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Consumer Welfare Impacts of Online and Omnichannel Retail

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I. Introduction

In the ever-evolving landscape of retail, the surge of online and omnichannel shopping options has fundamentally expanded the range of alternatives available to consumers. The digital age has ushered in a new era where the customer experience is no longer confined to the physical aisles of stores; instead, customers can navigate the vast expanse of the internet to find the products they need across any category or see a product in a physical store, and check online prices and reviews. This revolution in retail offers unprecedented accessibility and convenience, but it also raises important questions about its implications for consumer welfare, particularly when comparing the experiences of urban versus rural customers.

The transition to a more digitally integrated shopping experience has been accelerated by recent technological advancements and changing consumer preferences. This shift is evident in official U.S. government statistics and supported by research analyzing U.S. Census data[1], which highlights the growth and resilience of small and medium retail businesses amidst digital transformation. As these businesses and some of the largest retailers in the United States adapt to and embrace omnichannel and e-commerce strategies, they create a myriad of opportunities and challenges for consumers.

This white paper explores the consequences of the rise of online and omnichannel retail on consumers. By examining relevant retail categories and comparing the experiences of urban and rural shoppers, we provide a comprehensive overview of how the digital retail revolution is reshaping consumer choices, preferences, and the value they receive from different shopping options.

Through a dual approach that combines direct estimation of consumer preferences with a value-driven analysis, this exploration delves into the heart of modern retail, uncovering the ways in which online and omnichannel options are influencing shopping behavior and consumer welfare in the United States.

We estimate consumer preferences using conjoint analysis. Our findings indicate that for customers who live far from stores, travel time to stores is a source of disutility. The speed of receiving the product, such as shipping speed for online orders, is very important to customers, but they strongly dislike shipping costs. Customers show a low level of channel attachment;

[1] Robert Kulick, "Apocalypse Not: The Resilience of Retail SMBs in the 2010s," July 2023, available at https://research.ccianet.org/reports/ccia-apocalypse-not-smb-resilience/.

channel choice does not emerge as one of the most relevant attributes. Customers care about the effort they must expend to receive products (e.g., travel times) and the speed of delivery, but for given levels of effort and speed, they do not care much about which channel they use. This suggests that the lines between online and offline retail are blurring in the minds of customers in the era of omnichannel retail. Companies with an online-first tradition compete directly with companies rooted in brick-and-mortar retail through their omnichannel offerings. Instead of distinguishing between online and offline commerce, it is becoming more appropriate to simply talk about commerce.

In light of the results of the conjoint analysis and the importance customers attribute to travel time and delivery speed, we conduct a separate value-driven analysis to quantify the experiences of different types of customers using online or offline options. We document the varying levels of availability of offline options across different categories and analyze the differences between rural and urban locations. Customers in rural areas have fewer offline options available to them and must drive significantly longer distances to access the same number of offline options. While stores are less accessible, the in-store experience is similar for rural and urban customers once they reach the store. The online channel does not present significant differences between rural and urban customers in terms of availability and quality, apart from a somewhat slower delivery speed in some rural areas. Hence, the rise of online and omnichannel retail serves as an equalizer of the shopping experience for urban and rural customers.

Exploring the welfare implications of omnichannel retail for both rural and urban customers provides insights into the nuanced impacts of digital transformation on diverse consumer populations. This contrast sheds light on the broader socio-economic and logistical challenges that shape shopping behaviors and accessibility across different geographic landscapes.

II. Analyzing the Impact of Online and Omnichannel Retail on Consumers: Preference-Driven vs. Value-Driven Approaches

To understand the multifaceted impacts of online and omnichannel retail on consumer welfare, we employ two distinct methodologies: a preference-driven and a value-driven approach. These methodologies offer complementary insights into how digital retail strategies shape consumer experiences and satisfaction, providing a nuanced understanding of the value proposition offered by modern retail environments.

The Preference-Driven Approach: Understanding Consumer Choices

The preference-driven approach delves into the psychological and behavioral dimensions of shopping decisions. Through the administration of a choice-based conjoint (CBC) survey, this method investigates how consumers value various attributes of their shopping experience.

CBC surveys, designed to simulate real-world purchasing decisions, ask participants to choose from sets of hypothetical product profiles, thereby revealing their preferences and decision-making criteria. This survey, conducted by NERA, involved 2,000 individuals with recent and anticipated online shopping activity. Participants were segmented into categories reflective of their shopping habits: apparel, home improvement, electronics, and groceries. After filtering for engagement and reliability, 1,939 responses provided a rich dataset for analysis.

This preference-driven exploration uncovers the subtleties of individual preferences that extend beyond mere value and convenience, highlighting the importance of choice, customization, and experience in the digital retail landscape.

Together, these approaches paint a comprehensive picture of the impact on consumer welfare that encompasses both the rational and emotional drivers of consumer choices. This dual methodology grounds the analysis in the practical realities of shopping logistics and economics while also incorporating consumer behavior to capture the richness of the impacts on consumers. Thus, by integrating these complementary perspectives, this research offers nuanced insights that are crucial for understanding how consumer welfare has been enhanced in the digital age.

The Value-Driven Approach: Quantifying Accessibility and Customer Experience

Complementing the preference-driven analysis, the value-driven approach quantifies the utility consumers derive from various aspects of their shopping experience using online and omnichannel options. These include the number of retail locations available to customers, travel time to and from retail locations, time spent at the retail location, delivery times, and the financial cost of purchases.

This analysis begins with an empirical examination of the geographical and temporal accessibility of physical retail options. Leveraging data on retailer locations and consumer residential addresses, along with the Google Maps API, we assess the convenience of reaching physical stores.

We complement the analysis of the accessibility of physical retail options with an examination of in-store customer experiences using mystery-shopper data.

Finally, we study how online and omnichannel options change the landscape of accessibility and customer experience in different locations. For this purpose, we conducted a "shopping cart analysis" to evaluate the cost and time efficiency of receiving products through different delivery and pickup options. By creating sample shopping carts for each retailer and applying sample residential addresses, we captured a snapshot of the logistical and financial considerations facing consumers in the digital shopping age.

The dual application of preference-driven and value-driven approaches aims to achieve a holistic understanding of consumer behavior and satisfaction in the digital retail landscape. The value-driven approach provides a tangible measure of the economic and time-related benefits that online and omnichannel retailing offer to consumers, emphasizing the practical advantages of digital shopping platforms, especially for customers in non-urban locations. It quantifies the convenience and efficiency gains, pivotal for consumers' day-to-day decision-making processes. Conversely, the preference-driven approach delves into the psychological and experiential facets of shopping that metrics alone cannot capture. By exploring consumer preferences, values, and the trade-offs they are willing to make, this method uncovers the deeper, often subconscious, factors influencing shopping behavior. This comprehensive approach, combining both value-driven and preference-driven methodologies, provides a holistic understanding of the impacts of online and omnichannel retail on consumer welfare. By examining both the tangible benefits and the experiential facets of modern retail, we gain a richer, more complete picture of how consumer experiences and satisfaction are shaped in the digital age.

III. Preference Driven Approach: Choice-Based Conjoint Analysis

In this section, we delve into the methodological approach used to understand consumer preferences, one of the two primary methods employed to explore the consumer welfare implications of omnichannel retail options. This approach adopts the perspective of customers utilizing various omnichannel services and employs a choice-based conjoint (CBC) analysis to elicit preferences and trade-offs. Furthermore, we examine how preferences and consumer welfare implications vary among customers of different income levels and between urban and rural areas.

Methodology

To study the impact of online and omnichannel retail on consumer welfare, we designed a choice-based conjoint (CBC) survey. CBC surveys mimic the purchase process by asking consumers to evaluate a set of hypothetical product profiles and indicate which one they would select.[2] CBC methods are used to estimate consumer preferences and consumer decisions under various scenarios.

This task was conducted by NERA, distributing the CBC survey to 2,000 unique respondents. The survey targeted individuals who had (1) purchased products or goods online in the past twelve months and (2) planned to make online purchases in the next twelve months. Respondents were categorized into one of four groups, including, (1) apparel, (2) home improvement, (3) electronics, and (4) grocery, based on their shopping habits. After excluding respondents who took longer than 60 minutes or less than four minutes to complete the survey, 1,939 unique individuals remained. Table 1 provides a breakdown of respondents by group.

Table 1: Number of Survey Respondents by Group

Group	Number of Respondents
Apparel	482
Home Improvement	484
Electronics	487
Grocery	486
Total	**1,939**

After qualifying for the survey, respondents were presented with descriptions of six attributes to consider when making a purchase. These attributes included (1) purchase method, (2) travel time, (3) order fulfillment time, (4) return policy and fees, (5) retailer, and (6) shipping cost. Descriptions of the attributes are as follows, and the attribute levels are detailed in Tables 2 through Table 5.

> ***Purchase method:*** This feature relates to how you place your order.
>
> ***Travel time:*** This feature refers to the time in minutes that it takes you to travel to the store (e.g., by driving, walking, or public transit).

[2] Mizik, Natalie, ed. and Hanssens, Dominique M., ed., *Handbook of Marketing Analytics: Methods and Applications in Marketing Management, Public Policy, and Litigation Support*, (United Kingdom: Edward Elgar Publishing, 2018), p. 57.

Order fulfillment time: This feature refers to the time it takes to fulfill your order. Order fulfillment time may be for home delivery or for in-store pickup.

Return policy and fees: The return policy feature includes return location options, including in-store or mail returns, and any fees associated with returns expressed in a dollar amount.

Retailer: The retailer is the store at which you are shopping.

Shipping cost: The cost to ship expressed as a dollar amount.

Table 2: Apparel Group Attribute Levels

Purchase method		Travel time		Order fulfillment time		Return policy and fees		Retailer		Shipping cost	
1	Web	1	Not applicable	1	Home Delivery Same Day	1	Free return by mail or in store	1	Amazon	1	Free shipping
2	App	2	10 minutes to store	2	Home Delivery Next Day	2	Free in-store return or pay $1.72 for return by mail	2	Target	2	Shipping cost is $1.72
3	Traditional Retail Store	3	20 minutes to store	3	Home Delivery 2 business days	3	Free in-store return or pay $4.30 for return by mail	3	Walmart	3	Shipping cost is $3.44
4	Kiosk Retail Store	4	30 minutes to store	4	Home Delivery 5 business days	4	Pay $1.72 to return by mail (no in-store return)	4	Macy's	4	Shipping cost is $5.16
		5	40 minutes to store	5	Pick up in the store now	5	Pay $4.30 to return by mail (no in-store return)	5	The Gap	5	Shipping cost is $6.88
				6	Pick up in the store in two days					6	Shipping cost is $8.60

Table 3: Home Improvement Group Attribute Levels

Purchase method		Travel time		Order fulfillment time		Return policy and fees		Retailer		Shipping cost	
1	Web	1	Not applicable	1	Home Delivery Same Day	1	Free return by mail or in store	1	Amazon	1	Free shipping
2	App	2	10 minutes to store	2	Home Delivery Next Day	2	Free in-store return or pay $4.92 for return by mail	2	Target	2	Shipping cost is $4.92
3	Traditional Retail Store	3	20 minutes to store	3	Home Delivery 2 business days	3	Free in-store return or pay $12.30 for return by mail	3	Walmart	3	Shipping cost is $9.84
4	Kiosk Retail Store	4	30 minutes to store	4	Home Delivery 5 business days	4	Pay $4.92 to return by mail (no in-store return)	4	Home Depo	4	Shipping cost is $14.76
		5	40 minutes to store	5	Pick up in the store now	5	Pay $12.30 to return by mail (no in-store return)	5	DeWalt Store	5	Shipping cost is $19.68
				6	Pick up in the store in two days					6	Shipping cost is $24.60

Table 4: Electronics Group Attribute Levels

Purchase method		Travel time		Order fulfillment time		Return policy and fees		Retailer		Shipping cost	
1	Web	1	Not applicable	1	Home Delivery Same Day	1	Free return by mail or in store	1	Amazon	1	Free shipping
2	App	2	10 minutes to store	2	Home Delivery Next Day	2	Free in-store return or pay $7.10 for return by mail	2	Target	2	Shipping cost is $7.10
3	Traditional Retail Store	3	20 minutes to store	3	Home Delivery 2 business days	3	Free in-store return or pay $17.75 for return by mail	3	Walmart	3	Shipping cost is $14.20
4	Kiosk Retail Store	4	30 minutes to store	4	Home Delivery 5 business days	4	Pay $7.10 to return by mail (no in-store return)	4	Best Buy	4	Shipping cost is $21.30
		5	40 minutes to store	5	Pick up in the store now	5	Pay $17.75 to return by mail (no in-store return)	5	Microsoft Xbox Store	5	Shipping cost is $28.40
				6	Pick up in the store in two days					6	Shipping cost is $35.50

Table 5: Grocery Group Attribute Levels

Purchase method		Travel time		Order fulfillment time		Return policy and fees		Retailer		Shipping cost	
1	Web	1	Not applicable	1	Home Delivery Same Day	1	Free return by mail or in store	1	Amazon	1	Free shipping
2	App	2	10 minutes to store	2	Home Delivery Next Day	2	Free in-store return or pay $1.50 for return by mail	2	Target	2	Shipping cost is $1.50
3	Traditional Retail Store	3	20 minutes to store	3	Home Delivery 2 business days	3	Free in-store return or pay $3.75 for return by mail	3	Walmart	3	Shipping cost is $3.00
4	Kiosk Retail Store	4	30 minutes to store	4	Home Delivery 5 business days	4	Pay $1.50 to return by mail (no in-store return)	4	Kroger	4	Shipping cost is $4.50
		5	40 minutes to store	5	Pick up in the store now	5	Pay $3.75 to return by mail (no in-store return)	5	Costco	5	Shipping cost is $6.00
				6	Pick up in the store in two days					6	Shipping cost is $7.50

Survey respondents participated in a study using conjoint analysis, where they made choices among various sets of features relevant to deciding where and how to purchase a hypothetical cart of goods. Each choice scenario presented to the respondents included three options, each with a distinct combination of six previously described attributes. Respondents were then asked to select their preferred option from these combinations. Figure 1 illustrates a choice scenario specific to the apparel group. Across all four groups, each respondent evaluated 12 choice sets, culminating in a total sample size of 23,268.[3]

[3] 1,939 unique individuals x 12 choice sets = 23,268.

Figure 1: Example of a Choice Scenario for the Apparel Group in the Omnichannel Conjoint Analysis

Thinking about the options you see here, which option would you be most likely to select if you were purchasing these hypothetical goods for yourself or someone else?

Option 1	Option 2	Option 3
Free in-store return or pay $4.30 for return by mail	Pay $4.30 to return by mail (no in-store return)	Free in-store return or pay $1.72 for return by mail
Ordered on App	Ordered at Traditional Retail Store	Ordered at Kiosk Retail Store
Pick up in the store now	Pick up in the store in two days	Home Delivery 5 business days
Free shipping	Free shipping	Shipping cost is $3.44
Walmart	Target	Amazon
10 minutes to store	40 minutes to store	30 minutes to store
○	○	○

Results and Discussion

The impact of each attribute on the decisions made by survey respondents was assessed using a multinomial logit model. This statistical model calculates the likelihood that an individual will select a specific option from a given set. For each attribute, the model estimates both the random coefficient and its standard deviation.

The base attribute combination for all groups is detailed in Table 6 below.

Table 6: Attributes and Corresponding Base Levels

Attribute	Level
Purchase method	Web
Travel time	Not applicable
Order fulfillment time	Home delivery same day
Return policy and fees	Free return by mail or in store
Retailer	Amazon
Shipping cost	Free shipping

Note: Purchase method, order fulfillment time, return policy and fees, retailer and shipping cost variables are dummy variables. Travel time is a continuous variable measured in units of minutes.

Appendix B provides detailed regression results for each group, presenting the coefficients that describe the impact of various attribute levels on the likelihood of choosing a particular alternative compared to a reference alternative. A positive coefficient on a dummy variable signifies that the option is more desirable than the base case attribute, while a negative coefficient indicates the opposite. For instance, in the apparel group, the

coefficients for purchase method levels (i.e., app, traditional retail store, and kiosk retail store) are negative. This implies that, holding everything else constant, purchasing via an app, a traditional retail store, or a kiosk retail store is less desirable compared to purchasing via the web.

The "Travel Time" variable, a continuous variable, reflects travel time in minutes. The "No Travel" variable, a dummy variable, indicates scenarios where travel time is irrelevant, such as when items are shipped directly to the customer's home. This distinguishes these cases from situations where travel time is negligible (e.g., a store right next door). We assign a value of one to the "No Travel" variable when the purchased items are shipped (i.e., from an online-only retailer like Amazon) and a value of zero otherwise.

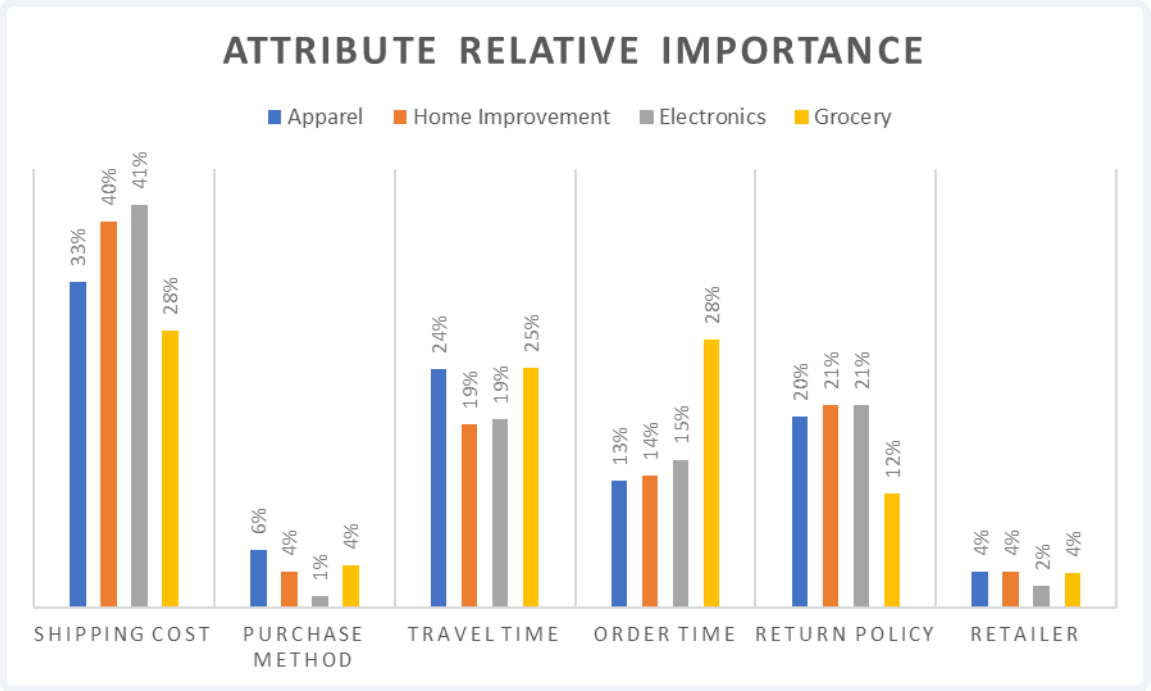
To estimate attribute importance, we calculated the relative importance of each attribute, which measures its influence on choice compared to other attributes. Relative importance is calculated by dividing an attribute's utility range[4] by the sum of the utility ranges for all attributes.

Figure 2 below illustrates the relative importance by attribute for each of the four groups for all geographies and all income levels. Travel Time and No Travel coefficients are negative and statistically significant[5] for all four groups. "Shipping Cost" consistently emerges as the most important attribute across all groups, indicating it has the greatest influence on choice. Conversely, "Purchase Method" and "Retailer" are consistently the least influential attributes. For all groups except grocery, "Travel Time" and "Return Policy" follow in importance. In the grocery group, "Order Time" is the second most important attribute.

[4] Utility range = Highest Utility Value of an attribute - Lowest Utility Value of an attribute

[5] A high degree of statistical significance indicates that the observed relationship is unlikely to have occurred by chance.

Figure 2: Relative Importance by Attribute and Group for All Geographies and Income Levels



To analyze the importance of attributes across different product groups, several key insights emerge:

In the apparel category, "Shipping Cost" emerges as the most critical factor, followed closely by "Travel Time." Conversely, "Retailer" holds minimal significance. Within the home improvement sector, "Shipping Cost" again proves pivotal, with "Return Policy" assuming a secondary importance. Meanwhile, "Retailer" and "Purchase Method" demonstrate negligible impact. Electronics exhibit a similar trend, with "Shipping Cost" as the foremost consideration, trailed by "Return Policy" and "Travel Time." Notably, "Retailer" and "Purchase Method" exhibit minimal relevance. The grocery segment underscores "Shipping Cost" and "Order Time" as pivotal attributes, followed by "Travel Time." Conversely, "Retailer" exerts little influence. To gauge each attribute's relative importance accurately, the average score for each attribute is divided by the cumulative utility ranges.

Figure 3 through Figure 6 display the average preference for levels by group type. High scores are assigned to levels that are strongly preferred by customers, while levels that perform poorly (in comparison) are assigned lower scores. The chart is scaled so that, for each attribute, the sum of all positive values equals (the absolute value of) the sum of all negative values.

Figure 3: Apparel Group Average Preference for Levels

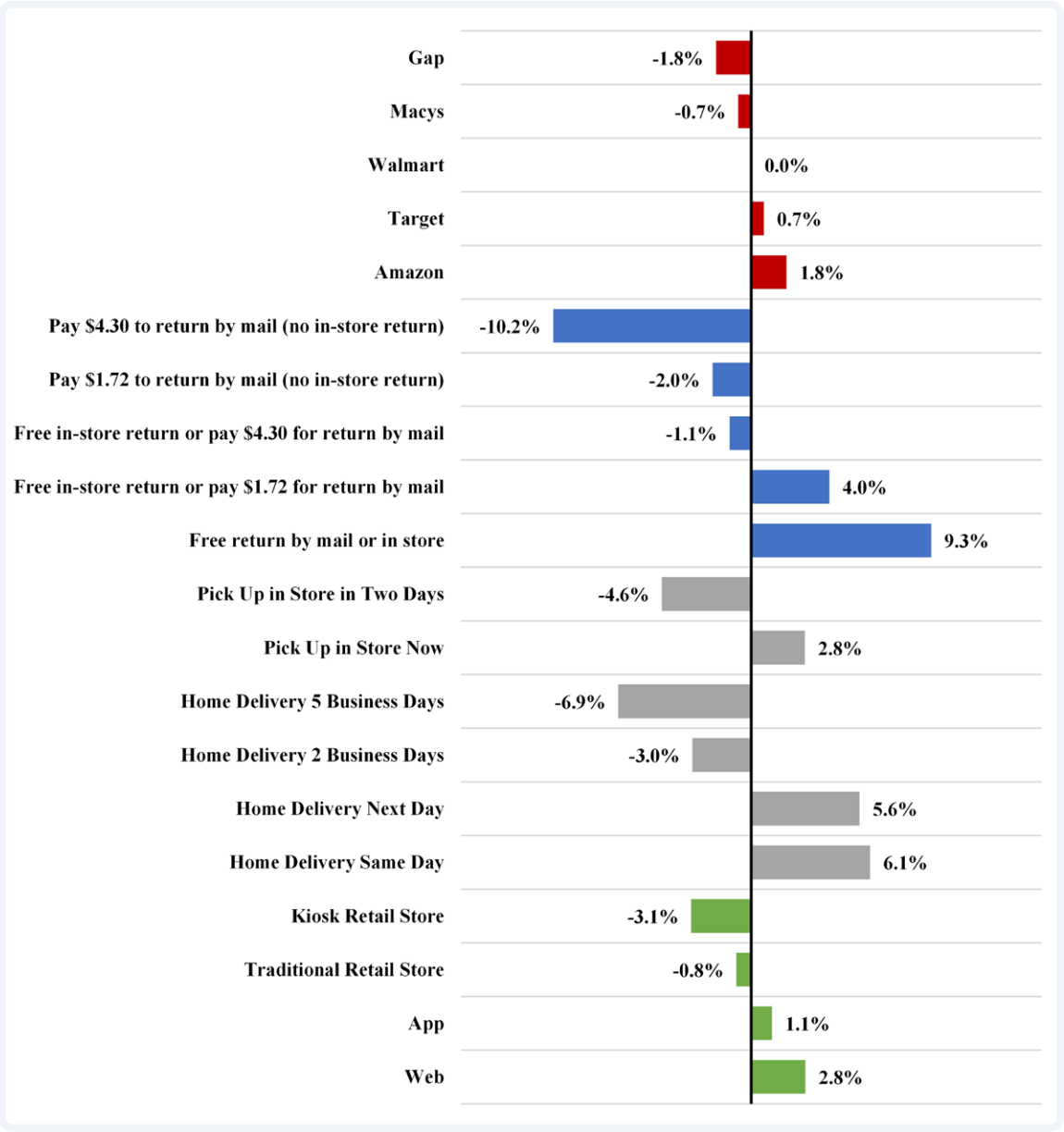


Figure 4: Home Improvement Group Average Preference for Levels

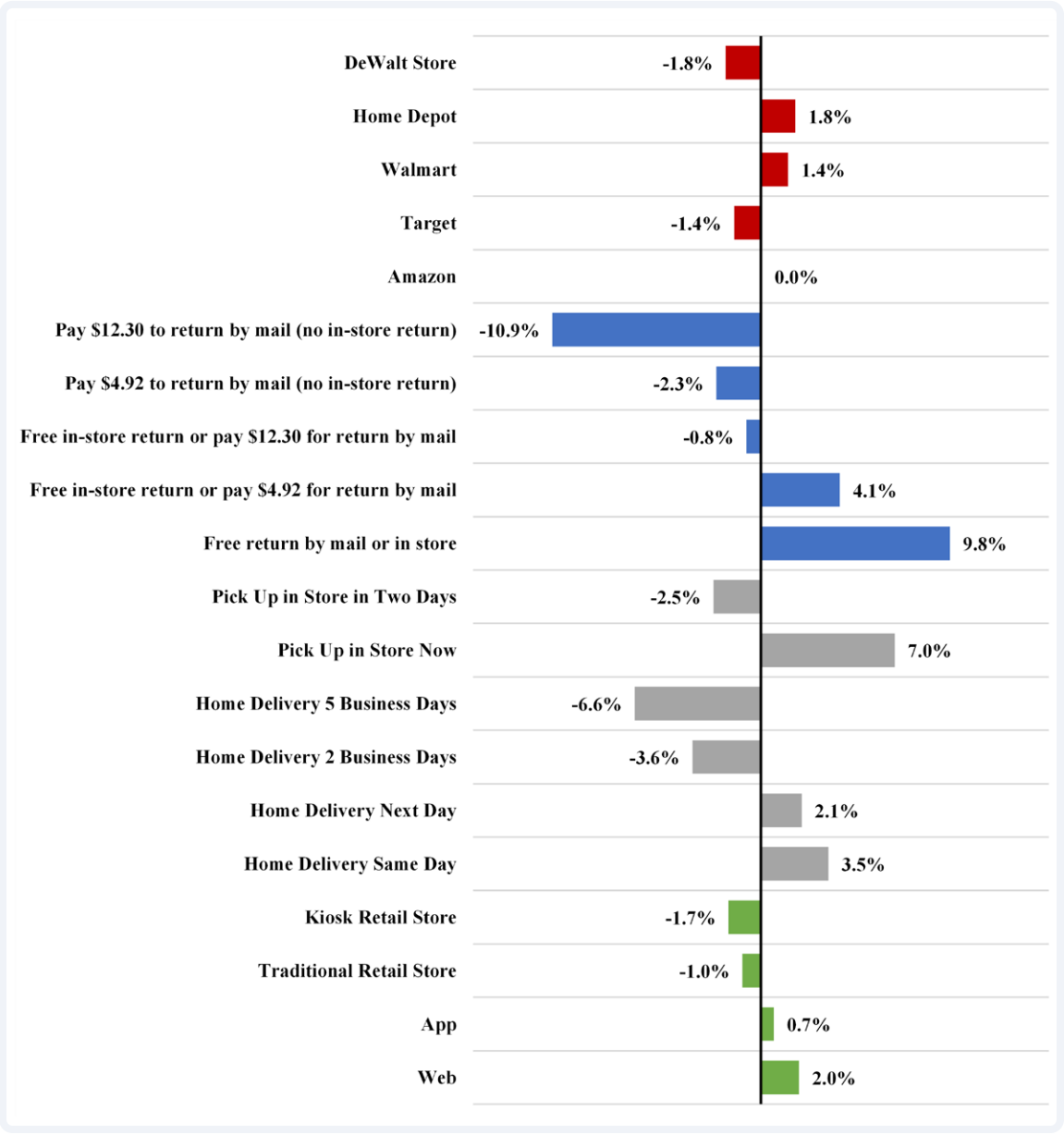


Figure 5: Electronics Group Average Preference for Levels

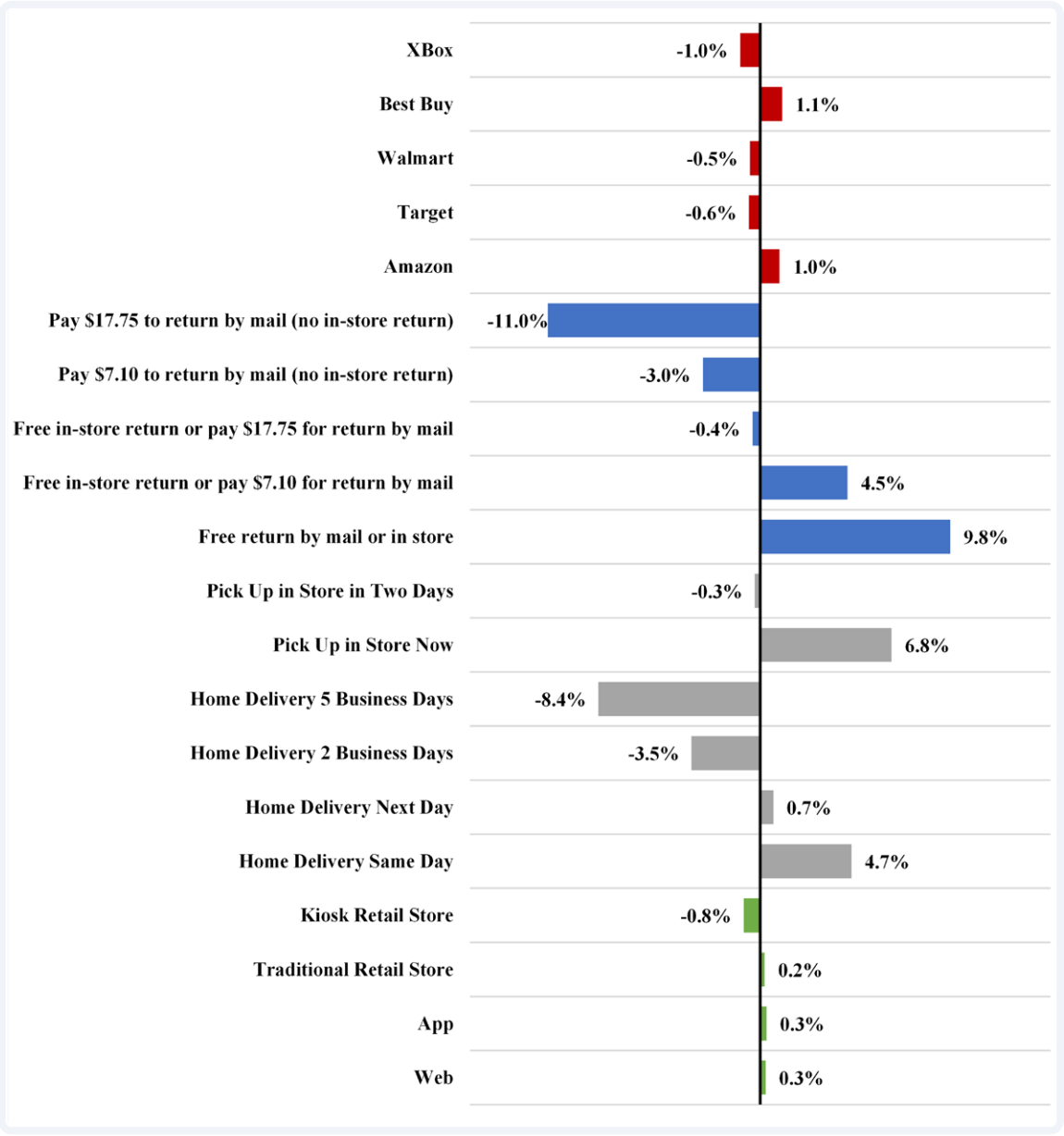
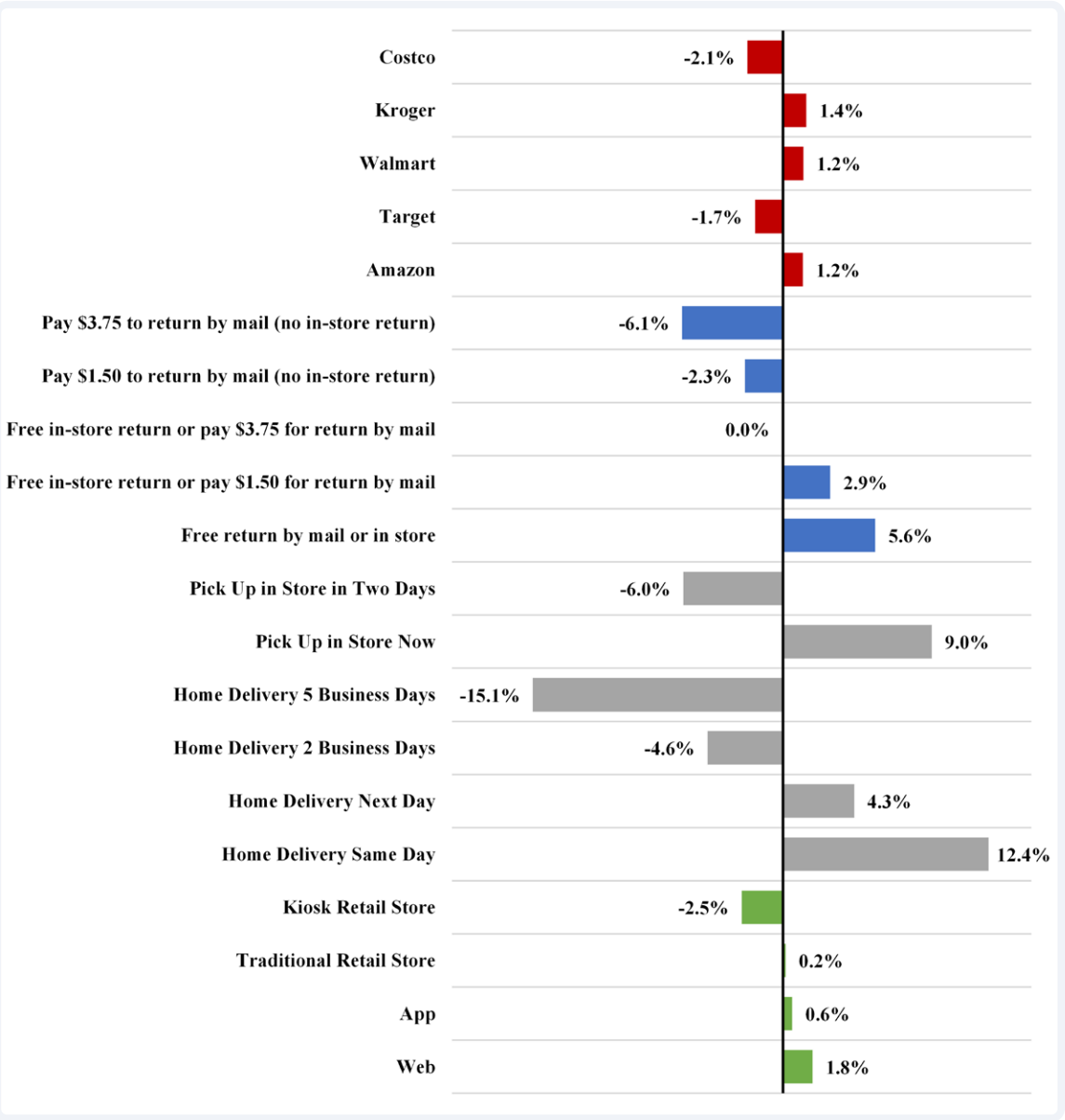


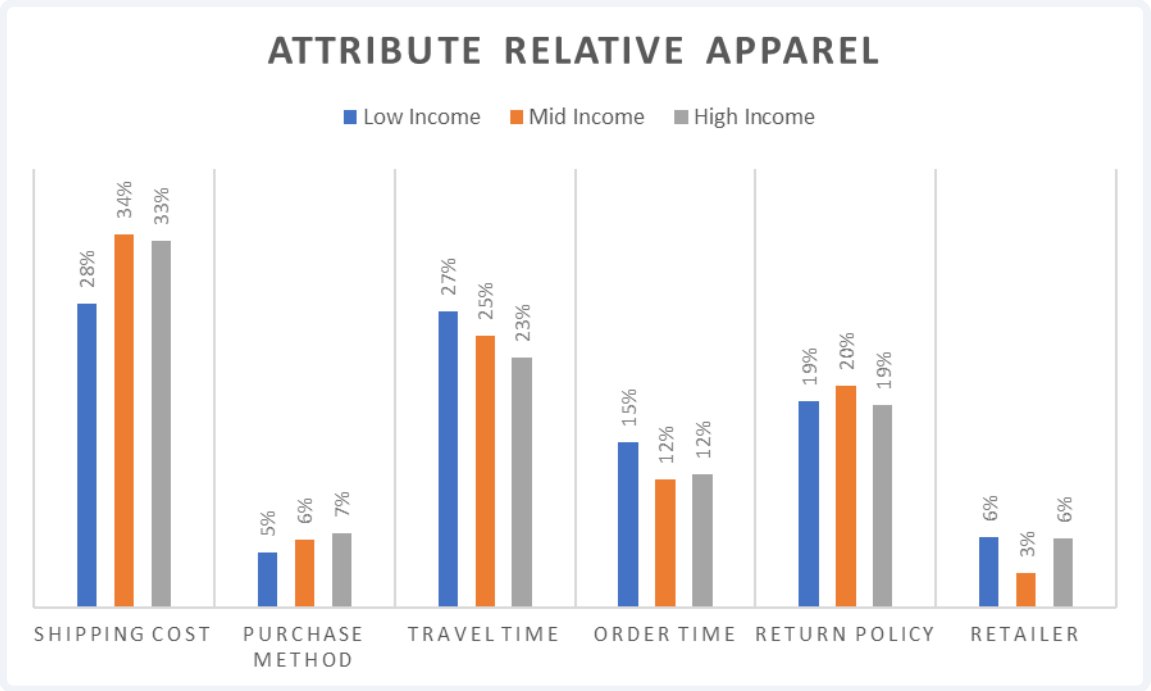
Figure 6: Grocery Group Average Preference for Levels



Role of Income

Figure 7 depicts the varying significance of attributes within the apparel sector across different income levels and geographical regions. Within this sector, attributes such as travel time show consistently negative and statistically significant coefficients. Among these attributes, "Shipping Cost" emerges as the most pivotal factor influencing consumer choice, followed closely by "Travel Time" and "Return Policy." Conversely, attributes like "Retailer" and "Purchase Method" exert minimal influence on consumer decision-making within the apparel industry. This hierarchy underscores that while shipping costs heavily sway consumer preferences, factors such as purchase method and retailer have the least influence.

Figure 7: Attribute Significance within Apparel Sector by Income



Within the apparel group, the attribute of "Shipping Cost" emerges as the most crucial, closely followed by "Travel Time." Conversely, "Purchase Method" ranks as the least influential attribute.

To determine relative importance by level, we divide the average score for each attribute level by the sum of all utility ranges. Figure D1 demonstrates that survey respondents show a 9.2% higher likelihood of selecting an option offering "Free Return by Mail or In-Store," compared to a 9.6% lower likelihood for options requiring a payment of $4.30 for mail returns with no in-store option. Similarly, respondents are 7.6% more inclined towards options providing "Home Delivery Same Day," while showing a 7.5% lower preference for "Home Delivery 5 Business Days."

It's notable that the income type variable only yielded significant results in the regression analysis for Group 1 (Apparel), failing to achieve significance in Home Improvement, Grocery, and Electronics groups due to insufficient variance in the respective sub-samples under the current regression model specification.

Figure 7 illustrates the relative importance of attributes within the apparel group specifically in mid-income geographies and Table B6 summarizes the regression results in the apparel group in mid-income geographies. Notably, for this income type variable, the sub-sample regression analysis was effective only for Group 1 (Apparel), with other groups lacking sufficient variation for statistical significance under the current model

specification. In mid-income geographies, the coefficients for travel time and shipping cost are negative and statistically significant. "Shipping Cost" emerges as the most influential attribute, followed by "Travel Time" and "Return Policy," whereas "Retailer" and "Purchase Method" are deemed least important attributes for the apparel group. This means that shipping cost has the biggest influence on choice, while purchase method and retailer have the least influence.

For the apparel group, the “Shipping Cost” attribute” turns out to be the most important attribute, followed by “travel time.” “Retailer” is the least important attribute.

Figure D2 outlines average preferences within the apparel group in mid-income geographies. Survey results indicate a 9.0% higher likelihood of selecting options offering "Free Return by Mail or In-Store," and an 11.2% lower likelihood for options requiring payment for mail returns without an in-store option. Additionally, preferences lean 6.0% towards "Home Delivery Next Day" and 5.9% towards "Home Delivery Same Day," while showing a 5.6% lower preference for "Home Delivery in 5 Business Days."

Figure 7 further emphasizes attribute importance within the apparel group, specifically in high-income geographies and Table B7 summarizes the regression results in the apparel group in high income geographies. As with mid-income findings, the income type variable's sub-sample regression analysis was effective solely for Group 1 (Apparel), lacking sufficient variation in other groups to achieve statistical significance under the current model. In high-income geographies, the coefficient for travel time is negative and statistically significant. "Shipping Cost" retains its position as the most influential attribute, followed by "Travel Time" and "Return Policy," with Retailer” and “Purchase Method” are the least important attributes for the apparel group in high-income geographies. This means that shipping cost has the biggest influence on choice, while purchase method and retailer have the least influence.

Figure D3 presents average preferences within high-income geographies for the apparel group, highlighting a 9.1% higher likelihood of selecting options with "Free Return by Mail or In-Store," and a 9.3% lower likelihood for options requiring payment for mail returns without an in-store option. Preferences also incline 5.4% towards "Free In-Store Return or $1.72 for Return by Mail," while showing a 6.8% lower preference for "Home Delivery in 5 Business Days."

Role of Geography

Furthermore, we present key findings categorized by geography type and income level. It's important to note that certain combinations lacked sufficient respondent representation, resulting in non-statistically significant coefficients.

Figure 8 presents the attribute's relative importance in rural geographies. Overall, results for rural customers mirror aggregate findings, emphasizing the low importance of "Purchase Method" across all cases, suggesting minimal channel attachment. In contrast, attributes such as shipping costs, travel time, order fulfillment speed, and return policies hold greater importance.

Figure 8: Attribute Relative Importance in Rural Geographies

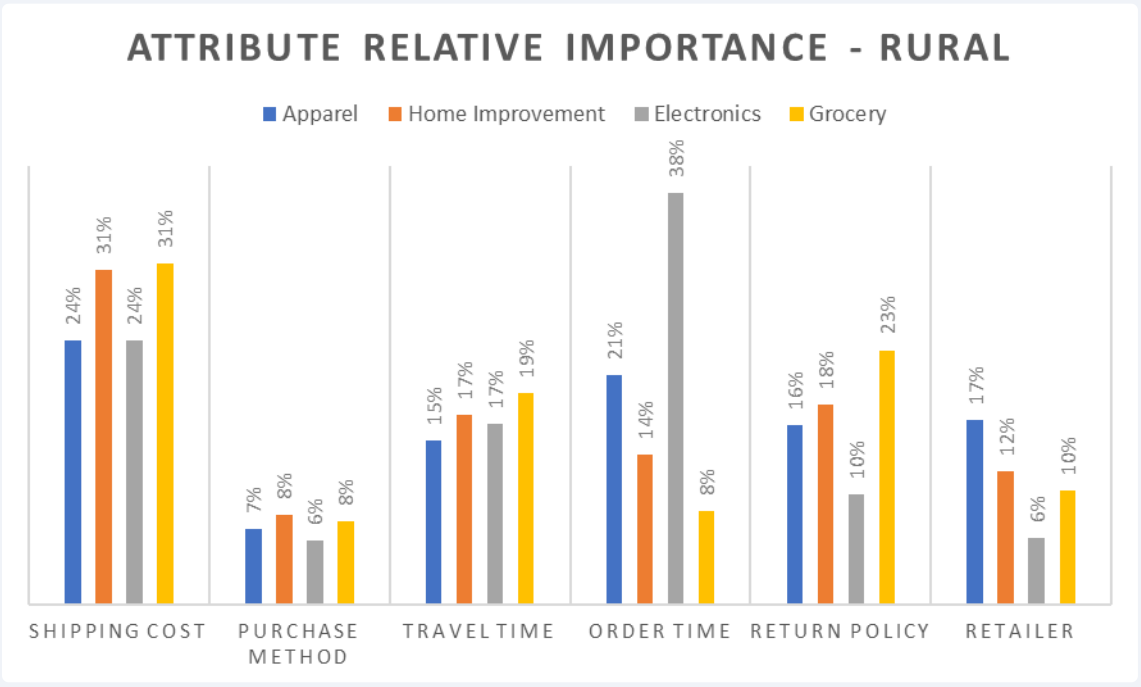
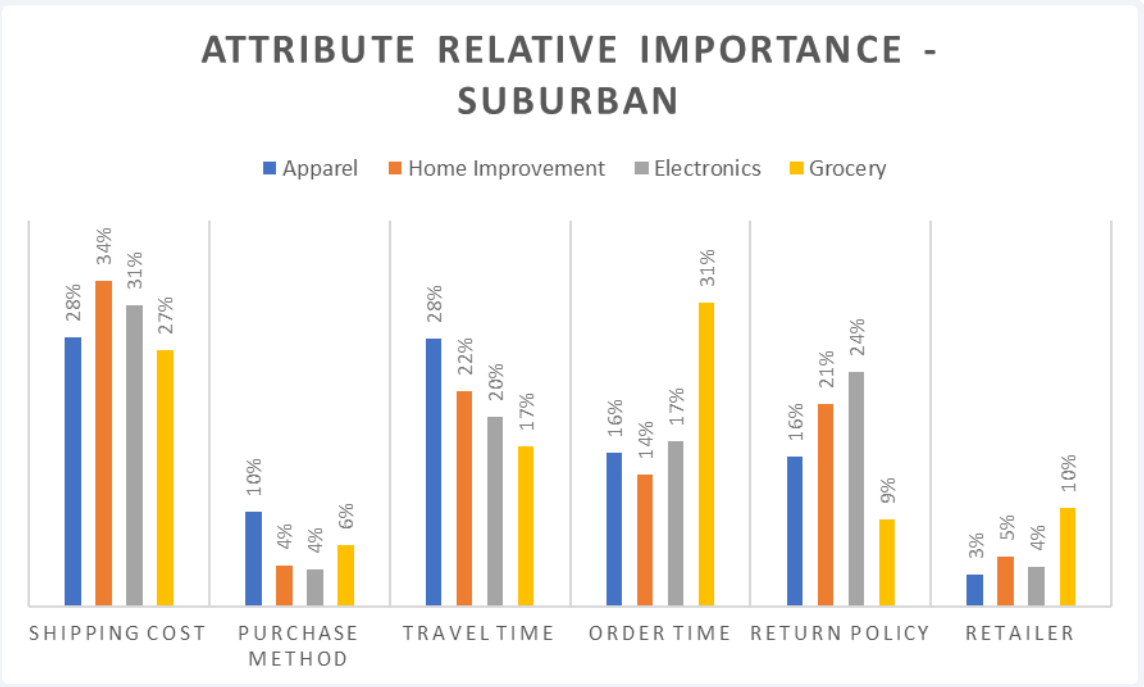


Figure 9 displays the attribute's relative importance in suburban geographies. The findings hold consistently across suburban customers. In all four groups, the coefficient for travel time is negative and statistically significant. For the Apparel, Home Improvement, and Electronics groups, "Shipping Cost" emerges as the pivotal attribute, whereas the Grocery group prioritizes "Order Time." Notably, there is minimal channel attachment; "Purchase Method" ranks as the least influential attribute for Home Improvement, Electronics, and Grocery groups, while "Retailer" holds the least significance for the Apparel group. Thus, shipping cost predominantly drives consumer choice across these groups, with the

exception of the Grocery group, where order time assumes greater importance.

Figure 9: Attribute Relative Importance in Suburban Geographies

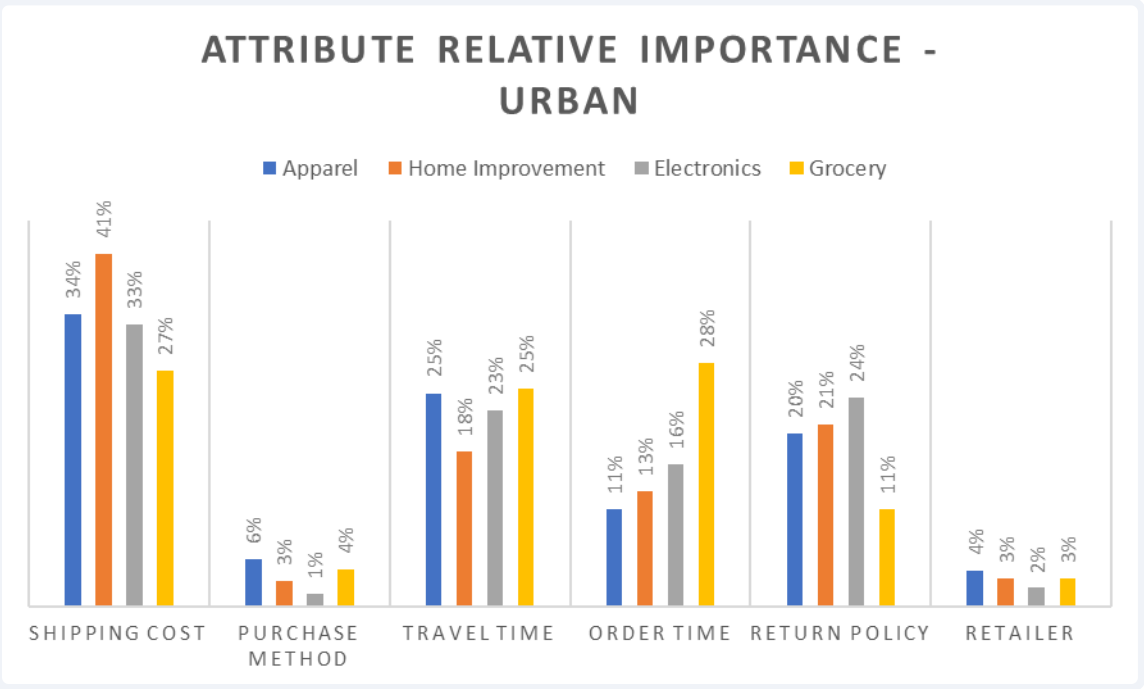


In the realm of consumer preferences across different product categories, the significance of various attributes varies notably. Within the apparel group, "Shipping Cost" is the most important attribute, followed closely by "Travel Time," relegating "Retailer" being the least important. Similarly, in the domain of home improvement, "Shipping Cost" retains its primary importance, with "Travel Time" following suit, while "Purchase Method" assumes a less critical stance. Electronics consumers also prioritize "Shipping Cost" above all else, with "Return Policy" assuming a secondary role, and "Purchase Method" again being of lesser concern. Contrarily, the grocery sector showcases a different dynamic where "Order Time" stands as the most critical attribute, followed by "Shipping Cost," whereas "Purchase Method" being the least significant.

Figure 10 shows the attribute's relative importance in urban geographies, which shows similar patterns. As illustrated in Figures 7 through 10, where "Retailer" and "Purchase Method" consistently rank as the least influential attributes across all groups, indicative of a lower level of attachment to specific shopping channels. Notably, the negative and statistically significant coefficient associated with travel time across all groups further underscores its lesser importance in consumer decision-making.

In summary, while "Shipping Cost" exerts significant influence across multiple consumer segments, variations in attribute importance underscore distinct consumer priorities across different product categories and geographic contexts.

Figure 10: Attribute Relative Importance in Urban Geographies



Within the apparel category, "Shipping Cost" emerges as the most critical factor, followed by "Travel Time," while "Retailer" ranks least important. Similarly, in home improvement, "Shipping Cost" takes precedence, with "Purchase Method" being least significant. For electronics, "Shipping Cost" is paramount, followed by "Return Policy," and "Purchase Method" holds the least weight. In the grocery sector, "Order Time" tops the list, "Shipping Cost" follows, and "Retailer" is deemed least crucial.

Across all groups, irrespective of geography or income level, travel time remains relevant, underscoring the importance of store proximity. Rural customers, facing longer travel times, may be disproportionately affected in utility terms. Shipping cost consistently stands out as the most influential factor in apparel, home improvement, and electronics, regardless of geography or income. For groceries, order time emerges as pivotal. This highlights that online options may not provide the same level of equalization across all consumer groups. Purchase method and retailer consistently rank as the least important attributes across all groups and demographics.

Exceptions to these trends are noticeable in rural areas, where order time becomes critical for electronics buyers due to limited physical store access. Quick delivery options facilitated by omnichannel and online platforms are particularly valued here. Additionally, shipping cost holds utmost importance for rural grocery shoppers, emphasizing affordability over speed.

Regarding preferences, free mail returns are strongly preferred across apparel, home improvement, and electronics categories, contrasting with a strong preference for same-day home delivery in the grocery sector. In apparel, home improvement, and electronics, paying for mail returns without an in-store option is strongly disfavored. For groceries, a five-day home delivery timeframe is notably unpopular.

Rural areas diverge from these preferences. In apparel, shopping on Amazon and avoiding five-day home deliveries are preferred. Electronics buyers favor in-store pickup, and rural grocery shoppers prefer free mail or in-store returns.

Summary

This section outlines our methodological approach to understanding consumer preferences and the implications of omnichannel retail options on consumer welfare. A conjoint survey, simulating the purchasing process, was conducted with 2,000 respondents categorized into apparel, home improvement, electronics, and grocery groups.

Key findings underscore shipping cost as the primary determinant of consumer choices across all demographics and product categories. This finding highlight consumers' sensitivity to shipping costs in online purchases. Quick delivery options and flexible return policies are also crucial, particularly in apparel, home improvement, and electronics.

Our findings indicate that customers show a low level of channel attachment; channel choice does not emerge as one of the most relevant attributes. Customers care about the effort they must expend to receive products (e.g., travel times) and the speed of delivery, but for given levels of effort and speed, they do not care much about which channel they use.

The survey underscores a strong preference for free returns, whether by mail or in-store, and reluctance towards paying return fees. This underscores the importance of convenience and cost-effectiveness post-purchase in enhancing consumer satisfaction and welfare.

Geographically, rural consumers exhibit distinct preferences. For example, electronics buyers prioritize order fulfillment time due to limited physical store access, while rural grocery shoppers prioritize lower shipping costs over delivery speed.

These insights suggest that while shipping costs and return policies are universally critical, retailers must tailor their strategies to address the specific needs of urban, suburban, and rural consumers effectively.

IV. Value-Driven Approach: Quantifying Accessibility and Customer Experience

Introduction

In our exploration of omnichannel retail's utility, our value-driven approach presents a framework that captures the essence of consumer accessibility and convenience. Central to this analysis is the premise that consumer utility hinges on several quantifiable factors: diversity in location options, temporal dimensions of access, duration spent at locations, lead time for product receipt, and financial outlay for purchases. Grounded in empirical data collection and analysis, this approach aims to offer a comprehensive view of the logistical and economic landscape of digital retailing.

Our investigation into location options and the time required to access these retail points involved compiling extensive data on retailer locations and a sample of consumer residential addresses. Utilizing the Google Maps API, we evaluated the spatial distribution of retail options available to consumers and the corresponding time investments required to reach these destinations. This phase of the analysis illuminated the geographic accessibility of physical retail options, providing insights into the spatial dynamics influencing shopping behavior.

We quantified aspects of the in-store customer experience through data collected from mystery-shopper trips across different geographic areas. The "mystery-shopper" exercise allowed us to delve into product availability and price differentiation in-store. Survey respondents from rural, suburban, and city-center locations shopped for pre-selected goods, reporting on availability, price, and time spent in stores. This data enabled us to assess how prices and availability varied across locations and in comparison, to online shopping options.

Lastly, we examined how online and omnichannel options alter accessibility and customer experience across diverse locations. Through a "shopping cart exercise," we explored the operational and financial aspects of online shopping. By creating representative shopping carts for

each retailer and inputting various residential addresses, we evaluated the range of shipping and pickup options available to consumers. This exercise not only unveiled the estimated costs associated with each option but also provided insights into delivery and pickup timelines, thereby quantifying the efficiency and economic viability of different fulfillment methods across residential addresses. Furthermore, this analysis allowed us to quantify geographic variations in service quality experienced by customers.

This multifaceted approach—analyzing spatial retail accessibility, in-store customer experiences, and operational logistics of product receipt—paints a comprehensive picture of the consumer journey within the omnichannel retail ecosystem. By systematically measuring these critical dimensions, our value-driven analysis illuminates the tangible benefits and constraints of digital retailing, offering valuable insights for businesses seeking to optimize their omnichannel strategies in line with consumer expectations and preferences.

Accessibility of Physical Retail

We conducted two types of analysis using the Google Maps API: (1) calculating travel times between each residential address and the nearest focal retailers and (2) determining the number of retailer store locations within 10, 20, 30, and 40-mile radius of each residential address.

To conduct this analysis, we utilized two datasets: residential address data and retailer location data. The residential address data was sourced from Caldwell List Company, a mailing list broker offering customized data pulls from their residential mailing list.[6] The retailer address data was obtained from ChainXY, a data solution company that sells business locational data by retailer chain.[7]

The residential data was sampled based on specific income distributions across urban and rural households. We sampled ten low-income zip codes in the 25th percentile of income per capita and ten high-income zip codes in the 75th percentile, across four urban (New York, Los Angeles, Chicago, Miami) and four rural locations (Vermont, Alabama, Montana, Oklahoma). In total, we collected 100 random residential addresses from 160 different zip codes, resulting in 16,000 residential addresses.[8]

[6] See "Residential Mailing List," Caldwell List Company, https://www.caldwell-list.com/consumer-lists/, accessed on July 10, 2023.

[7] See "About ChainXY", ChainXY, https://chainxy.com/pages/faq, accessed on July 10, 2023.

[8] (10 low-income zip codes + 10 high income zip codes) x 8 locations = 160 zip codes

Retailer location data from ChainXY included various department stores such as Costco, Walmart, Target, and Macy's; specialty stores like Best Buy, Home Depot, and The Gap; and the drug store Walgreens. Additionally, the top two regional grocery stores per urban and rural area of interest were selected.[9] These included Albertsons, Associated Food Stores, Grocery Outlet, Hannaford Supermarkets, Harps Food Store, Homeland, Jewel-Osco, Key Food, Mariano's, Piggly Wiggly, Publix Supermarkets, Safeway, Shaw's, Tops Friendly Markets, Winn Dixie, and ALDI due to its widespread presence.

Availability of Physical Retailers

We first analyze the total number of physical locations of the retailers in our sample that were available within a certain distance of each of our residential addresses. This provides a sense of the number of retail options available to customers in different geographic locations. We consider different cutoffs for the distance, including 10, 20, 30, and 40-mile radius.

To count the number of locations of each focal retailer in a 10, 20, 30, and 40-mile radius of the list of residential addresses, we used retailer and residential longitude and latitude data as inputs and computed the distance using the "distVincentyEllipsoid" function from the "geosphere" R package.[10]

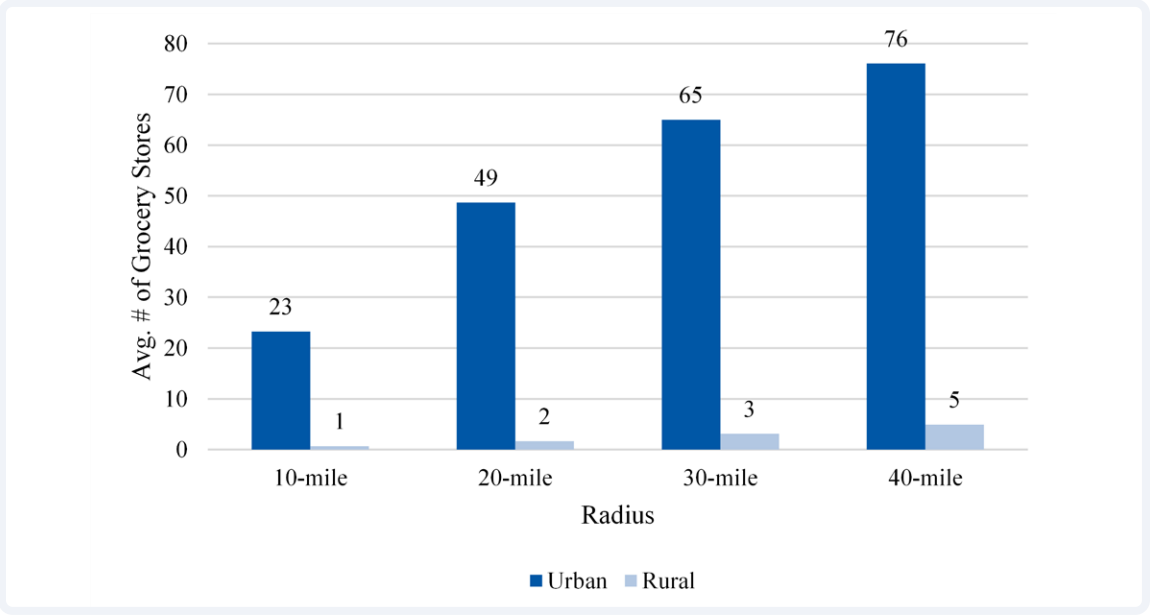
This methodology ensured comprehensive analysis of retail accessibility relative to residential locations, providing valuable insights into geographic retail distribution and accessibility patterns.

Figures 11 to 14 detail the average number of stores by store type, location type, and distance radius.

[9] Top grocery chains were selected based on the number of store locations in each state.

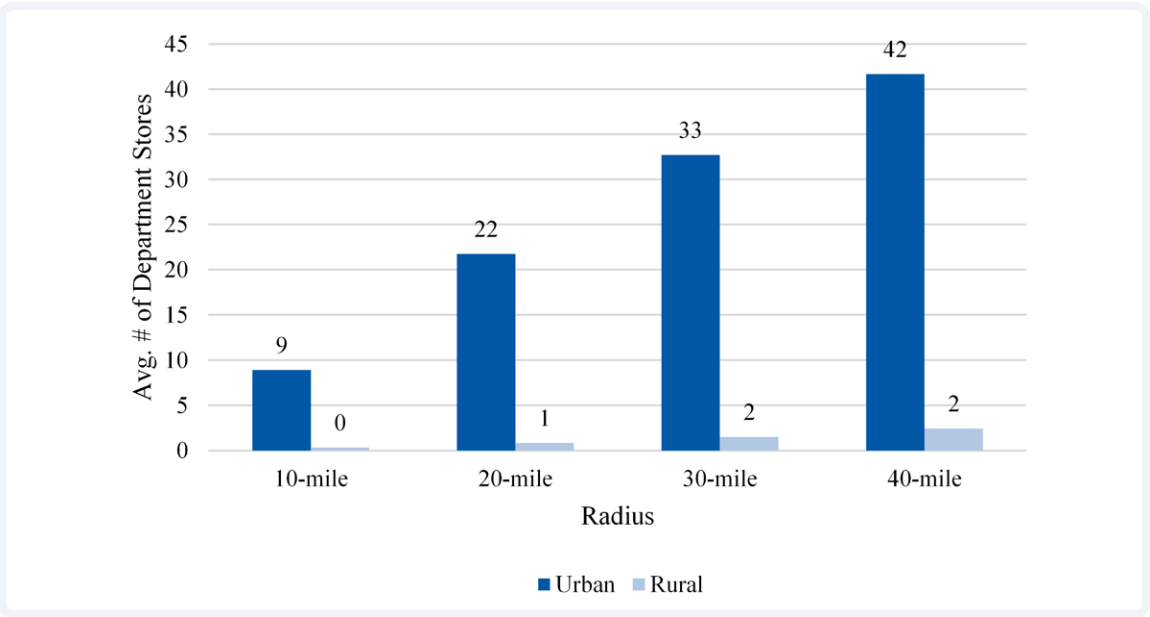
[10] Before conducting the retailer count, we performed the following data cleaning: (1) We dropped retailer store types that were not traditional versions of the store (i.e., neighborhood markets, pickup only, community pharmacy, pharmacy only, and Pacific Sales) and (2) We truncated the latitude and longitude coordinates to three decimal places since the coordinates are very sensitive. We then conducted a count of each focal retailer chain within a 10, 20, 30, and 40-mile radius of each residential address. We would like to note that some addresses have a high retailer location count in a relatively short radius. This is because some retailers operate under various store names (e.g., Key Food operates under Bonavita Market, Farm Boy Country Market, The Food Emporium, etc.)

Figure 11: Average Number of Grocery Stores in Urban vs Rural Locations



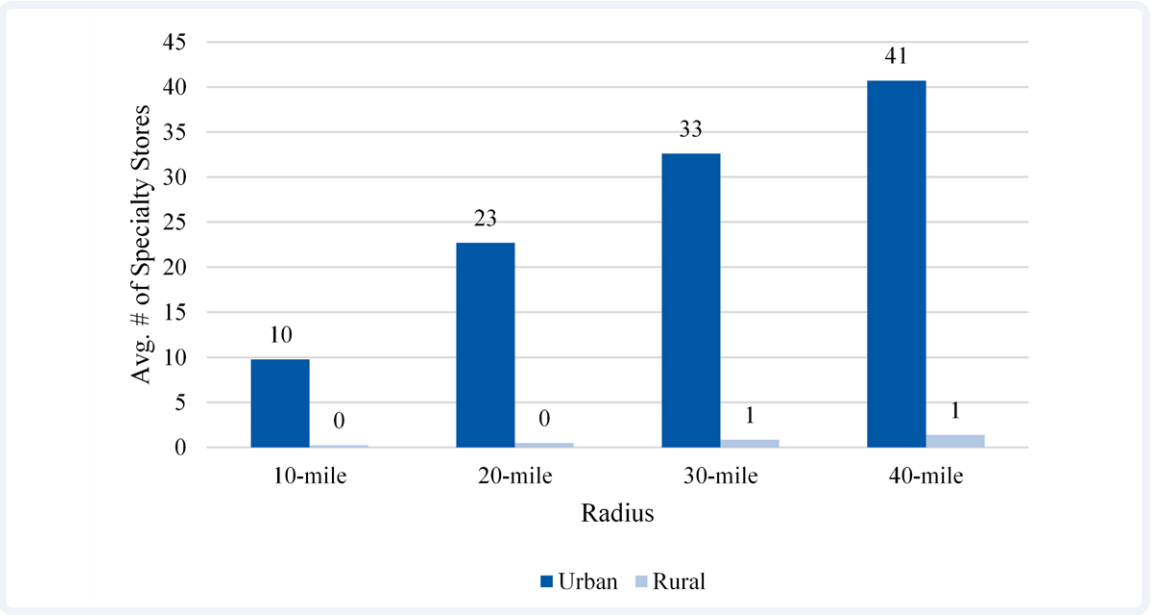
Note: Grocery stores include Albertsons, ALDI, Associated Food Stores, Grocery Outlet, Hannaford Supermarkets, Harps Food Store, Homeland, Jewel-Osco, Key Food, Mariano's, Piggly Wiggly, Publix Supermarkets, Safeway, Shaw's, Tops Friendly Markets, and Winn Dixie.

Figure 12: Average Number of Department Stores in Urban vs Rural Locations



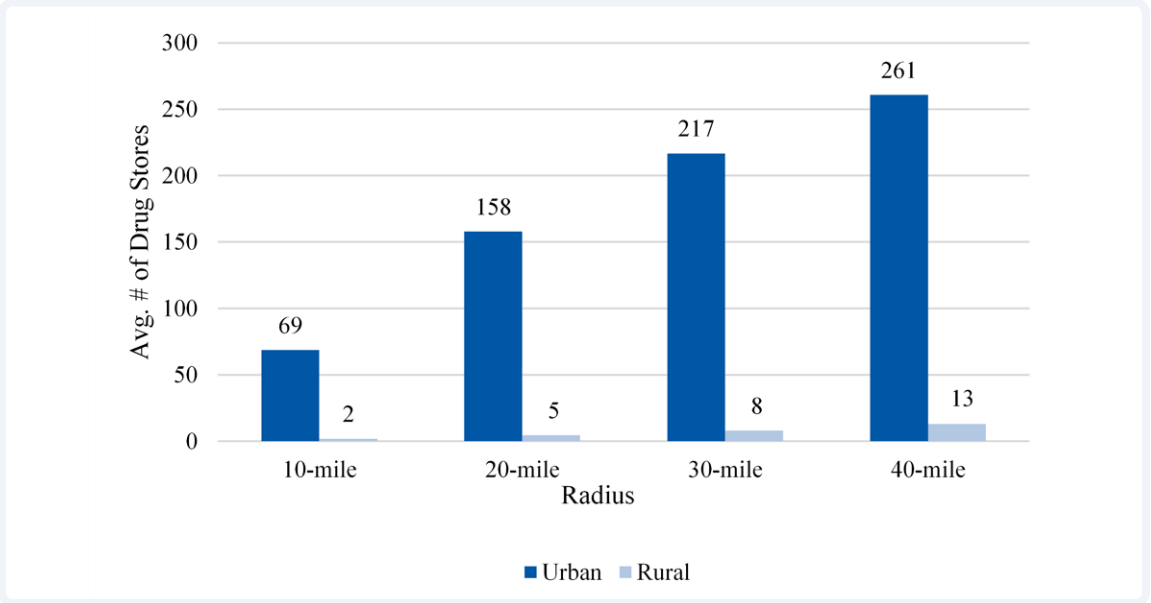
Note: Department stores include Costco, Walmart, Target, and Macy's.

Figure 13: Average Number of Specialty Stores in Urban vs Rural Locations



Note: Specialty stores include Best Buy, Home Depot, and The Gap.

Figure 14: Average Number of Drug Stores in Urban vs Rural Locations



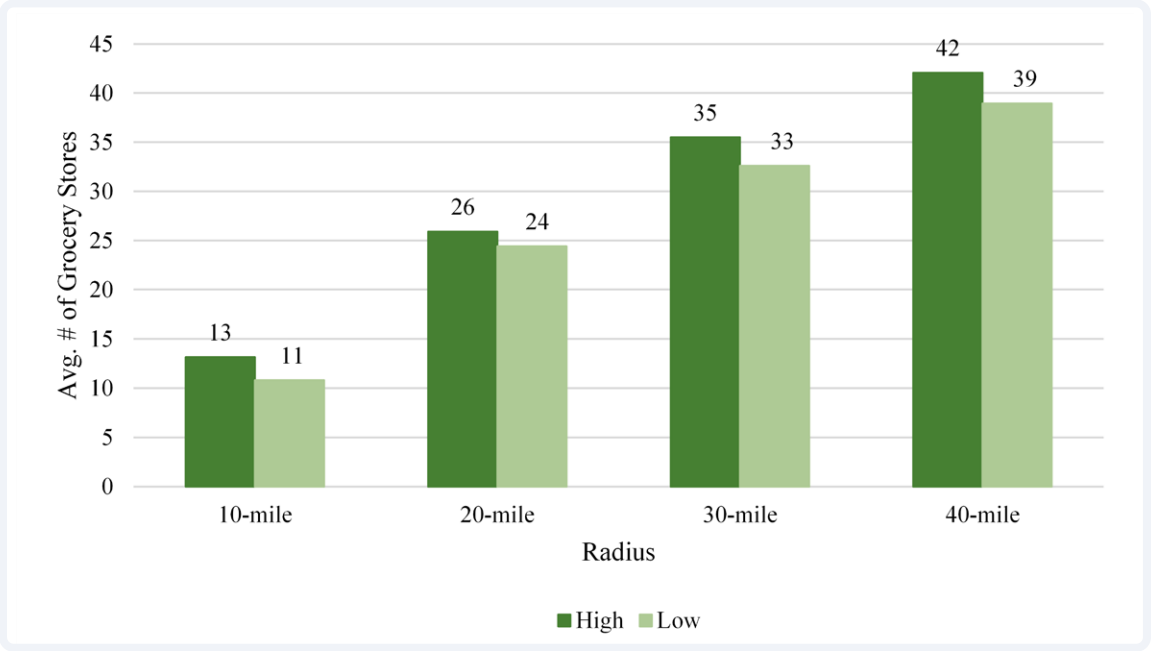
Note: Drug stores include Walgreens.

The data above indicates that, irrespective of store type, urban consumers have far greater access to physical stores compared to their rural counterparts. For instance, urban areas typically boast 23 grocery stores within a 10-mile radius, whereas rural areas have only one, on average. It is noteworthy that even when expanding the radius to 40 miles, urban

areas still maintain a significantly higher number of stores compared to rural areas across all retail categories.

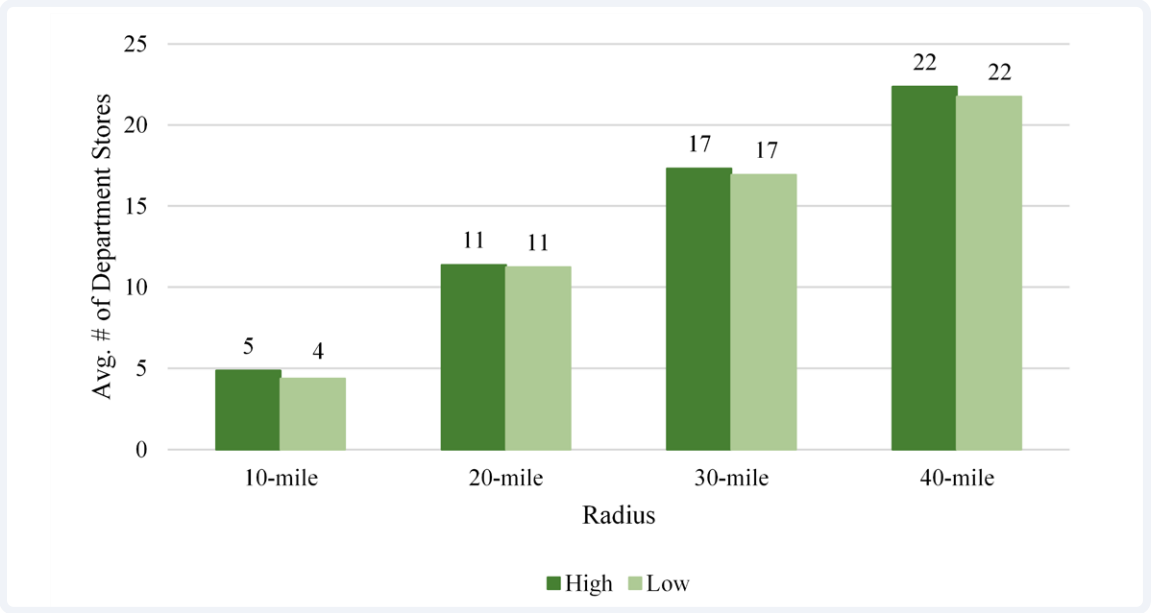
Figure 15 to Figure 18 detail the average number of stores by store type, income type, and distance radius.

Figure 15: Average Number of Grocery Stores in High-Income vs Low-Income Locations



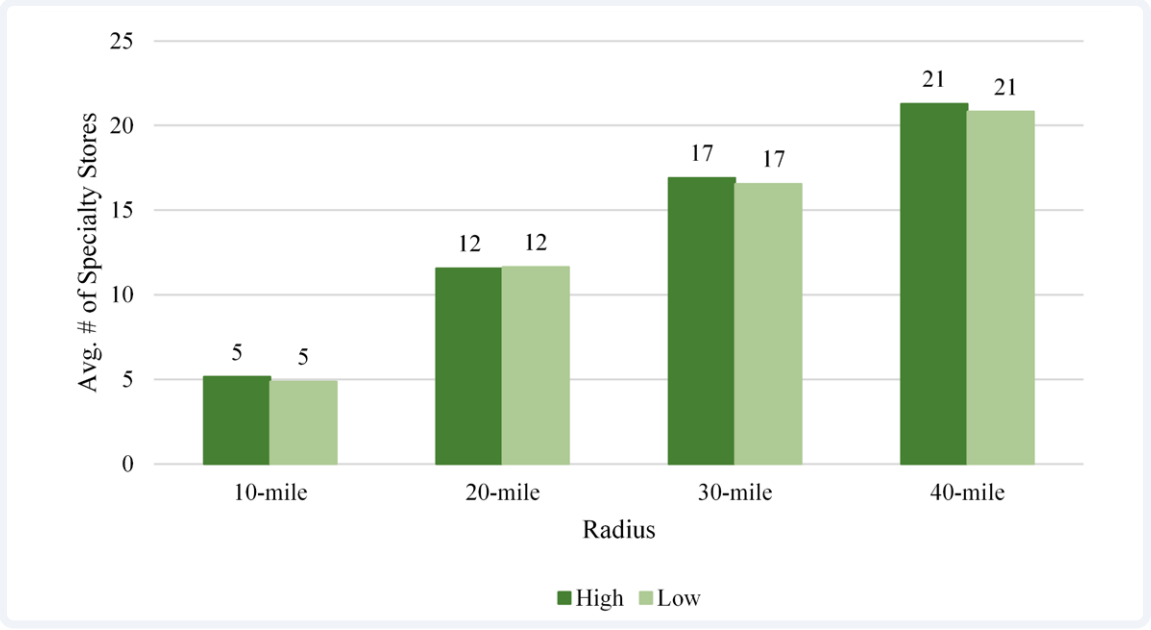
Note: Grocery stores include Albertsons, ALDI, Associated Food Stores, Grocery Outlet, Hannaford Supermarkets, Harps Food Store, Homeland, Jewel-Osco, Key Food, Mariano's, Piggly Wiggly, Publix Supermarkets, Safeway, Shaw's, Tops Friendly Markets, and Winn Dixie.

Figure 16: Average Number of Department Stores in High-Income vs Low-Income Locations



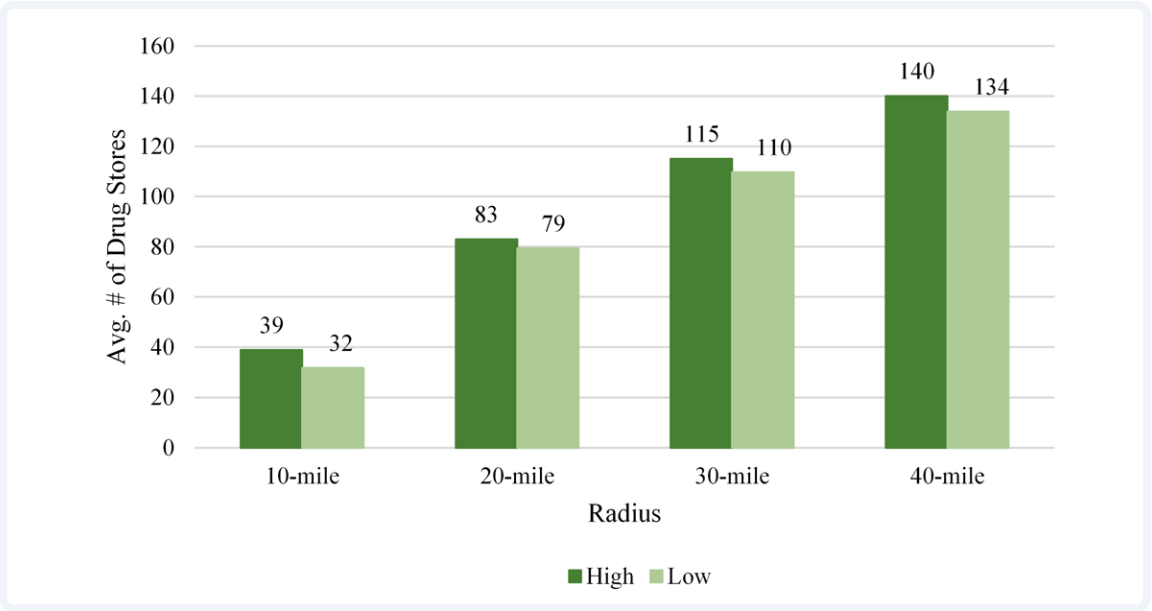
Note: Department stores include Costco, Walmart, Target, and Macy's.

Figure 17: Average Number of Specialty Stores in High-Income vs Low-Income Locations



Note: Specialty stores include Best Buy, Home Depot, and The Gap.

Figure 18: Average Number of Drug Stores in High-Income vs Low-Income Locations



Note: Drug stores include Walgreens.

The high-income vs. low-income charts show that there is a small difference between the number of stores across these two groups. The income level does show a meaningful impact on the number of stores near a residential address. For example, on average high-income and low-income areas have five specialty stores in a 10-mile radius.

Travel Time to Physical Retail

In addition to counting the number of retail locations within a given distance of the sampled residential addresses, we also quantified the time it takes to reach the nearest option from each residential address, which reflects the convenience of accessing physical locations.

Initially, we calculated the shortest distance between each residential address and every retailer address using longitude and latitude data. This was achieved by utilizing the "distVincentyEllipsoid" function from the "geosphere" R package, which computes the distance.[11] The "distVincentyEllipsoid" function calculates the "shortest distance between two points (i.e., the 'great-circle-distance' or 'as the crow flies')."[12] Next, refined our results by identifying the minimum distance between each

[11] See "Package 'geosphere'," *CRAN*, available at https://cran.r-project.org/web/packages/geosphere/geosphere.pdf, accessed on June 20, 2023, pp. 21–23.

[12] "Package 'geosphere'," *CRAN*, available at https://cran.r-project.org/web/packages/geosphere/geosphere.pdf, accessed on June 20, 2023, p. 21

residential address and each retailer location. As a result, each residential address was paired with the nearest retailer location associated with it.

Address cleaning was necessary for the residential addresses obtained from Caldwell List Company, as the dataset contained entries with missing or duplicate geographic coordinates.[13] To address this issue, we utilized the "Text Search" feature of the Google Maps Places API[14]. This method allowed us to obtain accurate geolocation data by matching specified input strings, such as “123 Main Street, Denver, CO 80238”.[15]

To minimize the cost of conducting travel time analysis, we needed to reduce the volume of queries processed through the Google Maps API for retailer location data. To achieve this, we implemented specific criteria for filtering the retailer data:

1. For regional grocery retailers, travel times were calculated only to the top two retailers operating within the same state as the residential address[16]

2. For national retailers, data was filtered to include locations within the residential state and its neighboring states. For instance, if the residential address was in California, travel times were calculated to retailer locations in Arizona, California, Nevada, and Oregon.

Finally, we used the Google Maps Distance Matrix API to obtain the travel times between each residential address and its closest retailer.[17] Each residential address's latitude and longitude coordinates served as the starting point, and the retailer's coordinates were the designated destinations based on their respective labels. For each address pair, we submitted requests three times:

1. Without specifying a departure time.

2. With a departure time set for Wednesday, June 21, 2023, at 5 pm local time.

[13] Addresses from different units within the same street are not treated as duplicates.

[14] See “Text Search,” *Google for Developers*, available at https://developers.google.com/maps/documentation/places/web-service/search-text, accessed on June 20, 2023. The geolocation data gathered through Google Maps Places API is only used as an input for Google Maps Distance Matrix API.

[15] “Text Search,” *Google for Developers*, available at https://developers.google.com/maps/documentation/places/web-service/search-text, accessed on June 20, 2023.

[16] The only regional retailers are grocery chains. In states where ALDI operates, travel time was calculated for ALDI and the top two regional grocery retailers within the state of the residential address.

[17] “Distance Matrix API request and response,” *Google for Developers*, available at https://developers.google.com/maps/documentation/distance-matrix/distance-matrix, accessed on June 20, 2023.

3. With a departure time set for June 24, 2023, at 5 pm local time.[18]

Table 7 shows that in urban areas, both the average and median distances to all types of stores are significantly shorter compared to rural areas. When considering income levels alongside location (high-income urban versus low-income urban), it becomes evident that the average and median distances to stores are notably shorter in high-income rural areas than in low-income rural areas. However, there is relatively little variation in the average and median distances to stores between high-income urban and low-income urban areas. Essentially, rural customers experience reduced retail accessibility and longer travel times, with low-income rural areas being particularly impacted. Similar trends are observed across all store types.

[18] Note that the results returned from Distance Matrix API may vary over time. *See,* "Distance Matrix API request and response," *Google for Developers*, available at https://developers.google.com/maps/documentation/distance-matrix/distance-matrix, accessed on June 20, 2023. ("Results for a given request may vary over time due to changes in the road network, updated average traffic conditions, and the distributed nature of the service. Results may also vary between nearly-equivalent routes at any time or frequency.")

Table 7: Average and Median Distance and Travel Time by Store Type and Consumer Type

	Average Distance	Median Distance	Average Travel Time	Median Travel Time
	(Miles)		(Minutes)	
Grocery Store				
Urban	2.4	1.4	10.5	8.7
Rural	14.6	13.4	24.9	24.0
High-Income	7.8	3.2	17.0	12.0
Low-Income	9.1	3.9	18.2	13.6
High-Income Urban	2.2	1.3	10.5	8.5
Low-Income Urban	2.6	1.6	10.4	8.9
High-Income Rural	13.0	9.9	23.0	20.4
Low-Income Rural	16.5	15.5	27.0	26.1
Department Store				
Urban	3.3	2.8	14.3	13.2
Rural	44.8	33.8	65.3	51.8
High-Income	20.6	5.3	35.3	19.3
Low-Income	27.5	7.1	44.3	21.8
High-Income Urban	3.1	2.5	14.2	13.3
Low-Income Urban	3.5	3.2	14.4	13.1
High-Income Rural	38.2	27.0	56.4	45.7
Low-Income Rural	51.5	38.4	74.3	60.1
Specialty Store				
Urban	2.7	2.0	12.2	11.3
Rural	45.8	34.1	66.6	52.3
High-Income	21.0	4.2	34.3	15.7
Low-Income	27.5	9.8	44.4	22.4
High-Income Urban	2.0	1.6	10.5	9.8
Low-Income Urban	3.3	2.5	13.8	12.6
High-Income Rural	39.9	28.2	58.1	47.1
Low-Income Rural	51.7	39.2	75.0	61.7
Drug Store				
Urban	1.0	0.9	7.1	5.9
Rural	16.4	11.7	26.5	21.5
High-Income	7.1	1.6	14.6	8.9
Low-Income	10.3	2.1	19.0	11.5
High-Income Urban	0.9	0.7	6.8	5.4
Low-Income Urban	1.2	1.1	7.5	6.3
High-Income Rural	13.3	8.6	22.5	17.1
Low-Income Rural	19.4	13.9	30.4	23.9

Note: Grocery stores include Albertsons, ALDI, Associated Food Stores, Grocery Outlet, Hannaford Supermarkets, Harps Food Store, Homeland, Jewel-Osco, Key Food, Mariano's, Piggly Wiggly, Publix Supermarkets, Safeway, Shaw's, Tops Friendly Markets, and Winn Dixie. Observations where the travel time was greater than one hour to a grocery store were dropped. Department stores include Costco, Walmart, Target, and Macy's. Specialty stores include Best Buy, Home Depot, and The Gap. Drug stores include Walgreens.

In-Store Customer Experience: Mystery Shopping Data

While the previous analysis focused on differences in accessibility and travel times across various customer types, this section delves into the differences in store experiences for customers who successfully visit.

This investigation employs a 'mystery shopper analysis' to assess the availability and pricing of items at prominent retailers such as Apple, Best Buy, The Gap, Home Depot, Lowe's, and Macy's. These retailers were chosen due to their nationwide presence and established reputation within their respective retail sectors.

The mystery shopper data collection was facilitated through the Premise platform, where contributors conducted surveys and tasks. Survey respondents were tasked with visiting one of the specified retailers, noting their entry and exit times, locating three specific items (or suitable substitutes), recording prices, photographing the items, and documenting their departure time. This data was utilized to determine each shopper's in-store duration, the availability of requested items, and pricing details, ultimately enabling comparisons with online availability.

The requested items are detailed in the tables below, encompassing apparel, electronics, and home goods. These items correspond to those used in the shopping cart exercise, enabling us to compare availability and pricing both in-store and online. The items in the analysis are described in the appendix. Pictures are included in the appendix as well.

For each retailer, we reviewed each submission and calculated the time each shopper spent in-store, from entry to exit, in locating and documenting the three specified items. Additionally, we examined each uploaded picture to determine whether the item matched exactly as requested, was a similar substitute, or did not match at all. From this analysis, we derived the average in-store prices for the exact items, substitutes, or a combination thereof.

Table C1 consolidates the in-store availability and pricing data across all retailers for the specified items. While there are variations among individual submissions, our analysis did not reveal systematic, significant differences between urban, suburban, and rural locations.

Across the six retailers in all geographies, respondents indicated that four items at three retailers were available 100% of the time: men's skinny fit stretch jeans at Macy's, AirPods (2nd generation) at Apple, Craftsman clog-free 30-inch lawn and leaf rake at Lowe's, and Hefty 34-count 39-gallon black outdoor plastic lawn and leaf drawstring trash bags at Lowe's.

Tables C2-C4 summarize each retailer's in-store availability and price for the requested items in rural, suburban, and urban geographies. The results show that the store experience does not significantly vary across these different geographies.

Table 8 outlines the average time spent in-store by retailer. Data was unavailable for shoppers at the Apple store. For retailers where average in-store time was reported by respondents, the range was between 10 and 20 minutes. The shortest time spent was at Best Buy (10.76 min), while the longest was at Macy's (19.01 min). These times reflect the duration to locate items and record prices. A typical store visit involves additional tasks, such as checking out. To supplement our dataset, we included average in-store time measurements from Placer.ai. Note that the data from Premise respondents reflects specific tasks, whereas Placer.ai data includes all customers, potentially affecting visit durations. A typical store visit likely takes longer, as indicated by Placer.ai data. While some customers find value in their in-store experience, it's evident that purchasing in-store entails significant costs beyond travel time, including time spent at the store.

Table 8: Average Time Spent In-Store by Retailer

Retailer	Time spent in store for Premise respondents	Time spent in store (data from Placer.ai)
Macys	19.01	41.35
Gap	13.97	38.36
Apple	N/A	45.22
Best Buy	10.76	33.92
Lowes	14.49	35.00
Home Depot	17.08	36.27

Online Accessibility and Customer Experience: Shopping Cart Analysis

The shopping cart analysis aims to evaluate the customer experience of placing online orders in omnichannel retailers. We investigated shipping options, pricing, and delivery times across six major retailers: Apple, Best Buy, The Gap, Home Depot, Lowe's, and Macy's. These retailers were chosen for their nationwide presence and prominence within their respective retail sectors.

Using residential data provided by Caldwell List Company, one address was randomly selected from each of the 160 zip codes sampled. This random selection ensured a broad representation across different geographic areas. These addresses were used to assess available shipping methods and in-store pickup options.

For each retailer, we developed a Python script utilizing Selenium WebDriver to interact with their respective websites. Selenium WebDriver,

an open-source framework, automates web browser actions such as navigating pages, clicking buttons, scrolling, and entering text into search bars. This approach allowed us to gather data on shipping options, prices, and in-store pickup availability for items in a predefined shopping cart across all selected retailers and residential addresses.

Table 9 summarizes the available pickup and shipping options for each retailer.

Table 9: Summary of Pickup, Shipping, and Shipping Price Options by Retailer

Retailer	Average Number of Shipping Options	Average Delivery Price	Average Delivery Time Including Free Options	Average Delivery Time Excluding Free Options	Addresses Where Pickup is Available	Average Pickup Time Where Available	Minimum Shipping Requirement	Minimum Cart Cost
		-----(USD)-----	-------(Days)------	--------(Days)---------	--------(%)--------	-----(Days)-----	-----(Yes/No)-----	-----(USD)-----
Apple	2.05	4.29	1.49	1.00	97.50	0.89	No	N/A
Best Buy	2.33	1.25	2.15	1.16	83.13	1.21	No	N/A
Home Depot	1.50	25.61	1.37	0.76	99.38	4.67	No	N/A
Lowe's	1.88	41.71	2.24	1.86	99.79	1.33	Yes	45
The Gap	4.68	11.76	4.52	4.52	35.00	0.00	No	N/A
Macy's	3.04	8.42	2.81	1.98	99.38	6.18	No	N/A

Source: Retailer websites.

Note: For Best Buy, the shipping information does not incorporate any information from the consoles as there is no shipping information available for these items. The items in the analysis included AirPods - 2nd generation (Apple), AirTag (Apple), OtterBox Lumen Series Case for AirPods Pro – 2nd generation (Apple), Microsoft – Xbox Series S 512 GB All-Digital Console Disc-0 Gaming – White (Best Buy), Microsoft – Xbox Stereo Headset for Xbox Series X|S, Xbox One, and Windows 10/11 Devices – Black (Best Buy), Microsoft – Xbox Wireless Controller for Xbox Series X, Xbox Series S, Xbox One, Windows Devices – Carbon Black (Best Buy), Kids Original Straight Jeans with Washwell, Size: 10, Color: Dark Wash (The Gap), Gen Good 100% Organic Cotton Original Pocket T-Shirt, Size: S, Color: New Off White (The Gap), Organic Cotton Crew Socks, Size: M/L, Color: New Heather Grey (The Gap), 20V MAX Cordless Battery Powered Hedge Trimmer Kit with (1) 5Ah Battery & Charger (Home Depot), 30 Gal. Paper Lawn and Leaf Bags (50-Pack) (Home Depot), 53 in. Long Wood Handle 22 in. Steel Leaf Rake (Home Depot), CRAFTSMAN Clog 0 30-in Lawn and Leaf Rake (Lowe's), Hefty 34-Count 39-Gallons Black Outdoor Plastic Lawn and Leaf Drawstring Trash Bag (Lowe's), Wild Badger Power Gas 26-cc 2-cycle 22-in Dual-Blade Gas Hedge Trimmer (Lowe's), Levi's Men's Classic Pocket Short Sleeve Crewneck T-shirt (Macy's), Polo Ralph Lauren Men's Crew Socks (Macy's), and Men's Skinny Fit Stretch Jeans (Macy's).

All retailers offered a free shipping option, with Lowe's requiring a minimum order size to qualify. Customers opting for paid shipping generally receive their items more quickly than those opting for free shipping. Among the six retailers, The Gap offered the highest number of shipping options, while Home Depot offered the fewest, on average. Shipping costs were notably higher for home improvement retailers like Home Depot and Lowe's compared to the others. Nearly 100% of addresses analyzed had a pickup option available for Apple, Home Depot, Lowe's, and Macy's, whereas only 35% had this option when ordering from The Gap. Average pickup times ranged from same-day to over six days.

Table 10 and Table 11 summarize the pickup and shipping options available from each retailer for orders placed in rural and urban locations, revealing slight differences between the two. Urban locations generally

offer slightly more shipping options with marginally faster delivery times, though the disparity is minor. Store pickup availability is high in both urban and rural settings, with all retailers except The Gap offering it for over 80% of the addresses analyzed. Urban areas showed even higher availability, with Apple, Home Depot, Lowe's, and Macy's offering pickup at all analyzed addresses and slightly quicker pickup times, except for Apple, which provided faster service to rural customers in our sample. These variations may stem from product availability in stores at the time of cart creation.

Table 10: Summary of Pickup, Shipping, and Shipping Price Options by Retailer, Rural Locations

Retailer	Average Number of Shipping Options	Average Delivery Price	Average Delivery Time Including Free Options	Average Delivery Time Excluding Free Options	Addresses Where Pickup is Available	Average Pickup Time Where Available	Minimum Shipping Requirement	Minimum Cart Cost
		----(USD)----	------(Days)------	--------(Days)--------	-------(%)-------	----(Days)-----	-----(Yes/No)-----	-----(USD)-----
Apple	1.65	3.18	1.69	1.26	95.00	0.73	No	N/A
Best Buy	2.31	1.30	2.65	1.57	83.33	1.91	No	N/A
Home Depot	1.43	27.57	1.50	0.95	98.75	3.74	No	N/A
Lowe's	1.59	42.90	2.52	2.13	100.00	1.32	Yes	45
The Gap	4.37	10.80	4.78	4.78	19.17	0.00	No	N/A
Macy's	3.00	8.33	2.83	2.00	98.75	6.42	No	N/A

Table 11: Summary of Pickup, Shipping, and Shipping Price Options by Retailer, Urban Locations

Retailer	Average Number of Shipping Options	Average Delivery Price	Average Delivery Time Including Free Options	Average Delivery Time Excluding Free Options	Addresses Where Pickup is Available	Average Pickup Time Where Available	Minimum Shipping Requirement	Minimum Cart Cost
		----(USD)----	------(Days)------	--------(Days)--------	-------(%)-------	----(Days)-----	-----(Yes/No)-----	-----(USD)-----
Apple	2.44	5.04	1.35	0.88	100.00	1.04	No	N/A
Best Buy	2.35	1.19	1.66	0.80	82.92	0.50	No	N/A
Home Depot	1.56	23.83	1.26	0.60	100.00	5.58	No	N/A
Lowe's	2.17	40.84	2.03	1.67	100.00	1.33	Yes	45
The Gap	5.00	12.59	4.30	4.30	50.83	0.00	No	N/A
Macy's	3.08	8.50	2.79	1.96	100.00	5.94	No	N/A

Tables 12 and Table 13 summarizes each retailers' available pickup and shipping options for orders placed from addresses corresponding to high income and low income. There are no systematic differences based on income.

Table 12: Summary of Pickup, Shipping, and Shipping Price Options by Retailer, High Income

Retailer	Average Number of Shipping Options	Average Delivery Price	Average Delivery Time Including Free Options	Average Delivery Time Excluding Free Options	Addresses Where Pickup is Available	Average Pickup Time Where Available	Minimum Shipping Requirement	Minimum Cart Cost
		----(USD)----	------(Days)------	--------(Days)--------	-------(%)-------	----(Days)-----	-----(Yes/No)-----	-----(USD)-----
Apple	2.11	4.43	1.46	0.98	97.08	0.87	No	N/A
Best Buy	2.33	1.27	2.13	1.21	82.92	1.13	No	N/A
Home Depot	1.50	24.79	1.35	0.73	99.58	4.73	No	N/A
Lowe's	1.94	41.99	2.20	1.83	100.00	1.32	Yes	45
The Gap	4.76	11.98	4.46	4.46	35.42	0.00	No	N/A
Macy's	3.06	8.47	2.80	1.97	100.00	6.05	No	N/A

Table 13: Summary of Pickup, Shipping, and Shipping Price Options by Retailer, Low Income

Retailer	Average Number of Shipping Options	Average Delivery Price	Average Delivery Time Including Free Options	Average Delivery Time Excluding Free Options	Addresses Where Pickup is Available	Average Pickup Time Where Available	Minimum Shipping Requirement	Minimum Cart Cost
		----(USD)----	------(Days)------	---------(Days)---------	-------(%)------	-----(Days)----	----(Yes/No)----	-----(USD)----
Apple	1.98	4.14	1.52	1.03	97.92	0.91	No	N/A
Best Buy	2.33	1.22	2.16	1.12	83.33	1.29	No	N/A
Home Depot	1.49	26.44	1.39	0.79	99.17	4.61	No	N/A
Lowe's	1.73	41.42	2.28	1.89	100.00	1.33	Yes	45
The Gap	4.60	11.52	4.59	4.59	34.58	0.00	No	N/A
Macy's	3.02	8.37	2.82	1.99	98.75	6.31	No	N/A

Since we utilized a script to access the retailer's websites, the time required to construct the carts was negligible. Our manual tests indicate that customers would spend less than a minute to locate the products and manually assemble the carts, in contrast to the reported 10-20 minutes it takes to perform this task physically in a store, as shown in Table 8.

Summary

In this section, we have explored various methodological approaches aimed at understanding the value customers derive when acquiring their desired products from different retailers. Our study delves into consumer welfare from both online and offline retail channels, emphasizing benefits across varying income levels and geographic locations.

Greater proximity to more locations within a given radius or shorter travel times provides customers with enhanced service and convenience options. Our analysis reveals significant disparities in access to retail stores based on geographic location, with urban customers generally enjoying better physical store accessibility compared to their rural counterparts, albeit with some variations across retail segments. Customers in rural areas often face greater challenges in accessing equivalent options, needing to travel longer distances.

While store availability shows minimal differences between high-income and low-income customers overall, those in low-income rural areas are notably disadvantaged, with fewer offline options available and significant travel distances required to access stores. Once customers reach a store, however, our mystery shopper analysis indicates a consistent quality of in-store shopping experience across different customer demographics.

Overall, stores typically offer a diverse range of product options with acceptable availability levels, though some products may not be found by our mystery shoppers. Customers frequently encounter uncertainty and travel time costs, particularly pronounced for rural residents, before confirming product availability in stores. Utilizing omnichannel strategies,

such as providing online store availability information, can mitigate these challenges.

Search costs within physical stores are considerable, requiring customers to invest significant time and effort to locate desired products. Alternatively, online shopping and omnichannel services offer time-saving alternatives, circumventing the need for in-store searches.

In contrast to the accessibility and cost challenges of offline options, our shopping cart analysis reveals minimal disparities in availability and expenses across various geographical and income demographics. Higher store density benefits customers by expanding omnichannel choices, such as online purchases and in-store pickups. Rural customers benefit primarily from online-only retail options, particularly when retailers cover shipping costs. For rural customers, online-only alternatives reduce travel time, underscoring their advantages.

While our shopping cart analysis did not identify consistent price discrepancies between online and offline platforms, these findings underscore the potential of omnichannel solutions. These platforms offer extensive product selections with transparent availability, thereby saving customers time, effort, and additional expenses. For example, offering information on store inventory availability online can be particularly helpful for customers who live far from stores, so that they can better plan their trips to stores.

The implications of these findings extend to retailers and policymakers alike. The effort exerted by customers in physical stores, including travel time and product search time, can be quantified monetarily, reflecting the time and expenses associated with reaching a store. These costs vary significantly across different retail segments and customer demographics. Higher-income customers face higher opportunity costs, whereas transportation expenses may disproportionately burden lower-income customers. Our analysis indicates that diverse omnichannel strategies can alleviate accessibility challenges for rural and lower-income customers, enabling them to enjoy shopping experiences comparable to their urban and higher-income counterparts. Retailers can enhance consumer satisfaction significantly for these demographics by absorbing shipping costs and offering a broader array of pickup options.

Most omnichannel services offered by retailers depend on an assumed infrastructure that is often taken for granted. This includes reliable internet connectivity, regular mail delivery, neighborhood safety, and accessible public transportation. Our findings underscore the critical role of supportive infrastructure in enabling online shopping access for rural and

low-income communities. As faster delivery options and more accessible pick-up points become increasingly available, the gap in customer experience between high-income urban customers and their low-income rural counterparts is likely to narrow. In essence, the rise of omnichannel services acts as an equalizer of customer experience.

Overall, this analysis suggests that omnichannel retail effectively democratizes shopping options across different demographic locations and income levels. By integrating online and offline platforms, retailers can ensure consistent access to products and services, thereby bridging the convenience gap between rural and lower-income customers and their urban and higher-income counterparts.

V. Conclusions and Implications

The rise of online and omnichannel shopping solutions has significantly reshaped and expanded the range of options available to consumers. Shoppers are no longer restricted to physical retail stores but can explore a wide range of products online. In our study, we employed two complementary approaches to examine retailer offerings from both online and offline perspectives, focusing on their implications for consumer welfare.

Our conjoint analysis enabled us to uncover customers' preferences and trade-offs across various dimensions such as delivery fees, delivery times, and return policies. By directly assessing these preferences, our goal was to uncover how different aspects of omnichannel retail influence consumer satisfaction and perceived value, taking into account factors like income levels and geographic location. These attributes were chosen to reflect real-world consumer choices.

Our findings indicate that customers exhibit a low level of channel loyalty, opting to use different channels as long as they offer favorable attributes in their offerings. Notably, shipping costs emerge as the most critical factor influencing consumer choices across different product categories, income levels, and geographic regions. Customers are particularly sensitive to shipping costs when making online purchases. Additionally, quick delivery options and flexible return policies significantly impact consumer decisions, especially in sectors like apparel, home improvement, and electronics. The convenience of travel time also plays a crucial role for products that require physical store visits.

In addition to our conjoint analysis of customer preferences, we conducted a value-driven analysis that quantifies various elements of the customer experience across different demographic characteristics. This approach

focuses on identifying key drivers that contribute to customer value during retail transactions.

Customer value in a retail transaction can be understood as the difference between the costs incurred and the benefits gained. Competitive pricing, overall shopping experience, product availability, and convenience play pivotal roles in enhancing customer satisfaction. Satisfaction with the purchased product represents a significant benefit to the customer. On the other hand, the costs incurred by the customer consist of the price paid and the effort expended to obtain the product. Effort can be quantified in terms of the time invested in obtaining the product. The farther customers need to travel to reach a store, the higher the perceived cost. Conversely, less time spent inside the store to complete a purchase reduces perceived cost. Our analysis reveals the effort customers face when purchasing a product, underscoring its impact on the value customers derive from their shopping experience and their overall well-being.

By exploring these dynamics, we gain insights into the factors that influence customer satisfaction and identify opportunities for enhancing retail services.

We assess customers' access to retail locations by evaluating the number of alternative locations available to the average customer, considering physical proximity and travel times. Our analysis revealed a notable disparity between rural and urban customers, with urban customers having significantly more accessible options. Interestingly, our findings indicated no meaningful difference in retail access across different income levels for urban customers, although low-income rural customers face a greater gap in accessibility to offline options. This suggests that geographic location plays a more crucial role than income in determining retail accessibility.

Once customers arrive at the store, the second factor from which they derive value is the variety, assortment, and availability of the products they wish to purchase. The breadth of options and consistent product availability significantly enhance the shopping experience. Our observations show that retailers generally succeed in maintaining high service levels regarding product availability for popular items. This reliability ensures that customers consistently find the products they need when visiting a physical store, contributing to overall consumer satisfaction.

While access to offline options varies by location and income level, the shopping experience itself, once customers are in-store, shows no systematic differences across customer segments.

Our shopping cart analysis quantifies the experience of customers who purchase online or use different omnichannel options. Customers have access to a wide variety of fulfillment options, including delivery with different speeds and costs, as well as in-person pickup of online orders. The online channel shows no significant gaps between customers of different location types. Retailers across various categories and locations generally implement a uniform pricing policy, ensuring equitable treatment for all customers regardless of their purchasing platform.

Our analysis highlights that shopping costs are not insignificant for in-store transactions and can involve considerable effort for some product categories. This effort includes evaluating multiple retail locations, traveling to these locations, finding products (or not finding them), completing transactions, and returning home. Consequently, the availability of online and omnichannel shopping channels provides consumers with options to reduce these costs and improve consumer welfare. One such popular option is “pre-shopping.” Pre-shopping consists of using digital channels and tools to decide what products to buy and at what stores before physically traveling to a store to pick up those products, whether using buy-online pick-up in-store fulfillment options or shopping for the selected goods in the selected brick-and-mortar store and transacting in-store.

More broadly, omnichannel retail significantly reduces the effort required for customers to interact with retailers. This reduction is achieved by eliminating travel time to and from physical stores, minimizing the time spent searching for products, and reducing the uncertainty of product availability. Customers can effortlessly search for products online instead of navigating store aisles. This streamlined process enhances the value customers derive from omnichannel transactions compared to traditional offline experiences. Once customers decide on a purchase, they can complete an online transaction from the convenience of their electronic devices within minutes. Products are reliably delivered to their doorsteps, saving time and effort and ensuring a smooth, efficient shopping experience that enhances overall customer satisfaction.

Omnichannel retail transactions offer significant convenience by allowing customers to shop from home without visiting a physical store. However, this convenience comes with a trade-off: the lack of immediate product fulfillment, which some customers may perceive as an additional cost.

Unlike in-store purchases, where customers can take items home immediately, online shoppers must wait for orders to be processed, shipped, and delivered, often taking several days. This delay is crucial for consumers who value instant gratification or need items urgently. The

trade-off between convenience and immediacy in online retail significantly impacts customers' perceived value of their shopping experience. While shopping online offers the substantial benefit of browsing and purchasing products from virtually anywhere, anytime, the delay in receiving purchased goods introduces factors that can diminish overall value perception.

The waiting period can lead to impatience and dissatisfaction, especially for customers needing the product quickly. It introduces uncertainty and anxiety about the order's status and delivery process, including concerns about shipping delays, lost packages, or receiving damaged or incorrect items. The inability to physically inspect products before purchase can lead to mismatched expectations. Even with detailed descriptions and images, there's always a risk the actual item may not meet expectations, exacerbated by the waiting period that may lead to disappointment upon product arrival. Lastly, delayed gratification can reduce the emotional satisfaction of acquiring and using a product, postponing the joy and utility and potentially diminishing overall shopping enjoyment.

Pushing the Boundaries

Our analysis indicates that customers show little loyalty to specific channels but greatly value various attributes associated with their offline, online, or omnichannel purchases. This trend has driven traditional brick-and-mortar retailers to expand their omnichannel capabilities, while online retailers have integrated elements of physical stores, blurring the distinction between online and offline retail. Both types of retailers compete for customers who weigh the advantages of different transaction channels.

Online shopping offers convenience, a wider product selection, easy price comparisons, access to reviews, and informed decision-making. However, customers often hesitate to pay for delivery, seeing it as an additional cost that diminishes the overall value of their purchase. For price-sensitive customers, delivery fees can deter purchases even after they've decided based on the product price alone. Major online retailers, by frequently offering free shipping, have set a standard that leads customers to expect free delivery, reducing their willingness to pay extra.

Competitive pricing and frequent online promotions appeal to price-conscious shoppers, enhancing the perceived value of online shopping. Yet, customers tend to mentally separate product costs from delivery costs, viewing the latter as an unjustifiable expense. This perception is reinforced when delivery fees are presented after the product price, making them feel unexpectedly high relative to the overall purchase.

Online shopping saves time and effort compared to visiting physical stores, which is particularly beneficial for busy or mobility-limited individuals. It also provides access to a broader range of products not always available locally. Many retailers offer alternatives like in-store pickup or free shipping, reducing customers' willingness to pay standard delivery fees.

Omnichannel retailers face a critical challenge in bridging the gap between the actual benefits they offer and customers' perceptions, especially regarding delivery costs. Addressing this gap can significantly enhance consumer satisfaction and maximize the potential benefits of omnichannel strategies for consumers.

Below, we highlight some of the best practices that leading retailers are already using to close this gap, and suggest other complementary approaches that can benefit retailers large and small:

1. **Transparent Shipping Costs:** One of the primary strategies for closing the perception gap is through transparency. Clearly communicating the total cost of purchase, including delivery fees, early in the shopping process sets realistic expectations and builds trust. This transparency reduces the likelihood of cart abandonment due to unexpected costs. Retailers can go further by offering a cost comparison calculator that highlights the savings on shipping costs when opting for omnichannel services like in-store pickup versus home delivery. By making the cost of visiting the store more explicit, customers can see the relative value of paying for delivery.
2. **Emphasizing Low Shipping Costs**: Since shipping cost significantly influences consumer choices across all product categories, income levels, and geographical areas, retailers must emphasize the value proposition of their shipping fees. By highlighting how low shipping costs compare to the effort required to obtain products in-store, retailers can shift the focus from the cost component to the overall benefit. This approach is particularly crucial for items where instant gratification is less critical.
3. **Quick Delivery Options:** Quick delivery options are particularly significant in sectors such as apparel, home improvement, and electronics, where instant gratification plays a key role. Retailers should offer express delivery options, such as same-day or next-day delivery, for high-demand categories. Investing in local warehouses and fulfillment centers can help shorten delivery times. Highlighting the efficiency of these local services in marketing materials and offering real-time tracking of deliveries can significantly enhance customer experience and satisfaction.

4. **Reliable store availability information:** By providing reliable inventory availability information, retailers can help reduce the shopping costs for customers, particularly for those customers who live far from stores.

5. **Flexible and Free Return Policies:** There is a strong preference for free returns, either by mail or in-store, and an aversion to paying return fees. Retailers should implement and prominently advertise free return policies, highlighting the ease and cost-effectiveness of returning products. Simplifying the return process with easy-to-follow instructions and minimal paperwork, and ensuring that return labels are prepaid and included in the original shipment, can improve customer satisfaction. Encouraging in-store returns by offering incentives such as discounts on future purchases or loyalty points can also drive foot traffic to physical stores. While generous return policies are crucial for driving demand, they can become problematic when customers abuse the system. Retailers should track the history of customers who abuse return policies and be more selective about offering free returns to these customers. This balanced approach maintains customer satisfaction while protecting the retailer's interests.

6. **Catering to Rural Consumers:** Rural consumers have unique priorities, placing high value on order fulfillment time and lower shipping costs. Retailers should focus on reducing order fulfillment times in rural areas by optimizing logistics and using local delivery partners. They could also establish a network of pickup points, potentially in partnership with third parties, to enhance accessibility. Communicating these efforts to rural customers can emphasize quick access to products. Additionally, highlighting cost-effective shipping solutions for grocery items, such as bundled shipping or subscription services offering discounted rates for regular deliveries, can address rural consumers' need for affordability.

While some consumer preferences like shipping costs and return policies are universally important, distinct differences exist based on geographical areas. Retailers should develop marketing campaigns that emphasize the universally appealing aspects of their omnichannel offerings, ensuring these messages are clear and consistent across all platforms. Targeted campaigns should address the unique needs of different customer segments, such as emphasizing quick delivery times for urban customers and affordability for rural customers. Using customer data to personalize offers and communications ensures that each customer receives information and promotions most relevant to their shopping habits and preferences.

The future of omnichannel retail

Overall, our results suggest that customers do not compartmentalize online and offline shopping experiences. They do not exhibit strong channel attachment and often weigh the attributes of different options when making purchasing decisions. As these attributes continue to evolve, encompassing both home delivery and physical pickup options, the convergence of historically brick-and-mortar retailers with e-commerce platforms is likely to persist, blurring the boundaries between online and physical commerce.

Our study has highlighted that certain regions face limited accessibility to traditional brick-and-mortar retail offerings. As omnichannel strategies advance, integrating features tailored to rural customers has the potential to narrow the gap between rural and urban consumers, democratizing retail access.