



A study of food retailing: How does consumer price sensitivity vary across food categories and retailer types in Mexico?

Estudio sobre comercio al detalle de alimentos: ¿Cómo afecta la sensibilidad al precio entre categorías de alimentos y formatos de detallistas en México?

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Abstract

The cost of food in Mexico has increased over several decades. Currently, consumers have several choices for buying food, which prompts retail managers to implement pricing strategies designed to attract more customers. The problem is that several retailers do not have a clear understanding of consumer price sensitivity, the effect of non-price promotions, and the variations across retail formats. This research will address these issues by analyzing scanner sales data and mystery shopper price reports to calculate price sensitivity across six food categories sold in four retail chains. Results indicate that product demand, in most food categories, is sensitive to price changes at big-box retail competitors and not traditional supermarket retailers. Additionally, results indicate that the six food categories in the study are sensitive to feature advertising. Retail managers can use these findings to help define their value propositions, focus their pricing strategies, and inform their marketing communications strategy.

JEL code: L81, M21, M31

Keywords: Price sensitivity; Retail marketing; Food marketing

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Resumen

El costo de alimentos en México incrementó en las últimas décadas. Actualmente, los consumidores tienen varias opciones donde comprar alimentos, por lo que detallistas compiten mediante estrategias basadas en precio. El problema es que los gerentes de estos negocios no tienen suficiente conocimiento sobre sensibilidad a cambios de precios, el impacto de la promoción, y variaciones entre formatos de tiendas. En este estudio se analizan reportes de demanda generados en puntos de venta e información de precios tomada de reportes de cliente misterioso. Los resultados sugieren que la sensibilidad al precio es significativa en los casos de las cadenas de tiendas grandes, pero no en el caso de los supermercados tradicionales. Asimismo, las seis categorías de alimentos son sensibles al uso del tabloide como instrumento de promoción. Los distribuidores de alimentos pueden utilizar estos hallazgos para desarrollar propuestas de valor, diseñar estrategias de precios, y de promoción.

Código JEL: L81, M21, M31

Palabras clave: Sensibilidad al precio; Mercadotecnia detallista; Mercadotecnia de alimentos

Introduction

In his seminal work on pricing and consumer behavior, Friedman (1967) noted that it was possible for consumers to make rational purchase decisions provided they had accurate quality and price information about their products. In his view, consumers could find accurate price information on goods and services, but the process could be cumbersome and ultimately not worth the effort. Hirsch (1956) and later Cotterill (1986) noted that consumers could pay different prices for the same products purchased from different types of retailers because they lacked adequate market information. Uhl and Brown (1971) cautioned that failure to perceive and act on retailer price changes would be detrimental to consumers. On the one hand, if consumers do not react to slight increases in prices, they may inadvertently encourage retailers to set higher margins for their products. On the other hand, if consumers do not reward retailers for reducing their prices, they may discourage them from negotiating better terms with suppliers or setting lower margins.

Working under the basic premise of Weber's law of consumer prices, which guided Uhl and Brown's (1971) study, Lambert (1978) examined a wide range of consumer products to confirm that perception of price changes depends on individual thresholds. The implication that derived from these studies is that consumers may not perceive price changes, up to a point, but that failure to react to these changes may negatively affect them. Consumer perceptions regarding retail prices are important for retail managers, not just for consumers. Retailers who make small sacrifices on their margins can obtain a higher return if customers become aware of the price reduction. According to Wang, Fan, and Liu (2016),

customers who perceive better terms, offered by a specific food retailer, are more likely to become long-term customers, ultimately leading to a stronger, more profitable client base. It is difficult for food retailers to know whether their efforts to provide better value for customers, by offering lower prices, works in their favor across product categories. What is known is that the degree of rivalry in the food retail industry in Mexico has intensified, a situation that resulted in price-based competition among food sellers (MarketLine, 2015), and that more research is needed to adequately understand the effect of price changes on demand (Ellickson, Misra, & Nair, 2012; Campos Vázquez & Medina Cortina, 2017). Increasing the knowledge on consumer response to prices changes in food may allow retail managers to better design their value propositions to serve their customers more effectively and increase their market share.

To address the knowledge gap, we examine the effect of price changes and feature advertising on unit sales across six food categories and compare results across four retail chains. Previous researchers examined price sensitivity for one retail category, dairy products. (e.g., Kinoshita et al., 2001; Widenhorn & Salhofer, 2014). Our study provides insights into a wider range of food categories in terms of consumer price sensitivity at the focal retailer in response to own or competitor price changes. Additionally, we measure consumer demand at the category level when products are featured in the focal retailer's weekly shopper. The results should serve retail managers concerned with the effects of price changes and use of advertising materials designed to generate demand for food products. Different retail formats offer differing value propositions to consumers. As such, they may price their products differently and may also have variation in how the products are advertised. In order to examine our results across retail formats, we include data from four retailers, two traditional supermarket stores, and two big box retailers, in our study which took place in Tijuana, Baja California, Mexico.

Results from our work can help retail managers understand the sensitivity on consumer demand in response to price and promotion changes and particularly across retail formats in Mexico. This helps advance knowledge in this field as there is limited work in this area on the Mexican supermarket

Literature review

Research conducted in India suggests that large retailers need to appeal to their markets because there is intense rivalry within the industry (Gupta et al., 2011). This may also be said of retailers in Mexico. Overall, the upward trend in prices in Mexico resulted in a moderate decrease in consumer demand in the country over the past few years (Instituto Nacional de Estadística y Geografía, 2017). Now, food sellers find themselves

catering to price-sensitive customer segments through competitive pricing strategies (Business Monitor International, 2014). After describing the food retail industry in Mexico, we address three main topics in this section which include price-based strategies, retail marketing communications, and retail store formats as related to our work.

The Food Retail Industry in Mexico

Mexico is the second largest retail food market in the Americas with 11.1% market share, and 40% projected growth from 2014 to 2019 (MarketLine, 2015). Currently, supermarkets and hypermarkets account for 30.2% of the total value of the food retail industry in the country (MarketLine, 2015). The growth of these modern retailers is expected to continue because the traditional food sellers struggle to modernize, making it harder for them to compete successfully (Ayala Ramírez & Castillo Girón, 2014). The expansion of the middle class throughout Mexico will yield increased business for sellers of branded goods, facilitating retailer growth (Business Monitor International, 2017). While these trends seem encouraging to sellers, fluctuations in food prices in Mexico over the last 50 years have resulted in greater share of household income being directed toward the purchase of basic goods (Torres Torres, 2010; Székely Pardo, 2014; Pardo & Díaz, 2014; Avalos, 2016). This has pushed consumers to make adjustments in their purchase of food and non-food items, based on their socio-economic characteristics (Nicita, 2008). The adjustments that Mexican consumers are making, given the rise of food prices, include choice of food retailer, which places more pressure on retail managers to sustain competitiveness.

Given that price satisfaction affects retailer choice (Sreedhara & Nagendra Babu, 2010), it is tempting for food retailers to develop strategies to compete under a low-price proposition. Rajagopal (2008) conducted research with four chain retailers in Mexico and found that Mexican consumers respond favorably to price-based promotions. His research concluded that price-based promotions tend to be disseminated with advertising materials like store shoppers or brochures (Rajagopal, 2010a), which makes marketing communications a part of the pricing tactics food retailers use. In the northern border of Mexico, retailer choice and willingness to switch retailers to get the best deal can be inferred by the fact that Mexican consumers are willing to cross the border into the United States to purchase goods and take advantage of better prices, quality, and overall shopping experience (Corrales, 2012).

Based on these studies, it is reasonable to suggest that the Mexican retail industry is growing, but retail managers face increased pressure from competitors, increases in the cost of food, and low-switching costs for customers. In response to these challen-

ges, food sellers would do well to develop a deeper understanding of consumer price sensitivity, which would allow them to develop more effective value propositions.

Price-Based Competition

Increased rivalry among food and grocery retailers in Mexico has contributed to the development and implementation of various pricing schemes (MarketLine, 2015). Retailers face the risk that their customers purchase only goods that are cheaper in their stores and seek out competitors who offer lower prices on other items. Previous research on competitive pricing strategies have spanned retail outlets, product categories, and brands to partially address this concern (Binkley, 2013). Reid, Thompson, Mavondo, and Brunstø (2015) noted that retailers continue to feel pressure from intense competition based on price promotion schemes. They recommended that retail managers find ways to offer their customers non-monetary incentives to minimize promotional costs.

Erdem, Keane, and Sun (2008) noted that price-based advertising and non-price advertising have different effects on customers. Their work suggests that non-price advertising may raise customer willingness to pay, thus, help justify increases in prices. Other research, however, cautions that consumers actively seek out lower prices, especially if they are on a tight budget, which can reduce the effect of other types of stimuli (Linzmajer, Hubert, Hubert & Kenning, 2011). In another study, Ellickson et al. (2012) studied the incidence of price switching schemes of retailers experiencing an increased competitive environment. They noted that price-based efforts to remain competitive are usual in the retail industry, but that more research is needed to better understand the changing dynamics of the retail industry.

Waller, Williams, Tangari, and Burton (2010) analyzed the impact of pricing strategies, shelf space, and product quantity (packaging) on merchandise turnover in a sample of 62 retail stores. Examining boxes of cereal sold through retailers, the authors concluded that pricing strategies are especially effective when the merchandise is allocated greater shelf space. In their own work, Gerstner and Hess (1990) noted that in-store promotions and high search costs allow retailers to influence their customers to make purchases that ultimately benefit both parties. It is noteworthy that these studies were conducted in the United States retail market, and their conclusions suggest a recurring influence of non-price advertising and merchandising on consumer behavior.

Changes in consumer demand due to price fluctuations in the United States have received a good amount of attention by researchers. Andreyeva, Long, and Brownell (2010) reviewed 160 studies conducted in the United States on demand elasticity due to fluctuations in food prices. Their work was developed to determine whether changes in food prices could serve to inform policy makers on potential tax-based strategies to reduce consumption of

unhealthy foods while increasing demand for healthier alternatives. The study concluded by suggesting that fluctuations on specific product prices have an effect on consumer demand by approximately 8% (Andreveva et al., 2010).

Other researchers believed that while own-price elasticities were important in understanding the effects of price changes in consumer demand, it was imperative to look at cross-price elasticities as well to get a better sense of consumer behavior (Comelsen et al., 2015). In other words, consumers who are particularly price sensitive may price compare at different retailers prior to purchasing products. Given the conclusions found in these studies, retailers in the United States can assume that price fluctuations, and non-price facts have an effect on consumer patronage. Perhaps these non-price stimuli affect consumer perception on prices, which has been studied before under the Weberian approach to consumer reactions to price fluctuations (Lambert, 1978). The few studies found in Mexico partially support this claim (Rajagopal, 2010a), however, a more thorough examination of consumer perceptions on prices is warranted.

Price-Based Competition in Mexico

While there is limited research on the effects of price changes on consumer demand in the Mexican retail market, a few studies have examined the effects of price changes on demand fluctuations in the soda category. Colchero, Salgado, Unar-Munguía, Hernández-Ávila, and Rivera-Dommarco (2015) analyzed the effects of tax-based price increases of soft drinks on consumer demand for those products and for substitute products like water and milk. They found that demand for soft drinks, after the new tax was imposed, decreased by approximately 10%, particularly among less affluent consumers. The authors also found that demand for substitute products increased as a result of the added taxes on soft drinks. In a follow-up study, Colchero, Guerrero-López, Molina, and Rivera (2016) compared cross-elasticities of sweetened beverages and plain water. They concluded that taxes on sweetened beverages produced decreases in product sales and increases of 5.2% on per capita sales of plain water. Further, Olivera-Chávez et al. (2010) analyzed data from 1994 to 2005 and found that a 10% increase on the price of cigarettes produced a decrease of about 2.5% in consumption. These researchers conducted their studies to measure the response to government-imposed taxes on certain product categories using market level data. The results indicated that price fluctuations indeed affect the demand for unhealthy products. However, it is important to note that price fluctuations are not always the result of government action, and they are not always uniform across competitors. Additionally, it is important to study how price fluctuations affect products beyond the unhealthy product categories (e.g., soda, cigarettes).

The work of Rajagoal (2008; 2010a) with Mexican retailers constitutes an initial effort to understand the effects of price promotions on consumer demand, but the studies available have not adequately addressed price sensitivity across competing retailers and across various product categories in Mexico. This justifies the call for future studies on the use of price-based strategies on the part of retailers and their general effects on consumers (Campos Vázquez & Medina Cortina, 2017).

Retail marketing communications

The study of price comparisons across retailers continues to be relatively unexplored in the literature (Miniard, Mohammed, Barone, & Alvarez, 2013). Several of the works cited thus far include price-based and non-price variables that affect consumer response to retailer food products. Retailer price changes may be the result of promotional schemes (Erdem et al., 2008; Campos Vázquez & Medina Cortina, 2017), tax policies (Olivera-Chávez et al, 2010; Colchero et al., 2016), and globalization (Pardo & Díaz, 2014). In all of these cases, price fluctuations have some effect on consumer demand.

In addition, studies on non-price effects on consumer demand have taken place (Martín Erosa & Arroyo López, 2011; Hino, 2014; Jayasankaraprasad, 2014) and serve to partially explain consumer decision-making regarding retailer selection. It is worth noting that price-based strategies tend to be accompanied by marketing communications designed to create awareness of good bargains. For example, research on the effect of feature advertising and in-store displays on the price sensitivity suggest that food sellers can use promotional materials to minimize the impact of price changes (Allenby & Ginter, 1995). Weber's law of consumer prices emphasizes the importance of consumer awareness of price changes for price reduction strategies to be effective (Lambert, 1978). Through marketing communications, retailers help consumers create images of the goods they purchase.

In Spain, Gázquez-Abad and Martínez-López (2016) examined the effect of store flyers on the purchase of coffee and olive oil. They noted that retailers encourage brand switching when they used store flyers accompanied by discounts, and that customers of featured products tend to purchase excess inventory to take advantage of the promotions. Earlier work on featured advertising across retail formats suggest that this type of marketing communications is effective when retailers aim to communicate price discounts, assortments, services, store image, and increase overall customers satisfaction (Martínez Ruiz, Jiménez Zarco, & Izquierdo Yusta, 2010).

Rajagopal (2013) argued that branding is an important aspect of consumer choice and loyalty. He analyzed the responses of 231 consumers in Mexico and noted that brand

appearance and brand meaning influenced buyer behavior. The Rajagopal (2013) and later Llonch, López, and Gómez-Villanueva (2016) studies suggests that consumer perceptions and subsequent brand development affect consumer preference in Mexico. These perceptions can be manipulated by marketing communication, and not necessarily by price alone. Part of the goal in the current study is to examine the effect of feature advertising used by the focal retailer to determine whether this type of marketing communication has bearing on consumer demand for products.

Food retail formats

Supermarkets and hypermarkets account for 30.2% of the value of the food retail industry in Mexico (MarketLine, 2015). Supermarkets typically focus on selling unpackaged and packaged food, while also providing small assortments of personal hygiene, kitchenware, and over-the-counter medicines. Hypermarkets (also known as supercenters and big box retailers) include electronics, furniture, clothing, and other non-food items in their inventories, but food products account for an important share of their sales and profits (MarketLine, 2015).

While the food retail industry is growing steadily in Mexico, large scale, modern retails face unique challenges. These include government imposed taxes on food, steady growth from specialty and convenience stores, acquisitions, increased presence of multinational retailers, similar value propositions among direct competitors, and low customer switching costs (MarketLine, 2018a). Perhaps the greatest challenge for these food retailers is the fact that they are being forced to sacrifice profit margins because of intense competition based on the promise of offering low prices to consumers (MarketLine, 2018b). To exacerbate the problem, these retailers can expect additional government imposed taxes on food, so long as the obesity crisis in Mexico does not diminish (MarketLine, 2015; Nakhimovsky, Feigl, O'Sullivan, & Macgregor-Skinner, Spranca. 2016; Sánchez-Romero et al., 2016).

Research on food retailer choice in Mexico is limited. In other parts of the world, there is enough literature to suggest that consumers tend to choose across retail format when buying food. Research conducted in India suggest that the choice of retailer format for food customers varies depending proximity, demographics, and life-style characteristics (Prasad & Aryasri, 2011). Deka (2018) surveyed 290 retail grocery customers in India, and discovered that demographics and price and non-price variables influence choice of retail format. These findings were consistent with previous work on cross-format grocery shopping in the country (Jayasankaraprasad, 2016). However, similar research in Europe suggest that convenience services like parking and atmosphere have limited effect on customer preference (Teller, Wood, & Floh, 2016).

In terms of the effect of store format on price sensitivity, Widenhorn and Salhofer (2014) examined the effect of price changes in discount stores and traditional supermarkets, in Austria, across three products within the dairy category. The authors concluded that discount store prices are more elastic compared to supermarket prices. This confirms claims that customers show different levels of price sensitivity across retail formats (Hui-Ming, Bezawada, & Tsai, 2010). Although research on consumer behavior across retail formats is clearly ongoing, researchers have not been able to develop enough studies in Mexico. This gap is important given the size and characteristics of the food retail business in the country. For this and other reasons noted throughout this study, it is important to provide retail managers with research on price sensitivity in Mexico.

Research questions

Given the information found in the literature and the problem under study, this analysis will center around three research questions regarding how category-level consumer demand fluctuates in response to changes in: (1) focal retailer price (2) retailer's competitor's price and (3) advertising in weekly features (shopper). Additionally, our paper examines whether the results vary across retail formats. The findings of this study have implications for retail managers with regards to pricing strategy and price-based promotions. Policymakers in Mexico might use the results of this study to help them to better understand price sensitivity in food items, which can lead to future policy decisions regarding incentives to retailers. This study serves the interests of consumers in Mexico by helping address the risks expressed in Weber's law of consumer prices (Lambert, 1978).

Method

Sample

Data from the Instituto Nacional de Estadística y Geografía (2018) show that there are 178 food retailers who employ 31 persons or more in Tijuana, Baja California, Mexico. There are four large retail chains in our study. Based on the same data, the four retail chains in the sample account for 96 stores, which represents 54% of these establishments in the region under study. Smaller retailers were excluded due to significant differences in food categories and overall range of products. The focal retailer in this study is a regional supermarket store that sells mostly food items. Of the three competitors in the study, one is a national supermarket chain, another one is a national big box retail chain, and the last competitor is a multinational big box chain. The four retailers have similar assortments of food items, but the two big box retailers sell clothing, electronics, furniture, and sporting

equipment as well. Therefore, the retailers in the study were classified as two traditional supermarkets, and two big box retailers.

Focal retailer scanner data

Kinoshita, Suzuki, Kawamura, Watanabe, and Kaiser (2001) argued that the use of scanner level data might help address the gaps in understanding that market level estimates of price sensitivity leave unaddressed. The focal retailer in this study provided weekly scanner data for multiple product categories over an eight-month period (March to October 2016). The six food categories in the study are listed in Table 1. The data files included store name, product code and description, date of sale, and unit sales per product. Unit sales were matched, by date, with the price information from all four retailers to ensure compatibility, and care was given to make sure products and times corresponded, avoiding mismatches in terms of dates, products, prices, or otherwise.

Mystery shopper data

The focal retailer in this study provided weekly mystery shopper reports that coincided with the eight-month scanner data, later narrowed down to the 10-week period under study. Similar to previous research that used mystery shopper data (Finn & Kayande, 1999; Wang, Tsai, Chen, & Chang, 2012), the data-gathering phase was conducted by trained professionals who were experienced in this type of data collection method. The team of mystery shoppers were full-time employees of the focal retailer. They visited one store for each of the four retail chains in the study, every Friday, to collect price information on a variety of products. The mystery shoppers only visited one store per retail chain because the prices and assortments were standardized across all stores, so prices and products were the same no matter which stores within each chain they visited.

The purchasing agents from each category of the focal retailer were the ones who determined which products to include in the weekly mystery shopper reports. For confidentiality, the names of the retailers cannot be mentioned. The mystery shopper reports include price information at the product and category level for the four retailers in the study, a price index used for international purposes, and they also indicated which products from the focal retailers were featured in their weekly shopper.

Database creation

The final version of the database which merged the mystery shopper data with the scanner

data consisted of 15 categories comprised of various products (See Table 1). For brevity, this research analyzed the six food categories that have the most data. The decision to select these six categories was made during the data-cleaning phase, which revealed the need to avoid inconsistencies in the price comparisons due to problems beyond the control of the researchers like lack of pricing information due to incompatible product selection across retail competitors. The three focal variables were price, units sold, and whether or not the product was advertised in a weekly shopping flyer of the focal retailer, which came out every Friday. The flyer would feature selected products by the purchasing agents for every category. As Table 2 indicates, the sample size ranged from 211-584 observations, per category, across the six categories.

Table 1

Sample products in each category

Category	Example Products
Produce	Fruits and vegetables
Meats and Fish	Beef, chicken, fish
Breakfast Foods	Cereal, jam, coffee, tea
Cold Cuts	Ham, eggs, chorizo
Dairy	Milk, cheese, yogurt, cream
Meal Preparation	Oils, pasta, condiments

Note: We include examples only for the sake of brevity and clarity.

Source: Developed by the authors.

Table 2

Descriptive statistics for Focal Retailer (prices expressed in Mexican Pesos)

Category	N	Price		Units Sold		Times advertised	Total Products
		Mean	SD	Mean	SD		
Produce	584	\$25.94	\$19.81	8 253.39	9 896.44	122	59
Meal Prepa-	320	\$17.28	\$11.58	7 400.74	9 756.17	199	32
Meats and Fish	314	\$93.88	\$57.90	4 081.79	8 571.95	216	39

Note: The data presented here represents the ten-week period covered in the study.

Source: Developed by the authors.

Breakfast	310	\$31.00	\$16.43	4 261.01	5 963.79	157	36
Foods							
Cold Cuts	220	\$60.91	\$39.00	2 613.85	3 109.03	98	22
Dairy	211	\$58.13	\$47.52	2 817.07	3 576.04	71	22

For the purposes of the present study, the analysis focused on data from the first and third week for March, May, July, August, and October 2016. These weeks and months were chosen primarily to get a consistent number of observations across all categories. This means that only weekly information for which focal retailer scanner data and matching product-level prices across the four participating retailers was considered. This resulted in 10 weeks of data and 1,959 observations. To compare the prices for the three competitors to the focal retailer, a price index, at the product level, was calculated. The index represents how the competitors' average prices at the product level relate to the average price of the product at the focal retailer. Given the large number of products in each category, the findings are presented at the category level rather than at the product level. In this analysis, the same products across the four participating retailers were used. The produce category had the greatest number of products in the category, the highest average units sold (8,253) and was most advertised over the 10-week period.

Table 3
Competitor Price Index

Category	Focal Retailer Average Price	Competitor 1	Competitor 2	Competitor 3
Produce	\$25.94	107%	107%	96%
Meats and Fish	\$93.88	92%	93%	103%
Breakfast Foods	\$31.00	101%	97%	95%
Cold Cuts	\$60.91	92%	89%	85%
Dairy	\$58.13	92%	91%	82%
Meal Preparation	\$17.28	101%	107%	95%

Note 1: Competitor Index = 1-((Focal Retailer Price – Competitor Price)/Focal Retailer Price). An index > 100% indicates that the focal retailer is less expensive than the competitor. An index < 100% indicates that the focal retailer is more expensive than the competitor.

Note 2: The analysis was conducted at a product level. This table is to provide an idea of the relative price indices by category.

Note 3: Competitor 1 is the direct competitor, competitor 2 is the national big box retailer, and competitor 3 is the multinational big-box retailer.

Source: Developed by the authors.

Statistical analysis

A log-log regression analysis was used to estimate effects on category demand due to focal retailer price changes, and price changes for each of the three competitors. Log-log regression had been used in similar studies in the past (Song & Chintagunta, 2006; Akhtar, Hussain, Javid, & Ishaque, 2011).

Results

In order to examine how retailer price, competitor price index and advertising affected units sold, log-log regression, by category, was conducted. For each product category used, the following model was estimated. See Table 4 for coefficients.

$$\log(\text{Units})_{i,t} = \beta_1 \log(\text{RetailerPrice}_{i,t}) + \beta_2 \log(\text{PriceIndex}_{1,t}) + \beta_3 \log(\text{PriceIndex}_{2,t}) + \beta_4 \log(\text{PriceIndex}_{3,t}) + \beta_5 \text{Advertising}_{i,t} \quad (1)$$

where i = product, t = week, and PriceIndex 1, 2, 3 are the price index for each competitor.

Table 4

Regression results of price and advertising predicting units sold. Beta (Standard Error)

Category	Intercept	Focal Retailer Price	Price Index 1	Price Index 2	Price Index 3	Advertising	Adj-R ²
Produce	15.78 (1.37)***	-1.21 (.09)***	-0.48 (.19)**	0.03 (.23)	-0.32 (.30)	0.44 (.12)***	40%
Meats and Fish	12.37 (2.78)***	-1.26 (.13)**	-0.83 (.55)	-0.51 (.60)	1.41 (.67)**	0.53 (.20)**	45%
Breakfast Foods	9.14 (2.33)***	-1.01 (.10)**	-0.21 (.29)	-0.04 (.49)	0.72 (.27)**	-0.03 (.13)	41%
Cold Cuts	7.11 (4.79)	-0.63 (.17)**	1.66 (1.03)**	-1.31 (.86)	0.21 (.63)	1.00 (.27)**	43%

Dairy	-11.27 (3.43)***	-0.84 (.10)**	0.583 (.77)	3.67 (.80)***	0.55 (.74)	-.06 (.20)	50%
Meal Preparation	13.49 (2.53)***	-0.91 (.08)*	0.73 (.51)	-0.26 (.28)	-1.07 (.52)**	0.29 (.14)**	38%

Note 1: * $p < .10$; ** $p < .05$; *** $p < .01$.

Note 2: Price index 1 is the direct competitor, Price index 2 is the national big box retailer, and competitor 3 is the multinational big-box retailer.

Source: Developed by the authors.

As expected, when the focal retailer price increased, the units sold significantly decreased, regardless of product category. Breakfast foods, produce, and meats and fishes, are the most price sensitive whereby a 10% price increase at the focal retailer results in a respective 10%, 12%, and 13% decrease in units sold at the focal retailer (all p -values < 0.05). Cold cuts are the least price sensitive whereby a 10% price increase at the focal retailer leads to a 6% decrease (p -value $< .05$) in units sold at the focal retailer. Additionally, feature advertising has a positive effect on demand in all categories except the dairy and breakfast foods categories (p -values > 0.10). It should be noted that relative to other examined categories, the products in the dairy category were promoted least frequently.

The purchasing behavior at the focal retailer has varying effects in response to competitor's price discounts based on product category. Interestingly, amount purchased in the produce category is not sensitive to price changes at the national or multinational big box retailer (all p -values > 0.10), which could suggest loyalty towards a particular retailer for produce purchases or a failure to perceive price differences on the part of consumers. Results indicate that products in the breakfast foods, meal preparation (e.g., oils, pasta, condiments), and meats and fishes are sensitive to price changes at the multinational big box retail competitor whereby a 10% price increase at the competitor leads to a 7%, 37%, and 14% respective increase in units sold at the focal retailer (all p -values < 0.05). However, there is no effect on sales when the direct competitor (supermarket) or the national, big box retailer raise their prices for products in these categories.

The focal retailer gains sales from the direct competitor when there is a price increase in the cold cuts category. Specifically, a 10% price increase at the competitor leads to a 6% increase in units sold at the focal retailer ($p < .05$). One counter-intuitive result was found in the produce category whereby an increase in prices at the direct competitor leads to a decrease in sales at the focal retailer. It is possible this is the result of the direct competitor having heavily discounted one of its star products (e.g., bananas, avocados), but raising the prices on the other products on the ca-

tegrity. The one product would attract more customers, raising the performance of the category as a whole. It is also reasonable to assume that price reductions in this category may have an effect on consumer perception regarding quality. Further research on this matter might clarify this.

As part of these analyses, the study examined whether seasonality may have an effect on price sensitivity or demand for products in the six categories examined. For example, in the summer months were certain dairy products (e.g., ice-cream) more or less sensitive to price discounting. There was no significant effect of time of year on demand or price sensitivity of products in the sample.

Discussion

This study was conducted to understand whether price sensitivity expands across food categories and competing retailer types in the emerging Mexican market.

To conduct the study, two unique datasets were used. These datasets comprised eight months of scanner data which captured weekly, product-level, price and units sold at a focal retailer, and mystery shopper data which captured weekly, product-level prices at three different competing retailers for the same time period. Results from this study show that price fluctuations have a significant effect on retail sales and this varies by category and retailer type in the growing Mexican retail market. These findings are consistent with research, conducted on a manufacturer level, on price- (cross-) price elasticity conducted in Mexico (Colchero et al., 2015; Colchero et al., 2016).

This study helps bridge the gap between food retailer pricing, and how prices are communicated through weekly shoppers, and consumer buying behavior using price changes as its main predictor. With the information developed in this study, retailers may plan their pricing strategies to better serve the preferences of their customers in the geographic region under study, helping them become more competitive. A key contribution to consider is the focus on purchasing behavior at the retailer level, where consumer preferences may be influenced by factors besides prices (Martín Erosa & Arroyo López, 2011; Ortiz & Harrison, 2011; Hino, 2014; Jayasankaraprosad, 2014). Additionally, the examination of price sensitivity across multiple Mexican retailers and multiple product categories is novel. Further, the findings presented in this research lend support to the use of retail advertising to inform customers about attractive pricing offers particularly in the categories of produce, meats and fishes, cold cuts, and meal preparation.

A few data limitations are present in this study. First, the study included one store of the focal retailer as the focal point for gathering data. This may affect data collection, although not observed in the dataset, due to stock-outs, which may affect consumer

loyalty (Martín Erosa & Arroyo López, 2011). The raw data were cleaned to eliminate cases where this seemed to be case, but this in turn may have partially affected the results, although the conclusions still hold. Second, the initial dataset spanned over an eight-month period. To ensure matching data across the four retailers and across categories, a narrower time span of 10 weeks was selected for analyses to obtain a complete dataset. Additional data would provide more insight. Third, this analysis was limited to price and promotion changes and hence the researchers are unable to uncover the motivations behind customer purchases or external market factors that could affect consumer demand, but that could be assumed, based on several studies reviewed in this paper, tend to have an effect on consumer decisions.

There are three general limitations worth noting in this study. First, the four retailers in this research were located in the state of Baja California, Mexico, particularly in the city of Tijuana. Although all of these retailers have operations in other states in the country, the data used apply to this one geographic location. However, the findings of this study may be transferable to serve consumers and retail managers in other parts of the country, but others are encouraged to conduct future research and explore data beyond the Baja California region. Second, this research examined the effects of price changes and the use of one specific advertising vehicle. As noted in the literature cited in this paper, there are non-price variables that affect consumer choices, which the researchers decided not to include as part of the analysis. Third, retailers use a variety of advertising and promotion tools to drive customers into their stores and increase sales. The one advertising vehicle examined in this study was the most prevalent, meaning the most significant promotional material in the marketing budget of the focal retailer, but did not address other efforts designed to drive commerce.

Managerial and policy implications

As a result of this study, managers can gain a better understanding of how price fluctuations and feature advertising affect unit sales differently across retailers and product categories in the Tijuana region. This is particularly true regarding cross-price elasticity. Retail managers in Mexico, in particular, can consider the findings of this study to develop competitive strategies at the category level rather than the store level. Retailers may choose which categories should be supported using price-based promotions and advertising, and which competitors to use as a benchmark for price variation. Previous studies have focused on the manufacturer or government side of pricing (Olivera-Chávez et al., 2010), however, the current research sheds light on how same-store and competitor pricing decisions, at a retail level, affect consumer preferences.

A word of caution is in order for retail managers to consider. Although these results seem to confirm that Mexican retail customers are price sensitive and are willing to shop around in search of a better deal, it is up to each individual retailer to assess whether it is worth it to compete based on price. It is possible that these findings may tempt food retailers to engage in price wars. In his seminal work, Cassady (1964) cautioned retail managers to consider the long-term implications of their pricing decisions, and not to be blinded by short-term gains. It is true that price decreases may create additional demand for food products, but the link between increased unit sales, sales, and profits was not examined in this study. Retail managers should discuss margins and profits when they design price-based strategies.

Mexican policy makers may use the results of this study to better understand how consumers might respond to price changes from a wide range of categories. Doubova, Sánchez-García, Infante-Castañeda, and Pérez-Cuevas (2016) noted that having a fixed income is associated with consumption of fruits and vegetables in at least one segment of the population in Mexico. It is disconcerting to see that even though the average price in the produce category is the lowest, it is the most price sensitive. This could imply that price is one of the factors that impedes the Mexican consumer's ability to eat healthier foods. Further, price changes for fruits and vegetables at competitors do not have a significant effect on purchases at the focal retailer.

Since feature advertising has a positive impact on sales of produce, retailers should continue to advertise these products and policy makers should consider the advantageous benefits of such advertising. This is an area for further exploration because it could have policy implications in terms of regulating prices of fruits and vegetables. An interesting angle for future research would be to conduct analyses at the product level to examine whether some products (e.g., healthy foods) are more susceptible to price changes or advertising effectiveness relative to other products (e.g., unhealthy foods).

The current study helps narrow the gap on research on how price changes and competitive price-based promotions influence consumer demand in the expanding Mexican retail market. For researchers, this study can serve as a resource on price and cross price sensitivity analyzed through scanner data and mystery shopper reports in the retail industry in Mexico as it joins Martín Erosa and Arroyo López (2011) in documenting the variables that affect retailer choice in the country. The benefit of these types of studies can aid both Mexican and foreign retailers to compete more effectively in the growing and complex consumer retail market in Mexico.

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