discount depth: high discounts are optimal for the competitive location, medium discounts for the focal location. Competitive locational targeting generates incremental sales without cannibalizing profits. Increasing distance to store by 1 km decreases response rates between 2.0 and 4.7%. Scrolling down one rank leads to a reduction in response rates from 4.4 to 5.2%. Consumers make tradeoffs between distance and coupon value: a value increase of 1% is equivalent to a distance reduction of 92–230 m. Managers deploying mobile coupons should establish coupon values that make transportation costs worth it. This decision is most important when coupons are ranked randomly, and thus distance differences can be exacerbated.
Molitor et al. (2016)	<ul style="list-style-type: none"> Coupon choice/redemption rate (by clicking on coupon) 	<ul style="list-style-type: none"> Distance to store Coupon ranking (by distance/random) 	<p>Field experiment</p> <ul style="list-style-type: none"> $N = 354,662$ clicks from 3965 German mobile users 3218 different mobile coupons from 3544 different stores in 372 cities 	<ul style="list-style-type: none"> When deploying mobile coupons in a competitor's location, the larger the discount depth, the larger the redemption rate, with 60% depth exhibiting the largest increase. Interaction between locational targeting and discount depth: high discounts are optimal for the competitive location, medium discounts for the focal location. Competitive locational targeting generates incremental sales without cannibalizing profits. Increasing distance to store by 1 km decreases response rates between 2.0 and 4.7%. Scrolling down one rank leads to a reduction in response rates from 4.4 to 5.2%. Consumers make tradeoffs between distance and coupon value: a value increase of 1% is equivalent to a distance reduction of 92–230 m. Managers deploying mobile coupons should establish coupon values that make transportation costs worth it. This decision is most important when coupons are ranked randomly, and thus distance differences can be exacerbated.

technical features that overcome them (for details see Web Appendix Table W1). Consumers can gather and compare mobile coupons with little effort (Fortin 2000), and firms can target consumers with customized coupon values that allow them to avoid price wars (Besanko et al. 2003). These capabilities create an opportunity to examine competing mobile coupons and to provide guidance to managers on how to design coupons that are more likely to be redeemed in a competitive environment.

This article contributes to the mobile coupon literature by examining the redemption behavior of a panel of supermarket shoppers who requested nearly 10,000 in-store, customized mobile coupons while they shopped by scanning the bar codes of grocery items on the supermarket aisle with an app on their smartphones. Scanning a bar code triggered the delivery of a set of coupons, including one for the product they scanned (referred to as the focal coupon) and others for close-substitute items. We observed whether consumers redeemed a coupon at checkout, and whether it was a focal coupon or whether they switched to a coupon for another brand. To test the effects of price and coupon value on this choice, the app manipulated coupon values according to each shopper's redemption history. Our data examines redemption behavior for an average of approximately five supermarket visits per shopper, spanning an average of 4 months.

The pricing literature shows that consumers evaluate price attractiveness differently depending on whether they judge a product in isolation or contextually, by comparing products presented together (Janiszewski and Lichtenstein 1999; Mazumdar et al. 2005). As technology facilitates price comparisons, understanding how consumers evaluate multiple coupons is of growing importance. While conceptual studies have modeled the anticipated effect of competing coupons (Chiang 1995; Shaffer and Zhang 1995), empirical work is only beginning to emerge, focusing on location-based targeting, where coupon values are based on consumers' proximity to the seller (e.g., Dubé et al. 2017; Fong et al. 2015). Unlike these studies, this article is the first we are aware of to examine competing coupons received alongside each other at a single retailer.

Our contributions are threefold. First, when presented with competing coupons after scanning a product, a substantial proportion of shoppers redeemed the focal coupon they received, after comparing the discounted price received with the focal coupon with that of competing coupons. In other words, in addition to the conventional memory-based or internal reference price (IRP) approach commonly used to evaluate individual coupons (Moon et al. 2006), consumers also adopted a contextual or stimulus-based reference price (SRP) strategy. This behavior is consistent with a range theory model of choice (Moon and Voss 2009), and our results extend the application of range theory to an important but previously

untested context in which consumers explicitly consider competing discounts.

Second, our findings offer insights into the influence of consumers' prior purchase behavior on their responses to competing coupons. As firms strive to provide rivals' customers with sufficient incentives to switch to their brand while continuing to reap profits from loyal customers, an important consideration is how to target consumers with customized coupons based on their purchase history. Across all consumers in our sample, loyalty had a significant, positive effect on coupon redemption. However, while a history of repeat purchases dampened the influence of coupon value, it had no significant effect on using a contextual reference price. We explore these differences using latent class analysis, which confirms the existence of two consumer segments: a more brand-focused segment that uses the IRP approach and a segment whose members are more deal-prone, are likely to seek value by switching brands, and use the SRP approach. Our data suggest that whether a consumer is more or less likely to switch brands is a result of the process he or she uses to evaluate a set of coupons. These differences are important because we show that firms can strategically set optimal coupon values for each of these consumer segments.

Third, our research also provides some initial evidence that competitive intensity, or the number of competing coupons provided, affects the likelihood of redeeming a focal coupon. This likelihood was greatest when consumers observed coupon sets that contained either a very small or a very large number of coupons. Thus, in setting their redemption goals, managers need to take into account how crowded a product category is. Taken together, these findings offer the first empirical evidence that in an environment in which consumers can easily gather and compare rival coupons, firms can improve coupon redemption rates by targeting coupon values according to the strategies their customers employ to make redemption decisions.

Background and hypotheses development

Although coupons have been a ubiquitous form of sales promotion for more than 130 years, little attention has been devoted to investigating competing coupons. One reason may be that the distribution of traditional paper coupons makes gathering and evaluating competing coupons difficult for consumers (Bawa et al. 1997). Another reason may be that print coupons are mass-produced and thus all consumers receive coupons for the same value, regardless of their brand preferences. Providing current customers with the same value coupon as is necessary to lure new customers is unattractive, as a coupon war could erupt, thus eroding profits, and coupon competition is discouraged (Shaffer and Zhang 1995).

Rather than competing simultaneously, manufacturers tend to alternate promotions (Kinberg et al. 1974), usually promoting at most one brand per category at a time (Inman and McAlister 1993) and relying on timing and expiration of coupons as a means to target new customers (Krishna and Zhang 1999). As Fortin (2000, p. 527) observes, “It would be unlikely to find a coupon for two or more brands of canned pasta sauce in a given week of a newspaper freestanding insert. As part of what compels consumers to try an alternate brand in a given week is the presence of an incentive for brand switching.”

Mobile technology overcomes these obstacles to competing with simultaneous coupons. Electronic distribution makes searching for and evaluating competing coupons more appealing to consumers by reducing their costs to do so (Fortin 2000). Furthermore, the value of mobile coupons can be customized according to consumers’ brand preferences (Besanko et al. 2003) or location. For example, location-based targeting allows marketers to customize coupon values according to consumers’ proximity to the seller, such that distant consumers are offered greater incentives than proximal consumers (Dubé et al. 2017; Fong et al. 2015).

Customization helps ameliorate concerns about price wars (Besanko et al. 2003) and prompts firms to “rethink discounts through the lens of personalization... This approach – awarding less for loyalty – flips the traditional understanding of loyalty on its head. Yet it does make sense in a shopping world where loyalty is a vehicle for data-driven, personalized discrimination” (Turow 2017, p. 221). Next, we conceptualize some of the major levers that drive redemption and that marketers can use to customize mobile coupons.

Reference prices

Consumers often judge the attractiveness of a particular price by comparing it with a price they remember from a prior shopping occasion (i.e., IRP) (Krishnamurthi et al. 1992; Mazumdar et al. 2005). These comparisons influence consumers’ decision making because they perceive prices lower than the IRP favorably and prices above the IRP unfavorably (Kalyanaram and Winer 1995). This model is based on adaptation-level theory (Helson 1964), in which the consumer’s IRP is the adaptation level formed by shopping experience (Kalyanaram and Winer 1995). When a consumer considers a coupon, the focal price is the net or discounted price (Papatla and Krishnamurthi 1996), and the adaptation level is his or her memory of prior prices (Niedrich et al. 2001). Coupon value, defined here as the discount (in dollar terms) received when redeeming a coupon, influences focal prices because high coupon values provide a deeper discount, making focal prices more attractive (Lichtenstein et al. 1990), and positively influence product choice and redemption rates (Leone and Srinivasan 1996). Although we expect higher

coupon value to increase the likelihood of redemption, we test this intuition with coupons for brands that compete in narrow product categories, since Jia et al. (2018) show that the relationship between coupon value and consumer spending for product line coupons, where consumers engage in similar price comparisons, is not always intuitively positive. Consequently, we propose:

H1: Coupon value will have a significant, positive effect on the likelihood of redeeming the focal coupon.

When presented with a set of prices, consumers may not judge a single price following an IRP strategy, but rather judge prices contextually, forming an alternative price (i.e., SRP¹) based on comparisons made across the set of observed prices (Moon et al. 2006). The SRP forms on each purchase occasion when a consumer observes the prices of competing brands (Mazumdar and Papatla 2000). Analogously, we conjecture that a similar SRP forms when consumers assess a set of coupons displayed on their cell phones. Range theory predicts that consumers evaluate prices according to their location on a scale defined by the lower and upper bounds of the range of other prices (Janiszewski and Lichtenstein 1999). This range forms when a consumer considers the range of prices at the time of purchase (Rajendran and Tellis 1994). While research has examined range theory using retail prices (Janiszewski and Lichtenstein 1999; Moon and Voss 2009; Pontes 2018), unlike typical scanner data, we are able to model the effect of both shelf price and coupon value for each product presented to the shopper, and to examine range theory in a purchase setting in which buyers consider the effect of promotional discounts across a set of competing prices.

Because consumers use net prices when considering coupons (Papatla and Krishnamurthi 1996), we operationalize the construct of SRP following Janiszewski and Lichtenstein (1999), by using the net price range (NPR) of coupon c in coupon set h during scanning occasion j as

$$NPR_{chj} = \frac{NP_{cj} - LNP_{hj}}{HNP_{hj} - LNP_{hj}}, \quad (1)$$

where NP_{cj} is the net price of the focal product (i.e., the product’s shelf price less the coupon’s value), LNP_{hj} denotes the lowest net price of a product in coupon set h , and HNP_{hj} denotes the highest net price of a product in coupon set h . This measure captures the percentile value (between 0 and 1) of the focal product’s net price within the set of

¹ The literature sometimes refers to SRP as the external reference price, because price depends on current rather than remembered prices. While the external reference price and SRP are sometimes used interchangeably, we adopt the SRP designation to refer specifically to reference prices based on a consumer’s comparison of a range of current prices, as consistent with the literature on range theory.

coupons offered. NPR represents a “psychologically transformed” representation of coupon value that captures the location of a focal product’s net price within the range of net prices presented to consumers (Moon and Voss 2009). A high NPR value reflects a price that is relatively costlier and thus should result in lower redemption because it is less attractive. Therefore, we hypothesize:

H2: The location of a product’s net price within the net price range (NPR) will influence redemption of a coupon for the product scanned. A coupon that results in a low NPR value will more likely be redeemed than a coupon that results in a high NPR value.

IRP and SRP strategies are not mutually exclusive, and consumers may use a combination of both reference prices to make judgments. Whether they rely more on memory-based or contextual reference prices depends on how salient the reference price is and the extent to which brand loyalty moderates the effect of the reference price.

Brand loyalty

Brand loyalty influences coupon attractiveness (Mazumdar and Papatla 1995) and a consumer’s tendency to redeem coupons (e.g., Raju et al. 1990). Consumers are considered brand loyal if they purchase the same product repeatedly from the same brand, regardless of a competitor’s actions (Jacoby and Kyner 1973). Although there is an attitudinal component of brand loyalty (Dick and Basu 1994), researchers have adopted behavioral measures of brand loyalty by showing that repeat purchasing captures the loyalty of a consumer to the brand (Dekimpe et al. 1997). In this study, we observe the choices of shoppers who redeemed a coupon after receiving a set of competing coupons. Coupon values were set as a function of consumers’ purchase history, with frequently redeemed coupons showing progressively smaller values (for details, see Web Appendix Fig. W1). Since the relative price of a brand changes with respect to its competitors after each redemption, this measure captures a shopper’s tendency to purchase the same product repeatedly from the same brand, in the face of a competitor’s promotional efforts (Jacoby and Kyner 1973). We operationalize the construct of *brand loyalty*, subject to receiving a coupon, for each scan j of product i in subcategory c at time t , specified as

$$LOY_{ijt} = \frac{\text{Number of coupons redeemed for product}_{ijt}}{\text{Number of coupons redeemed for any product in subcategory}_{cjt}} \quad (2)$$

This measure is based on the percent-of-purchases approach (Cunningham 1956; Krishnamurthi and Raj 1991), which is favored for its simplicity of calculation and interpretation

(Jacoby and Kyner 1973; Mellens et al. 1995). We treat consumers in our data as being completely loyal to their first purchase and update this measure on each subsequent occasion that the customer is again offered a coupon for the product.

Prior studies have found a robust negative association between brand loyalty and coupon redemption, such that loyalty attenuates consumers’ responses to coupon value (Mittal 1994; Shoemaker and Tibrewala, 1985). This suggests that for (so-called brand-focused) customers who routinely redeem coupons for a particular brand, coupon value has a smaller impact on their redemption decision than for less brand loyal consumers. Thus, in the context of competing coupons, we hypothesize the following:

H3a: Brand loyalty will (negatively) moderate the effect of focal coupon value on redemption, such that coupon value will have less influence on the behavior of highly brand loyal consumers than less loyal consumers.

Prior pricing research has shown that the effects of an external reference price can also vary with the degree of brand loyalty. For example, using scanner panel data, Rajendran and Tellis (1994) show that brand loyalty moderates the effect of an external reference price (the lowest retail price encountered in a category) on grocery purchases. Similarly, Kumar et al. (1998) demonstrate that the effect of an external reference price is contingent on the extent to which a customer is deal-prone (i.e., a shopper who actively engages in comparison of prices among competing brands). Thus, in the context of competing coupons, we predict the following:

H3b: Brand loyalty will (negatively) moderate the effect of NPR on redemption, such that NPR will have less influence on the behavior of highly brand loyal consumers than less loyal consumers.

Competitive intensity

As we posit that focal coupon redemption depends on the presence of other coupons, a related question is how the number of competing coupons influences redemption. Even when facing simple choices, consumers find decision making difficult as the number of choices increases (Iyengar and Lepper 2000). That is, while more choices offer benefits, as a greater number of options help satisfy a broader set of needs (Broniarczyk et al. 1998), these choices also imply additional costs (Scheibehenne et al. 2010). If the perceived marginal cost of comparing prices exceeds the benefits, consumers will forgo comparisons (Schwartz 2004), and if the benefits increase more slowly than the cost, set size will impose a U-shaped influence on consumers’ overall utility (Reutskaja and Hogarth 2009).

In this study, we grouped grocery items according to their similarity, such that when the bar code of any product in the group was scanned, a set of coupons for all similar items appeared. This approach produced sets of varying size (from 2 to 13 coupons) depending on the number of competitors in a given subcategory. For example, scanning a package of pretzel rods resulted in a set of three coupons related to the three brands presented in the pretzel rod subcategory. By contrast, consumers searching for seedless rye bread received eight coupons because there were more competing brands. These variations can be informative with regard to how coupon set size influences redemption.

Sets with few coupons, while easy to process, provide fewer potential benefits, while large sets require shoppers to compare the net price of each product with others in the set. Shoppers may find the effort necessary to make such comparisons overwhelming, leading to a negative relationship (Diehl and Poynor 2010; White and Hoffrage 2009). In response, they might simply redeem the coupon for the product they scanned (Scheibehenne et al. 2010). For example, Jia et al. (2018) find that cognitive load in calculating coupon discounts influences consumer spending. The novel setting of this study allows us to explicitly test the effect of competitive intensity by varying the number of coupons delivered to supermarket shoppers. We reason that when evaluating a set of coupons, too few or too many alternatives will increase the likelihood of choosing the (default) focal coupon. Thus:

H4: Coupon set size will exert a U-shaped effect on the redemption rate for a focal coupon. Shoppers will be more likely to redeem a coupon for a product they scan when the size of the coupon set is either very small or very large.

Empirical setting and data description

We conducted the study in a 40,000-square-foot supermarket in northern Ohio. The store sells approximately 35,000 different products (stock-keeping units [SKUs]) and is located approximately eight miles from its nearest competitor. Although some customers also shop at other stores, management believes that its store is the primary store for grocery shopping for its customers. Consumers downloaded a free smartphone app developed by a third-party developer by visiting the app store or scanning a QR code on posters located throughout the store. This installation process required only a few minutes. Upon arriving at the store, consumers could scan the bar code of any product in five categories (bread, carbonated soft drinks, salty snacks, breakfast cereals, and bulk-size pet food)

using their phone. Scanning triggered the delivery of a set of coupons consisting of a coupon for the focal product and coupons for several substitute products. Consumers could choose products they preferred and redeem coupons at checkout.

To create coupon sets of manageable size, the app developer assigned each SKU to a subcategory of close substitutes. For example, a 2-l bottle of Diet Coke was assigned to a subcategory with five other 2-l diet cola SKUs. For the 923 different scannable products, 163 subcategories averaging 5.6 SKUs per subcategory were created. Upon scanning any product, consumers received a set of coupons for all brands in that product's subcategory. Coupon value was set by the developer as a function of consumers' purchase history, with frequently redeemed coupons showing progressively smaller values. Although in practice manufacturers and retailers might find some of these coupons more or less profitable, this novel experimental setting allows us to model coupon redemption across a range of coupon values for both a target brand and for competitors' coupons as well (for details, see Web Appendix Fig. W1).

During the study, 169 households participated, with 162 redeeming at least one coupon, indicating high engagement. Among these 162 consumers, approximately 91.2% of redeemed coupons were for the scanned product; the remaining 8.8% were competing coupons for a different brand. Switching patterns varied, with 32.3% of switches being for a less expensive alternative, 34.4% being for a higher-priced product, and 33.3% for a similarly priced one of a different variety, such as a new flavor.

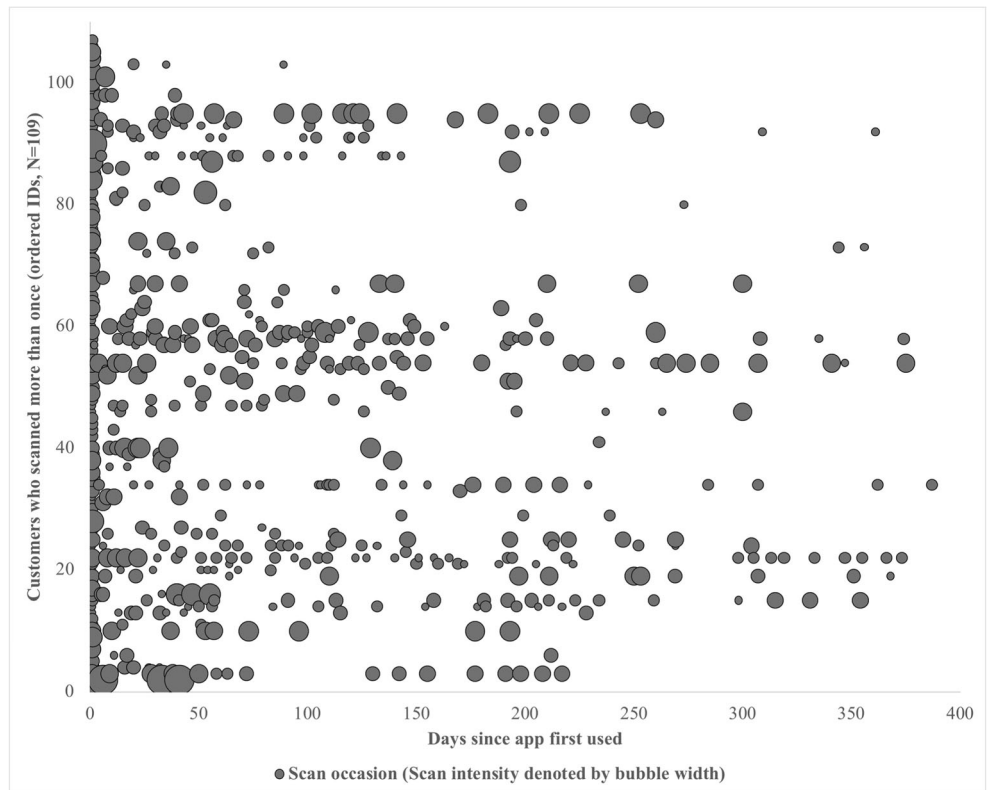
These consumers made 625 trips to the supermarket, where a *trip* captures a visit in which the consumer scanned at least one product. We identify each consumer's first trip by detecting the first time a scan occurred and then compute trip data for each consumer according to his or her subsequent scanning behavior. In the dataset, 109 consumers (approximately 67%) redeemed a coupon with the app on several shopping occasions.

Figure 1 illustrates the use of mobile coupons for these 109 consumers. Each bubble represents a shopping trip on which the consumer scanned; the size of the bubble is proportional to the number of scans. On average, these consumers scanned on 5.3 shopping trips over 119.8 days, with a mean of 1.8 scans per trip. Thus, most users appear relatively consistent in both the regularity and intensity of scanning.

Sample characteristics and representativeness

Web Appendix Table W2 provides descriptive statistics. According to supermarket management, the shoppers in this study represent approximately 15%–20% of the

Fig. 1 Scanning occurrences over time (bubble diameter is proportional to number of scans)



regular customer base. The store tracks average consumer measures such as demographics (age and gender), shopping habits (day of the week and time of day), and purchase outcomes (number of items and spending per trip). To ensure the representativeness of our sample, Web Appendix Table W3 compares these metrics for our sample, the average store shopper, and surveys of average shoppers across the United States. Given the similarity of both sets of metrics, we conclude that the sample is indeed representative of the typical grocery shopper in the United States.

Approach to analysis

Determinants of coupon redemption We model the likelihood of redeeming a coupon for the focal product, on each scanning occasion, with a panel logistic regression model that controls for unobserved consumer heterogeneity using a random-effects specification. The dependent variable is the binary choice of whether or not to redeem the coupon for a focal product. For consumer *i* on trip *t*, the dependent variable for each scan *j* of a focal product is

$$Y_{ijt} = \begin{cases} 1 & \text{if the focal coupon is redeemed} \\ 0 & \text{otherwise} \end{cases} \quad (3)$$

This latent variable includes the covariates discussed previously, and its basic specification is

$$Y_{ijt}^* = \beta_0 + \beta_1 SETSIZE_{ijt} + \beta_2 FV_{ijt} + \beta_3 NPR_{ijt} + \beta_4 LOY_{ijt} + c_i + \varepsilon_{it}, \quad (4)$$

where

- SETSIZE_{ijt} number of coupons a consumer receives after scanning a product;
- FV value of the focal coupon, in dollars;
- NPR net price range of the observed coupon set, defined in Eq. 1;
- LOY the coupon-based brand loyalty measure, as defined in Eq. 2; and
- ε_{it} i.i.d. logistic.

In the specification, *c_i* denotes unobserved individual effects, distributed $N(0, \sigma_v^2)$. We maximize the panel-level log-likelihood from this specification using the adaptive Gauss–Hermite quadrature (Wooldridge 2010). Note that the specification in Eq. 4 only shows main effects; the empirical application includes interactions as well.

Unobserved consumer segments In addition, we identify latent consumer segments by analyzing redemption data over

time with a latent class, finite mixture panel logistic regression (Finch and French 2015). We specify the finite mixture for redeeming a focal coupon as

$$H(Y|X, \Theta) = \sum_{s=1}^S \pi_s(\alpha) P(Y|B_s(X)), \quad (5)$$

where Y and X denote the observations of the dependent and independent variables, respectively; Θ collects the relevant parameters in the model, which are α , the propensity to belong to each of $s = 1, \dots, S$ latent class segments to be found in the data (S is specified a priori), and β_s , which indicate parameters β_0 through β_S , now being segment-specific; $\pi_s(\alpha)$ denotes the probability of being a member of segment s ; and $P(Y|\beta_s(X))$ is the likelihood of redeeming the focal coupon. Maximization is conducted using an expectation–maximization approach (Leisch 2004).

This approach allows us to capture unobserved consumer segments. Note that because the tendency to be classified into a segment is determined by α and there are no covariates in the segment probability specification, this propensity is informed by time-varying redemption patterns, as we measure coupon redemptions scan by scan. As such, the latent class segment memberships revealed in the data can capture redemption patterns over time.

Results

In this section, we estimate the models specified previously to determine the influence of individual coupon characteristics (coupon value), factors related to competition (NPR and set size), and consumer characteristics (brand loyalty) on coupon redemption. We begin by considering a panel model that does not incorporate consumer segments. Next, we test a latent class model that allows uncovering such segments. On the basis of model estimation, we then predict redemption probabilities for each consumer segment, coupon characteristics, and competitive conditions to provide a rich picture of the underpinnings of coupon redemption. Finally, we show how managers can use these predictions to strategically set coupon values in a competitive mobile-coupons environment.

Determinants of redemption

Table 2 presents panel and latent class logistic regression results that estimate the determinants of coupon redemption. Regarding the panel model, a main effects model reveals that coupon value has no effect on redemption ($b = -0.167$, $p > .10$), whereas the location of the focal product's net price in the coupon set's price range significantly influences redemption likelihood ($b = -0.541$, $p < .01$). The negative valence of this coefficient means that as price becomes more

expensive relative to others, the coupon becomes less attractive, and the likelihood of redemption falls. Exponentiating the price range estimate reveals that, as H2 proposes, a consumer is approximately 40% less likely to redeem a coupon for a product at the low end of the price range than at the high end. Yet, when we account for brand loyalty in the interactions model, the main effect of coupon value turns significant ($b = 5.837$, $p < .01$), consistent with H1, and we find a negative interaction between coupon value and brand loyalty ($b = -5.104$, $p < .01$). Although higher coupon values increase redemption likelihood overall, the influence of coupon value is weaker for consumers who are more brand loyal, consistent with H3a.

The interactions model, which also investigates the likelihood of coupon redemption due to the joint effects of loyalty, coupon value, and NPR, reveals no significant interaction between brand loyalty and NPR ($b = 0.787$, $p > .10$); therefore, H3b is not supported. That is, when we use a pooled model that does not differentiate among consumers, the shoppers who rely on price comparisons tend to select coupons with little regard for their own purchase history. Table 2 also captures the effect of coupon set size on redemption via the set-size and set-size-squared terms. The panel model reports the predicted U-shaped effect ($p < .05$). The lowest probability of redemption occurs with moderately sized sets of around six coupons. This means that consumers are most likely to redeem a coupon for the product they scanned when sets are substantially smaller or larger than six coupons. This is consistent with H4, which posits that though consumers prefer variety, the cognitive burden involved in evaluating too many options leads to decreased motivation to choose.

Robustness checks

Two potential factors could potentially confound our loyalty measure. Each time a consumer redeems a focal coupon, value is reduced on his or her next visit. Therefore, it is possible that consumers become angered by this practice, and switch brands in response. Alternatively, customers might infer that they can obtain higher values by “gaming the system” and intentionally alternate brands. We test each of these potential confounds empirically.²

To address the possibility of anger, we model the probability of a consumer switching from the brand he or she was last observed to redeem. The rationale is that if consumers are angry from value erosion, past observed values should influence switching. We estimated a panel-logistic regression using three measures: (1) focal value observed at time t for each scan; (2) lagged focal value (i.e., during trip $t - 1$); and (3) lagged focal value difference, or the difference between the

² We thank an anonymous reviewer for suggesting these two potential confounds.

Table 2 Likelihood of redeeming a coupon for the focal product

	Panel model		Latent class model	
	Main effects	Interactions	Brand-focused	Deal-prone
Weekend (day)	.464** (.213)	.461** (.219)	0.394 (0.246)	.370 (.361)
Weekend (evening)	.354 (.280)	.399 (.287)	0.061 (0.387)	.920** (.465)
Weekday (day)	.304 (.202)	.317 (.207)	0.406 (0.240)	-.227 (.513)
Set size	-.512** (.255)	-.506** (.253)	-0.442 (0.331)	-.418 (.398)
(Set size) ²	.042** (.019)	.040** (.019)	0.036 (0.025)	.034 (.030)
Brand loyalty	2.353*** (.0254)	4.116*** (.555)	5.837*** (.0724)	.118 (1.257)
Coupon value	-.167 (.189)	3.917*** (.691)	4.115*** (.0714)	3.069 (1.939)
NPR	-.541*** (.172)	-.980*** (.512)	0.167 (0.579)	-2.956** (1.180)
Value × loyalty		-4.873*** (.772)	-5.104*** (0.810)	-4.974** (2.301)
NPR × loyalty		.787 (.590)	-0.327 (0.745)	3.279** (1.353)
Constant		-1.001 (.961)	-2.385* (1.250)	1.415 (1.651)
Percentage of consumers in segment			79.88%	20.12%
Log-likelihood		-820.15	BIC 2 segment: 1772.37	BIC 3 segment: 1813.79

N = 1529 scans, **p* < .10, ***p* < .05, ****p* < .01. Random-effects specification used. NPR = 0 for 23 occurrences, which were dropped from Models 3a/b. Estimating Models 1a/b and 2a/b, also dropping these 23 observations, produced nearly identical results

focal value observed at time *t* less the previous value observed during trip *t* - 1. We found no significant effect of any of these measures on current switching.

Next, we examine the role of strategic behavior by cross-tabulating whether consumers switched or not during their current (*t*) and past (*t* - 1) trips. The rationale is that if consumers are indeed gaming the system, the likelihood of switching immediately from one trip to another should be high. A chi-square test indicates that the incidence of immediate switching was not statistically significant ($\chi^2(1) = .2703$, *p* = .603), with only 6% of observed switches being immediate. Taken together, these results suggest that neither confound is a concern. A more detailed description of these test results appears in Web Appendix Table W4.

Segmentation

The unexpected finding from our pooled model—that in a competitive coupon environment, brand loyalty moderates the effect of coupon value but not the effect of NPR—prompted further analysis. As noted previously, prior literature suggests that the effect of brand loyalty on the influence of a contextual reference price depends on whether a consumer is more brand-focused or deal-prone (Kumar et al. 1998). Therefore, it is reasonable to assume that these two unobserved consumer segments may be present in the data. To account for this potential source of unobserved heterogeneity, we apply the latent class logistic regression model (Eq. 5) described in the analytical approach. Table 2 presents results using the same specification as the Interactions model.

Using the Bayesian information criterion (BIC), we find that a two-segment solution provided the best fit. Consistent with H1, members of the first segment (79.88% of all shoppers in the sample) relied on coupon value to determine redemption (*b* = 3.917, *p* < .01). For this segment, brand loyalty again positively influenced the likelihood to redeem a coupon (*b* = 4.116, *p* < .01). In other words, coupon value mattered least for the most brand loyal shoppers (*b* = -4.873, *p* < .01), again consistent with H3a. For consumers in this segment, contextual comparison across the other brands (NPR) was not a significant factor (*p* > .10). These consumers can thus be characterized as brand-focused, using an IRP approach to evaluating coupons. By contrast, for consumers in the second segment (20.12% of shoppers), the dollar value of a coupon for the product they scanned did not significantly influence its redemption (*p* > .10), unless consumers were extremely brand loyal, in which case we again found a negative interaction (*b* = -4.974, *p* < .05) as H3a predicts. Rather, these consumers appeared to choose coupons by making price comparisons (NPR) across products. The higher the net price of the focal product in the range of alternatives, the less likely consumers were to redeem the coupon (*b* = -2.956, *p* < .01). Consequently, we characterize this consumer segment as deal-prone, using a contextual, SRP approach to evaluate coupons.

Although H3b was not supported in the panel models, we find that the NPR-Loyalty interaction gains significance (*b* = 3.279, *p* < .01) when consumers are further segmented. Here, we find that the interaction holds for deal-prone consumers such that for consumers who are likely to engage in price

comparison, the probability of redemption increases as loyalty increases, but especially when competitive position is unfavorable (i.e., a high NPR). This condition may occur when deal-prone consumers are particularly loyal to a given brand, and willing to purchase the target brand even when its competitive position is relatively low.

Using the segment memberships uncovered by the latent class analysis, we tabulate the average level of brand loyalty for each of these two segments over time. We find that while the average brand loyalty decreased for the entire sample, the rate of decline was different between the segments. Brand loyalty declines from 90.5 to 68.7% for shoppers who used an IRP approach, while it declines from 95.8 to 46.5% for shoppers who employed an SRP approach.

The demographics of these two segments, gender ($z = -1.10$, $p > .10$) and age ($t = 1.68$, $p = .10$), are similar. This finding suggests that while targeting shoppers by demographics is not an effective strategy, targeting by the process they use to evaluate coupons may be fruitful.

Finally, although the set-size coefficients have the same valences and similar magnitudes in the latent class model as in the panel model, the influence of set size does not have the same significance found in the panel logistic models. One reason for this finding may be that segment membership itself has an effect on the relationship between set size and redemption. More specifically, we conjecture that consumers who employ an IRP strategy are less sensitive to set sizes while those who employ an SRP approach likely prefer medium set sizes; these set sizes, in turn, gain significance when consumers use more process-level variables, such as actual IRP and SRP measurements.

Setting strategic coupon values

The estimates from the latent class model enable us to separately predict the redemption behavior of each segment. That is, with these predictions, we can determine what coupon values to set to best target members of each segment under different loyalty and NPR conditions.

Figure 2 uses the estimates in the latent class model to compute the predicted probability of redeeming a focal coupon. We show the expected redemption rate (on the vertical axis) for various coupon values (on the horizontal axis) at different levels of brand loyalty (indicated by the color of each line) and by whether the coupon is low or high in relation to competitors (i.e., at levels of $NPR = 0.1$ or $NPR = 0.9$), as indicated by either a solid or a dashed line, respectively. We hold set size (three coupons) and time of purchase (weekend day) constant.

The upper panel of Fig. 2 depicts the predicted probability of redeeming a focal coupon for members of the brand-focused, IRP segment. As reflected by the model estimates

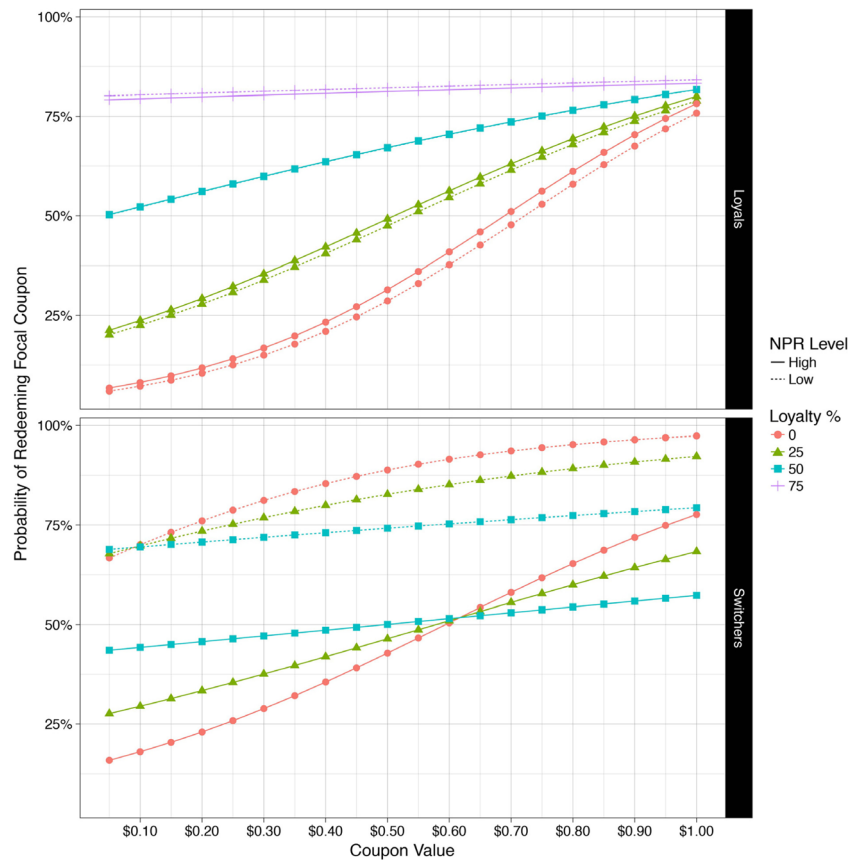
and shown by the narrow separation of the dashed and solid lines, these shoppers are insensitive to NPR because they do not engage in coupon comparisons. Moreover, the influence of loyalty on how a coupon's value influences redemption is substantial. Members of this segment with low brand loyalty are extremely sensitive to coupon value, with redemption probabilities rising steeply as coupon values increase. However, very loyal members (i.e., those with loyalty of 75%) are relatively insensitive to changes in coupon value and, though flat, exhibit the highest overall redemption probabilities for any coupon value.

The lower panel of Fig. 2 illustrates the predicted probability of redeeming a focal coupon for members of the deal-prone, SRP segment. For these consumers, coupon targeting is more complex, requiring us to incorporate both loyalty and NPR to provide an accurate picture of their redemption rates. Given the deal-prone segment's tendency to compare coupons, when NPR is low (indicating a very competitive coupon with respect to the alternatives), redemption probabilities are high regardless of loyalty, and they plateau at approximately 60%–70% when loyalty is relatively high for this segment (50%). Even minimal coupon values may motivate redemption. When NPR is high, however, the behavior of these consumers changes considerably. The probability of redemption diminishes markedly, reaching 45%–50% for relatively loyal consumers. Moreover, coupon value is largely responsible for variations in redemption probability.

When setting a redemption goal, managers can use predictions such as those we provide here to estimate how successful a prospective coupon would be. For example, issuing the same \$0.50 coupon to every shopper in the entire brand-focused segment would yield redemption probabilities ranging from 31.4 to 80.5%, depending on each consumer's loyalty. Instead, a manufacturer could target coupon values to achieve a predetermined redemption goal. For example, to achieve a 60% redemption rate among brand-focused shoppers, the firm should offer approximately \$0.85 coupons to customers who are 0% loyal (e.g., new customers, or the customers of rival brands), \$0.70 coupons to customers who are 25% loyal, and \$0.35 coupons to customer who are 50% loyal. For the most loyal consumers, our data show that a consumer will redeem most any coupon the firm offers (an outcome we address in the Discussion section).

An important takeaway is that by not taking into account the large variation in redemption due to differences among shoppers, managers risk deploying coupons that fail. Conversely, because the gain in redemption from larger discounts may be quite small, managers do not always need to maximize the coupon value. Indeed, an \$0.80 increase in coupon value (from \$0.10 to \$0.90) generates a lift of only 3.37% for 75% loyal consumers but a lift of 60.3% for 0% loyal (i.e., new) consumers.

Fig. 2 Illustrative probability for selecting optimal coupon values by segment



Note that managers need not monitor competitors’ responses when targeting brand-focused shoppers because the response of other brands has a negligible effect on their behavior.

Targeting deal-prone segment consumers is somewhat more complicated because of the tradeoffs between deploying a coupon that is valuable (in dollar terms) and one that is competitive (in comparative terms). Given the variation in redemption probabilities for this segment, managers who cannot anticipate or monitor competitive coupons risk a failed deployment. Note that in this example, but unlike in the case of brand-focused consumers, the high and low NPR curves intersect at two points: at approximately \$0.10 for an attractive coupon (i.e., when NPR is low) and \$0.60 for a valuable coupon (when NPR is high). Indeed, the predicted redemption rate is *higher* for the competitive \$0.10 coupon than for the more valuable but less competitive \$0.60 coupon. Therefore, a useful rule of thumb is to deploy a very low value coupon when the coupon is competitive and a slightly higher value coupon when the coupon is not competitive; that is, there is no variation in redemption probability due to differences in brand loyalty at these coupon values, guaranteeing a redemption rate of approximately 70% under low NPR conditions and 50% under high NPR conditions.

Discussion

This article examines how consumers respond to mobile coupons for competing brands. While prior research has modeled the potential outcomes of competitive couponing conceptually (Chiang 1995; Shaffer and Zhang 1995), the limitations of traditional mass-produced coupons have dampened interest in evaluating competing coupons for both consumers and manufacturers (Fortin 2000). Using mobile technology, which makes finding and comparing coupons less effortful for consumers and gives firms the ability to customize coupons, this study examines coupon redemption behavior of supermarket shoppers. Importantly, our latent class segmentation approach extends range theory by demonstrating that a sizable proportion of consumers will use discounts to compute net prices to form contextual reference prices. Applying range theory to a setting of simultaneous coupons has eluded analysis, as data for competing coupons have been unavailable and the “common practice in analyzing grocery panel data ignores the possible presence of coupons for competitor brands” (Moon and Voss 2009, p. 33).

Specifically, we find that when evaluating sets of competing coupons, approximately 79.88% of consumers use an IRP strategy and focus on one coupon. These

consumers appear brand-focused, purchasing their preferred brand when a coupon provides an attractive value, with the importance of coupon value diminishing as loyalty increases. For these shoppers, memory-based reference prices may be more salient because they purchase the same products frequently and are better able to recall past prices (Mazumdar et al. 2005). Yet the finding that NPR influences coupon redemption (supporting H2) provides evidence that a substantial proportion (20.12%) of shoppers appear to use a contextual (SRP) reference price to decide whether a coupon is attractive. As SRPs are formed at the time of purchase, scanning for in-store discounts might make these contextual reference prices particularly salient for shoppers (Mazumdar et al. 2005). This result is consistent with the notion that mobile consumers have two shopping mindsets: “seekers,” who shop with a specific purchase intent in mind, and “cruisers,” who have no specific purchase intent in mind (Faulds et al. 2018).

Given these results, we suggest that mobile coupon researchers incorporate discrete latent class structures to predict redemption to illuminate how to develop segment-specific pricing strategies, as “ignoring the difference in the types of reference price used by different segments may produce biased estimates of reference-price effects” (Mazumdar and Papatla 1995, p. 121). The redemption behavior of two shoppers from our panel helps illustrate this point. Panel A of Fig. 3 depicts the shopping history of a 45-year-old male consumer over seven trips in which he continued to scan Cool Ranch Doritos chips, receiving coupons for that product as well as five competing products (other flavors of Doritos and other flavored tortilla chips). This consumer repeatedly purchased Cool Ranch Doritos, even as he received coupons of progressively lower value for his preferred brand. After the seventh trip, the coupon value for Cool Ranch Doritos was \$0.07, while the highest-competing coupon value was \$1.29. This consumer is loyal to Cool Ranch Doritos, so coupon value makes little impact.

This behavior contrasts with the journey of a 42-year-old woman, depicted in Panel B of Fig. 3. This consumer shopped the rippled potato chips subcategory, which offers six competing brands. Unlike the brand-focused consumer, she scanned Snyder’s potato chips on eight of nine trips but redeemed a coupon for this product on only three occasions, switching to the higher-priced Shearer’s brand after the first visit, when Shearer’s coupon value increased, making switching more attractive. Contextually, the NPR of the Snyder’s coupon increased from \$0.66 (with an estimated probability of redemption above 70%) to an NPR of \$0.86 (with an estimated probability of redemption of just 45%). On the third trip, she purchased both the higher-priced brand and a discount brand (perhaps revealing an

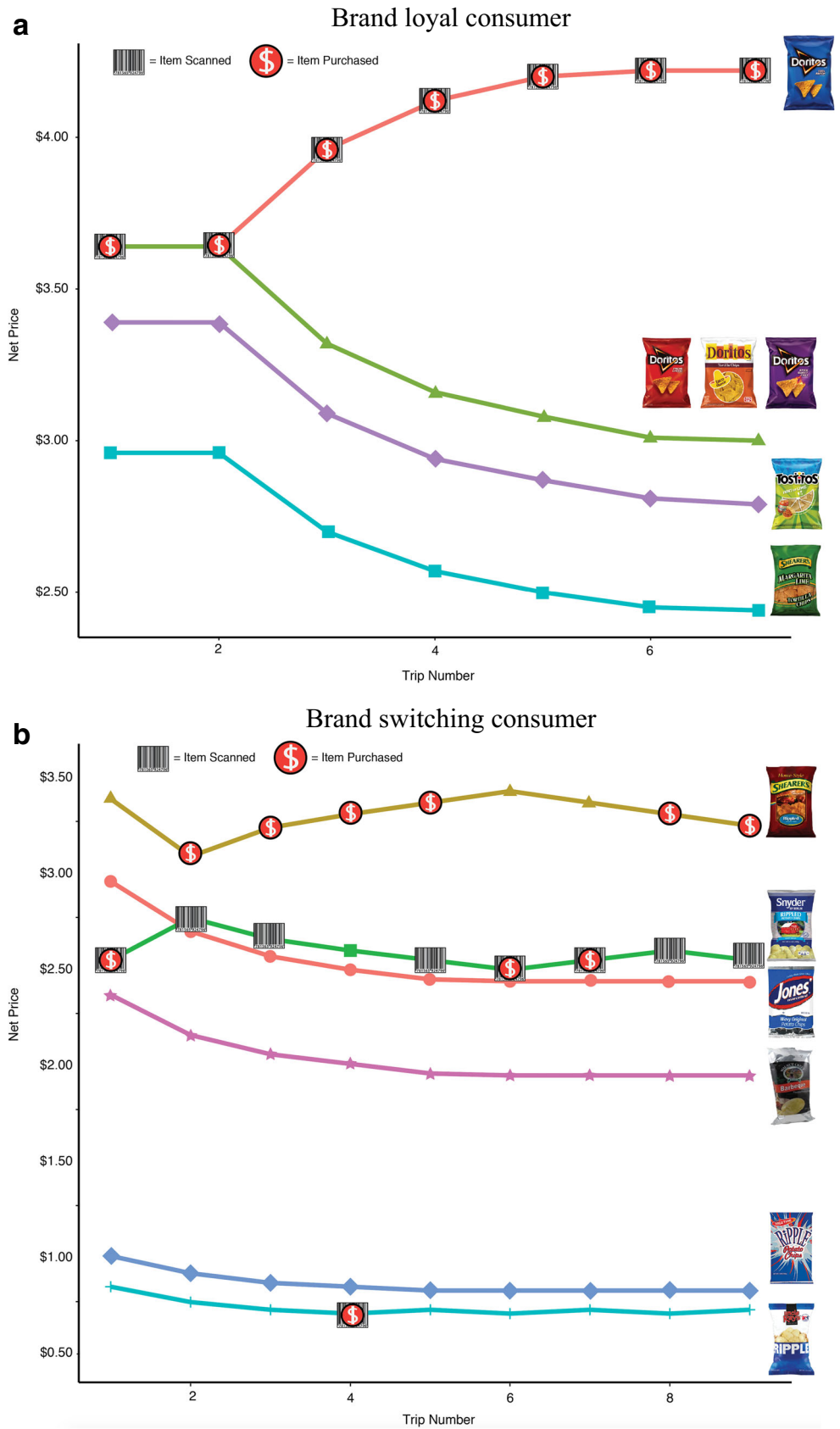
unplanned, trial purchase, triggered by a high-value coupon). Overall, this consumer’s journey is consistent with a deal-prone shopper who is actively engaged in comparison of prices among competing brands (Kumar et al. 1998).

More generally, we observe that consumers in our study become less brand loyal over time. This change is more pronounced for shoppers who used an IRP (for whom average brand loyalty declined from 90.5 to 68.7%) compared with consumers who used a contextual reference price (for whom average brand loyalty declined from 94.8 to 46.8%). These differences might be due to how consumers approach different shopping goals. Tellis and Gaeth (1990) explain differences in repeat purchase behavior over time by classifying shoppers into three groups: (1) price-averse consumers, who prefer the lowest-priced product to minimize immediate costs; (2) price-seeking consumers, who prefer the most expensive product (inferring that it has the highest quality); and (3) value-seeking consumers, who choose products on the basis of the lowest price for the expected quality. They find that experience exerts a greater effect on the repeat purchase behavior of value-seeking shoppers than on the (price-averse or price-seeking) consumers who rely on simple price heuristics. Correspondingly, for shoppers in our study, changes in brand loyalty of deal-prone shoppers who engage in price comparisons might be more pronounced than changes in loyalty of brand-focused shoppers, as such comparisons provide them with information that influences their decisions. With experience, across both segments, price comparisons become more commonplace. Consequently, the longer a consumer has used a mobile coupon app, the greater is the need for firms to monitor and anticipate competing coupon prices, to optimize redemption with relatively low coupon values.

Our data lend support to the argument that whether a consumer is more or less likely to switch brands depends on the *process* he or she uses to evaluate coupons. Consumers who are more likely to switch are also more likely to use a comparative strategy that provides them with information about competitors, with brand loyalty exerting little direct influence on these decisions (Table 2). If consumers encounter a sufficiently attractive alternative, they switch. By contrast, consumers who exhibit high repeat purchase behavior do not appear to evaluate coupons contextually, but only consider the value of coupons offered for their preferred brand. For these shoppers, brand loyalty has a significant influence on their decisions.

By inference, firms can induce (or deter) brand switching by encouraging (or discouraging) price comparisons. For example, varying the number of comparisons required by shoppers who use SRPs can deter them from making comparisons. We find evidence that the number of competing coupons influences whether a shopper will redeem the focal coupon or switch to another. When few coupons were presented, shoppers were more likely to redeem the coupon for their focal

Fig. 3 Scanning and redemption example



brand, perhaps because the probability of encountering attractive alternatives is low. However, consumers were also more likely to redeem the coupon when they received a large set of competing coupons, perhaps because the cognitive effort required to make a large number of price comparisons is too burdensome. Thus, our panel model revealed that coupon set size had a significant, non-linear, U-shaped influence on redemption, as predicted by H4. However, this effect loses significance when we take the segments into consideration. Thus, the effect of coupon intensity on choice may not be intuitive, and further research on the role of set size and the conditions under which it matters would be fruitful.

Digital technology reduces the effort required to make comparisons, and thus consumers are more likely to consider coupons for alternative brands. This may account for the relatively significant proportion of consumers (8.8%) who redeemed a coupon for a different product than the item they scanned. These consumers were just as likely to switch to a higher-priced product as a lower-priced one. A consequence of this behavior is that it reduces the concentration in a subcategory, boosting the share of more niche brands. Prior research has predicted and observed such a shift in other settings involving electronic search (Brynjolfsson et al. 2011). Thus the 80/20 Pareto principle has given way to “the long tail,” in which a higher percentage of consumer purchases come from a broader set of suppliers, because non-directed search presents customers with information about a much broader range of products (Brynjolfsson et al. 2011). Thus, although *as a group* sellers may oppose the introduction of systems that lower the search costs of buyers, individual sellers (or intermediaries) can realize benefits at the expense of others (Bakos 1997).

Taken together, our results indicate that successfully deploying mobile coupons need not only rely on maximizing coupon value. Instead, such deployments must necessarily consider segment membership, loyalty, coupon value, and NPR to optimize redemption. Firms thus can use competitive marketing intelligence to gain an edge in the competitive mobile coupons space and maximize redemption even with relatively low-value coupons.

Managerial implications

Can competitive coupons be beneficial? This article takes a first step toward addressing this question by offering novel empirical findings. In our study, competitive couponing led to strong customer engagement. More than 60% of shoppers who downloaded the app used it to repeatedly scan products on shopping trips that spanned several months. These customers engaged in scanning products and making in-store price comparisons using their mobile phones, at what Procter & Gamble has referred to as “the first moment of truth” (Nelson and Ellison 2005).

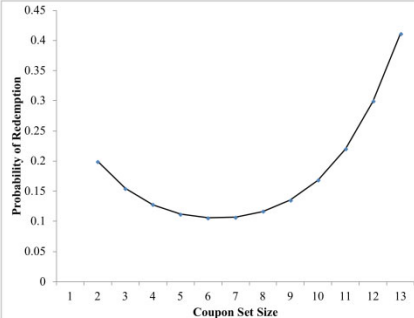
Demand for real-time interactive shopping tools is strong. In 2015, 59% of customers used a mobile device while supermarket shopping, (an increase of 16% over the previous year), and 27% of shoppers used their mobile phone to obtain competitor pricing (Martin 2015). Google reports that 85% of shoppers would be more likely to shop in stores that offer in-store personalized coupons and exclusive offers. This demand is likely to increase, as 55% of shoppers age 20–29 years use a cell phone to do comparative pricing while shopping compared with under 20% of shoppers over age 50 (GfK 2015). Consumers’ appetite for technology may make competitive couponing inevitable as third-party intermediaries step in to offer mobile coupon applications (Bakos 1997). In line with our beliefs on the positive effect of competitive couponing on engagement, supermarkets have begun experimenting with mobile apps that provide competitive coupons (Lin-Fisher 2013; Smith 2016), and large chains such as Kroger and Safeway are evaluating targeted coupon strategies (Clifford 2013; Turow 2017).

Our results provide guidance that help managers navigate these new waters. We find that shoppers can be segmented and targeted with customized coupons according to their brand preferences. Loyal customers provided with defensive promotions continued to redeem coupons worth only a few cents, while deal-prone customers of rival brands were induced to switch brands using commensurately higher value coupons. The benefits of behavioral targeting greatly depend on the brand’s ability to segment consumers. Thus, firms must monitor and update segment affiliations dutifully.

Competitive couponing could potentially be a valuable new tool to attract consumers from competitors’ base and to upsell. Nearly 9% of the coupons redeemed in our study were for brands other than the one the shopper held to scan. While further work is necessary to understand and predict switching behavior, 34.4% of those who switched “traded up” to a higher-quality, premium brand, usually paying more than the original brand. Other shoppers switched to lower-priced brands (32.3%), while a third group of switchers (33.3%) appeared to be variety seeking, often selecting a new or different flavor than the item they scanned. This suggests the potential for competing coupons to help firms and retailers achieve different goals.

Deciding which products, and how many, to group together into sets affects redemption outcomes. The likelihood of encountering an attractive alternative is greatest in medium-size sets. Thus, leading brands might prefer to be grouped in small or large sets to avoid unfavorable comparisons, while smaller brands less likely to be scanned should fare better in medium-size sets. Retailers can instead establish groups strategically, but manufacturers and retailers should bear in mind that consumers may balk and abandon the system if they believe they cannot receive appropriate coupons.

Table 3 Summary of findings and managerial takeaways

Finding	Takeaway for Managers
<p>Consumers judge whether a coupon is attractive differently: As consumers redeem coupons, they reveal the process they use to evaluate competing coupons. Once enough information is known, targeting becomes possible.</p> <ul style="list-style-type: none"> • (79.88%) of mobile coupon users judge a coupon based on dollar value. Target these (IRP) shoppers with customized coupons depending on their observed brand loyalty. • These IRP shoppers are unlikely to compare coupons, so there is no need to monitor or respond to competitors’ coupon strategy. • (20.12%) of mobile coupon users are judge a coupon by comparing the net price that results from a coupon, to others. For these (SRP) shoppers, a competitive, low-value coupon can be more attractive than a less competitive, high-value coupon. • Monitoring competitors’ coupon strategy is important to effectively target these SRP customers. • A rule of thumb for these shoppers is to issue a very low value coupon when your coupon is very competitive, and a slightly higher-than-average value coupon when your coupon is not competitive. 	<p>Ideal coupon values to achieve 75% redemption rate per segment:</p> <p>IBR, Loyal: Minimal (\$.10) IBR, Not Loyal: Maximum (\$1)</p> <p><i>When coupon is competitive...</i> SBR, Loyal: \$.50 SBR, Not Loyal: \$.20</p> <p><i>When coupon is not competitive...</i> SBR, Loyal: \$1 SBR, Not Loyal: \$.95</p>
<p>Consumers respond differently depending on their brand loyalty:</p> <ul style="list-style-type: none"> • For IRP shoppers with high brand loyalty, coupons for a few cents will be redeemed. They can be targeted with lower coupon values than used for traditional paper coupons. • For SBR shoppers, brand loyalty has a relatively weak effect when coupons are perceived as highly competitive. When uncertain about a consumer’s loyalty, a competitive coupon is a safe alternative. 	<p>Increase in redemption rate from moving from 50 to 75-cent coupon, segments with highest/lowest rates.</p> <p><i>Highest redemption rate change</i></p> <p>↑ SBR, 0% Loyalty, Low NPR: +25% IBR, 0% Loyalty, either NPR: +24.25% IBR, 25% Loyalty, either NPR: +17.29% SBR, 25% Loyalty, High NPR: +5.59% SBR, 50% Loyalty, High NPR: +2.68% IBR, 75% Loyalty, either NPR: +1.02%</p> <p>↓ <i>Lowest redemption rate change:</i></p>
<p>The amount of competition in a coupon category matters:</p> <ul style="list-style-type: none"> • Leading brands might prefer to be grouped with either very few, or a large number of competitors to discourage brand switching. • New entrants, niche, and house brands that are less likely to be scanned may fare better when grouped in medium size sets. • By adjusting subcategory size, retailers can strategically influence outcomes to favor established or lesser known brands • Spam-sensitive consumers may become angry if the products are not close substitutes (e.g., bait-and-switch) and respond by not scanning any longer. 	 <p>Competing in a 6-8 coupon set leads to the lowest redemption rate.</p>

Although our data do not allow us to assess profitability, we observed that mobile coupon shoppers saved an average of \$0.80 per trip using coupons but spent \$4.18 more per trip than the average shopper, suggesting a larger difference from non-mobile coupon users. This result is consistent with

Heilman et al. (2002), who find that a \$1 in-store surprise coupon increases basket size by 11%–12% and overall spending by \$7.68. Some consumers may view the savings from surprise coupons as a windfall and feel entitled to purchase additional items, or treat themselves to a higher-quality brand,

consistent with the observation that 34% of those who switched brands purchased a more expensive item than the one they first selected.

While the average grocery free-standing insert coupon value in 2015 was \$1.18,³ the average coupon value that consumers observed in this study was \$0.62, and many coupons were redeemed for values as low as \$0.02. A possible reason consumers found low-value coupons attractive may be that coupons are offered in-store and on their mobile devices. Thus, consumers require smaller incentives to search for and redeem coupons compared with the effort required to find, clip, save, and redeem paper coupons. However, the context of competing coupons, particularly for SRP shoppers, provides another rationale. Rather than judge coupons by the discounts they provide in absolute terms, these consumers weight the attractiveness of a coupon by comparing it with others. Therefore, firms do not need to “outrun the bear” but simply outrun their competitors.

As Fig. 2 suggests, managers have considerable latitude in determining what coupon values to select, based on parameters such as the number of competing brands, competing brands’ anticipated promotional response, the target consumers’ brand loyalty, and how aggressive they wish to be. Accordingly, they can select a discount depth that best suits their promotional budget and set redemption goals that can be achieved using targeted coupon values. Table 3 summarizes some of the main findings and practical takeaways of this research that managers can use to successfully deploy targeted mobile coupons that are more likely to be redeemed in a competitive environment.

Limitations and future research

This study provides new insights by analyzing actual use of mobile coupons, but several limitations remain. First, the data come from a supermarket in a town with few nearby competitors. While this provides a controlled experimental environment, one concern might be the generalizability of the findings to more competitive settings. Research on the effects of pricing and promotions on supermarket store choice shows that only a small fraction of consumers are knowledgeable about competitive prices (Monroe and Lee 1999) and few consumers switch stores because of price policies⁴ (Von

Freymann 2002). Neither unadvertised (Walters and MacKenzie 1988) nor advertised (Walters 1991) price discounts have an appreciable effect on inter-store traffic. Industry statistics show that approximately 96% of supermarket shoppers nationally report having a primary grocery store in which they routinely shop for their groceries (Brown 2015). Moreover, the question of how customers choose among competing coupons seems less prone to influences of inter-store competition than other questions might be. Future research might benefit from a more competitive empirical setting.

Second, while we tried to control for the influence of brand loyalty, the effects might nevertheless be confounded by the pricing algorithm used by the third-party app developer to compute coupon values. Future work with an updated version of the app might have greater ability to control for confounding effects of price and prior purchases. Our measure of brand loyalty is also based on purchases made using a coupon. While this provides novel insights into purchase behavior in a dynamic pricing environment, it may not correspond to the purchase of brands irrespective of coupon redemption in a category. Future research should examine the association of brand loyalty as the percentage of brand purchases in a category with the current coupon redemption-based measure.

Finally, coupon values in this study were set by the app developer without considering cost, and whether a particular coupon might result in a short-term profit or loss and consequently our data do not allow us to determine whether the increased spending by mobile coupon users resulted in greater profitability. Although behavior-based pricing can increase channel members profits (Li 2018), and recent empirical data shows that targeted couponing can be profitable for competing firms (Besanko et al. 2003; Dubé et al. 2017), even if competitive coupons failed to produce a short-term economic gain, the goals of mobile couponing can extend beyond the short-term goal of sales conversion to other aspects of the consumer journey, such as increasing awareness, promoting positive attitudes, generating consumer engagement, and encouraging repurchase (Grewal et al. 2016).

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³ This figure represents the average face value of grocery coupons redeemed per item. We use this measure because some coupons are redeemed for multiple units, and thus the average face value for all grocery coupons was \$1.42.

⁴ A possible concern with an isolated store is that shelf prices might be higher than prices in a more competitive location. We tested this possibility by conducting a price comparison. We shopped a basket of products used in this study (by randomly selecting four name-brand products from each of the four major product categories) and compared it to the same basket shopped at a larger store in a nearby city that has three competing grocery retailers. We found no significant difference in the total price of these two shopping baskets ($t = 0.37, p > 0.10$).

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