Rider Multihoming in the United States Rideshare Market

by

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ABSTRACT

This thesis examines rider multihoming in the US ridesharing market. Ridesharing services experience substantial multihoming on both sides of the platform, and appear to suffer from a combination of a lack of differentiation as well as low multihoming costs. Through an informational interview, a qualitative survey, and a conjoint survey and analysis, rider preferences were able to be categorized and quantified. An adapted conjoint survey and analysis allowed for a simulation of rider decisions to accept a ride or multihome along price, time, and company attributes. With baseline thresholds, examining the prevalence of multihoming with use of several multihoming reduction strategies, have shown that network bridging strategies may have an impact in reducing the prevalence of multihoming among riders. In-App Promotions and Incentive-based strategies, meanwhile, have shown to have the opposite results, showing an increased tendency to multihome in riders that utilize them.

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1.0 INTRODUCTION

Over the last few decades, the share of the most successful companies are increasingly platform businesses. Five of the six most valuable companies by market capitalization in the world revolve around their industry platform businesses (Yoffie, Cusumano, and Gawer 2019). Microsoft, Alphabet, Apple, Amazon, Facebook, Alibaba, etc. all are businesses that rely on their business platforms. Between 60 and 70 percent of the current and former 'unicorns' (companies valued at $1 billion or more) relied on a platform business model for a large portion of their business (Cusumano et al., 2019). All of these companies have redefined their markets as they established their dominant platforms over the years, taking advantage of their robust economies of scale, powerful network effects, and typically, high margins on their products and services.

Rideshare companies have sought to follow their pathways to dominance. Since Lyft and UberX blasted into the US market with their transportation platforms, they have significantly altered the way many in the US fulfill their transportation needs, and increasingly, how cities plan their development and transportation networks. Lyft's mission statement of "Improve people's lives with the world's best transportation" and Uber's mission "Transportation as reliable as running water, everywhere for everyone" speak to their visions in how they believe they are fundamentally transforming how humans get around. As both companies have expanded, they have successfully spurred the rapid growth of the ridesharing market from their Silicon Valley roots in 2012. In 2015, 15% of American adults used ridesharing as a means of transportation. By 2018, the percentage more than doubled, rising to 36% (Statista 2020). US rideshare rides, now totaling around 2 billion rides per year, has increased at a compounding annual rate of 150% since 2013. Along with this, average ride distance has also increased, growing an average of 3-5% annually (Baltic et al. 2019).

Despite such a large and quickly growing market with massive user demand, Uber and Lyft continue to remain grossly unprofitable. Uber recorded a $1.1 billion loss in its 2019 Q4 earnings, adding to a total loss of $8.5 billion for the year (Kerr 2020). The company has announced expectations and a general plan towards reaching profitability by the end of 2020, but it's an uphill battle. Lyft similarly has been taking heavy losses, although not to the extent of Uber (Lyft has a smaller global footprint and fewer side business ventures). Lyft's 2019 Q4 loss was $121.4 million

with an annual loss of $651 million (Lyft Announces Record Fourth Quarter and Fiscal Year Results 2020). Lyft has never seen a profitable quarter since its inception. The only one Uber managed, came from them selling off their Chinese venture to Didi Chuxing for $933 million, as they retreated from the market where they spent over $2 billion.

There are many reasons for these losses: management decisions to prioritize national or global growth over profit, diversification in side verticals (self-driving technology, food delivery, Uber Elevate, etc.), and a non-streamlined administrative structure. But, their core business of rideshare has several factors that play into these losses as well, including scaling costs with driver acquisitions, core platform insurance, marketing efforts, regulations, and others. However, one major factor – exasperated by the previous costs – is the tight competition to attract and retain drivers and riders on the platforms. With multihoming (users using multiple comparable services) being so prevalent on both sides (riders and drivers) of Uber's and Lyft's platforms, it becomes difficult for them to achieve profitability from their main businesses (Zhu and Iansiti 2019). Often, drivers drive for both services, and riders also easily have access to multiple services. Both companies are competing on every ride and driving down revenues collected to incentivize drivers and riders to stay on their service. This leaves little room for Uber or Lyft to raise prices on riders, or increase take rates on drivers (Wessel and Sherman).

This multihoming of riders and drivers is undercutting both platforms' abilities to more easily achieve profitability. With so many years of competition, what has prevented this US market from tipping after over seven years of intense competition? A look at multihoming tendencies may provide insight.

Moving forward, I will present a literature review that delves into previous studies around platform strategy, two-sided markets, multihoming, and rideshare competition. Through the course of foundational interviews and an in-depth qualitative survey, this thesis will seek to describe the reasons why riders multihome or singlehome, what preferences lead them to prefer one service over another, and which attributes motivate them to switch between services when looking for a ride. Finally, through the use of conjoint analysis, a simulation of participant responses will show

the price and time levels where different riders decide to multihome, and observe if any strategies being used today coincide with reduced multihoming.

2.0 LITERATURE REVIEW

2.1 Industry Platforms

Industry Platforms provide "a foundation that connects individuals and organizations for a common purpose or to share a common resource" (Cusumano, Gawer, and Yoffie 2019). Most platforms must accomplish three core elements. Platforms are often characterized as having 'network effects' which serve to provide greater value to user sets as the size of the network grows as well as greater barriers to entry to competitors. Platforms must connect or bring together multiple sides of users, whether it's a two-sided (such as Amazon.com), or a multi-sided market (such as Facebook). And finally, in order to achieve the network effects, the platform must solve the 'chicken and egg problem' (Cusumano, Gawer, and Yoffie 2019).

2.1.1 Network Effects

Network effects generally come in two forms: Direct (same-side) and Indirect (cross-side). Direct network effects occur where the actions of users on one side of a platform impacts the value of platform to the rest of the users on the same side of the platform (Solheim and Tovsen 2017). When more users from a user set participate in a platform, more value is created and experienced by that user set – increasing in value as more users join. This creates a virtuous cycle of further increasing value and users. The direction of these direct network effects can be forwards or backwards. In a backwards scenario, losing users to a competing service reduces the value in the existing userbase, which then causes more users to leave and, further erodes the value for the existing users; therefore causing a rapid downward spiral of users and value (Solheim and Tovsen 2017).

An early platform example that demonstrates the strength of direct network effects is the introduction of the telephone. Initially, the value of having a phone was low when there were few other people in one's network that also had a phone. There was little use in a device made for contacting people when few people in one's network had one that could be contacted. This began to change as more people in one's network (business or personal) had a phone and could be

reached. As more people in one's network joined the network, the value of owning a phone dramatically increased (Cusumano, Gawer, and Yoffie 2019).

Indirect network effects (or cross-side network effects) occur when one set of users obtains more value in a platform by the increased presence of a separate set of users (Eisenmann, Parker, and Alstyne 2006; Caillaud and Jullien 2003; Evans and Schmalensee 2010). This can be seen in the Airbnb platform, where short-term tenants gain more value from the platform as more listings are uploaded to the site. At the same time, property owners that seek to rent out their homes gain more value from the platform as more prospective tenants utilize the platform. It is also possible for indirect network effects to be completely one-sided – where only one side benefits from the incremental addition of user sets on the other side of the platform – and not vice versa. For instance, Facebook users do not gain increased value through the addition of more advertisers on the other side of the platform, but advertisers incrementally gain value as more users join and use Facebook.

Rideshare services benefit from indirect network effects. Additional riders do not directly benefit other riders, nor do additional drivers directly benefit other drivers. A prospective rider gains increased value in a service when there is an increase in the number of drivers on the other side of the platform, as they're likely to get a ride quicker. Vice versa, drivers gain value in the platform as more riders join the on the other side of the platform, as they get more opportunities to get paid. More riders on the service attracts more drivers, and the increase in drivers attracts more riders, in a reinforcing loop.

2.1.2 Two-sided markets

Two-sided markets are where two sets of agents come together through an intermediary or platform, and the actions and policies of one set of agents affects the other set of agents (Rysman 2009). Two-sided markets tend to experience indirect network effects, with an increased presence on one side of the platform, positively increasing the value and presence on the opposite side of the platform (Eisenmann, Parker, and Alstyne 2006). An example of a two-sided market is the video game console industry. PlayStation and Xbox both serve as intermediaries between two sets of actors: independent video game developers and video game players. As the number of video game developers creating new games for one platform increases, the number of players using that

service may increase as they will have access to a greater volume and variety of games on that platform. At the same time, the number of video game players buying into a specific console impacts which developers desire to produce for that service.

Similarly, ridesharing is a two-sided market that brings together people who desire a ride, with people who have a vehicle and desire to make money incrementally by driving. Ridesharing services utilize a platform to match riders and drivers, arrange pick up and drop off locations, determine a fair price, and facilitate the experience. Both sides benefit from the increased presence of the opposite side of the platform.

2.2 Strategies for winning a platform war

Many platform markets lead to winner-take-all or winner-take-most outcomes, as network effects tend to provide one clear winner over time once it achieves critical mass (Solheim and Tovsen 2017; Eisenmann, Parker, and Alstyne 2006). Platforms that can capitalize on the positive network effects by attracting and retaining the best users, can often feed a positive cycle of increased users and value. As more users flock to that platform, competing platforms may lose users, thereby, quickly diminishing the value of the competing service and causing more users to leave. Over time, a clear leader emerges that continues to further grow from its success (Eisenmann, Parker, and Alstyne 2006). Platform leaders can eventually leverage higher margins, invest more heavily in R&D, and provide increasingly superior service than its competitors at scale (Eisenmann, Parker, and Alstyne 2006). In these situations, platforms seek to become the clear platform leader and 'tip' the market in their direction. Examples of platforms that have successfully tipped their markets in the past are: Facebook in social, Google in online search, and Android in smartphone operating systems. Once the market is tipped, the existing network effects stand as a strong barrier to entry (Solheim and Tovsen 2017).

Tipping is when a firm wins a platform war by building and maximizing market momentum (Cusumano, 2008; Eisenmann et al.). There are multiple strategies towards tipping a market, which include: providing more incentives to complementors (developers that create complementary products for a platform) than competitors, creating a coalition of competitors, using pricing or subsidy mechanisms to overwhelmingly bring a set of users the platform, or courting 'marquee'

users (Cusumano 2008; Eisenmann et al. 2006). The usefulness of each strategy is dependent on the type of platform in question, the competitive environment, and how the different sides of the platform interact. Pricing strategies and mechanisms tend to be used in multi-sided markets, to attract one side in overwhelming numbers that capitalize on the network effects that bring along the other side (Eisenmann, Parker, and Alstyne 2006).

When using a platform strategy, a company needs to identify what the sides of the market are that is to be served, and then begin to bring both sides onto the platform. In multi-sided markets, this can create a "chicken and the egg" problem, whereby the platform intermediary needs both a larger number of suppliers to attract buyers, and a large base of buyers to attract sellers at the same time (Jia, Cusumano, and Chen 2019; Caillaud and Jullien 2003). Usually the goal is to attract one side of the market through incentives or subsidies, that will achieve a critical mass to bring along the second (or third) side of the market – and then charge those sides (Caillaud and Jullien 2003; Jia, Cusumano, and Chen 2019). Understanding which side (or sides) to focus on first is a vital decision for a company seeking to seed and tip the platform.

In many cases, a strong strategy is to identify the price elasticity of each side of the market and create pricing accordingly. In this strategy, the platform will subsidize the price elastic side – subsidizing the side that would be less likely to pay for it, while applying the costs to the side that will be more inclined to bear it (Eisenmann, Parker, and Alstyne 2006). This type of cross-subsidization uses one side of the platform to pay for both sides of the platform, while the other side pays zero-pricing (Kuoppamäki 2015). An example of this strategy employed successfully is Google Search. Google provides unlimited free access and use of nearly all of its services to internet users, but charges advertisers for priority of advertisement placement and access to user search history and web navigation. If Google charged users for search results, it is likely they would opt to switch to a competitor which, as Google defends against Antitrust arguments, "competition is a click away" (Helft 2009). By focusing on gaining revenues from the side with highest willingness to pay, and giving away for free to the side that attracts them, Google is better able to grow the platform and capitalize from it, as well as disincentivize any new entrants that would have to provide a better service than Google, while charging nothing for an extended period of time before seeing advertisement revenues.

In the context of ridesharing, a service that provided a superior experience at a lower price for riders, would attract a larger set of riders to the platform. This in turn, would attract more drivers to serve the demand. The increased activity and availability of drivers would increase the value of the ridesharing service to more riders, encouraging them to abandon the competitors. The reduction in riders on the competitor's platform, then reduces the value for drivers to serve that platform, and some drivers would exit the platform. This in turn would further reduce the value for riders on that platform and a downward spiral would eventually end the competitor's platform while improving the value and attractiveness of the leading platform. Eventually, one leading rideshare platform would grow so dominant that it would be the clear winner.

Finally, just because a platform achieves momentum in gaining users, does not mean that the users have a high cost to reverse their platform decision (switching cost), and move to another (Evans and Schmalensee 2010). Evans and Schmalensee in their 2010 paper "Failure to Launch", discuss that success or failure depends on "both the value that the platform brings to participants as well as the steps that platform entrepreneurs take early on to push adoption past the critical mass frontier." Friendster was a popular social media network, until its users fled after dissatisfaction, and flocked to Myspace (Evans and Schmalensee 2010). Myspace, which had 75.9 million users in 2008, would quickly lose those users to Facebook within a short couple of years (Gillette 2020). In 2019, Myspace had 8 million monthly active users compared to Facebooks 2.5 billion (Infographic: Myspace Isn't Dead 2019; Facebook Users Worldwide 2019).

2.3 Threats to platform market dominance

Although a leading platform would benefit greatly from tipping a market, there are some factors that go against a platform's ability to experience a winner-take-all market. According to Cusumano (2019), the major threats to platform market dominance are multihoming tendencies (in what way or how often users choose to multihome), ability to have differentiation in services and rapid technological advancement. Solheim and Tovsen share a similar perspective arguing that the three components that determine whether a market will tip and produce a winner-take-all, or winner-

take-most scenario are: (1) high multihoming or switching costs, (2) a lack of ability to differentiate, and (3) economies of scale (Solheim and Tovsen 2017).

For ridesharing platforms, past research has suggested that it is difficult for a service to differentiate outside of price or the liquidity of drivers on the platform (Thompson 2014). Since the primary need is relatively simple – getting from point A to point B – being able to create a differentiated service to satisfy a segment is difficult. Additionally, economies of scale are present in the industry. As a company grows, its administrative costs consolidate and increased buying power allows it to negotiate better rates, becoming more cost competitive. Both of these factors point toward an eventual winner-take-all outcome. Critically missing from the rideshare industry, however, are high multihoming costs on either side of the platform, so far preventing a true winner-take-all scenario from materializing.

2.4 Multihoming

Multihoming is the decision of a user in a network to utilize more than one platform or source to receive the same product or service (Jia et al., 2019). Multihoming could occur on one side of the platform, or it could occur on both sides of the platform. Some viewers could decide to subscribe to only Netflix, while content providers provide their shows on Netflix, Amazon Prime, and Hulu. If all the content providers single-homed, viewers might subscribe to multiple streaming services to see all the shows they like. For dating platforms that seek to match men and women, often both sides of the platform use multiple dating services at the same time, opting to have profiles and search for a match on Tinder, Hinge, and Bumble at the same time. The opposite of multihoming is 'Single-homing,' where an agent in a network only utilizes a single platform or source for a service. For the on-demand music streaming industry, a customer that subscribes to Spotify or Apple Music, is unlikely to also subscribe and utilize a direct rival service, as they would pay more for a redundant service that offers limited increased benefit.

2.4.1 Why multihoming occurs

One factor that leads to multihoming is the benefit of multihoming to a particular user set or multiple user sets. This can be defined by the amount of benefit or user-value gained by using

multiple services. The benefits differ from platform to platform, and can be a mix of benefits ranging from monetary, expanded choice, availability (reduced interaction failure), or time. Buyers could find that they can achieve increased excess consumer surplus by choosing to multihome (Belleflamme and Peitz 2019).

Sellers will often multihome because they want to reach as many of their potential buyers as possible (Armstrong and Wright 2007; Belleflamme and Peitz 2019). For instance, retail sellers may want to offer their goods on Amazon.com as well as in a department store, in order to have the opportunity to maximize volume of sales, by capturing buyers that prefer to shop through e-commerce as well as buyers who prefer to shop in person at brick and mortar stores. However, some platforms or businesses might charge sellers larger margins of revenue or fees, which also adds to the benefit (as well as costs) for sellers to shop around for a better margin for their placements.

In equilibrium, two-sided market platforms usually do not compete directly for sellers, but choose to indirectly compete for them by subsidizing buyers and bringing them onto the platform (Armstrong and Wright 2007). Sellers often multihome in order to reach multiple sets of buyers and are generally more willing to pay a fee for access to these buyer groups. Conversely, buyers tend to be more price sensitive and raising prices can often push them to other platforms, where they are likely to find multihoming sellers. If a platform subsidizes sellers, they will be slow to stop multihoming, and will likely continue to provide service on the other service to reach extra customers. Raising prices on sellers too much can push them to other platforms, which can reduce your buyer demand on your platform (Armstrong and Wright 2007).

If differentiation is present on only one side of the platform, we often see a “competitive bottleneck,’ where multiple platforms compete aggressively to capture one side of the market while charging the other side. For example, in a situation where multiple platforms are competing aggressively to sign up buyers by charging them less than cost, and generate revenue from multihoming sellers that want to reach the mass of buyers. In this scenario, at equilibrium, sellers are left with no surplus (Armstrong and Wright 2007; Belleflamme and Peitz 2019).

In two-sided markets, where there are multiple competitors, the sourcing habits of customers (the buyers) differ based on their preferences and perceived value of the competing services. A customer could be a 'Sole Source' customer and use only one service, regardless of the results provided to the user in that instance. These customers are loyal, and generally locked in (singlehoming). A customer could also be using the service as a 'First Source,' choosing to always use that service over a competitor, but will switch to a competing service in the event the preferred service could not provide the appropriate service or match. Considering a service could be a customer's first choice, it could also be a 'Second Source,' where a customer would primarily search a competing service, but utilize this service when the other fails to provide the service at the proper time, price, or fashion (Rysman 2009). Finally, an 'Opportunistic' customer (especially in a customer-perceived undifferentiated market) could choose to always search all available options, and choose the one that provides the most benefit, the least cost, or greatest value at that time.

A vendor (eg. driver, retailer, coder, etc.) that decides to singlehome forgoes the revenues they might have received from buyers participating on another platform, but saves in any additional expenses it takes to use that service ("multihoming cost"). Buyers that single-home restrict themselves from exploring potentially superior purchasing options on another platform, yet reduce multihoming costs by only interacting and paying for a single service (Landsman and Stremersch 2011).

2.4.2 Costs of Multihoming

Multihoming costs are the costs associated with using multiple similar platforms or services (Solheim and Tovsen 2017). These costs could be monetary (such as paying multiple subscription fees for streaming services, or purchasing multiple gaming consoles) time and effort (downloading multiple apps and checking prices between all services), or psychological (having multiple apps cluttering your phone, increasing frustration or anxiety from more decision-making). When the perceived benefits of multihoming outweigh the perceived costs, platform users are more motivated to multihome. Similarly, if the perceived multihoming costs are greater than the total perceived benefit of multihoming, participants will choose to singlehome (Eisenmann, Parker,

and Alstyne 2006). These costs can be different to the groups on each side of the platform, and can lead to different decisions on whether or not to multihome or singlehome for each side.

Though they share many similarities, multihoming costs are distinct from switching costs. Switching costs are the costs associated with leaving one platform or service, and completely switching to another (Solheim and Tovsen 2017). These costs can also be characterized as monetary (paying a fee to break a mobile phone contract to switch carriers), time and effort (transferring all of your data from one cloud service to another rival service), and psychological (losing your photos and memories from several years changing social media platforms). If the benefit to switch services or a platform is higher than the perceived switching costs, it is likely that a user will switch to the other service or platform. If the switching costs are higher than the benefit of switching, users will tend to stay with their current service or platform (Hagiu n.d.).

This stands to reason that for every multisided market, there are spectrums of space where multihoming or switching is an attractive option, and there is a point somewhere along that spectrum, where it no longer is worth it for each individual agent.

2.4.3 Methods to reduce Multihoming

From looking at past literature, it is clear that one of the best methods of reducing multihoming among users, is to make the perceived *cost* of multihoming higher than the perceived *benefit* of multihoming (Eisenmann et al.; Cusumano, 2008).

When a competitive platform market is confronted with multihoming on both sides of the platform, incumbents can reduce multihoming by locking in one side of the market or ideally both (Zhu and Iansiti 2019). By locking in one side of the market, incumbents create a ‘competitive bottleneck,’ where platforms begin focusing their efforts on the single user set (Armstrong and Wright 2007; Belleflamme and Peitz 2019). A platform can deploy several strategies to lock in (utilize only one service over time) one side of the user base including network bridging and partnerships, generous incentives, or through exclusivity (Zhu and Iansiti 2019; Choi and Jeon 2018).

Network Bridging and Partnerships: Platforms can reduce multihoming by providing increased user value through the addition of complementors or partners. Creating partnerships can help provide additional value and synergies to users that otherwise would not be able to be provided by the original platform alone (Zhu and Iansiti 2019). Additionally, partnerships allow for differentiation that could pull in niche groups of users. The more partnerships that bring together multiple niche user groups, the greater ability a platform has of locking in a heterogeneous user group (users with differing preferences and habits). For Facebook, independent developers created games and apps that provided increased entertainment and value for the users of the platform. American Express has a partnership with Delta Airlines that allows its cardholders to also be able to enter Delta Skylounges for free, further increasing the value of holding an American Express Platinum card for frequent airline travelers.

Incentives: Incentives increase the overall value of a platform for a user and reduce the value of multihoming. Incentives are often viewed as a pricing strategy, where the company is subsidizing the platform side that they want to lock in. Credit cards are an excellent example of leveraging incentives to lock in the demand side of the platform. For example, the American Express Platinum Card has 5x points on travel and hotel expenditures, plus 1x points on all other charges. These points all add up to being able to be used for free travel, further incentivizing users to continue to use only their American Express card for purchases in order to gain more points. Similarly, Airline frequent flyer programs can create a massive benefit to the user for continuing to build points by taking more flights exclusively with one airline. As the flyer accumulates more miles with the airline, they might receive internal upgrades in status (Silver, Diamond, Gold, etc.) that provide more perks, further incentivizing them to book more flights to build points on one airline. For those flyers, the value of multihoming to find a cheaper flight on a rival airline, begins to diminish.

Exclusivity: Another way a platform can undermine multihoming is to establish exclusivity contracts for sellers. For contracts to work one would have to have a subsidized rate for sellers that agree to exclusivity, and then charge an exorbitantly high non-exclusive rate to those that do not agree (Choi and Jeon 2018). This reduces the sellers' incentive to multihome, and forces them to decide to side with the platform that has the most buyers and/or the best rate combination. It is likely that the competitor will also retaliate with their own exclusivity contract. Network effects

would eventually consolidate most sellers onto the side that has the most buyers, which could bring sellers to that platform in greater numbers. Essentially, the most dominant platform in size of buyers would have the greater ability to win out from the network effects (Armstrong and Wright, 2007). Reasons for caution for Uber and Lyft to take this approach, however, are two-fold. First, many states (and perhaps especially the federal government), may find this type of aggressive action as anti-competitive, and within the recently evolving antitrust atmosphere, may bring along heightened scrutiny with such actions. Second, and perhaps more threatening to their business models, is the new California Assembly Bill 5 (AB5), as well as other state efforts that are seeking to upend the status of 'contract workers' for their drivers. Should Uber or Lyft lock in these drivers in exclusive contracts, they could potentially face a harder time proving the case that their drivers are contractors, and not fulltime employees – that are entitled to the full benefits of said employment status.

Below is a table that summarizes the three general strategies to reduce multihoming from one's platform outside of product/service differentiation:

General Strategies to Reduce Multihoming						
	Network Bridging Strategies		**Incentive-based Strategies**			**Exclusivity Strategy**
Strategies	**Third Party Partnerships**	**Company-provided Credits**	**Pricing**	**In-App Promotions**	**Loyalty Programs**	**Exclusive Contracts**
Description	Strike partnerships with outside companies to provide linked incentives, overlapping the benefits to users of partnered networks	Strike partnerships with companies to provide service as an employee benefit	Providing the cheapest price to attract customers and reduce revenues for competitor	Similar to pricing strategy, but discontinuous discounts on prices	Provide an additional incentive for repeated use of one service (priority rides, upgrades, free rides, discounts)	Create contracts of exclusivity with suppliers
Goal	Increase the benefit of customer that uses combined services, provide additional benefit outside of offered service/product, increase lock in by reducing attractiveness of cheaper alternatives	Companies directly offer the service to their employees, increase attractiveness to use the service over rivals' (company foots bill, near-zero marginal cost for employee)	Outlast competitor, hope that near-term savings for customers keep them with service over time	Hope that near-term customer savings leads to long-term use	Increase perceived value of continued use of one service, reduce attractiveness of potential cheaper alternatives	Prevent or minimize competition for supply. Beneficial to those with large market power

Figure 1 - General strategies for reducing multihoming in an undifferentiated market

Successful strategies against multihoming have been used in several industries over time. The console game industry utilizes contracts of exclusivity to lock in marquee suppliers to increase differentiation, in conjunction with higher-priced consoles (higher multihoming costs) to reduce the chances of customers multihoming. Airlines differentiate their flights through onboard

amenities and service, as well as loyalty incentive programs to reduce the value for flyers to take other airlines. Amazon combines a loyalty program (Prime), with network bridging (free delivery, streaming, music, Kindle, Alexa, etc.) to increase the perceived value of making that site the first place to shop online. The key to these companies and industries have been in finding a way to differentiate, or to construct higher costs to multihoming (or both).

The ridesharing industry has so far, found it difficult to do either. Its service, transportation, is simple and currently difficult to differentiate outside of price and supply of drivers. Second, the cost to multihome is not necessarily very high, as instead of a console one has to purchase, riders can download an app for free. The combination of the two, both reduces the unique value of a service to a specific rider, and also fails to disincentivize that rider form seeking rides elsewhere – leading to an undifferentiated and commoditized industry.

An industry that also experienced such a combination in the past was the tin-canning industry in the 1950's. With many seeing very little difference in one can product over another, cost-differentiation was how canning companies won market share. Buyers would dual or triple-source their canning, playing each company against each other, and dropping a canning supplier should their prices not be low enough (Gorgon, Reed, and Hamermesh 1988). This led to a major emphasis on increasing output to achieve economies of scale to drive down unit costs, to offer a competitive price to win demand – with shrinking margins. The industry was heading for a race to the bottom. John Connelly, the former CEO of Crown Cork and Seal, showed how differentiation was possible in this extremely commoditized industry. Connelly restructured Crown Cork and Seal to turn their undifferentiated product (canning) into a differentiated service. Through product-line focus, integrated teams, and a responsive, solutions-focused customer approach, Connelly set his company apart from the competition, and held the highest profit margins and return on equity in the industry, out of the four largest canning companies (Gorgon, Reed, and Hamermesh 1988). Overall, Connelly showed that even in the most commoditized and seemingly undifferentiated industries, there is room for differentiation. For a more in-depth description on Connelly's turn-around of Crown Cork and Seal, see '**Appendix B:** A lesson in differentiation.'

2.5 Ridesharing Platforms

Ridesharing firms such as Uber and Lyft are two-sided platforms that serve as matchmaking intermediaries between two user groups: riders and drivers. This match-making service provides value to both sides and attracts users to join with the use of pricing and liquidity. Riders generally tend to value an affordably priced ride with a low wait time – i.e. drivers available to pick them up quickly. Drivers also find value in having a large supply of riders available to have less downtime between rides, maximizing their time to make revenue (Bryan and Gans 2019).

A study comparing taxi drivers in NYC and San Francisco with Uber and Lyft drivers, found that taxi drivers had a median idle time of 10 minutes between rides, while Uber and Lyft had a median idle time of about 1 minute (Jiang et al. 2018). This lower idle time and higher utilization rates of drivers in ridesharing over that of taxi drivers, can be attributed to the following factors. First, the technological efficiency of Uber's and Lyft's matchmaking applications allow for drivers to find in-demand riders quicker than a radio-supported taxi – sometimes even getting assigned their next ride before finishing their existing ride. Second, the scale of the driver networks of Uber and Lyft, allow for more drivers to be closer to all rider demand, and more of their signs visible to stimulate demand. Third, inefficient taxi regulations that limit the number of medallions available, or specify required service in all areas – even those that might not have high demand. Finally, dynamic pricing allows the ridesharing platforms to better manage supply and demand (Cramer and Krueger 2016).

2.5.1 Platform Competition

In February of 2015, Uber was the clear leader (and still is) in terms of US market share, hitting a peak around 92%. At that time, Lyft had only 7% of market share (Molla 2018). Over time, as Lyft and Uber continued to expand into new cities, Lyft began to gradually gain market share, increasing to 13% in February 2016, and then to 18% by January 2017 (Molla 2018). This period of time was marred with intense competition, and a giant battle to win over drivers and riders alike. Price wars were rampant in cities across that country that weren't controlled by a single provider, fueled and prolonged by investor funding rounds that allowed each company to sacrifice profitability for growth (Solomon 2016). During this time, Uber looked poised to win in a

protracted price war, having raised $8 billion in funds, compared to Lyft's $2 billion (Solomon 2016).

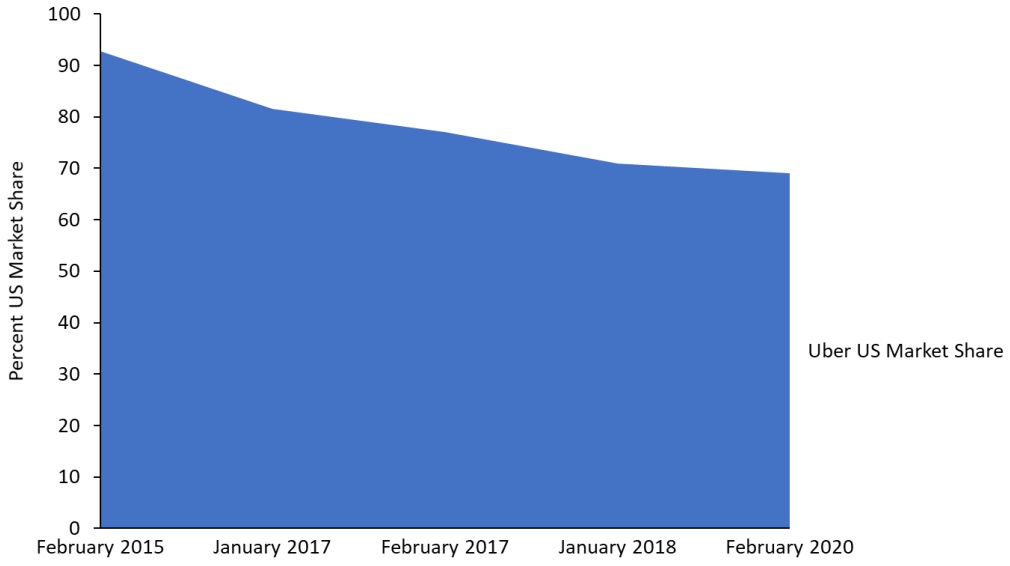


Figure 2 - Uber US market share (Molla 2018; Gessner 2020)

A common theory at the time was the Uber would win over the market through a combination of depressing prices long enough to outlast Lyft, and allowing indirect network effects to do the rest. As Uber continued to siphon off riders from Lyft with lower prices, drivers would follow, causing Lyft's liquidity of drivers to fall – spurring further flight of riders from Lyft. This would compound quickly and eventually leave Uber with nearly the entire market (Thompson 2014).

The start of 2017 would prove to be exceptionally consequential for Uber. After multiple scandals involving workplace culture, sexual harassment claims, allegations of corporate espionage, intellectual property theft, and an ousted CEO, Uber's brand image began taking a serious hit which was reflected in a massive loss of market share (Gessner 2020). On the 28th of January 2017, the #DeleteUber hashtag began trending and went viral. In a single week, Uber lost 5% of its marketshare to Lyft. By the end of that year, Uber's marketshare had fallen from 82% to 71% (Gessner 2020). Since then, the overall US market share has remained somewhat stable. According to a Second Measure study, 69% of the share of US rideshare spending in February 2020 went to

Uber, 30% went to Lyft, and 1% went to all other rideshare services (such as Juno, Via, or Gett) (Gessner 2020).

Had Uber beaten out Lyft, it is still unclear it would be able to increase rates to achieve profitability. When Uber exited China, Didi Chuxing was able to squeeze out the rest of the competition for a little while, and increase prices. It looked as if it was to finally become profitable until another new entrant, Meituan started a rideshare service in Shanghai. Meituan offered 3 months free use for drivers, and then only took 8% from driver earnings, compared to Didi's 20%. More new competitors followed suit, targeting specific cities and regions to compete. As a result, Didi began losing marketshare once again, and had to depress prices and take-rates from drivers (Zhu and Iansiti 2019). With barriers to entry being low, and the service still undifferentiated, Didi Chuxing can expect to continue to be dogged by new entrants and intense price competition.

Overall costs are still high for both services. Some of the largest cost drivers for Uber and Lyft deal almost exclusively in either bringing in and retaining drivers and riders, or are costs that are scaling with each additional ride booked. Uber and Lyft's greatest costs lie in their Cost of Revenue (Trefis 2019; Griswold 2019). This includes insurance costs related to ride hailing, incentives paid to drivers, credit card processing, data center expenses, as well as mobile device and service expenses. In traditional digital platforms, or in software in general, the marginal costs do not scale as linearly as they do in the physical world. The marginal cost to produce another replication of software or support another customer, is generally at near-zero. For Uber and Lyft, many of the components of these Costs of Revenue (credit card processing, insurance, and driver incentives), scale as more rides are taken, or more drivers are hired (Trefis 2019; Griswold 2019). To make matters worse, the churn rate for drivers is extremely high. Uber experiences a monthly churn rate of about 12.5%, and roughly 20% of their acquired drivers remain after a year, putting more pressure on driver acquisition costs (CBI 2019). These all serve to reduce the topline of the business. Sales and Marketing expenses are the third largest contributor of Uber's and Lyft's expenses (Trefis 2019). These costs include advertising, salaries to sales & marketing employees, consumer discounts, rider promotions, driver referral bonuses, and credits and related expenses.

With both riders and drivers multihoming, it is difficult for these companies to increase prices on riders or increasing take rates on drivers to make up for their large expenditures. Any company that attempts to extract more revenue from either side of the platform risks losing market share to its rival. Lyft experienced this in 2015, when it refused to lower its prices after Uber did so, and subsequently lost market share (Solomon 2016).

2.5.2 Multihoming Tendencies

In the ridesharing market, multihoming is seen to occur on both sides of the platform. Riders will often switch between multiple services before choosing a ride, or hit a threshold that compels them to look away from their first source of rideshare. The benefits riders can achieve from multihoming are the ability to find the cheapest fare, the quickest pick up time, or the quickest overall time to get to their destination (HBS Digital Innovation and Transformation 2015). These benefits generally increase if the supply of drivers is less stable across platforms. The monetary costs for these riders are zero, as it costs nothing to download and use multiple apps (HBS Digital Innovation and Transformation 2015). Other less measurable multihoming costs are time and effort to check between applications, as well as psychological burden involved with having a clutter of apps on a phone and extra decision making.

It is estimated that about two thirds of all drivers work for both Uber and Lyft (Berry 2019). In order to maximize the amount of revenue they make when they choose to drive, drivers tend to try their best to maximize the percentage of time they are driving customers. By doing this, they are able to maximize the amount of revenue they earn for the period of time they are working. Drivers who multihome can benefit from reducing their idle time, and following rider demand wherever it exists (Liu, Loginova, and Wang 2017). If ride matches are not occurring quickly on one service, the driver can search the other service, to find a potential match quicker. By doing this, drivers ensure they minimize the amount of time they are left idle – not making money. The monetary costs for drivers to switch between services are quite low as well, as it costs nothing to download both apps. On the contrary, both Uber and Lyft's incentives may actually make it more beneficial to drive for both services, as bonuses and incentives fluctuate between the two services. A multihoming driver could benefit from the incentives given by both companies. Additional multihoming costs can be similar to riders with juggling multiple apps – especially while driving.

Market Thickness and multihoming

Thickness, or the number of participants on the driver side of a ridesharing platform's market relative to prospective riders, also helps explain a reinforcing motivation for drivers to multihome. There is a correlation between higher wages in thinner markets that are thickening, and lower wages in higher thickness markets (Nikzad 2017). This is because in thinner markets, additional drivers that sign on serve to complement existing drivers by adding improved service to the platform. This increased service attracts riders to the platform, so as thin market labor increases, so does driver welfare. However, at a certain point (the 'saturation point'), there becomes an excess of drivers, which then creates the dynamic of other drivers being 'substitutes' as opposed to 'complements' (Nikzad 2017). This can lead to a decrease in driver wages as drivers take riders from each other, and begin to experience longer idle times and decreasing the number of rides they can complete in a given time (Liu, Loginova, and Wang 2017). At sufficient thickness, labor increases reduce labor welfare. This can lead drivers to switch to the thinner market – with the rival service, bringing with them multihoming riders as driver availability transfers, and starting the cycle over again.

Rider and Driver Welfare Effects from Multihoming

Along with market thickness, two studies looked into how multihoming tendencies on either side of the ridesharing platform, affects the overall welfare of both riders and drivers. With their models, in a duopoly, multihoming riders can have a positive welfare effect on drivers, as they helped reduce idleness when they switched services in search for lower wait times (Bryan and Gans 2019). Surprisingly, multihoming riders also can have a positive effect on singlehoming riders, as they are quicker to leave the system either once served or if they opted for the competing service, reducing the wait times for the singlehoming rider (Liu, Loginova, and Wang 2017). A positive effect on riders also exists when drivers multihome. The more drivers multihome, the better off riders are as their wait times drop closer to zero (Bryan and Gans 2019). As rider demand fluxes between services, multihoming drivers are able to more quickly serve the available demand by pivoting to the service with liquidity in riders. The multihoming drivers benefit by having less idle time, finding availability quickly through a matching on both services. Although singlehoming drivers benefit in having shorter pick up times, they spend more time idling between rides, as

multihoming drivers pick up some of the excess rider demand (Liu, Loginova, and Wang 2017). Overall, both riders and drivers tend to be better off when both sides multihome. Uber and Lyft, however, experience the least surplus when both sides multihome. Missing from these studies' models, however, was the element of dynamic pricing that each service employs to balance the supply of drivers with the demand of riders. Should dynamic pricing be included in their models, the real monetary gain from multihoming, instead of waiting a bit longer for a rider, might not be as large as thought. More research needs to be conducted to include dynamic pricing with multihoming and idle time on driver welfare.

2.5.3 Strategies Employed to Reduce Multihoming

From looking at past literature, it is clear that one of the best methods of reducing multihoming among users, is to make the perceived *benefit* of multihoming be less than the perceived *cost* of multihoming (Eisenmann et al.; Cusumano, 2008). A clear strategy that is being taken up by Uber and Lyft is to try to create a benefit of singlehoming and thereby reduce the benefit of multihoming. On the rider side of the platform, this can be seen in some of the new incentives and partnerships that they have rolled out in the past couple of years. For Uber, a partnership with American Express has created a program that gives all American Express Platinum cardholders a credit of $15 per month, and $20 of credit in December (Uber AMEX Platinum 2020). Lyft has partnered with Chase, to provide all cardholders with 5% rewards on all rides, and for the Chase Sapphire Reserve cardholders, 15% discount and 10x points on all rides taken with Lyft as part of a free year-long subscription to LyftPink (Passenger Perks and Rewards – Lyft 2020). Additionally, Lyft has struck a partnership with Delta Airlines, that provides all Delta Skymiles members with a matched Skymile for every dollar spent on Lyft (Passenger Perks and Rewards – Lyft 2020). These incentives and partnerships seek to make it become more beneficial for riders to continue to prioritize using their services, in order to receive the full benefits provided by these third-party vendors – thereby reducing the perceived value of multihoming, and enhancing the value of their network.

Uber and Lyft have also taken to expanding into selling ride credits to companies to provide as benefits to their employees. Each company involved negotiates a certain value of credit that they would like to provide to each of their employees. As their employees use the service, the rideshare

service charges the company instead of the employee (Lawler 2014). This encourages the employees of those targeted companies to use only that specific service, as their marginal cost to use rides with that service is near-zero until they spend over their company-provided credit limit (Lawler 2014). This type of employee benefit has been used by other transportation industries in various cities, with some companies offering their employees discounts or credit for the city public transportation program. These have especially been used as parking space is limited or expensive to provide in cities (Manning 2019). Offering rideshare credit can serve as a way for a company to cut costs or deal with parking constraints, while providing an increased employee experience.

On the driver side, Uber and Lyft have begun incentivizing drivers to complete more trips with their services through discontinuous incentives such as bonuses and rewards that only are awarded at set points. Although each platform calls them different things, they essentially have the same incentive offering to keep drivers on their service. The driver incentives fall under three categories: Total rides completed, consecutive rides completed, and guaranteed pay for rides completed. Drivers are sometime presented with rewards for conducting a certain number of rides back-to-back in a certain time of day (Uber Website 2020; Lyft 2020). This is to incentivize the driver to not switch back between Uber and Lyft, and to stay continuously with that service for longer period of time – especially during peak demand times. Drivers will be offered a certain reward for completing a specified number of rides in a given period of time (Uber Website 2020; Lyft 2020). For instance, a driver may be offered a $30 reward for completing 30 drives between Monday and Friday. This doesn't necessarily incentivize drivers to stay continuously on Lyft, but does encourage a higher rate of participation on the platform, for the driver to achieve the bonus from the challenge. Finally, drivers are often given 'guaranteed' pay for a certain number of rides (Uber Website 2020; Lyft 2020). An example of this would be a $100 dollar guaranteed pay for five rides. If the driver earns $90 after five trips, the company would pay them the $10 difference to get the driver to the guaranteed earnings. This is likely to incentivize drivers to accept rides that might be less profitable instead of declining them.

Below is a table summarizing Uber and Lyft's current strategies to reduce multihoming:

Uber & Lyft Strategies to Reduce Multihoming						
	Network Bridging Strategies		Incentive-based Strategies			Exclusivity Strategy
Companies	Third Party Partnerships	Company-provided Credits	Pricing	In-App Promotions	Loyalty Programs	Exclusive Contracts
Uber	AMEX Platinum monthly credits, Starwood Hotels, etc.	The Uber for Business program has sought to strike deals with various businesses to provide credits to their employees.	Both have sought to compete via price. Price fluctuations have shown ability to capture market share if rival does not follow.	Both offer discounts and deals - often based on frequency of use, rating, etc. Discounts are generally not continuous, and occur over time.	Uber Rewards: Each dollar spent earns you points, which allow you to upgrade your Rewards Class (blue, gold, platinum, diamong) which give increasing number of perks.	Not being utilized
Lyft	Chase Cards, Chase Sapphire Reserve, Delta Skymiles, Hilton Honors, etc.	The Lyft Business program has sought to strike deals with various businesses to provide credits to their employees.			Lyft Pink: Offers 15% off rides, ride priority, and other discounts over time.	

Figure 3 – Uber's and Lyft's employed strategies to reduce rider multihoming

3.0 RESEARCH QUESTIONS

In light of the rideshare industry's difficulty in reducing multihoming between services on both sides of their platforms, this thesis sought to better understand and focus in on the rider side of the platform. As shown in several of the reviewed literatures, buyers more so than sellers are normally the side that gets locked in on successful platforms, as sellers are more likely to seek out buyers wherever they are. As such, focusing in on the motivations of riders to prefer a service, to multihome, and also to not multihome, are extremely valuable in understanding what strategies should be taken to reduce their multihoming.

Although several strategies to reduce multihoming have been presented throughout the research, they have generally been successfully applied in industries that have room for differentiation, higher multihoming costs, or higher barriers to entry. Missing in much of the literature is how they have been effectively and sustainably used in undifferentiated markets with low multihoming costs – much like ridesharing. How well do the current strategies being utilized by Uber and Lyft impact or effect the decisions of riders to multihome? The following research questions, and the remainder of the thesis, seek to gain insights on rider preferences and habits with regards to multihoming, and which strategies might be effective to reduce rider multihoming.

3.1 Factors that determine preference of service

Q1: Which factors play a role in determining the rideshare service of preference amongst riders?

When looking at Uber's and Lyft's reasonably undifferentiated services, it is useful to understand what it is that attracts different riders to each service – or to even have a preference at all. For this research question, the goal was to better understand what the attributes were that riders cared about, and what led them to prefer (or not prefer) one service over the other. Understanding what attracts riders to a specific service can provide insight for rideshare companies to better acquire more riders to their platform.

3.2 Attributes contributing to multihoming

Q2: Which attributes contribute to riders multihoming between ridesharing services? Which attributes contribute to riders singlehoming?

Along with rider preferences for a certain service over another, the next step is to better understand which attributes drive riders to multihome and use multiple services, as well as which attributes reduce the desire to multihome. Learning what motivates users to do both could provide greater insight on what potential levers rideshare companies may use to encourage less multihoming, and increased usage of a single service.

3.3 Cost of multihoming

Q3: Can the attributes contributing to rider multihoming be quantified as an overall multihoming cost? Can they be manipulated?

Finally, once we developed an understanding of which attributes riders cared about the most when deciding to multihome, we wanted to see if we could measure the limits of those attributes. Identifying those limits could lead us to better identify the *cost of multihoming.* The costs of multihoming being measured are primarily money, time/hassle, psychological, and loyalty-based (or how locked-in the user is to the company). For instance, how expensive does a ride have to be to encourage a user to search the rival service? How long of a wait or time until arriving to one's destination influences a certain type of rider deciding to accept the ride or search the rival service? Does having a preferred service have effect on price and time thresholds? This can further help companies be better able to understand at what point they lose a type of customer to multihoming. Additionally, it may help companies understand the relative effectiveness of the differentiating strategies in place (3rd Party Partnerships, Company-provided credits, and In-App Promotions), on having an effect to *increase* the cost of multihoming, thereby, increasing those cost and time thresholds to multihome.

4.0 RESEARCH METHODS

This thesis utilized a combination of qualitative and quantitative approaches to answer the above research questions. The qualitative approach began with interviews to flush out thoughts and ideas from riders to better inform a larger qualitative survey. The survey then dug in on an expansive set of segmented rider preferences and habits. Finally, these qualitative analyses fed into the final quantitative approach – a conjoint analysis that sought to measure the importance of the qualitative results through a simulation of rider choice.

4.1 Qualitative approach

In order to gather sufficient data on the first two research questions (ridershare preference factors and attributes leading to multihoming), data was collected utilizing qualitative approaches. These approaches used both interviews and surveys of ridesharing riders to paint a better picture on what factors have effect on their preference of a service, as well as which attributes contribute to them multihoming. The rider interviews were collected prior to the surveys, in order to ensure that the right questions could be developed. Interviews were utilized to provide greater understanding of rider thoughts and reasons behind their habits and activity. With a more robust understanding of the variables, the survey would then be used to scale the collection of data from a larger and segmented sample size.

4.1.1 Rider interviews

The explicit goal of interviewing riders was to gain a general understanding about the thought process that various riders use to determine whether to use a service, under which conditions to multihome, and what they prioritized the most in ridesharing services.

Interviewees were contacted via email or phone, requesting an interview. Interviews were conducted in person or over the phone. The interviews were audio recorded with permission of the interviewee. Names were not recorded from the interviews to protect confidentiality, and were omitted in the results section. Basic demographic data about the interviewee was collected (age, gender, occupation, city), but nothing that could be used to identify the subject.

The interview included responses from 9 interviewees. The goal of the selection of interviewees was to create as much variation in cases as possible. Subjects from various backgrounds, occupations, genders, and geographic location were chosen to try to bring forward a diversity of experiences and potential responses. This would allow the subsequent survey to ask more relevant questions from its participants. Interview questions can be found in ‘

Appendix A: Interview Topics/Questions.'

4.1.2 Rider surveys

With the information gained from the interviews, a clearer picture of what needed to be collected presented itself. Some topics that were tested included: frequency of use, number of services used, frequency of switching between services, what factors persuaded riders to singlehome vs multihome, tendencies to multihome with other applications outside of ridesharing, and more.

This survey was created through the Qualtrics XM service. Each survey participant was asked a set of demographic questions, and then questions about their uses and preferences in ridesharing services. Over the course of one month, survey results were collected from 495 participants. 44% were paid respondents through the Qualtrics XM online panel. Participants were routed through the survey and segmented into two major segments of riders: singlehoming users and multihoming users. Multihoming users were further segmented into whether they always check between multiple services, and users that had a preferred service, but multihomed occasionally for various reasons.

The survey data was screened for completeness, failed criteria (e.g. not being a rideshare user), or quality issues (illogical responses: such as selecting multiple services but also claiming to use only one). After screening and data cleaning, 430 responses were accepted and analyzed. The distribution of participants was nearly even among male and female participants. Income distribution was also fairly evenly spread, with the exception of a smaller representation from those that made $135,000 - $149,999. Out of the 20% of the sample that reported earning less than $30,000 a year, nearly half were students. The income distribution skewed higher than the national average. The median salary from the survey, was between $50,000-$75,000 compared to the 2018 US median salary of $33,706 (U.S. Census Bureau 2018). Age group participation skewed more heavily than the US average towards younger age brackets, which is consistent within users of ridersharing services broadly. This is also apparent in the primary modes of transportation reported by survey takers, where private vehicles are seen to be used less than the national average. Those earning less than $30,000 walked and took the bus in greater proportion than those of higher incomes (Figure 8). Those earning between $30,000 and $75,000 had the highest proportion using

rideshare as their primary mode of transportation. Participants between the ages of 25 and 35 drove the least out of all other age groups, and used light-rail as a primary transportation source more so than other groups (Figure 9).

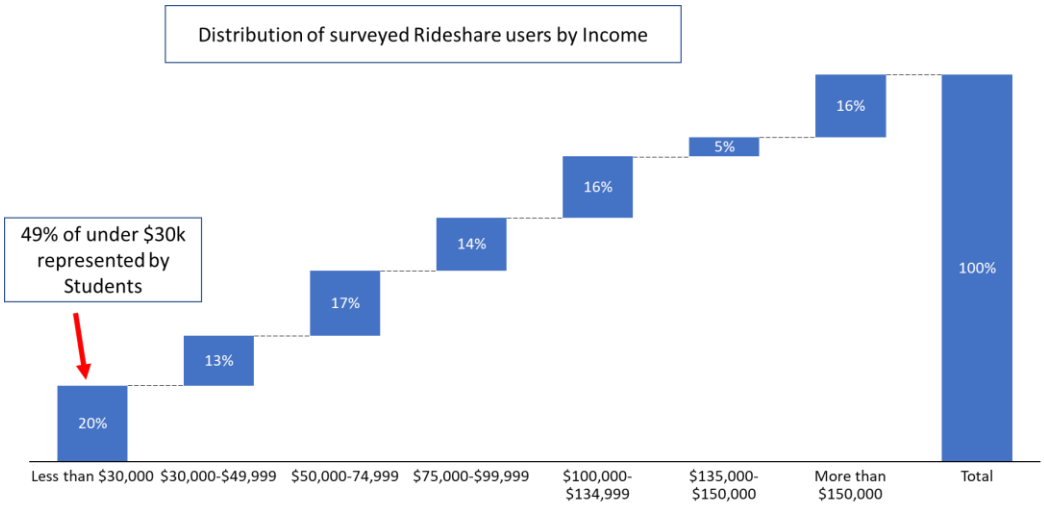


Figure 4 - Distribution of surveyed rideshare users by income

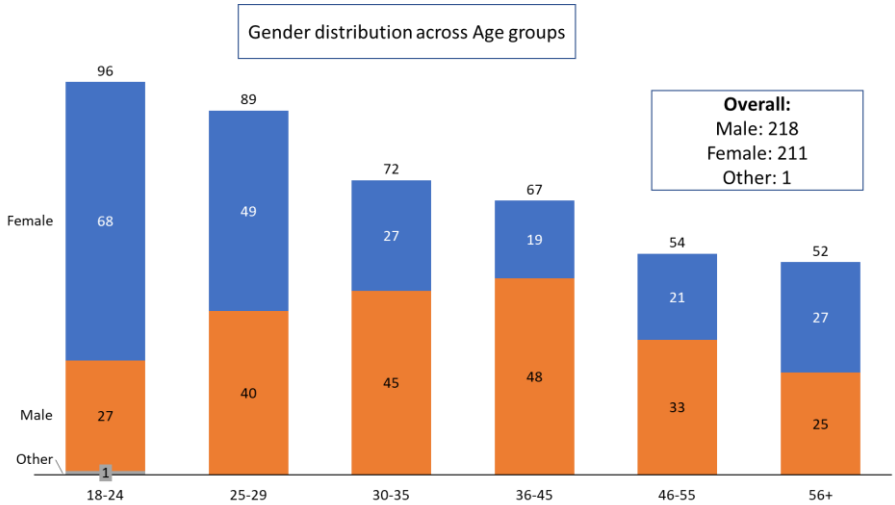


Figure 5 - Distribution of gender across age groups

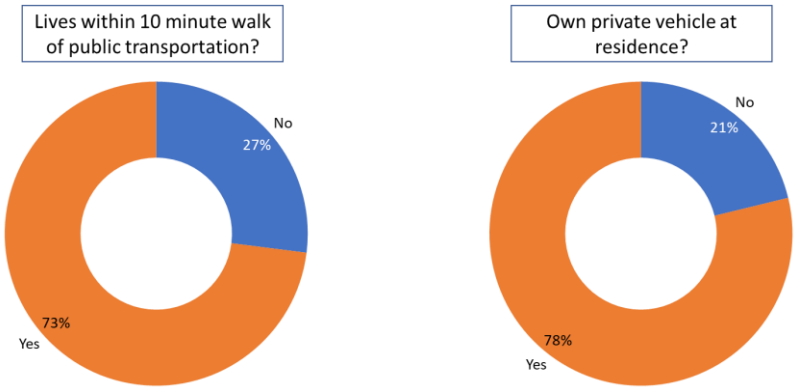


Figure 6 - Proximity to public transportation and private vehicle ownership

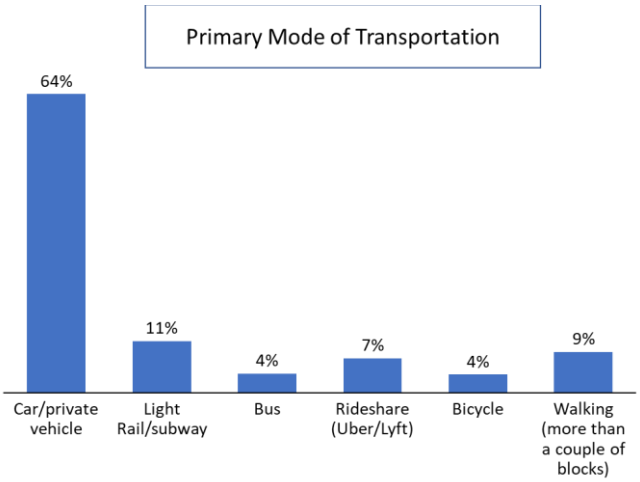


Figure 7 - Primary mode of transportation for surveyed riders

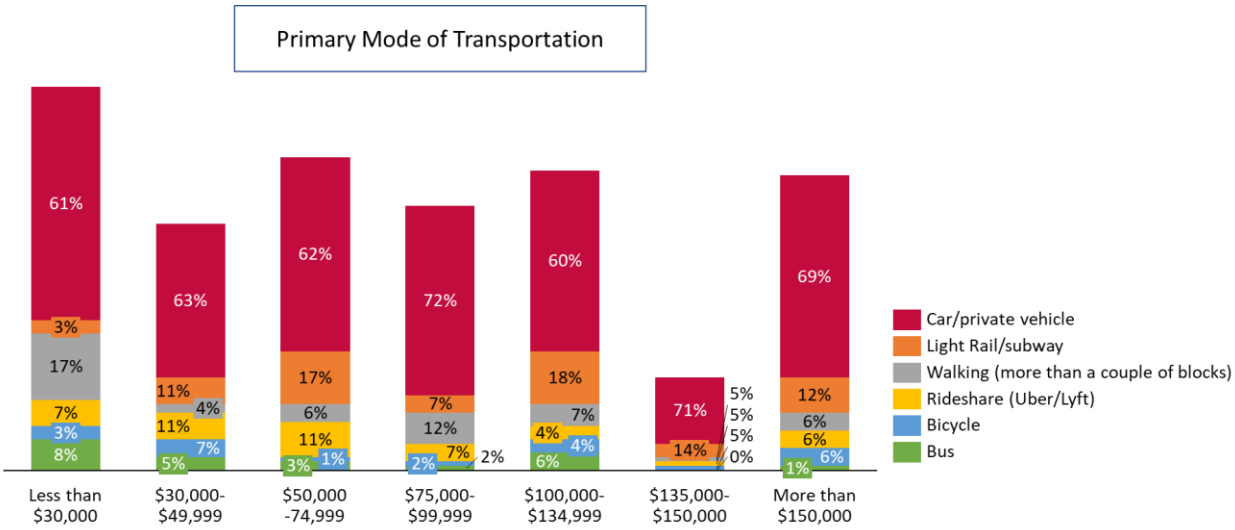


Figure 8 - Primary mode of transportation across income brackets

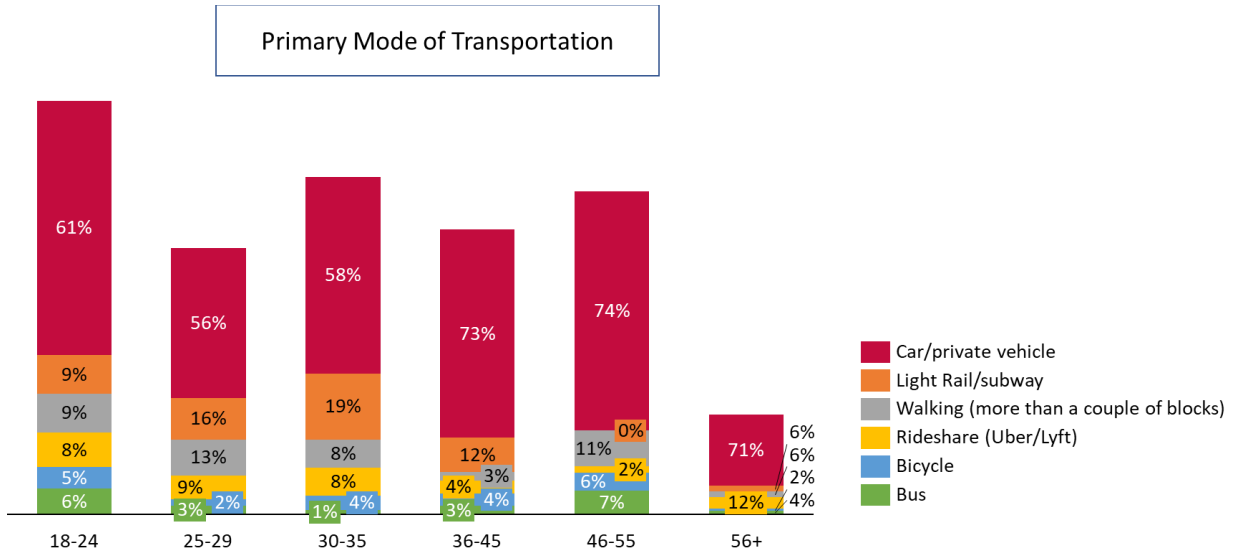


Figure 9 - Primary mode of transportation across age brackets

4.2 Quantitative approach

After collecting the preferences of a larger sample of riders through qualitative means, this thesis sought to find a way to quantify these preferences. A conjoint survey was used to test what the thresholds were for the attributes provided from the results of the qualitative research.

Conjoint analysis is typically a product development and marketing tool used to understand which product or service features are the most important or valuable to customers, and from those utilities estimate how combinations of product features and price can drive overall market demand. Choice Based Conjoint (CBC), is a process that presents several sets of attribute combinations, and forces the survey participant to choose which combination out of the set is most agreeable to them – or select that *none* of the presented combinations are agreeable. CBC is meant to simulate an actual buying scenario, where if a customer walked into a store and saw the three to five different products offered, they would pick the one bringing them the best benefit for the cost. Each choice made compares the chosen combination of features (or none) directly against all of the combinations that were not chosen. After several sets with varying combinations and choices, utilities can be estimated for each of the attributes for each participant. The aggregate of responses to these questions provides a better picture of how different segments value certain features. From these results, product teams can run simulations of different product options to have a better

understanding of what their 'optimal' product should consist of for the segments they are after, how to price it, and what the demand for their product might look like.

The CBC concept was adapted from its typical product/marketing use, to be used as a simulation of user behavior when using a rideshare application. Instead of directly comparing multiple different combinations of ride attributes (price, wait time, estimated time to drop off, and company) and making participants choose which they would prefer to take, this CBC provided participants with a single ride option. In the place of the 'none' selection, it gave the participant the option to search for another ride. Attributes in the presented scenarios are all indirectly compared to each other as a participant accepts or rejects the offered ride.

Using Sawtooth Software's Conjoint Analysis software, each participant was presented with 25 scenarios that simulated them opening up one of their rideshare apps and being presented with ride details. These rides varied in company (Uber/Lyft), price, wait time, and estimated drop off time. The participants were made to choose an option presented to them. The option would be to accept the ride from the service, or to change services and check what the other service had to offer. In total, 300 separate versions of the survey were issued, each version with different combinations and sets of choices, building a picture of user preferences and relative importance.

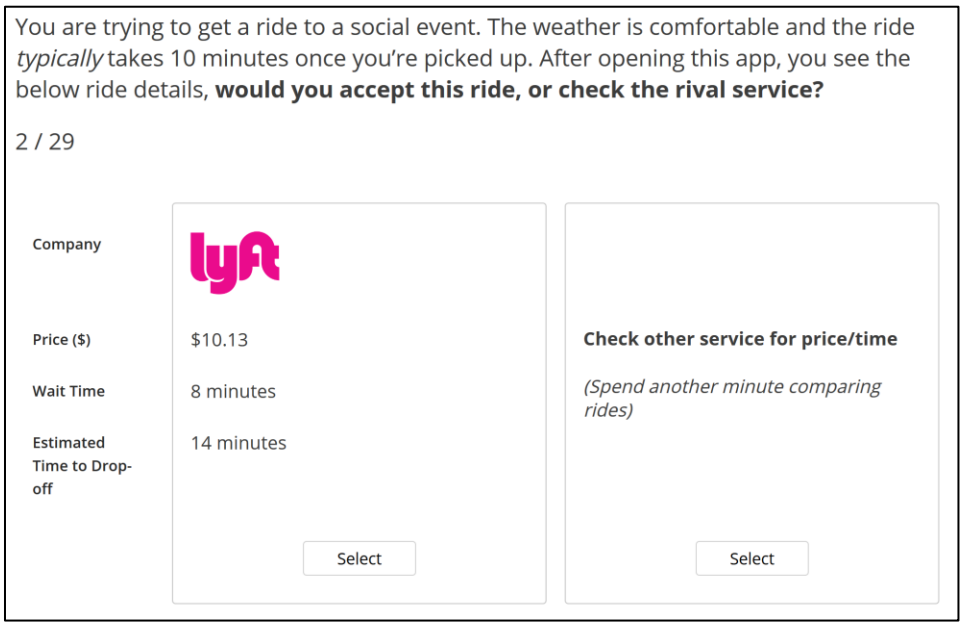


Figure 10: Example scenario shown to conjoint participants

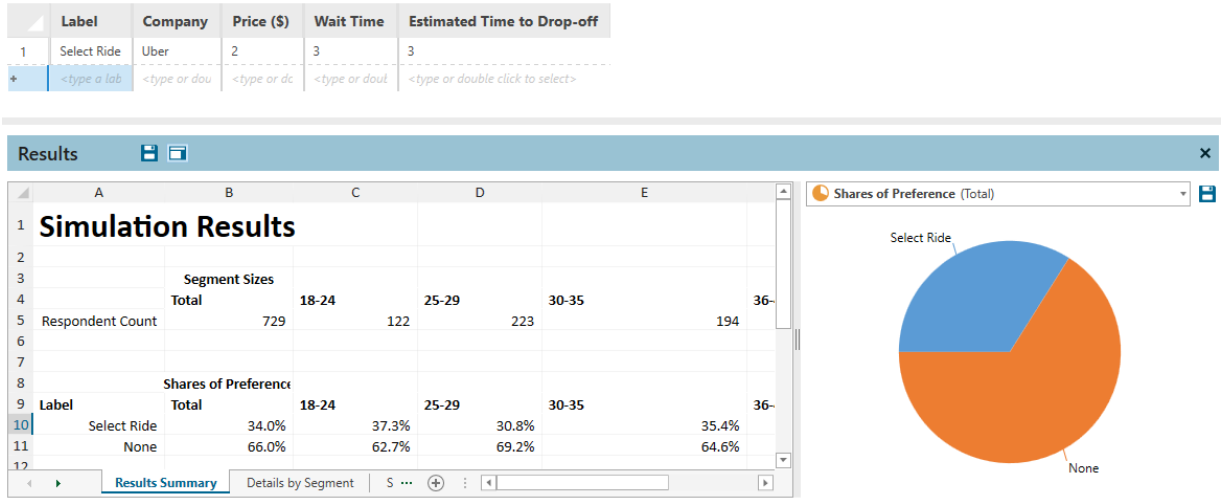
Based on all of the responses, the relative importance for each attribute, as well as the relative importance (or utility) of each attribute level was calculated. In conjoint analysis, utility is a measure of relative desirability (also known as a part worth). The higher the utility, the more desirable the attribute level, and the more impact it will have on customer choice. These part worths were calculated on the individual level and aggregated for the total population of responses. The following were the main attributes and attribute levels used:

Company	
Code	Company
1	Uber
2	Lyft

Price			Wait Time			Estimated Time to Drop Off		
Code	Price	Per Change	Code	Wait Time	Per Change	Code	Estimated Drop off	Per Change
0	8.10	-20%	0	2	-80%	0	12	-80%
1	10.13	0%	1	4	-60%	1	14	-60%
2	12.16	20%	2	6	-40%	2	16	-40%
3	14.18	40%	3	8	-20%	3	18	-20%
4	16.21	60%	4	10	0%	4	20	0%
5	18.23	80%	5	12	20%	5	22	20%

Figure 11 - Main attributes and attribute levels measured in conjoint

Sawtooth's conjoint program also provides a 'Market Simulator.' Once the relative importance and utilities were calculated from the responses, a simulation of market preference was able to be created using the analyzed part worths to see how the 'market' would react given certain ride scenarios of the attributes and levels. Because the part worths were down to an individual level, it was possible to test choices of the general population as well as how certain segments would choose to accept a ride or not depending on varying conditions. Based on the presented ride scenario and segments chosen, the simulation would see which percentage of customers would accept the ride or reject the ride and search for a ride on the rival service (choose to multihome). This would become more useful to identify which drivers may have had impact on user decisions, or describe how certain user sets tend to act given different circumstances.



	Label	Company	Price ($)	Wait Time	Estimated Time to Drop-off
1	Select Ride	Uber	2	3	3
+	<type a lab	<type or dou	<type or dc	<type or doul	<type or double click to select>

Results

Simulation Results

		Segment Sizes				
		Total	18-24	25-29	30-35	36-
	Respondent Count	729	122	223	194	

		Shares of Preference				
Label		Total	18-24	25-29	30-35	36-
	Select Ride	34.0%	37.3%	30.8%	35.4%	
	None	66.0%	62.7%	69.2%	64.6%	

Results Summary | Details by Segment

Shares of Preference (Total)

Figure 12 - Example of a Market Simulator result

These responses were segmented in a few different ways to isolate behaviors of different groups. Segmentations on brand preference helped understand how a rider that prefers a specific brand acts differently on price or time thresholds when presented with a brand they prefer vs. the rival. Additionally, testing different segments with potential drivers of lock-in (such as 3rd Party Partnerships) to see how strong of a factor they were in reducing multihoming from their brand.

This conjoint survey took in a total of 1,392 responses, 1,286 complete responses, and ended up with a total of 729 responses after taking into account screening criteria and quality checks. To reduce the noise in the results, only responses that were from US rideshare riders who used both Uber and Lyft were accepted. Additionally, further screening was conducted to remove responses of riders that always check both services (or in the survey rejected all options). Although these were valid responses that showcase how they would act in real life, they would not help with measuring multihoming thresholds (since this population has none). Should these users have been kept, their responses would give the importance of all attributes and levels as 'zero.' These responses would skew the remainder of the population's results, and distort the measurement of the rider thresholds to multihome. The following are the basic demographic/psychographic information of the screened and accepted responses:

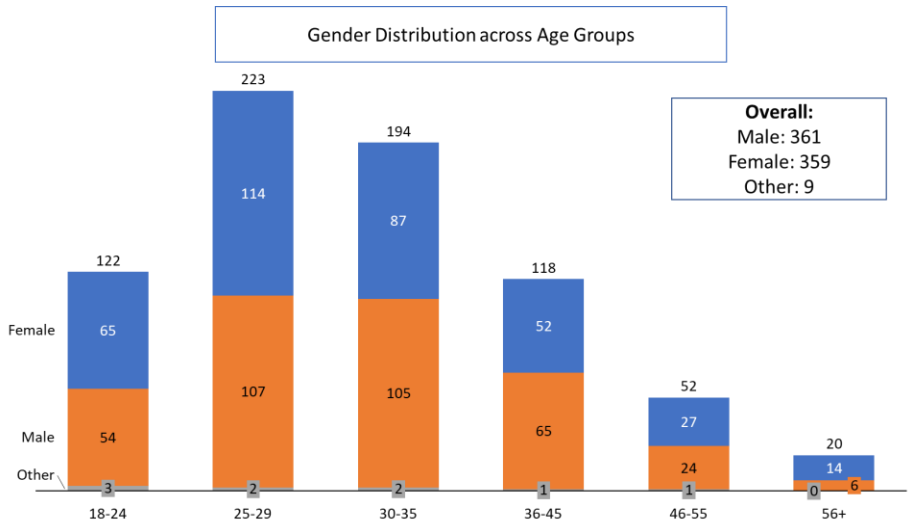


Figure 13 - Distribution of gender across age groups for conjoint

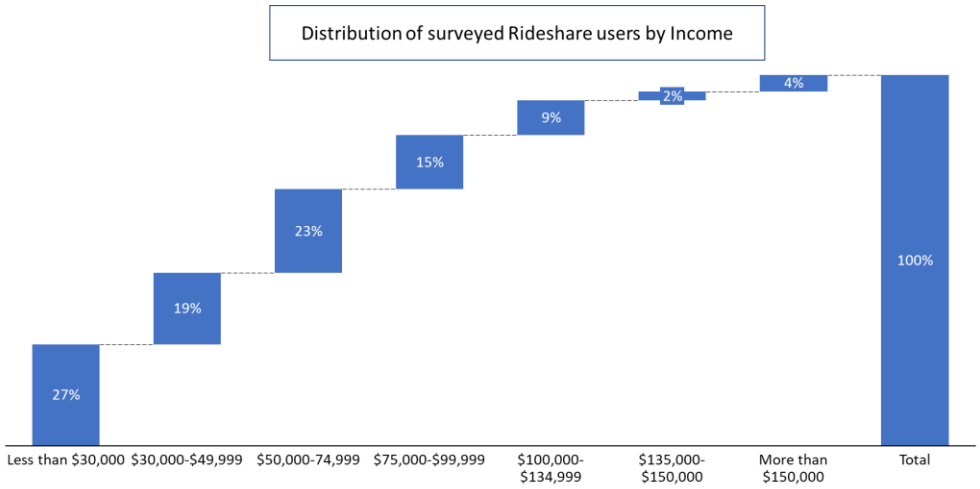


Figure 14 - Distribution across income groups for conjoint

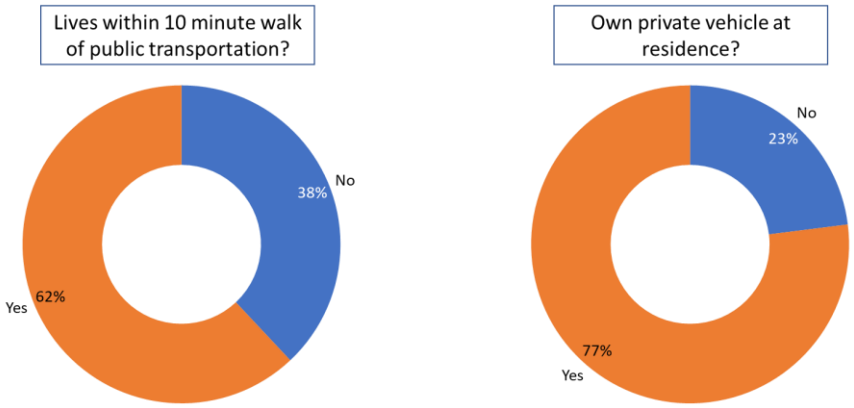


Figure 15 - Proximity to public transportation and private vehicle ownership for conjoint

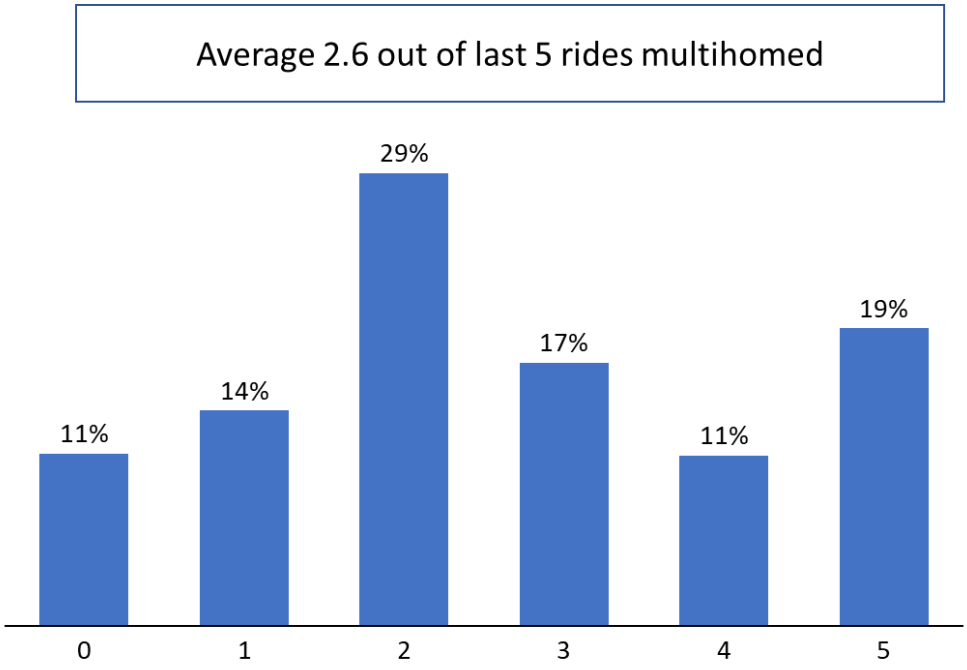


Figure 16 – Users were asked to report the number of their last 5 rides where they searched multiple services. This shows the average responses claiming the number of rides multihomed

4.3 Bias and limitations

As with most studies, there is some level of bias in the data that was collected, and how it was collected. Although interviews were tailored to bring in users from diverse backgrounds and environments, qualitative interviewees (9) were all from my own network. Additionally, in the surveys and conjoint, a portion of data came from people within my network, as well as those peoples' networks. This connection with my network is in itself, somewhat of a bias, as people within my network could share certain traits or backgrounds that might not be fully representative of the US population. For instance, the median salary from the survey and conjoint, was between $50,000-$75,000 compared to the 2018 US median salary of $33,706 (U.S. Census Bureau 2018). The survey and conjoint also used proximity to public transit as a proxy for living in an urban environment, where the responses came in 7% and 18% below the 80.7% national urban distribution. Additionally, paid responses were solicited from both Qualtrics XM and Prolific. Although data was screened and reviewed for quality, there is always the possibility that a participant provided less-than-honest or less thought out responses. Finally, the population interviewed and surveyed were only people living within the United States. These studies do not

account for business, geographic and cultural preferences that exist in other international rideshare markets.

5.0 QUALITATIVE ANALYSIS

5.1 Insights from interviews

Although the purpose of the interviews was primarily to inform the creation of the survey, many interesting insights came through from discussing riding habits with interviewees.

The rider interviews displayed a heterogeneous behavior regarding rideshare preferences and use. Multihoming tendencies, and the rationale behind those tendencies were incredibly diverse. The overarching multihoming tendencies of the interviewees fell in three rough categories: always multihoming, sometimes multihoming, or singlehoming.

The always multihoming interviewees were people who checked multiple services ever time before accepting a ride to their destination. Some of these riders were completely price-sensitive, and explained that they would only use price as a determining factor, regardless of how long the wait time was. Other riders were either primarily price-sensitive, wait time sensitive, or arrival time sensitive – with a threshold in a secondary category that would eventually trump their main determining factor.

The sometimes multihoming interviewees are riders who sometimes checked multiple services before accepting a ride to their destination. These riders usually (but not in all cases) had a preferred service that they would check first. The main determinants for selecting their preferred service were either company reputation, or whether they downloaded that service first. Among riders that cared most about the company reputation, Lyft was identified as their primary service. The interviewed riders that chose their preferred service based on precedence of download; Uber tended to be their primary service and first service they had downloaded. Another interviewee, who had company Uber credit, singlehomed with Uber until she used up her company credits. Once her credits ran out, she would multihome between the two services, preferring to spend slightly more on Lyft for a ride because of their reputation.

The singlehoming interviewees (3), were people who only utilized a single service for ridesharing, and did not check between multiple services. All of these interviewees had only one ridesharing application downloaded on their phones. These users either use the first service they downloaded (usually Uber), completely switched services (Uber to Lyft because of various Uber scandals), or used to be multihoming riders that became locked-in with Lyft benefits.

An interesting insight from these results is the effectiveness that 3rd party partnerships have shown to have in temporarily locking in, or indefinitely locking in niche groups of the interviewees. Two of the interviewees went from always multihoming on price and time for every single ride, to becoming locked in completely because of Lyft's partnership with Chase Sapphire Reserve. Lyft's incentives for these riders proved to be so beneficial for these riders to indefinitely stop multihoming completely and solely use Lyft. These interviewees are a possible signal of success in a ridesharing company being able to lock in members of one side of the platform.

5.2 Insights from survey

Out of the 430 accepted responses in the survey, 68% claimed to multihome between multiple ridesharing services (Figure 17 - Proportion of multihoming and singlehoming responses). These responses showed a larger disparity between Uber and Lyft for singlehoming users (Figure 18), but a smaller difference between services when comparing multihoming users, with 22% claiming to have no preference among the ridesharing services (Figure 19). The proportion of singlehoming users that use Uber (80%) was higher than their national market share of 69% (Gessner 2020).

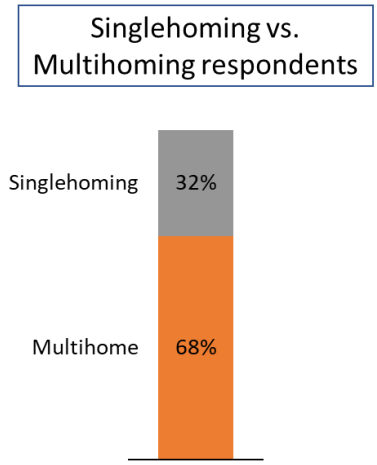


Figure 17 - Proportion of multihoming and singlehoming responses

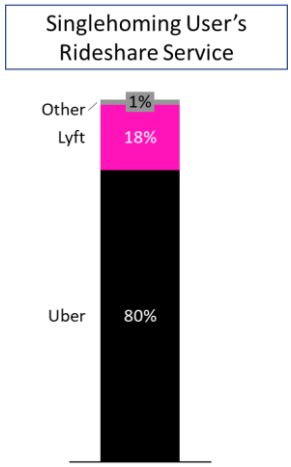


Figure 18 - Services used by singlehoming responses

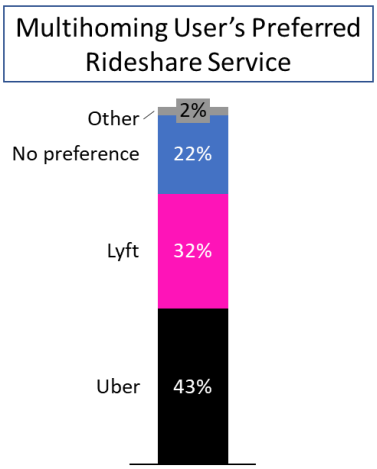


Figure 19 - Preferred services of multihoming responses

A review of demographic and psychographic trends revealed a few interesting results. From the surveyed participants, it was found that the percentage of multihoming users within an income bracket generally increased as income levels increased (Figure 21). There were also some general trends that showed an increased level of singlehoming behavior the older the participants were (Figure 20). There was a slightly higher prevalence of multihoming by male riders compared to female riders (Figure 22), as well as riders who live a ten-minute walk from public transit (Figure 24). Another revealing trend found was a clear increase in the prevalence of multihoming with increased frequency of use of rideshare. For participants that used rideshare services less than monthly, 52% of them multihomed while 90% of participants multihomed that used rideshare services daily (Figure 23). A possible reason for this is that these riders, having used the services more, are more aware of fluctuations in pricing between the two. It could also be due to them being more sensitive to price, as the increased number of rides raises the total amount saved by multihoming. As rideshare companies try to increase the frequency of use within their current customer bases, it will be interesting to see if their struggle with multihoming riders increases as well.

Proximity to public transit was used as a proxy for living in a more urban area. A trend showed increased frequency of usage from those that lived withing a 10-minute walk from public transit (Figure 25). As expected, a trend in the data shows that those who earn higher incomes tend to

utilize ridesharing services at a higher frequency (Figure 26), while those younger also used rideshare in a higher frequency – especially those 18-35 (Figure 27).

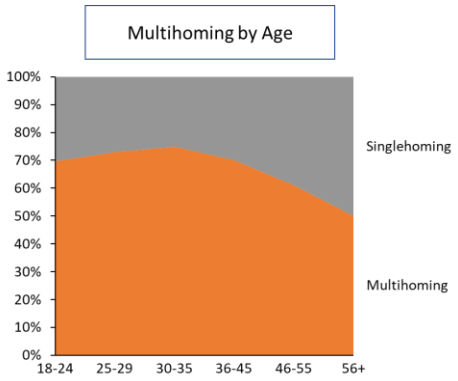


Figure 20 - Multihoming by age

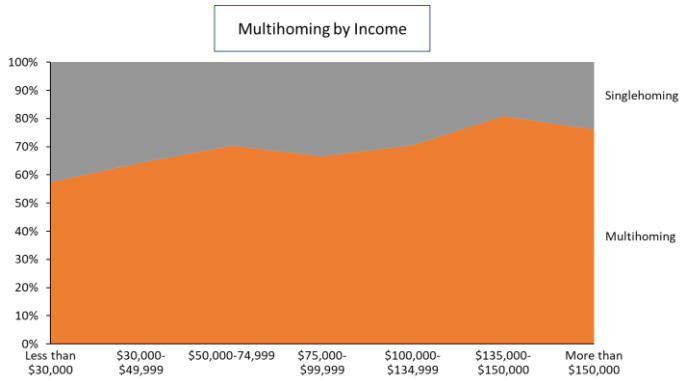


Figure 21 - Multihoming by income

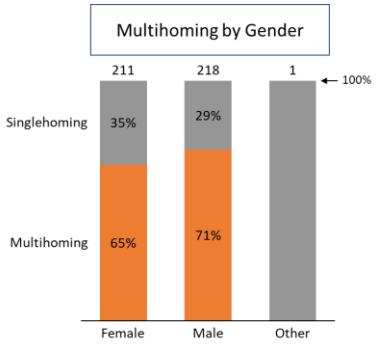


Figure 22 - Multihoming by gender

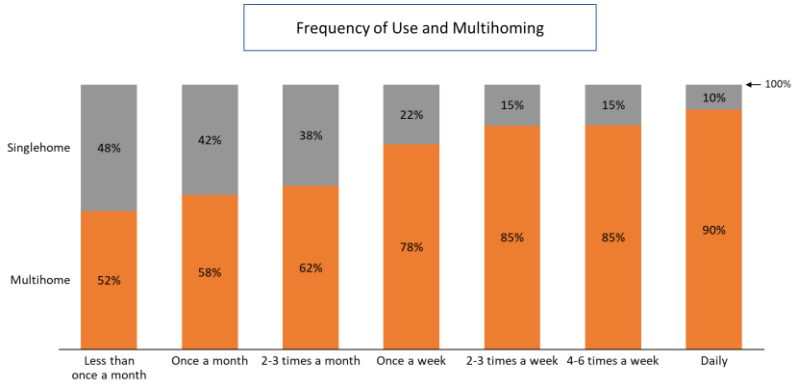


Figure 23- Multihoming by frequency of rideshare use

	Frequency of usage - Proximity to Public Transit	
	No, I do not live within 10 minutes from public transportation	Yes, I live within 10 minutes from public transportation
Daily	3%	5%
4-6 times a week	6%	10%
2-3 times a week	9%	19%
Once a week	9%	12%
2-3 times a month	21%	20%
Once a month	12%	11%
Less than once a month	39%	21%

Figure 25 - Frequency of use and proximity to public transit

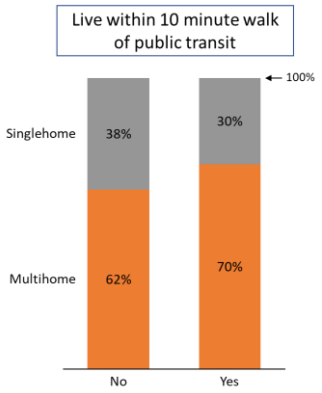


Figure 24 - Multihoming by proximity to public transit

Frequency of Rideshare Use by Income							
	Less than $30,000	$30,000-$49,999	$50,000-74,999	$75,000-$99,999	$100,000-$134,999	$135,000-$150,000	More than $150,000
Daily	5%	9%	4%	2%	6%	5%	4%
4-6 times a week	5%	7%	7%	8%	10%	5%	19%
2-3 times a week	11%	9%	17%	13%	19%	24%	27%
Once a week	6%	13%	15%	17%	13%	10%	7%
2-3 times a month	23%	21%	24%	18%	21%	19%	16%
Once a month	16%	13%	4%	12%	9%	24%	9%

Figure 26 - Frequency of rideshare use by income

Frequency of Rideshare Use by Age						
	18-24	25-29	30-35	36-45	46-55	56+
Daily	7%	1%	7%	6%	4%	4%
4-6 times a week	13%	6%	13%	9%	7%	6%
2-3 times a week	13%	21%	24%	19%	11%	8%
Once a week	9%	19%	11%	9%	7%	10%
2-3 times a month	18%	28%	17%	19%	20%	21%
Once a month	18%	8%	13%	7%	11%	8%
Less than once a month	23%	17%	17%	30%	39%	44%

Figure 27 - Frequency of rideshare use by age

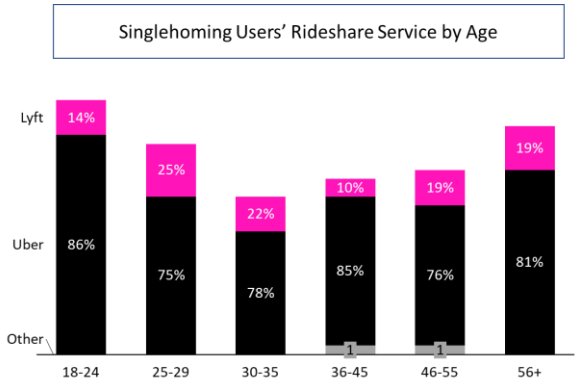


Figure 29 - Services used by singlehoming riders by age

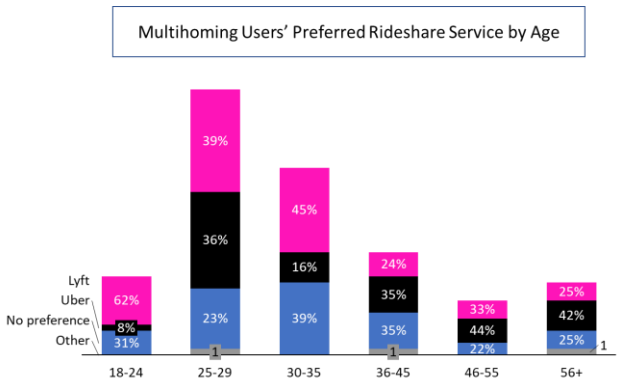


Figure 28 - Services preferred by multihoming riders by age

5.2.1 Singlehoming Sample

Q1: Which factors play a role in determining the rideshare service of preference amongst riders?

In identifying the attributes that impacted singlehoming service preferences, our surveyed participants were asked how much of an impact the following factors had on their decision to prefer a specific service over rivals (A great deal, a moderate amount, a little, not at all):

1. Company Reputation
2. In-App Promotions
3. 3rd Party Partnerships
4. Company-provided credit
5. Price being cheaper than rival
6. Wait time lower than rival
7. User Interface/App features
8. Safety Features

Company Reputation had a large impact on preference. Among the participants that singlehomed using Lyft, 64% selected company reputation as having 'A great deal' of influence in their decision to choose Lyft as their sole source for ridesharing. Uber's singlehoming users in contrast had 35% report that company reputation had 'A great deal' of influence on their selection. This level of importance in Uber may be linked to a variety of perceived factors, such as its disruptive technology reputation or it being a pioneer company, but the discrepancy between them and Lyft riders is stark. This could likely be due to the previous string of scandals and legal actions that Uber had experienced in 2017, as the #DeleteUber hashtag encouraged many riders to switch services.

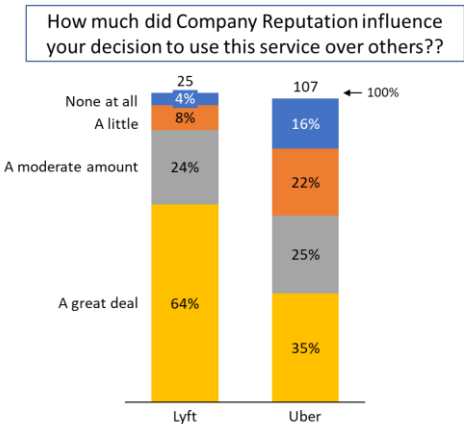


Figure 30 - Impact of company reputation on preferred company decision

In-App promotions (ride discounts) also had a large claimed impact on how many singlehoming riders selected their preferred service, with 52% of Uber riders reporting it as having a 'A great deal' of influence on their selection, along with 42% of Lyft riders surveyed.

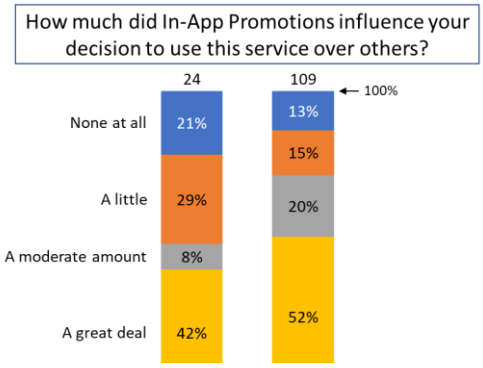


Figure 31 - Impact of In-App Promotions on preferred company decision

Third party partnerships had a surprisingly very limited influence on singlehoming riders, as only 9% of Uber and 4% of Lyft riders reported it as having a 'great deal of influence.' The values including 'A moderate amount' fair somewhat better. This lower prevalence of importance on 3rd party partnerships (such as AMEX, Chase, Delta Airlines, etc), could be an indicator of how niche these targeted groups are that are being locked in through partnerships, and although they may be effective in changing behavior, they so far only reach a small percentage of the potential customer base.

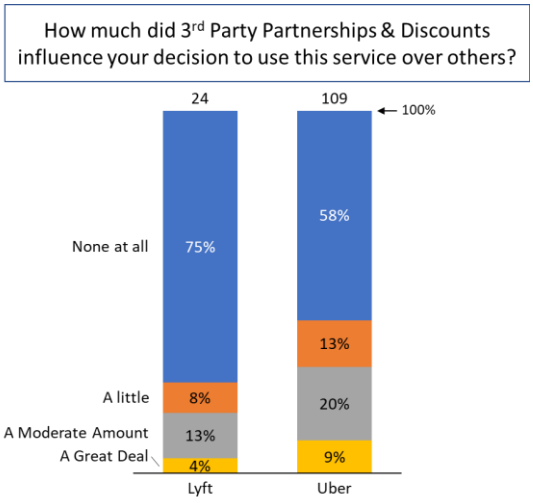


Figure 32 - Impact of 3rd party partenrships on preferred company decision

Company-provided credits had a slightly larger impact than third party partnerships, but also remained low compared to Company Reputation, and In-app Promotions. This also likely experiences the similar niche group benefits of 3rd party partnerships, as users' employers individually would need to determine whether or not to offer the benefit. This is especially more likely to be taken up by urban-based companies as less of their employees would drive to commute, and parking is more expensive.

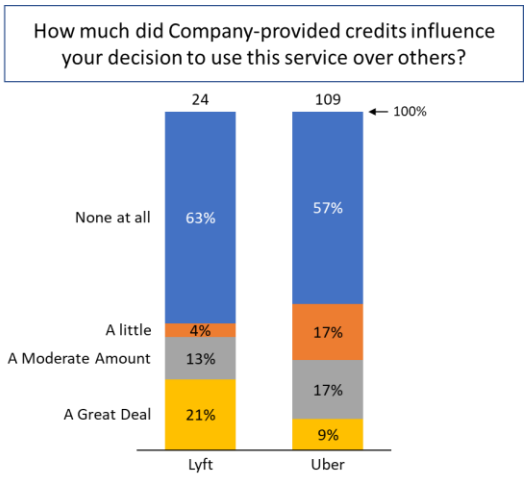


Figure 33 - Impact of company-provided credits on preferred company decision

Price showed a larger contributing factor to Lyft riders than Uber riders, with nearly a third of all singlehoming Lyft riders claiming it has having a great deal of impact on their decision to choose Lyft over rivals. In other research of reported pricing, evidence has not shown that Lyft is consistently cheaper than Uber. In fact, the cheaper service tends to vary from city to city, with Uber being cheaper, in general, in some cities, and Lyft in others. To add to the price variability by city, dynamic pricing is slightly different between services, and prices will fluctuate differently based off of the supply of drivers compared to rider demand (market thickness). This makes it increasingly difficult to identify a consistently cheaper option.

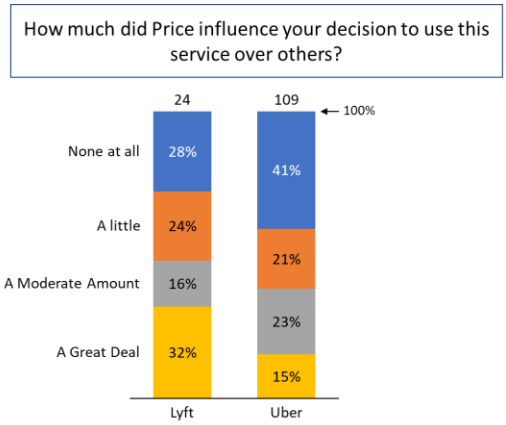


Figure 34 - Impact of price on preferred company decision

Wait Time was balanced between Uber and Lyft users in its impact on their decision to choose their current service. Lyft had 21% claiming it had a great deal of impact on their decision to choose their service, compared to 18% for Uber users that participated. Less than half of respondents claimed wait time as having a moderate amount of impact or greater.

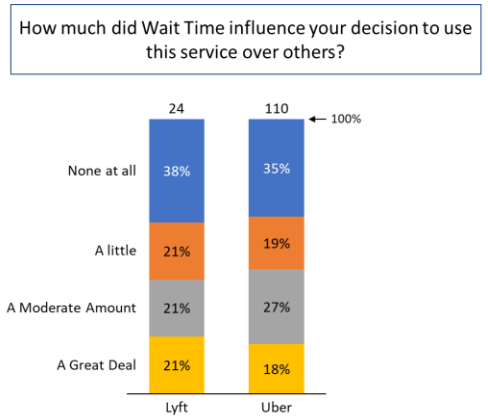


Figure 35 - Impact of wait time on preferred company decision

User Interface and App features, was cited as a much larger importance by Uber users than Lyft users. 26% of Lyft singlehoming users claimed it had a moderate amount or more impact in their decision, compared to 52% of Uber singlehomers. This could signal that the Uber users that participated held either a greater level of importance on User Interface/App Features, over those that used Lyft, or they appreciated Uber's Application in general over Lyft's.

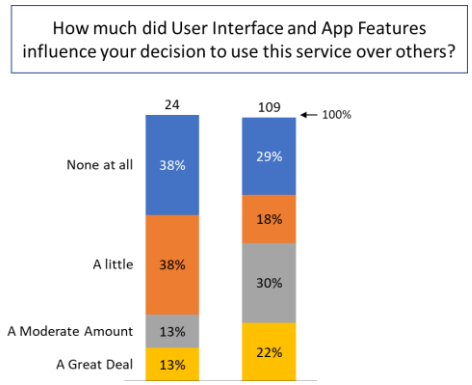


Figure 36 - Impact of user interface and app features on preferred company decision

Safety Features as a factor of importance was mixed between services, with 29% of Lyft singlehoming riders citing it as having a great deal of impact on their decision, compared to 19% of Uber. However, when incorporating the riders that found it had a moderate amount of impact, it included 50% of Uber riders versus 37% of Lyft riders.

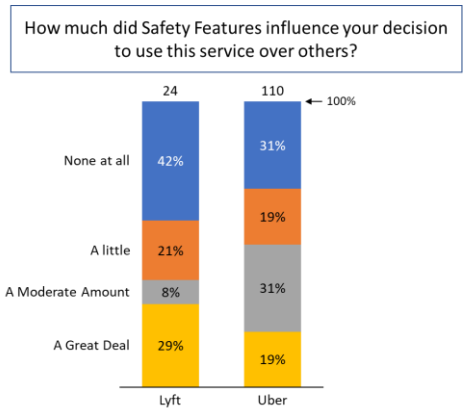


Figure 37 - Impact of safety features on preferred company decision

Below is a summary of the impacts that each factor had in influencing singlehoming riders to choose one service over the other (Figure 38). The percentages show those who chose each factor as having 'a moderate amount' or higher of impact. For Lyft riders, company reputation, by far, had the greatest impact for the vast majority of riders (88%). For Uber, company reputation had the highest number of riders claiming impact (61%), followed by user interface (52%). Company reputation remained the highest reported factor amongst all age groups and incomes of singlehoming riders (Figure 39, Figure 40). The $135,000-$150,000 income group, among singlehoming individuals, had too few participants to gather sufficient insights as to their preferences.

Singlehoming population			
Factors Influencing decision to prefer company	**Total**	**Uber**	**Lyft**
Company Reputation	66%	61%	88%
In-App Promotions	31%	28%	50%
3rd Party Partnerships	27%	29%	17%
Company-provided credit	27%	27%	33%
Price being cheaper than rival	39%	38%	48%
Wait time lower than rival	45%	45%	42%
User Interface/App features	47%	52%	25%
Safety Features	48%	50%	38%

Figure 38 - Summary of impact each factor had in influencing decision to use each company

Singlehoming population						
Factors Influencing decision to prefer company	**18-24**	**25-29**	**30-35**	**36-45**	**46-55**	**56+**
Company Reputation	72%	70%	72%	55%	71%	56%
In-App Promotions	52%	35%	11%	16%	30%	31%
3rd Party Partnerships	34%	35%	33%	26%	20%	12%
Company-provided credit	31%	39%	44%	21%	10%	19%
Price being cheaper than rival	41%	58%	33%	42%	29%	31%
Wait time lower than rival	41%	54%	39%	47%	30%	54%
User Interface/App features	41%	57%	44%	42%	60%	42%
Safety Features	59%	52%	44%	40%	40%	46%

Figure 39 - Summary of impact each factor had in influencing decision to use a company, by age

Singlehoming Population							
Factors Influencing decision to prefer company	**Less than $30,000**	**$30,000-$49,999**	**$50,000-74,999**	**$75,000-$99,999**	**$100,000-$134,999**	**$135,000-$150,000**	**More than $150,000**
Company Reputation	65%	79%	67%	60%	70%	25%	67%
In-App Promotions	36%	37%	38%	20%	32%	0%	25%
3rd Party Partnerships	28%	11%	33%	35%	21%	25%	31%
Company-provided credit	25%	26%	38%	25%	32%	25%	19%
Price being cheaper than rival	32%	45%	52%	30%	47%	25%	38%
Wait time lower than rival	28%	65%	48%	40%	58%	25%	50%
User Interface/App features	39%	47%	57%	55%	42%	50%	50%
Safety Features	47%	72%	48%	37%	45%	25%	44%

Figure 40 - Summary of impact each factor had in influencing decision to use a company, by income

Q2: Which attributes contribute to riders multihoming between ridesharing services? Which attributes contribute to riders singlehoming?

To identify the attributes that encouraged singlehoming behavior, our surveyed participants were asked how much of an impact the following attributes had on their decision to only use one service (A great deal, a moderate amount, a little, not at all):

1. Time and Hassle to download and set up another service
2. Time and Hassle to check between multiple services
3. Clutter of Apps on phone
4. Stress of dealing with multiple apps
5. Loyalty to a service
6. Disliking the rival company
7. Disliking the rival product/service provided

Time and hassle to download and set up another service deals with a rider deciding it's not worth searching for the app, downloading it, filling out the user and credit card information and learning how the app works. This was found to have a rather high impact as a whole, with 30% claiming this to have impacted their decision 'a great deal.' With well over half of riders claiming this to have a 'moderate amount' of impact or higher on their decision to singlehome, this could potentially highlight the importance for Uber and Lyft to get to new prospective ridesharing customers *first*, as many of these users will find the time/hassle costs of downloading and setting up a second service to be not worth it.

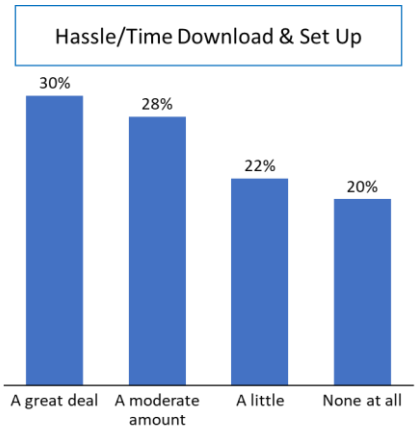


Figure 41 - How much impact hassle/time of download and set up had on singlehoming

Time and hassle to check between multiple services was shown to have a larger impact on singlehoming riders' decision to use only one service. Nearly a third of respondents claimed it has having 'a great deal' of impact, while 59% of respondents claimed it as having 'a moderate amount' or greater. Overall, a large portion of riders sampled that singlehomed found it worthwhile to not have to take the time or hassle to switch between services. This again may reinforce the need for rideshare companies to place importance on being the first service downloaded by new rideshare users.

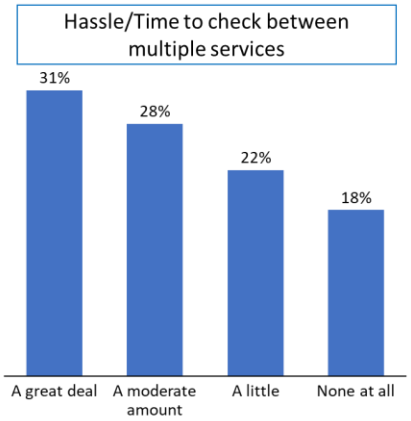


Figure 42 - How much impact hassle/time to check between multiple services had on singlehoming

From the interviews, clutter of apps on the phone as well as increased decision-making was cited as a trigger of stress that encouraged a rider not to use multiple services. The next two questions were placed to identify whether stress or anxiety of having multiple services (both present and making decisions between them), would have an impact on riders deciding to singlehome.

Clutter of apps on a user's phone resulted with nearly a third claiming it having 'a great deal' of impact on their decision, and slightly over half of respondents claimed it had 'a moderate amount' of impact. Overall, this turned out to be a rather high impact attribute for influencing riders to not utilize both services. It also showcases that something such as clutter of apps may increase user stress or anxiety and increase the psychological cost of multihoming.

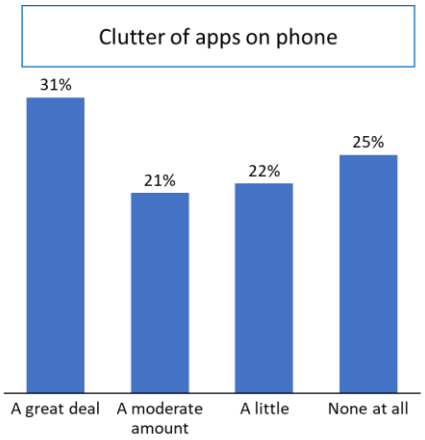


Figure 43 - How much impact the clutter of apps on a phone had on singlehoming

Stress of dealing with multiple apps had a high rate of reported impact with singlehoming riders. 25% claimed it had 'a great deal' of impact, and 50% 'a moderate amount' or greater impact in their decision to only use on service. This highlights the psychological cost associated with having to make several decisions, and to compare an increased amount of options. Overall, the psychological cost factors showed to have impact on a sizable number of singlehoming riders.

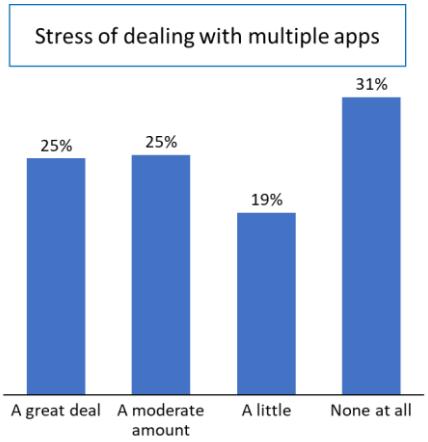


Figure 44 - How much impact the stress of dealing with multiple apps had on singlehoming

The last three questions centered around strong feelings for brand, whether it dealt with loyalty to a specific brand, disliking a rival brand, or disliking a rival brand's product in general. When asked about whether loyalty to a service had an impact on their decision to use a single service, just under a quarter of respondents found it to be 'a great deal' of impact, with 42% 'a moderate amount' or higher. Noteworthy though is that Lyft riders scored this attribute noticeably higher than Uber riders did.

Figure 45 - How much impact loyalty to a service had on singlehoming

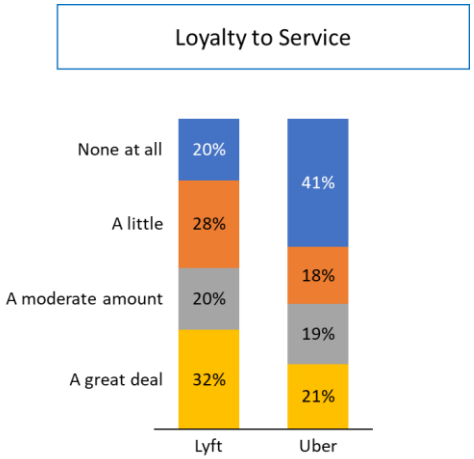


Figure 46 - impact of loyalty to a service for each service

A similar pattern is also seen when respondents were asked about whether their dislike for a rival company impacted their decision to only use one service. Less than 13% of respondents claimed it as having 'a great deal' of impact, however, when segmenting the respondents based off of their used service, 40% of Lyft riders claimed disliking the rival service as having a great deal of impact. When looking at those that claimed 'a moderate amount' or higher, it consisted of 76% of all singlehoming Lyft riders, compared to 33% for Uber. This is a strikingly large difference for how brands impacted the different user sets, and may show that Uber has a way to go for repairing their overall brand reputation for Lyft users.

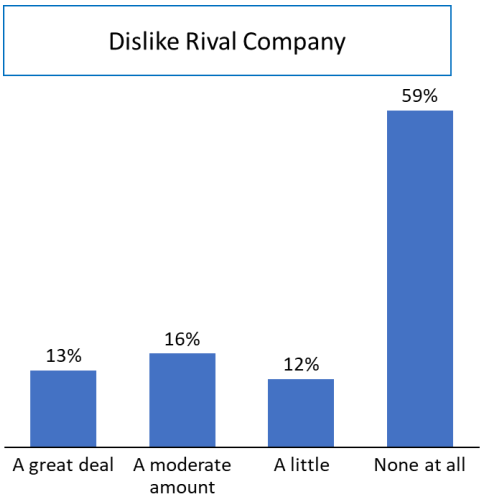


Figure 48 - How much impact disliking a rival company had on singlehoming

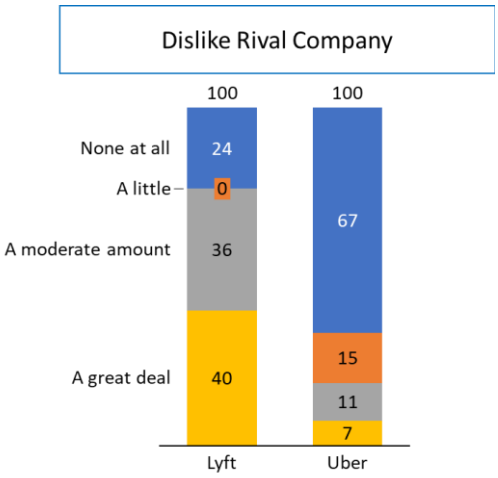


Figure 47 - impact of disliking a rival company, by riders of each company

Finally, when looking at disliking a rival company's product or service, a low number of users suggested it had a great deal or moderate amount of impact overall. This could likely be due to the similarity in how rideshare services work, and ease in which services imitate features as they are added to particular service. Nevertheless, 36% of Lyft riders still reported disliking the rival service product having at least a moderate amount of impact on their decision.

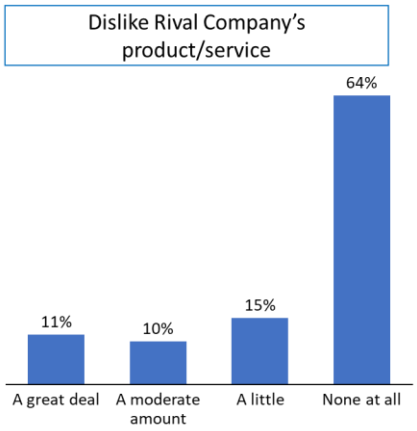


Figure 50- How much impact disliking a company's product/service had on singlehoming

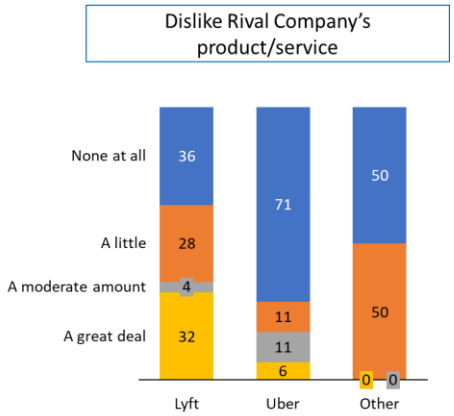


Figure 49- impact of disliking a product/service by company

A summary of all factors contributing to singlehoming is below (Figure 51), showing the percentage of total riders, as well as Uber and Lyft riders that found each factor to have a moderate amount or greater impact on their decision to singlehome. As a whole, the time and hassle to download and setup another service, as well as checking between multiple services had the highest proportion of riders claiming they impacted their decision to singlehome. Following these, the psychological cost factors (clutter of apps and stress of dealing with multiple apps) played the next largest amounts of impact on riders' decisions to singlehome. The factor with the most impact on why Lyft users chose to singlehome was disliking the rival company, which is a sign that Uber's reputation may have had a long-lasting impact on some riders' decision to exclude them from their ridesharing usage.

Factors Contributing to Singlehoming	Total Population	Uber	Lyft
Time and Hassle to download and set up another service	58%	61%	52%
Time and Hassle to check between multiple services	59%	63%	48%
Clutter of Apps on phone	52%	54%	48%
Stress of dealing with multiple apps	50%	51%	44%
Loyalty to a service	42%	40%	52%
Disliking the rival company	29%	18%	76%
Disliking the rival product/service provided	21%	17%	36%

Figure 51 – Summary of factor impacts on contributing to riders' decision to singlehome

When looking at singlehoming rates across age groups, those 56 and older showed the highest rate than any other group, with half choosing to singlehome. Looking at their most important factors for choosing to singlehome (Figure 53), the time and hassle to download and set up the service, as well as to check between the multiple services were the highest reported factors. Disliking the rival company as well as the rival company's product/service were the least mentioned factors influencing this segment to multihome. Although not tested in this thesis, technological fluency could be a potential cause for this.

Proportion Singlehoming					
18-24	25-29	30-35	36-45	46-55	56+
30%	27%	25%	30%	39%	50%

Figure 52 - Proportion of each age group singlehoming

Factors Contributing to Singlehoming	Total Population	18-24	25-29	30-35	36-45	46-55	56+
Time and Hassle to download and set up another service	58%	55%	63%	67%	70%	38%	62%
Time and Hassle to check between multiple services	59%	69%	61%	61%	60%	38%	62%
Clutter of Apps on phone	52%	48%	71%	39%	55%	48%	50%
Stress of dealing with multiple apps	50%	45%	57%	56%	30%	62%	50%
Loyalty to a service	42%	41%	43%	33%	32%	43%	58%
Disliking the rival company	29%	28%	43%	22%	26%	24%	32%
Disliking the rival product/service provided	21%	28%	30%	17%	16%	10%	20%

Figure 53 - Summary of factor impacts on contributing to riders' decision to singlehome, by age

Observing singlehoming rates by income (Figure 54) showed those making less than $30,000 having the highest proportion of singlehoming participants (43%). Their most prominently claimed factor for influencing their decision to multihome was also the time and hassle related to download and set up an additional service, as well as to switch between multiple services. This finding was surprising, as it was expected that this demographic would be substantially more price-sensitive, and therefore more likely to choose to have the option to multihome and compare prices of rides.

Proportion Singlehoming						
Less than $30,000	$30,000-$49,999	$50,000-74,999	$75,000-$99,999	$100,000-$134,999	$135,000-$150,000	More than $150,000
43%	36%	30%	33%	29%	19%	24%

Figure 54 - Proportion of each income group singlehoming

Factors Contributing to Singlehoming	Total Population	Less than $30,000	$30,000-$49,999	$50,000-74,999	$75,000-$99,999	$100,000-$134,999	$135,000-$150,000	More than $150,000
Time and Hassle to download and set up another service	58%	49%	65%	57%	60%	70%	75%	56%
Time and Hassle to check between multiple services	59%	59%	58%	62%	55%	75%	50%	44%
Clutter of Apps on phone	52%	43%	55%	62%	60%	55%	75%	38%
Stress of dealing with multiple apps	50%	43%	74%	52%	40%	55%	75%	31%
Loyalty to a service	42%	38%	58%	43%	35%	42%	25%	50%
Disliking the rival company	29%	32%	28%	33%	20%	32%	0%	38%
Disliking the rival product/service provided	21%	24%	11%	24%	15%	26%	0%	25%

Figure 55 - Summary of factor impacts on contributing to riders' decision to singlehome, by income

5.2.2 Multihoming Samples

Q1: Which factors play a role in determining the rideshare service of preference amongst riders?

For the 'Sometimes Multihoming population we also looked into what factors swayed decisions to prefer one service over another. Although these users had multiple options on their phone, there were some factors that convinced them to check one service first, and sometimes not check the rival service. The same eight questions used for the singlehoming riders were used for the multihoming rider population.

A Company's reputation played a very large role in many riders' decision to select a preferred service. Similar to the Singlehoming population, those who preferred Lyft over other services, overwhelmingly claimed company reputation as having 'a great deal' of impact in their decision. Over half of Lyft-preferring riders claimed this compared to 27% of Uber-preferring riders. When combining 'a moderate

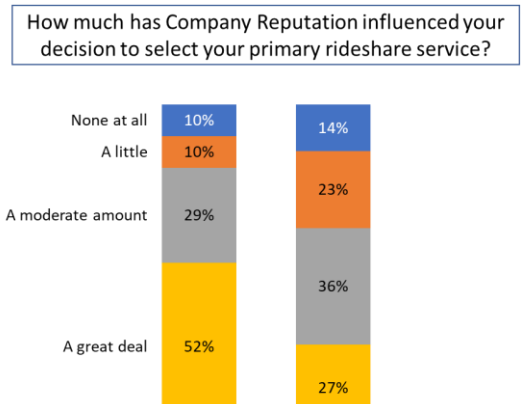


Figure 56 - Impact of Company Reputation on preferred company decision

amount' results, the pool includes 81% of Lyft-preferring riders and 63% of Uber-preferring riders.

In-App promotions effects were similar between Uber and Lyft, and higher for those that used other services (Via, Gett, etc.). Although the percentages are pretty large at around a quarter of Lyft, and just under a third of Uber respondents claiming it as having a great deal of impact on their selection, it is substantially lower than what was reported from users that strictly singlehomed. This could have to do with frequency of use and a greater exposure to variation in deals and promotions offered by multiple services. The higher prevalence of importance for 'Other' services could be a result of smaller competitors offering deeper promotions in a city, in order to expand marketshare and be competitive versus the incumbents – however the sample size for the riders that prefer other services is too small to draw conclusive insights.

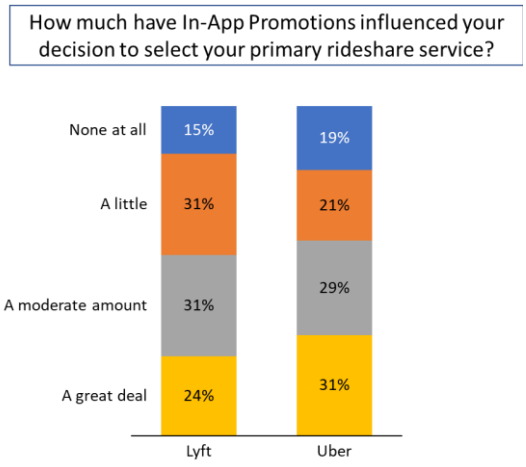


Figure 57 - Impact of In-App Promotions on preferred company decision

3rd Party Partnerships accounted for a smaller proportion of those claiming it had a great deal of impact, with 18% of both Uber and Lyft riders. That none of the 'Other' riders claimed it as important makes a deal of sense, as their partnerships are likely less expansive than the larger incumbents. Although overall the prevalence of importance is smaller than the previous two factors, it is notable that the percentage who claimed it important was substantially higher among multihoming users than singlehoming users. This could be a sign of increased awareness of up to date partnerships across platforms, and where the multihoming users could gain a greater advantage.

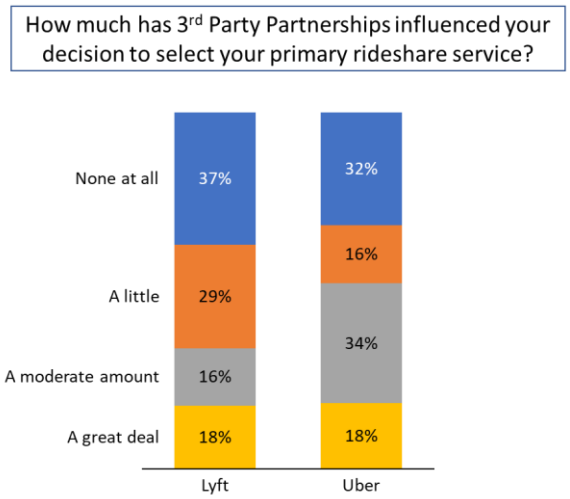


Figure 58 - Impact of 3rd Party Partnerships on preferred company decision

Company-provided credits overall came in higher than with singlehoming users, with Lyft and Uber riders at 19% and 22% claiming it had a great deal of impact on their preference. None of the participants from other service claimed it as having a great deal of impact, which could suggest the smaller competition has not been able to negotiate with as many companies to provide their service as an employee benefit, as Uber and Lyft have.

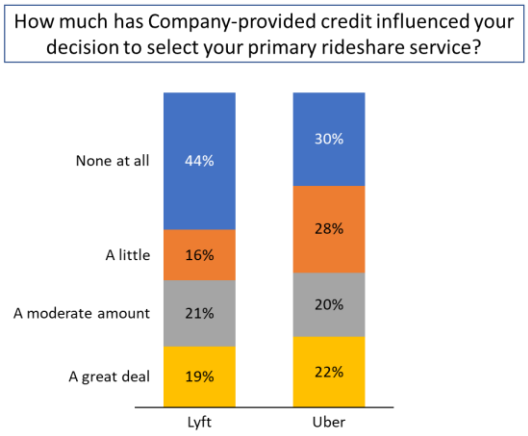


Figure 59 - Impact of company-provided credits on preferred company decision

Price and wait time continued to provide a great deal of impact on rider's decisions to select a particular service. Across Uber and Lyft, the results are fairly consistent, which could indicate the perceived pricing and overall driver liquidity compared to rider demand is diverse in our respondents' experiences. For pricing, this could be due to geographic variabilities that are treated by each company's dynamic pricing algorithm in a different way, providing price differentials from pick up location to drop off location. Since riders are travelling to and from varying locations, the prices they compare are different and some may experience one service as cheaper overall than the other. For wait time, because the network cluster effects are localized for rideshare companies, network effects for one company could be stronger in one location compared to another. For instance, in Bloomington, Indiana, Uber may have a more dominant position and a correspondingly higher ratio of drivers than Lyft, but it may be more balanced

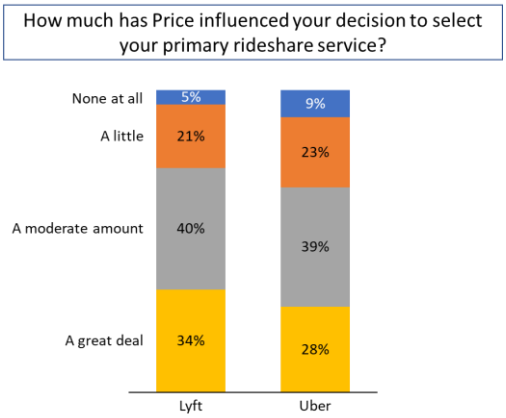


Figure 61 - Impact of price on preferred company decision

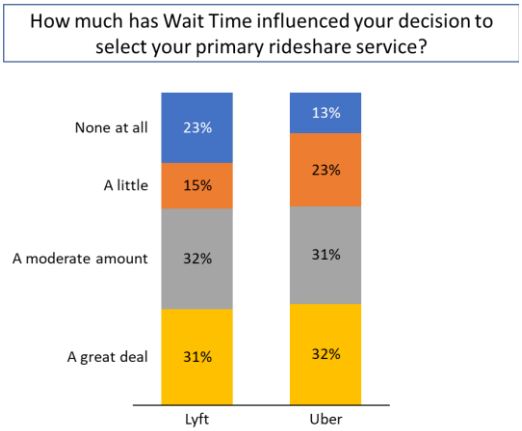


Figure 60 - Impact of wait time on preferred company decision

in San Francisco. This could explain why some respondents disagree as to which is cheaper, and which has lower wait times.

User Interface and App Features had lower level of importance for more riders than Price and Wait Time, with 20% of Uber, and 23% of Lyft-preferring riders claiming it as have a great deal of impact on their decision to select a preferred service. When including 'a moderate amount' responses or higher, Uber-preferring riders show a larger level of importance than Lyft-preferring riders (50% of Uber-preferring riders vs. 38% of Lyft's).

Finally, Safety features were fairly evenly distributed between all services, with 21% for Lyft, and 22% for Uber, and 25% for other services. Most rideshare services have released emergency 'SOS' style safety buttons on their applications that alert emergency services when a rider feels threatened or unsafe.

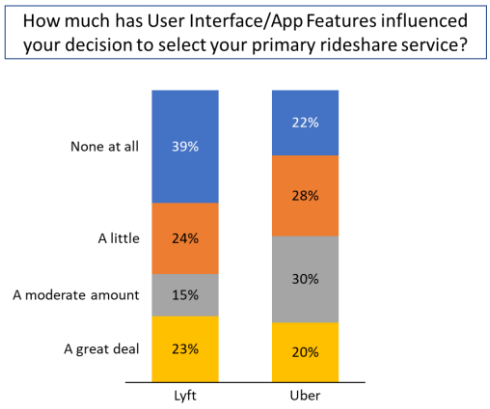


Figure 62 - Impact of user interface and app features on preferred company decision

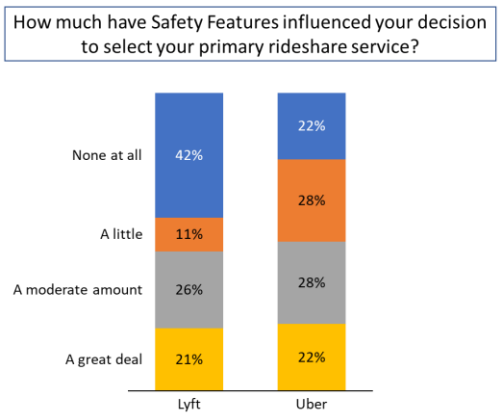


Figure 63 - Impact of safety features on preferred company decision

A summary of all factors contributing to singlehoming is below (Figure 64Figure 51), showing the percentage of Uber and Lyft riders that found each factor to have a moderate amount or greater impact on their decision to choose their preferred service. For Lyft riders, company reputation was found to have impact the most with 81% claiming it. Following reputation, price and wait time were the most important to them. For Uber riders there was an even amount of claimed impact between company reputation, price and wait time.

Multihoming Riders			
Factors Influencing decision to prefer company	**Total**	**Uber**	**Lyft**
Company Reputation	65%	62%	81%
In-App Promotions	58%	59%	55%
3rd Party Partnerships	42%	52%	34%
Company-provided credit	44%	50%	35%
Price being cheaper than rival	74%	68%	74%
Wait time lower than rival	67%	64%	63%
User Interface/App features	42%	50%	37%
Safety Features	47%	50%	47%

Figure 64 - Summary of factor impacts on contributing to riders' decision to choose a preferred service

Across age groups (and income), price and wait time had the largest impact across age groups by far, however, underscoring the commoditization of the market. Despite this, company reputation remained high for those younger than 25 and older than 35, as well as those earning between $135,000 and $150,000. In-app promotions were claimed to have impact by the majority, except for those over the age of 56. 3rd party partnerships were claimed to have impact most between the ages of 25-35 and 46-55, and company-provided credits were claimed the most by those 18-24 and 46-55. Out of the three differentiation strategies, in-app promotions had the widest spread claimed impact for multihoming riders to have chosen their preferred service.

Multihoming population						
Factors Influencing decision to prefer company	**18-24**	**25-29**	**30-35**	**36-45**	**46-55**	**56+**
Company Reputation	72%	59%	49%	82%	74%	70%
In-App Promotions	62%	63%	60%	54%	61%	36%
3rd Party Partnerships	31%	47%	51%	42%	65%	9%
Company-provided credit	54%	43%	40%	42%	57%	27%
Price being cheaper than rival	74%	73%	65%	87%	78%	70%
Wait time lower than rival	62%	53%	64%	79%	74%	87%
User Interface/App features	33%	22%	42%	59%	65%	55%
Safety Features	56%	20%	40%	62%	65%	68%

Figure 65 - Summary of factor impacts on contributing to riders' decision to choose a preferred service, by age

Multihoming population							
Factors Influencing decision to prefer company	**Less than $30,000**	**$30,000-$49,999**	**$50,000-74,999**	**$75,000-$99,999**	**$100,000-$134,999**	**$135,000-$150,000**	**More than $150,000**
Company Reputation	65%	73%	70%	65%	51%	75%	70%
In-App Promotions	56%	50%	66%	56%	57%	42%	67%
3rd Party Partnerships	32%	32%	58%	35%	50%	25%	48%
Company-provided credit	44%	36%	48%	41%	44%	25%	55%
Price being cheaper than rival	85%	73%	70%	74%	63%	67%	82%
Wait time lower than rival	71%	64%	61%	70%	57%	83%	74%
User Interface/App features	35%	41%	39%	50%	35%	67%	42%
Safety Features	44%	50%	39%	44%	39%	67%	61%

Figure 66 - Summary of factor impacts on contributing to riders' decision to choose a preferred service, by income

Q2: Which attributes contribute to riders multihoming between ridesharing services? Which attributes contribute to riders singlehoming?

In the survey, multihoming users were categorized by those that claimed to check between multiple services before every ride (Always Multihoming), and those that claimed to multihome in any amount (Sometimes Multihoming). The Always Multihoming group are users that generally will always compare multiple services to get the best deal in either price, time or another attribute (driver, rating, etc.). The Sometimes Multihoming group might not necessarily consistently check multiple services each time, and a variety of reasons may make them decide to check a rival service, or accept the initial ride offer from their preferred service.

To hone in on the actual frequency of multihoming, all multihoming riders were asked to recall their last five rideshare rides. They then reported how many of those they checked multiple services before selecting a ride. The results for this question were largely evenly spread, with an average of users multihoming 2.9 rides out of 5 rides (median: 3/5). When segmenting by the type of multihoming individuals, a divide presents itself.

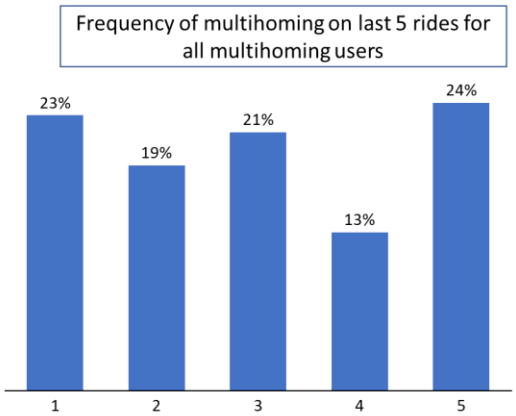


Figure 67 - Frequency of multihoming out of last 5 rides taken by participants

The 'Always Multihoming' group, as expected (and reassuringly), multihomed a high amount (Figure 68). This group multihomed an average of 4 out of their last 5 rides (median: 5/5). The 'Sometimes Multihoming' group (Figure 69), in contrast, multihomed with much less frequency.

They multihomed an average of 2.53 out of the last 5 rides (median: 2/5). The Sometimes Multihoming group skewed towards multihoming a minority of the last 5 rides, with 54% less than 3 rides, and 75% multihoming for 3 or fewer rides. This could indicate a level of cost associated with checking multiple services, or an increased benefit to singlehome for these riders. Based on their situation or the offer presented to them, they may find scenarios where it is not worth it check multiple services before accepting a ride.

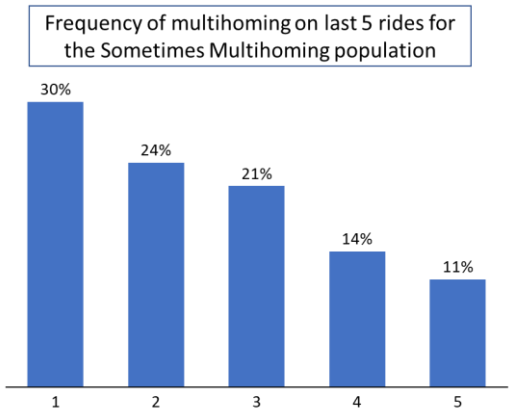


Figure 69 - Frequency of multihoming ('sometime-multihoming' sample)

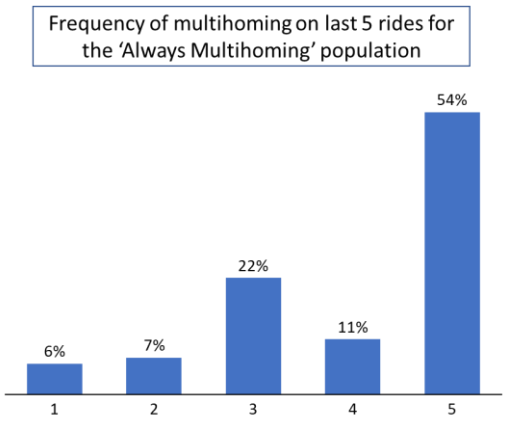


Figure 68 - Frequency of multihoming ('always-multihoming' sample)

Out of the sometimes multihoming population (Figure 70), those above the age of 56 and between 25 and 35 had the highest proportion of low-multihoming riders. Those under the age of 24 had the lowest, followed by riders between 36 and 55. For income (Figure 71), those earning between $50,000 and $135,000 had the highest proportion of low-multihoming riders. Those earning between $30,000 and $50,000 had the lowest proportion.

Exhibit Low Multihoming					
18-24	**25-29**	**30-35**	**36-45**	**46-55**	**56+**
16%	35%	42%	21%	22%	41%

Figure 70 - Low multihoming riders by age

Exhibit Low Multihoming						
Less than $30,000	**$30,000-$49,999**	**$50,000-74,999**	**$75,000-$99,999**	**$100,000-$134,999**	**$135,000-$150,000**	**More than $150,000**
30%	5%	33%	38%	39%	17%	28%

Figure 71 - Low multihoming riders by income

When multihoming users were asked which was the most important factor when deciding whether to check a rival's service, Price followed by Wait Time were at the top. This confirms riders are primarily price and time sensitive, however, estimated time of arrival to destination was not selected by many (8%). 'Cannot connect to a ride' may suggest that 14% of multihoming riders primarily have multiple services as backups in case their first source has a connection failure and they cannot get matched with a ride.

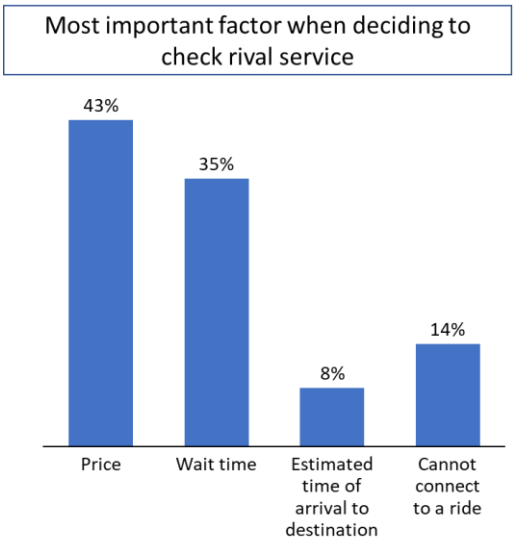


Figure 72 – Factors leading the most to checking a rival service

Looking at the most important factors leading to checking a rival service along age lines, major differences in importance emerge between younger and older riders (Figure 73). A higher proportion of riders in the 18-24 age range (56%) cited price as being the most important attribute, compared to only 18% of those 56 or older. Riders that were 46 years old or greater, overwhelmingly chose wait time over all other attributes, with 78% of those 56 and up selecting it as the most important factor.

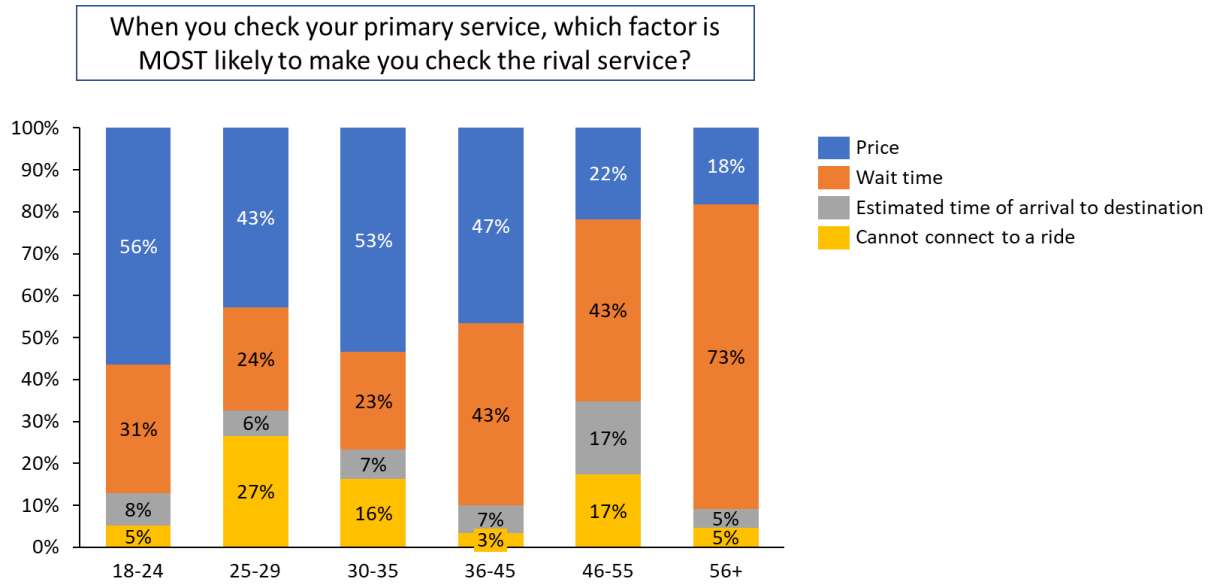


Figure 73 - Factors leading the most to checking the rival service; by age group

Breaking this down by income (**Error! Reference source not found.**), as expected, an o verwhelming amount (73%) of those who earned less than $30,000 a year, found price to be the most important factor. Those earning between $135,000 and $150,000, showed the least amount of importance in price (9%), and weighed much more heavily on wait time (55%) as their most important factor.

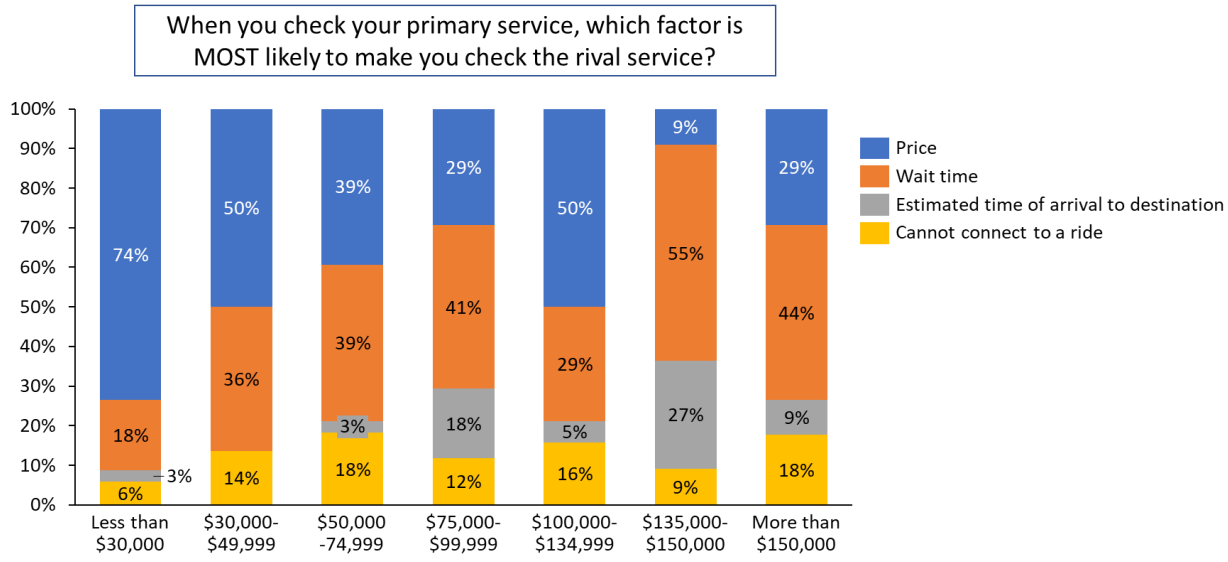


Figure 74 - Factors leading the most to checking the rival service; by income

Looking to vehicle ownership trends (Figure 76), it was found that those that did not own a private vehicle at their residence had a larger percentage (56%) select price as their most important factor to check the rival service than those who did own a vehicle (40%). Additionally, those that lived within a 10-minute walk of public transit (Figure 75), cared substantially more about price than those that lived further than a 10-minute walk of public transit.

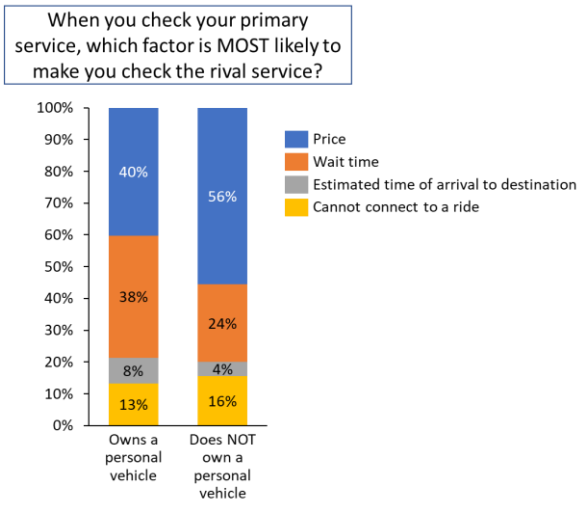


Figure 76 - Factors leading the most to checking the rival service; by vehicle ownership

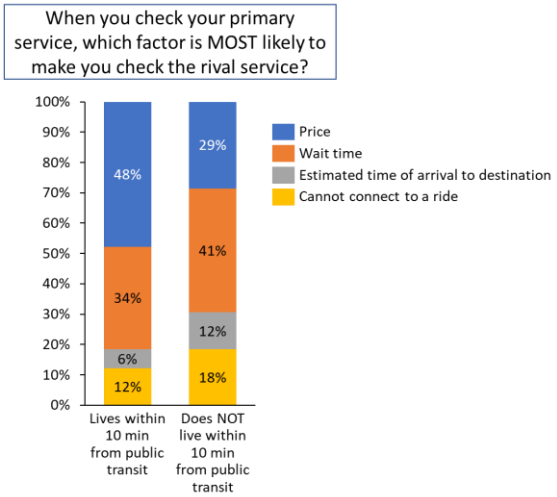


Figure 75 - Factors leading the most to checking the rival service; by proximity to public transit

Although these are the most important factors that drive riders to decide to check another service, how effective are the factors that determined service preference in *reducing* the desire to multihome? When looking at the ride preference factor responses, we compared those who claimed a certain factor had 'a great deal' of impact in them preferring a service over another, to the frequency that they multihomed over their last five rides (Figure 77). In this comparison, it was found that for those that found 3rd Party Partnerships having a great deal of impact in their decision, they proportionally multihomed significantly fewer times than those that chose other factors. In contrast, In App promotions had the highest instance of multihoming.

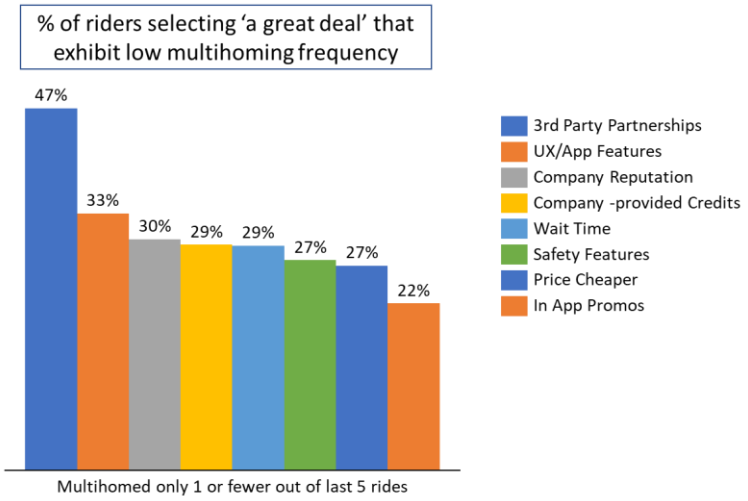


Figure 77 - Percentage of riders of each factor that displayed low multihoming tendencies (61 riders total)

5.2.3 Additional habits between multihoming and singlehoming users

Questions were posed to participants about how long they would be willing to wait for a ride in both fair weather conditions and in poor weather conditions. Each city has different average wait times which are hard to come by, however, Washington D.C. has an average wait time is 5.5 minutes (Smith 2019). The graphs below show what percentage of multihoming respondents are willing to wait for each time frame shown. Under normal weather conditions, over half of the demand is lost after 8 minutes. In poor weather conditions over half is lost after 6 minutes.

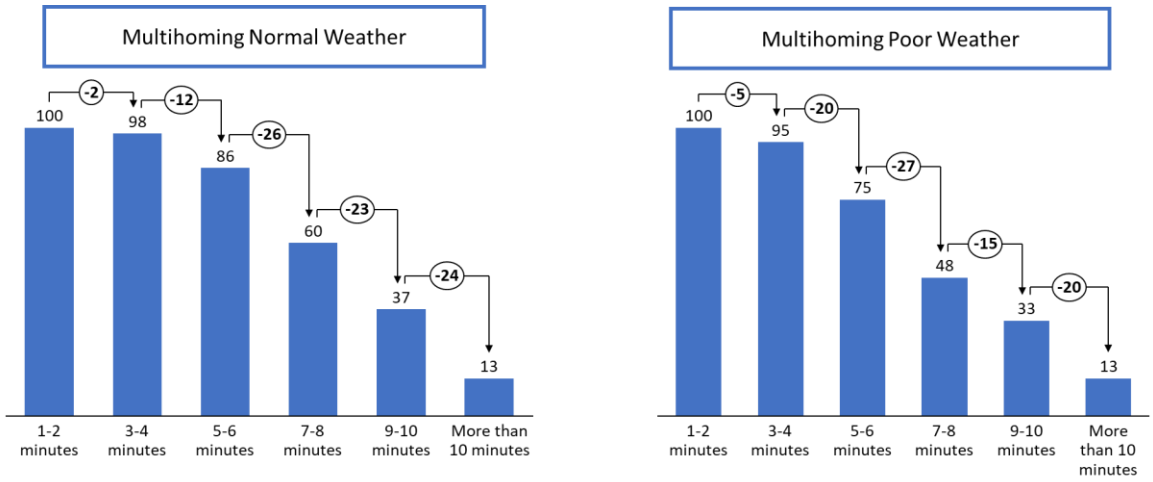


Figure 78- Multihoming rider willingness to accept a ride in normal and poor weather

Comparing the willingness to wait with singlehoming users we see similar curves, but slightly different results when comparing poor weather. For the singlehoming population, under both normal and poor weather conditions, over half of the demand is present after 8 minutes. This indicates that those that singlehome are more likely to accept the same wait regardless of conditions. To compare, poor weather conditions reduced the willing multihoming population to wait for more than 6 minutes by 12%, while the same conditions reduced the willing singlehoming users by only 3%. This could be because of singlehoming users do not have another alternative (at least within ridesharing), while multihoming users may decide the time is too long and will check another service for a better response.

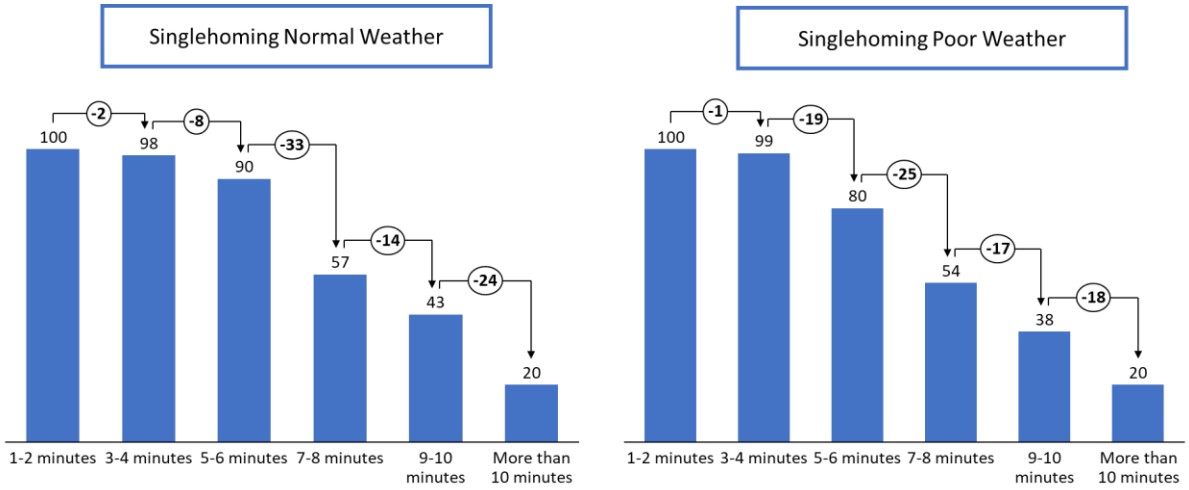


Figure 79 - Singlehoming rider willingness to accept a ride in normal and poor weather

To identify whether or not an individual that multihomes with rideshare services would be more prone to multihoming in other similar phone applications, two questions asked about the number of travel apps and food delivery apps each respondent had downloaded on their phones. The findings showed that users that multihomed with rideshare services, also multihomed more often with both travel apps and food delivery apps. The correlation between singlehoming and multihoming rideshare populations and those on other apps are positive. Rideshare user multihoming tendencies have relation with how they multihome in other apps, although the correlations are weak (0.14 for Food Delivery, and 0.25 for Travel Apps).

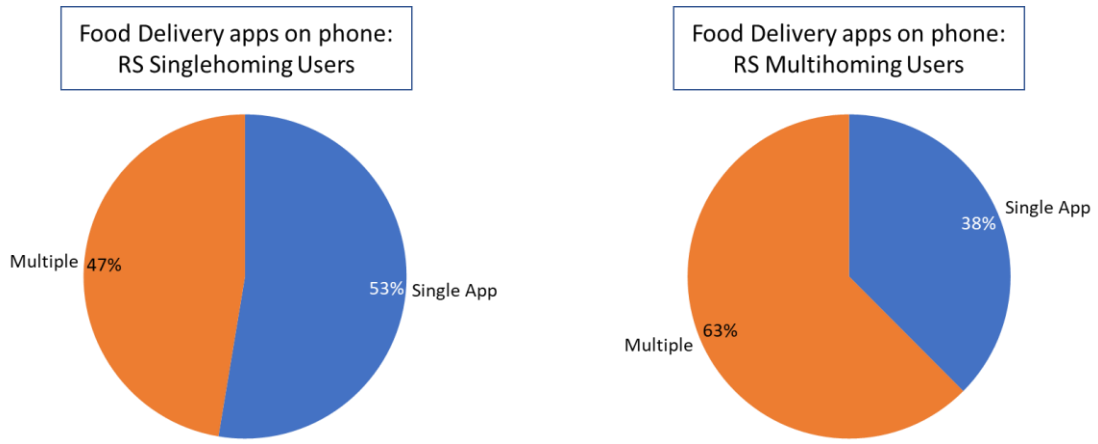


Figure 80 – Comparing participant rideshare multihoming with their multihoming with food delivery services

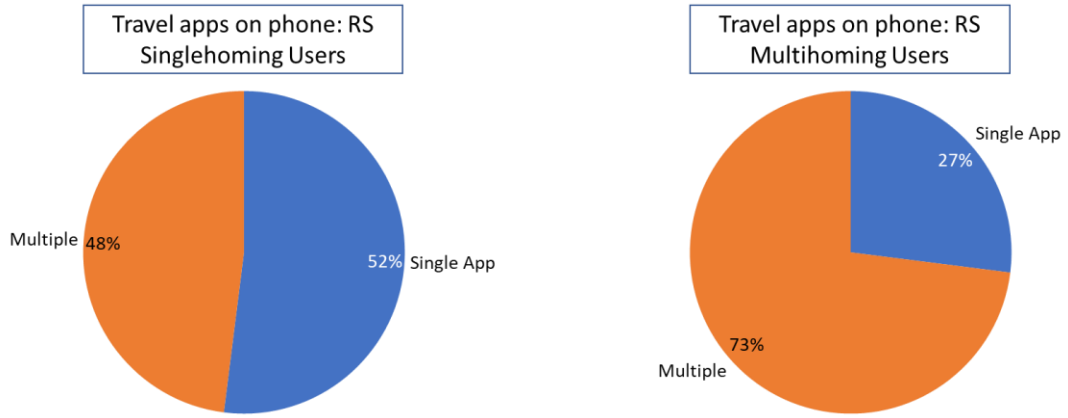


Figure 81 – Comparing participant rideshare multihoming with their multihoming with travel applications

5.3 Overview of findings and conclusions

Q1: Which factors play a role in determining the rideshare service of preference amongst riders?

Factors Influencing decision to prefer company	Singlehoming Riders	Multihoming Riders
Company Reputation	66%	65%
In-App Promotions	31%	58%
3rd Party Partnerships	27%	42%
Company-provided credit	27%	44%
Price being cheaper than rival	39%	74%
Wait time lower than rival	45%	67%
User Interface/App features	47%	42%
Safety Features	48%	47%

Figure 82 - Singlehoming and multihoming differences in factors impacting company preference

	Singlehoming		Multihoming	
Factors Influencing decision to prefer company	**Uber**	**Lyft**	**Uber**	**Lyft**
Company Reputation	61%	88%	62%	81%
In-App Promotions	28%	50%	59%	55%
3rd Party Partnerships	29%	17%	52%	34%
Company-provided credit	27%	33%	50%	35%
Price being cheaper than rival	38%	48%	68%	74%
Wait time lower than rival	45%	42%	64%	63%
User Interface/App features	52%	25%	50%	37%
Safety Features	50%	38%	50%	47%

Figure 83 – Singlehoming and multihoming differences in factors impacting company company choice

For the surveyed singlehoming riders, Company Reputation had the greatest impact in their decisions to use a particular service. 61% of singlehoming Uber riders and 88% of Lyft riders claimed Company Reputation as having a moderate amount of impact or greater on their company decision. In-App promotions had a strong pull from Lyft users. The factor least claimed as having a great deal of impact were 3rd Party Partnerships and Company-provided Credits. This could be indicative of how few riders as a whole are being affected by these partnerships currently. Another possible cause could be a lack of searching for deals from those that only utilize one service.

Highlighting the lack of service differentiation seen by many multihoming riders, the most common important factor for service preference revolved around which they believed held the lowest Price and Wait Time. The least common important factors for multihoming users appeared to be User Interface/App Features and Safety Features, likely due to the similarities of both company's applications and features, and these multihoming users more regularly being immersed in both applications. Company Reputation still had a large amount of importance – especially for Lyft users. For the Lyft riders this likely highlights the continued impact that Uber's 2017 string of missteps has had on pushing customers to choose their rival, and perhaps not utilize their service at all.

Q2: Which attributes contribute to riders multihoming between ridesharing services? Which attributes contribute to riders singlehoming?

For singlehoming users, a few conclusions can be drawn from the results. A discovery was of the strong effects that brand seems to have on riders deciding to forego multihoming and choosing to only use one service. This is especially the case with those riders that used only Lyft. This was seen as an overwhelming percentage (88% and 76%) of Lyft riders claimed company loyalty and disliking a rival company as having a great deal of impact on their decision to singlehome. A second conclusion gleaned from the data was that time and hassle of multihoming provided a barrier to multihoming for many users. Both downloading and setting up a second service as well as the hassle and time to switch between multiple services had the strongest impact on riders deciding not to multihome. The third insight gained from the results was that psychological factors such as stress and anxiety appeared to play a role in riders' decisions to not use multiple services. Roughly half of the singlehoming riders claimed that both clutter of applications on a phone and the stress of dealing with multiple apps had a moderate amount of impact or greater. This point is reiterated in how users that singlehome in rideshare, appear to more likely singlehome in other phone applications and services (food delivery, travel). Finally, the fact that time and hassle, as well as psychological costs appear to be a major motivator to most users, may reiterate the need for rideshare companies to compete aggressively to be the first service chosen by new rideshare customers, as they may never choose to use a second service because of the time and hassle.

For multihoming users, price and wait time are overwhelmingly the most important to the majority of users when deciding whether or not to check a rival service, restating the fact that customers, by and large, still consider this market undifferentiated and a commodity service. Even though estimated time of arrival to destination also deals with the time-sensitivity exhibited in the choices for wait time, it appears waiting for the ride to pick up the rider is more important than the time it takes to actually arrive to the destination. Also, a sizable number of multihoming users cited 'unable to connect to a ride' as the most important factor in deciding to check the rival service. This would indicate that these riders tend to only multihome when their preferred service fails to match them with a driver.

The most important findings, however, surrounded discoveries that showcased the relative effectiveness of incentives compared to network-bridging strategies in *reducing* multihoming.

The incentives provided by the rideshare companies to riders (In-App promotions and Prices) had a very large number of riders claim as having a great deal of influence on their choice of preferred service. However, this preference in service did not seem to lead to consistency in usage, as in-app promotion users multihomed at higher rates. In fact, these two factors (In-App promotions and Prices) appeared to have had the least impact in reducing multihoming among their users, having the smallest proportion of users that multihomed one or less times out of their last five rides (Figure 77). A potential explanation is that customers that care most about price or promotions (which essentially reduces price), may have very little lock-in, and will be more likely to be opportunistic to find the best current price or deal available.

Network bridging activities through 3rd Party Partnerships had the lowest number of riders claiming impact in their choice in a preferred service. Despite this, those that did claim it as having a great deal of influence on their preferred service, tended to multihome the least – by far – out of all other preferences. Although there is not enough evidence to prove causation, this shows that even though 3rd Party Partnerships have not been expanded yet to reach the masses of riders, it may have a very strong lock-in effect on the riders that experience them. If rideshare companies were to vastly expand the number of partnerships (and more importantly, the base of users that are affected by their partnerships), rideshare services could make significant headway in locking in the rider side of the platform at a large scale instead of just niche groups. This shows a potential network bridging strategy that can be taken to create a competitive bottleneck, where platforms solely compete to lock in riders, and allow drivers to multihome. Should both rideshare companies embark with this strategy, they might be able to carve out their customer bases, increase take rates on drivers, and allow drivers to continue to multihome.

6.0 QUANTITATIVE ANALYSIS

6.1 Insights from Conjoint survey

After taking in the accepted responses and running the CBC analysis, the high-level results were the relative importance of each attribute for the entire population – or which attributes do people care strongly about when deciding to accept a ride option, or search another service for their offering? Overall, it was found that Price was the most important factor by far for the surveyed riders, followed by Wait Time, Estimated Time to Drop-off, and then far behind was Company.

This held the same when segmented by those who claimed preference in Uber, Lyft, or no preference at all, suggesting that this is a market phenomenon, and not company dependent. The biggest difference between companies lay in the relative importance of Company, as those who preferred Lyft had double the relative importance for Company than those that preferred Uber or had no preference. The effects of this increased importance on company would have impact further on in the results.

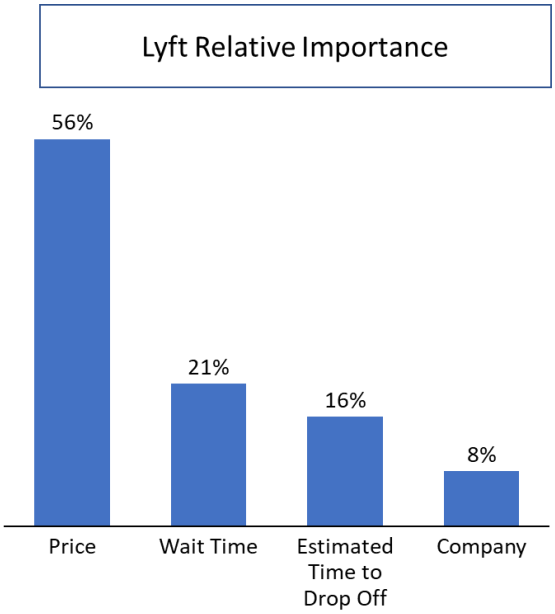


Figure 84 - Overall relative importance of ride attributes

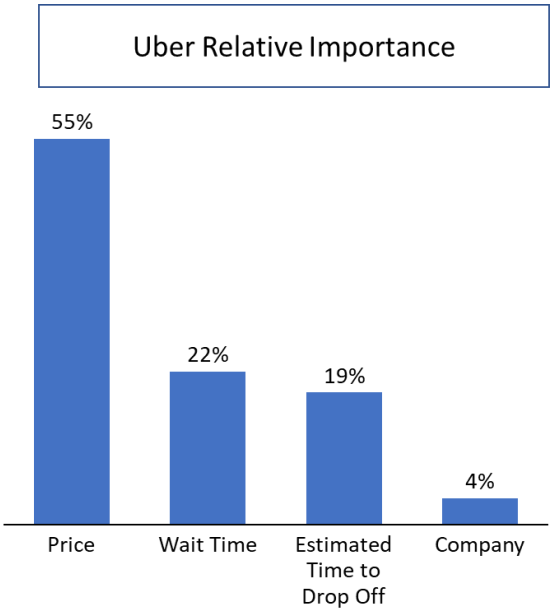


Figure 85 - Relative importance of ride attributes for Uber riders

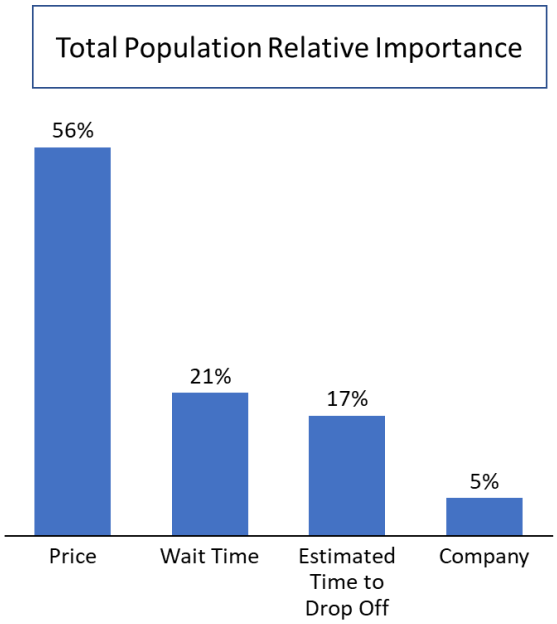


Figure 86 - Relative importance of ride attributes for Lyft riders

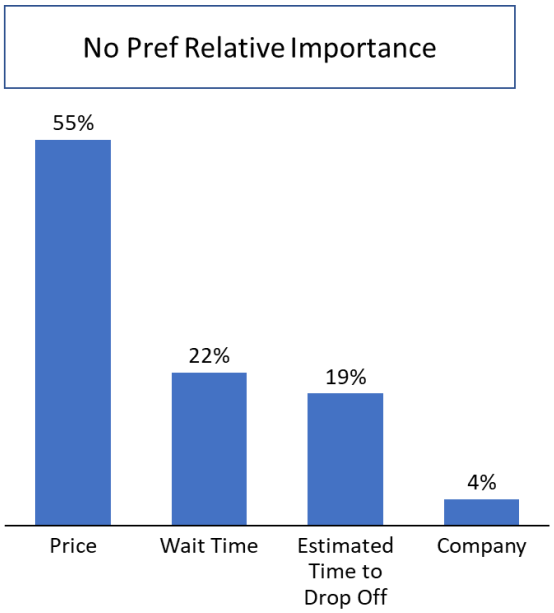


Figure 87 - Relative importance of ride attributes for riders with no stated service preference

After understanding the overall high-level importance of each attribute for accepting a ride, the analysis also delved deeper into the individual attributes and identified the overall relative importance of each level *within* each attribute. This would identify how much a 'step' in each level for each attribute impacted the relative importance for the rider. For example, how much relative importance is gained for a rider when the wait time reduces from 4 minutes to 2 minutes. Overall, price has the steepest slope between each level, suggesting variance in levels has a larger impact on customers' overall utility. The importances shown from the conjoint are similar to the results found in the survey, showing price, then wait time, then estimated time to drop-off for being most important to most riders. One thing to note is that although they appear to be mostly linear at the entire population scale, the degree of change in importance differs from level to level suggesting that each time increase or price increase is treated differently. Those differences become more apparent as individual segments are compared.

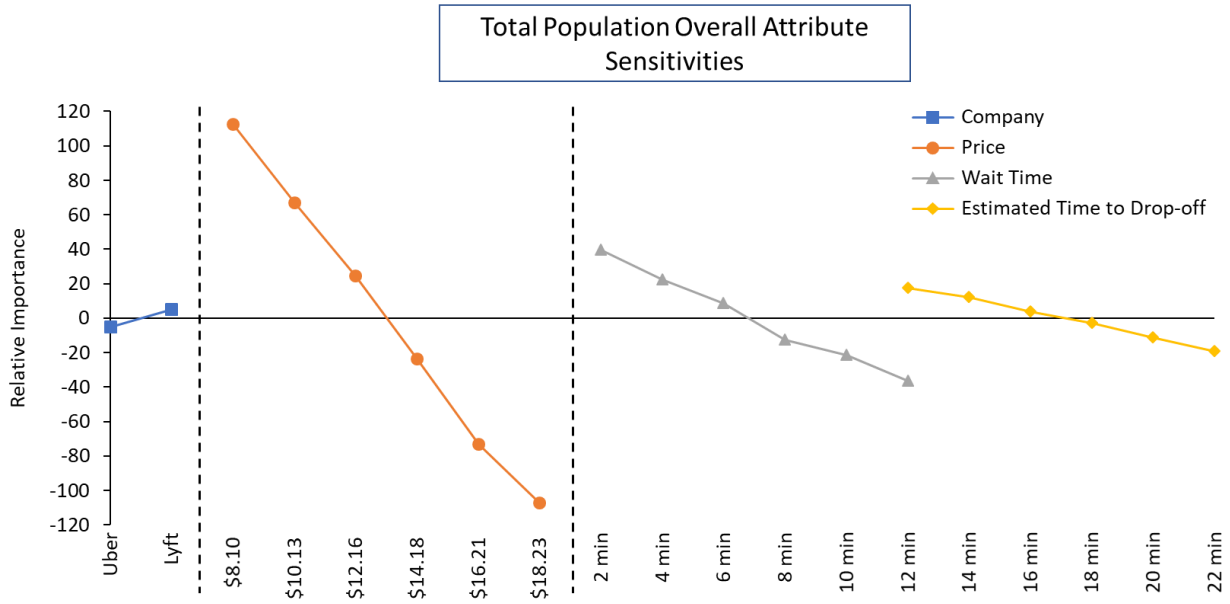


Figure 88 - Overall relative importance of attribute levels for all riders

Viewing these attribute levels by company preference segmentation, one can identify differing points of increased and decreased relative importance. For company importance, the relative importance disparity is larger with Lyft than for Uber. Expectedly, for those that claimed no preference in company, company had a smaller impact. This ties in with some of the previous findings from the qualitative survey, that showed an increased importance in brand for Lyft riders, whether they just liked Lyft as a company better, or actually had negative opinions of Uber.

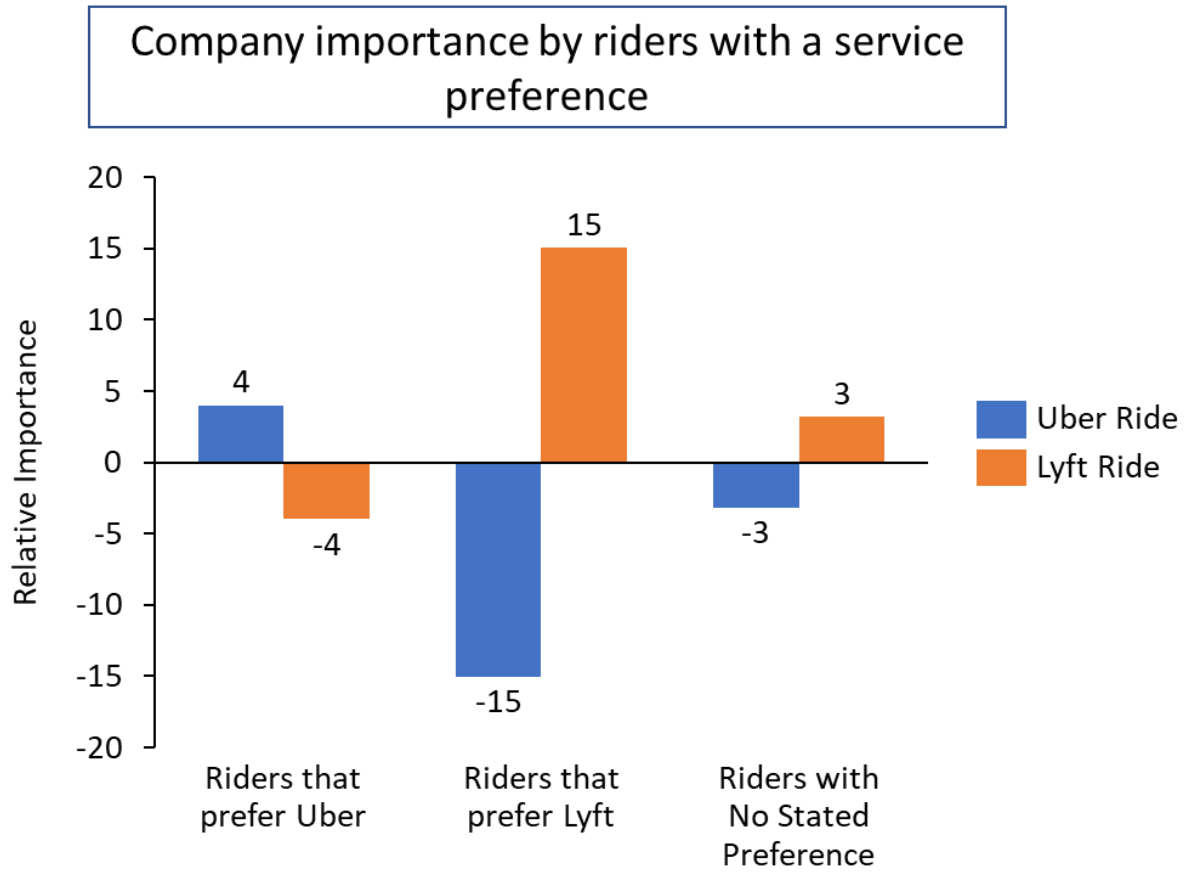


Figure 89 - Company importance between service preference

The results for the importance of price was generally similar for all riders across all segments, with those that had no stated rideshare preference showing a tendency to be more price-sensitive overall. Uber and Lyft riders were almost the same across all price levels.

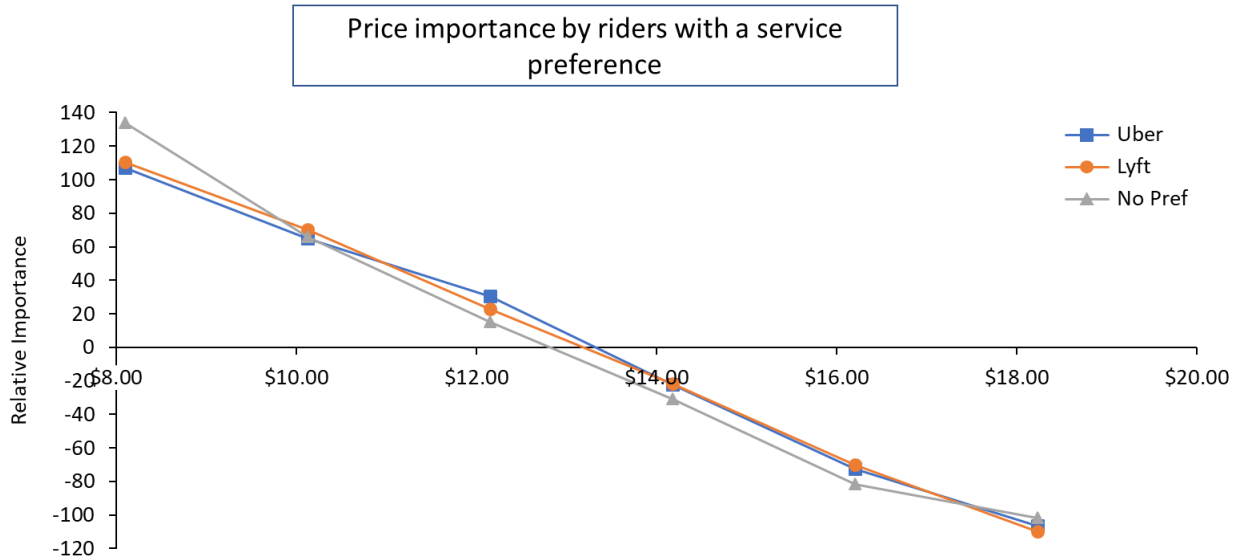


Figure 90 - Relative price importance by company preference

For Wait Time, although all segments' relative importance decreases as time increases, the points with the largest drop offs differ by company preference. Lyft experiences a more consistent and steady loss of utility, as Uber experiences its steepest drop between 6 and 8 min. For those with no stated service preference. The largest drop up-front, and highest overall value around the 10-minute and 12-minute mark, potentially highlight the divide between the very price-sensitive and the very time-sensitive subsets of riders.

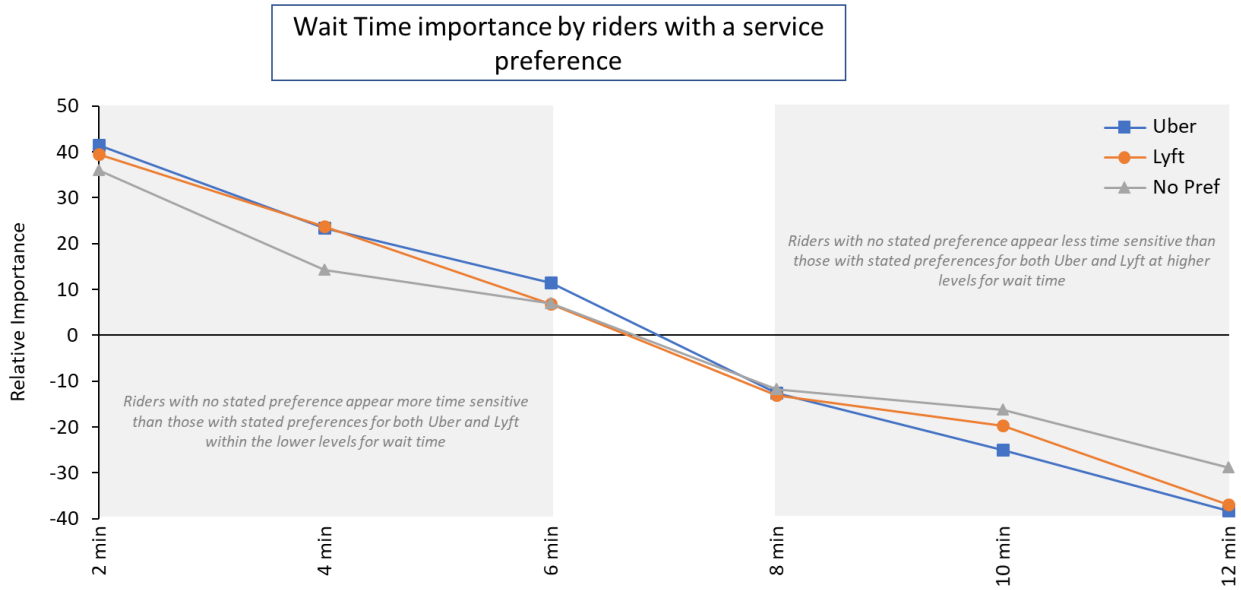


Figure 91 - Relative importance of wait time by company preference

The Estimated Time to Drop-off curves segmented by rideshare company preference also serves to show the variance in importance each level has on a different customer set. Relative importance differs greatly for each company and those with no preference at different levels.

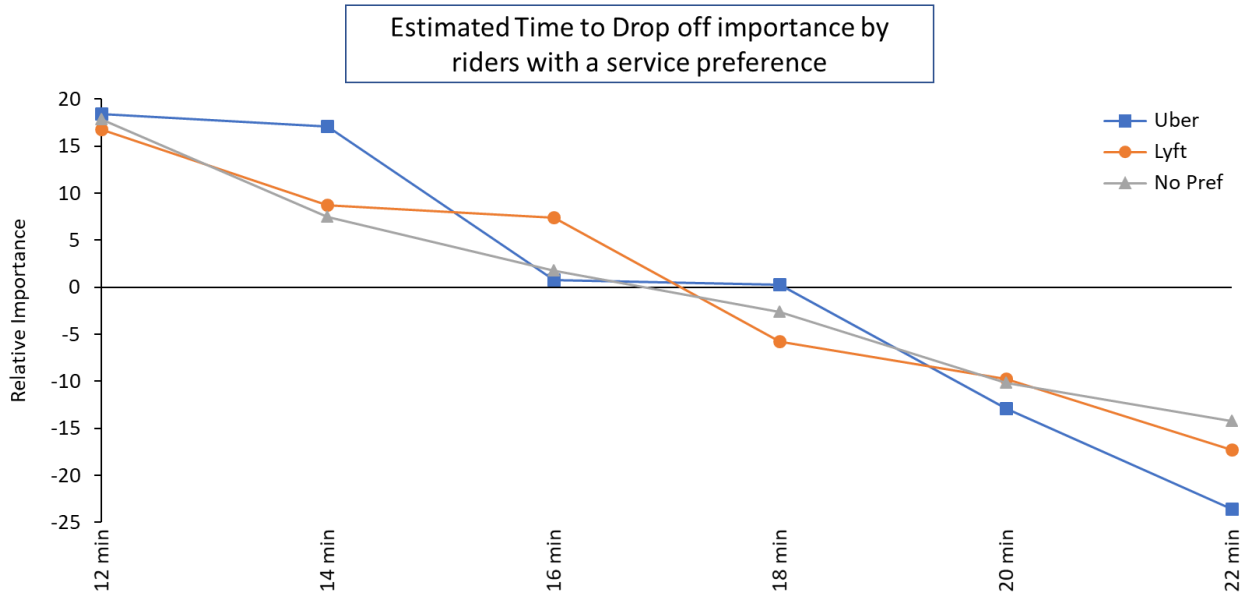


Figure 92 - Relative importance of the estimated time to drop-off by company preference

Q3: Can the attributes contributing to rider multihoming be quantified as an overall multihoming cost? Can they be manipulated?

After gathering all of the major attribute importance and level utilities, the part worths from the respondents were put through the Sawtooth Market Simulator, to test how riders from various segment breakdowns would choose to multihome or accept different ride combinations offered. Various scenarios were tested, but to begin to understand how the sample at large acted between the two services, the whole population was run through without segmentations initially. This would show what the overall thresholds were for the population when it came to price and time for each company. The Market Simulator, showed the percent that would accept (accept the ride) or select none (choose to multihome). In the following graphs, it should be read that as 'Percent Accept' goes downward, that the percentage multihoming is increasing.

For the full population price sensitivity analysis, both Wait Time and Estimated Time to Drop-off were held at their base levels (2 min wait, 12 min estimated time to drop-off), while Price was adjusted through each of its levels (starting at it base of $8.10). This was tested with both an Uber and a Lyft ride. The curves for both services are similar, with the biggest drop off rates in riders occurring between $10.13 and $14.18. Another take away from these results is the price premium that Lyft experiences. The percent of customers that accepted for Lyft is consistently between 2-4% higher for each price level. This can be related back to both the importance of company shown in the previous relative importance of company for Lyft users, as well as the greater level of utility of a Lyft rider using Lyft over Uber.

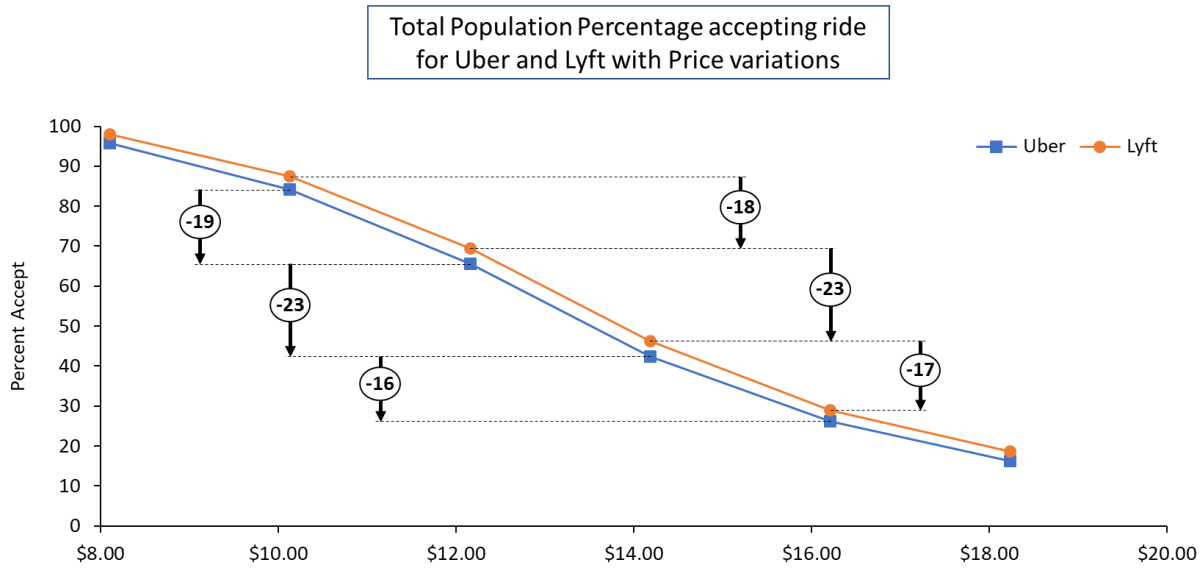


Figure 93 - Increases in multihoming with stepped-increases in ride price

For the population Wait Time analysis, Price and Estimated Time to Drop-off were both held constant at their base levels ($8.10 and 12 minutes), while Wait Time was adjusted between each of its levels, starting at its base of 2 minutes. This was done for both Uber and Lyft ride services. Again, the ride acceptance curves follow similar patterns between both services, with the largest spike in multihoming occurring between 4 min and 6 min above the base wait time. There is a more defined wait time premium for Lyft, with at its extreme, a 4.6% acceptance rate higher for Lyft.

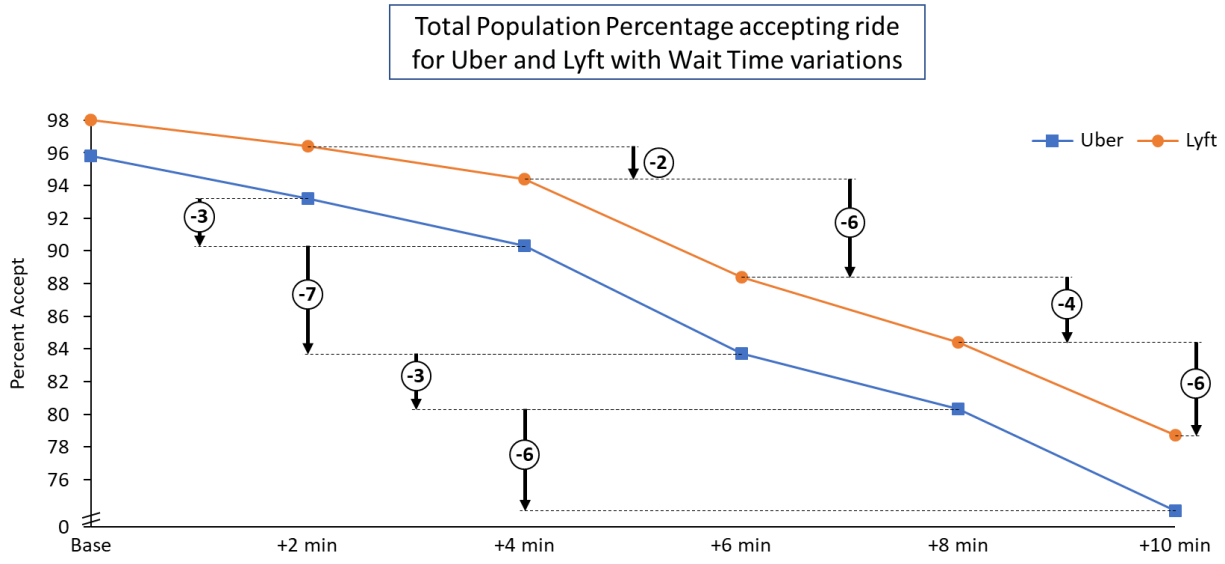


Figure 94 - Increases in multihoming with increases in wait time

For the total population Estimated Time to Drop-off analysis, Price and Wait Time were both held constant at their base rates ($8.10 and 2 minutes), while Estimated Time to Drop-off was adjusted for each of its levels. This was done for both Uber and Lyft ride services. The ride acceptance curves follow similar patterns, with the most riders lost to multihoming after the 6-minute mark and after the 10-minute mark. Again, just as in the Price and Wait Time analyses, Estimated Time to Drop-off experiences a premium for Lyft, as at most levels the percent accepted for Lyft is around 3% higher. This consistent premium in both price and time, shows a potential loyalty to the Lyft brand, despite it, in essence providing the same undifferentiated service.

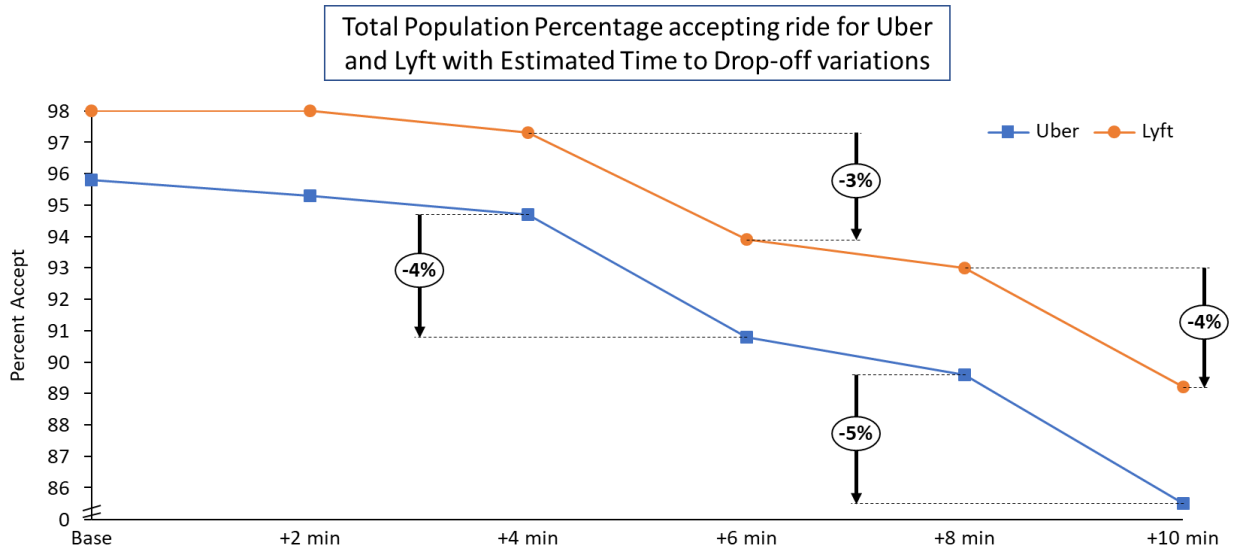


Figure 95 - Increases in multihoming with increases in estimated time to drop-off

After seeing how the population-at-large acted when presented with different ride options, the analysis dove deeper to identify any demographic trends. Rider segments were analyzed to identify any discernable trends in multihoming rates given changes in price or time. For price sensitivities, prices were adjusted along each price level, while Wait Time and Estimated Time to Drop-off were held constant at their base level (2 minutes and 12 minutes respectively). This would allow the ability to understand how each group would decide to multihome or accept the offered ride as prices fluctuated. For time sensitivities, price was held constant at its base level ($8.10), while Wait Time and Estimated Time of Arrival were adjusted together, throughout all of their levels, starting at their base levels (2 minutes and 12 minutes respectively), and moving to their highest levels (12 minutes and 22 minutes respectively). These tests were conducted using both Uber and Lyft as the offered ride service.

Segmenting by age to check price thresholds to multihome, both Uber and Lyft rides were evaluated. From this, for both Uber and Lyft rides, it was found that those in the 18-24 age group tended to show the highest price-sensitivity and would multihome at a larger proportion than other age groups as prices increased. In contrast, the 56 and up age group acceptances dropped off the slowest out of all groups, showing they were less price-sensitive, and slower to multihome than the rest of the age groups.

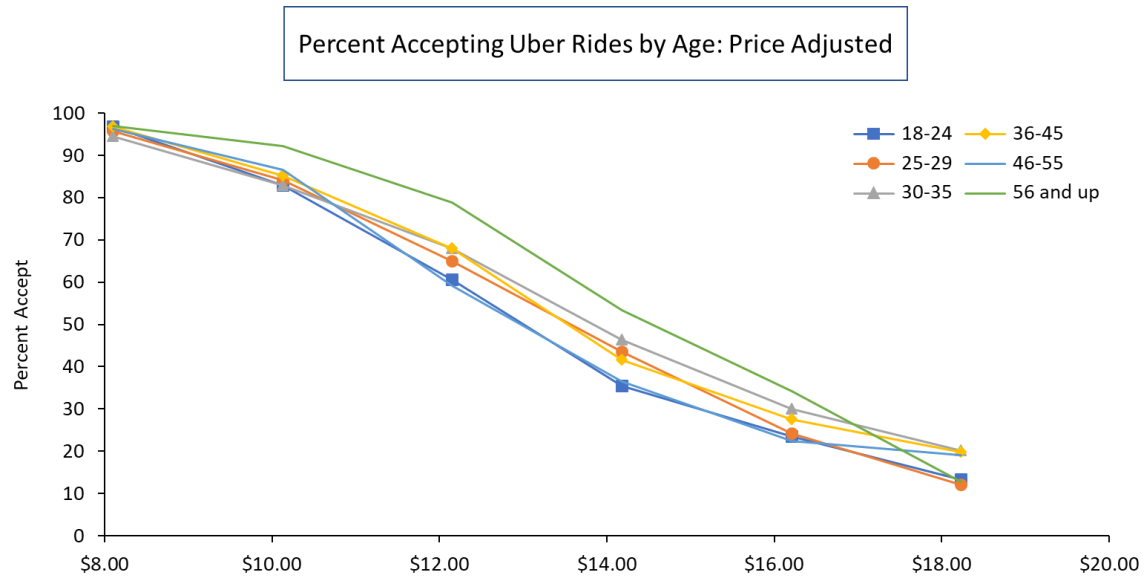


Figure 96 - Percent of riders accepting Uber rides with price variation

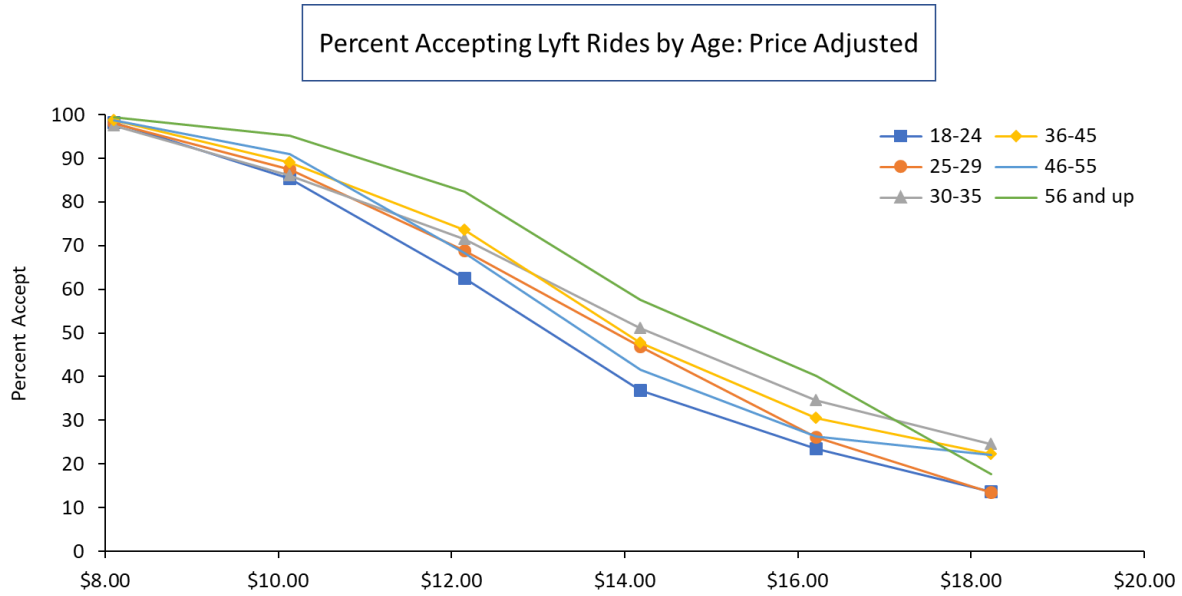


Figure 97 - Percent accepting Lyft rides with price variations

Segmenting by age to identify time thresholds, rider behavior for the two services remained similar in pattern, but with lower retention overall for Uber than Lyft. The 18-24 age bracket showed the least time-sensitivity, and was overall the slowest age group to multihome given increases in time. The 30-35 age group appeared to be the most sensitive to increases in time, followed by the 24-29 age group. The biggest drops in retention as a whole occurred between 4 and 6 minutes above the base time. The lack of time-sensitivity shown in the 18-24 age bracket may show a potential willingness to wait longer in order to get a cheaper ride.

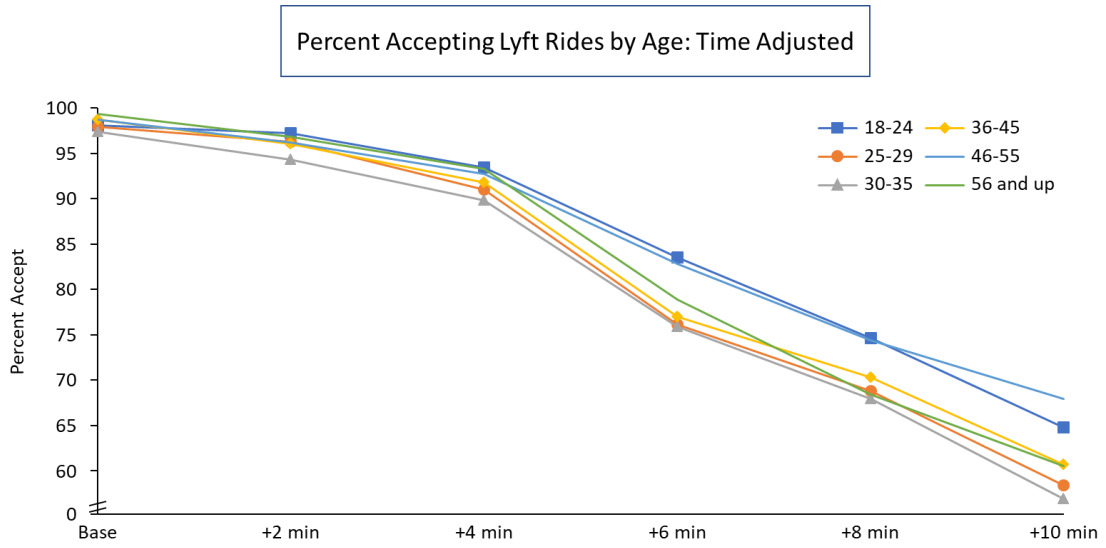


Figure 98 - Percent accepting Lyft rides with time variations

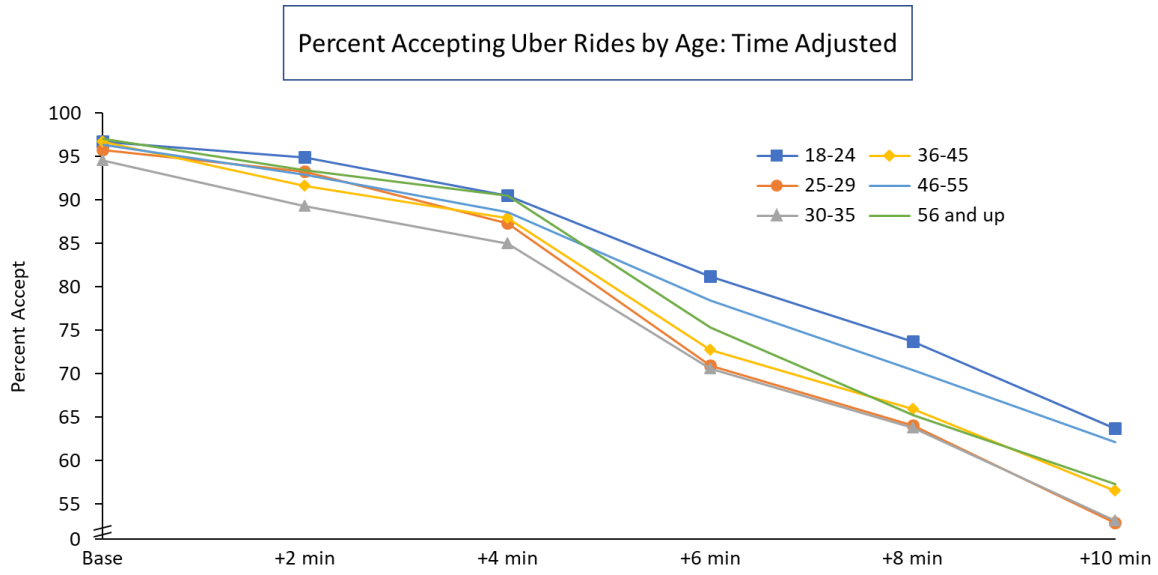


Figure 99 - Percent accepting Uber rides with time variations

Next, the population was segmented by income bracket, to see if there were any multihoming trends that fell along income lines. These segments were first tested for price, followed by time sensitivities. As expected, those who earned less than $30,000 showed the highest price-sensitivity, and would opt to multihome in greater proportion than other income groups as price increased. On the opposite end of the spectrum, those making more than $150,000 tended to multihome the least with increases in price than any other income group.

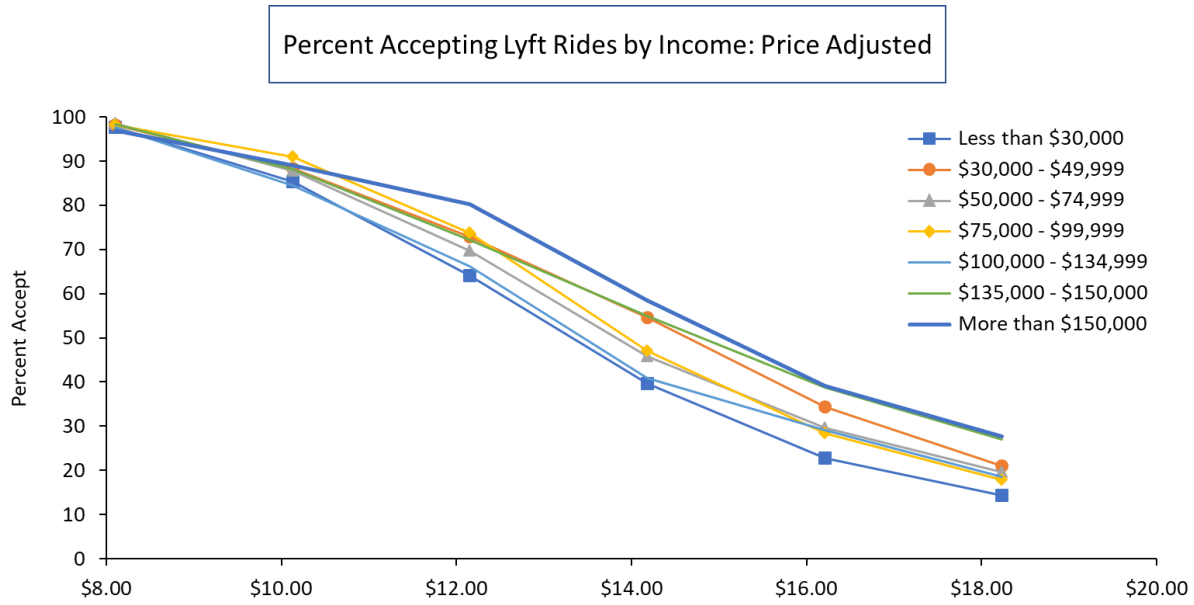


Figure 100 - Percent accepting Lyft rides with price variations, by income

After reviewing price sensitivities, income groups were then tested for sensitivities related to time. Those earning less than $30,000 were the least time sensitive, while both income groups above $100,000 were the most time sensitive. This is understandable, since the less than $30,000 group was more price-sensitive, they were likely willing to wait a little bit longer for a less expensive ride. Likewise, as expected, those earning more than $150,000, being less price-sensitive could be more likely to shop around for a quicker ride. Overall, for both Uber and Lyft these dynamics are similar, however, for the Uber rides, the $135-149,999 group showed the most multihoming before switching places with the over $150,000 group between 4 minutes and 6 minutes above the base times.

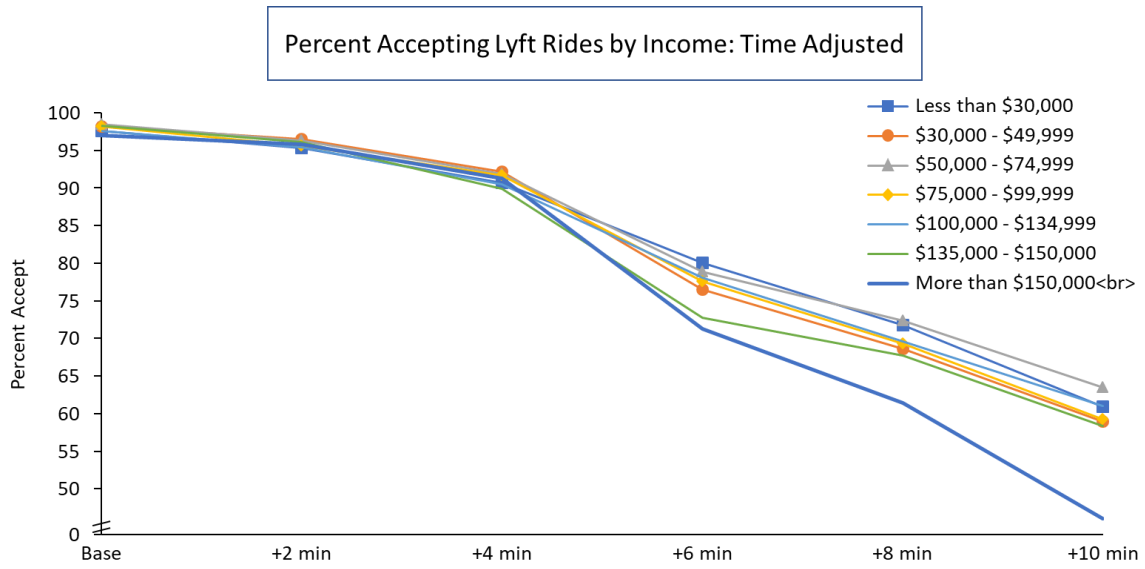


Figure 101 - Percent of Lyft rides accepted with time adjustments, by income

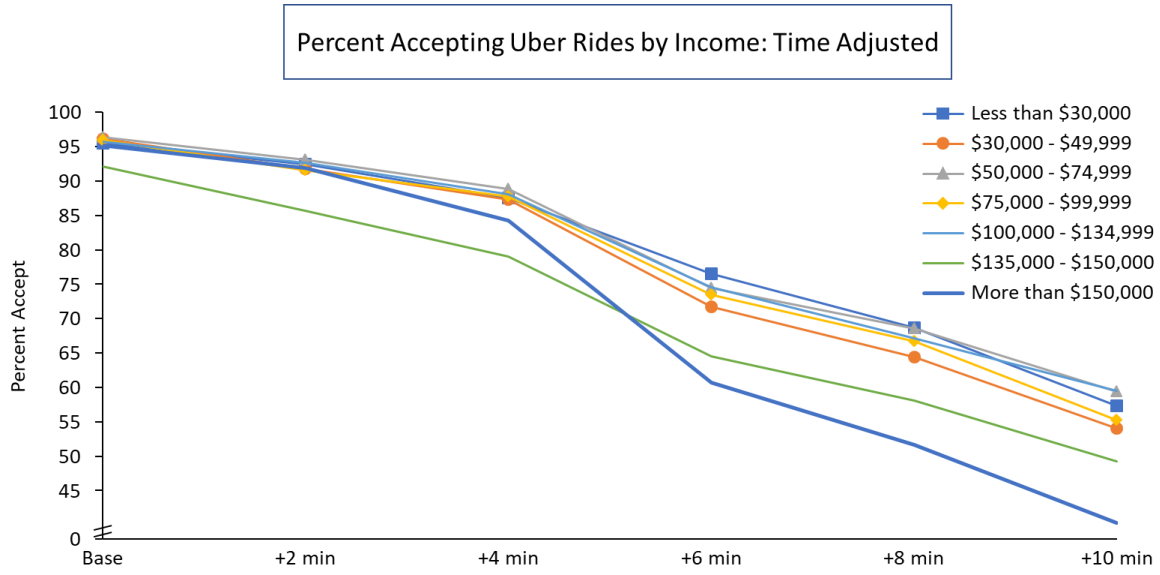


Figure 102 - Percent accepting Uber rides with time adjustments, by income

As a proxy for urban vs. non-urban riders, the multihoming habits of those living near public transit was tested for both price variations and time variations. In the survey, the urban riders used rideshare services with greater frequency (Figure 25), and increased frequency of use showed trends of increased multihoming. Because of this, it was anticipated that, in the conjoint, they would multihome more often than those that were non-urban riders as well. In the conjoint, the urban riders did indeed multihome more than the non-urban riders. It was found that urban riders multihomed at greater rates with price variations until $14.18, where they began to multihome less than the non-urban riders (Figure 103). Urban riders expected a timelier ride than non-urban riders,

as urban riders overall had a roughly 4%-5% greater multihoming rate than their peers with increases in time levels (Figure 104).

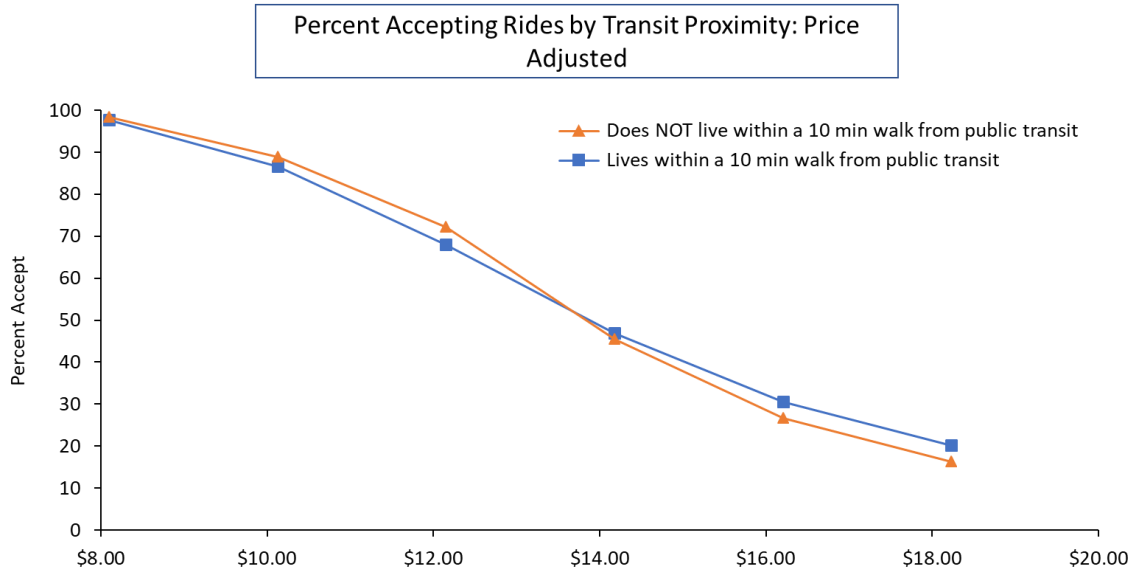


Figure 103 - Percent accepting rides with price adjustments, urban/non-urban

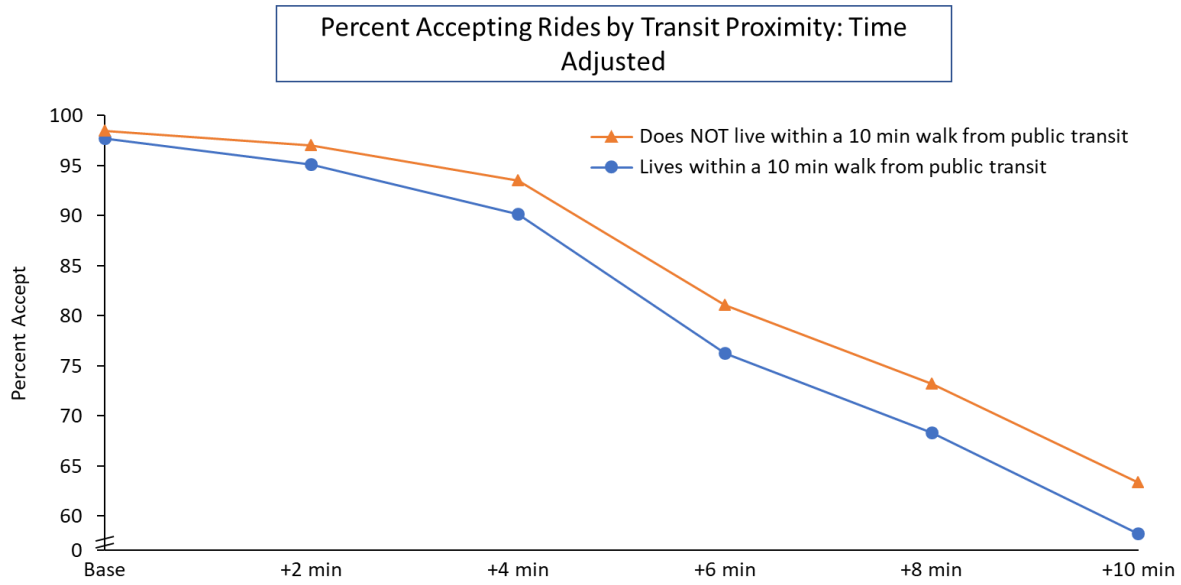


Figure 104 - Percent accepting rides with time adjustments, urban/non-urban

After completing the conjoint survey, participants were asked various questions as to their habits in ridesharing and using other applications. One question asked participants, similar to the qualitative survey, to reflect back on the last five rideshare rides they had taken, and state for how

many of those rides they checked multiple services before selecting a ride. This was used to get an understanding of the frequency that some riders multihome in general. Price and Time sensitivities were then analyzed along these lines, segmenting riders by the number of times they multihomed out of their last five rides. The goal of splitting the population along these lines was to characterize the drop off points for riders that multihome more often in their lives compared to those that tend to multihome less often.

Those that claimed a higher frequency of multihoming in their real lives, showed themselves in the conjoint to indeed multihome more as prices increased in their rides. Those that claimed to multihome less in real life also showed in the conjoint that they multihomed less as prices increased. Each group can be analyzed at each price level, however, to simplify the analysis, the median user was used as a benchmark for when multihoming occured in each segment. The dashed lines on the graphs below mark where 50% of the population of each segment chose to multihome instead of accepting the ride. For those riders that claimed to have multihomed five times out of their last five rides, over 50% chose to multihome by $12.16. For riders that claimed to have multihomed for three or four of their last five rides, over 50% chose to multihome by the time the price was $14.18. Finally, those that claimed to have multihomed zero to two times out of their last five rides, over 50% chose to multihome by the time the price offered was $16.21. These results were with the shortest wait times and time to drop off. As wait time and estimated time to drop off increase with price, the multihoming rates will shift lower in price levels.

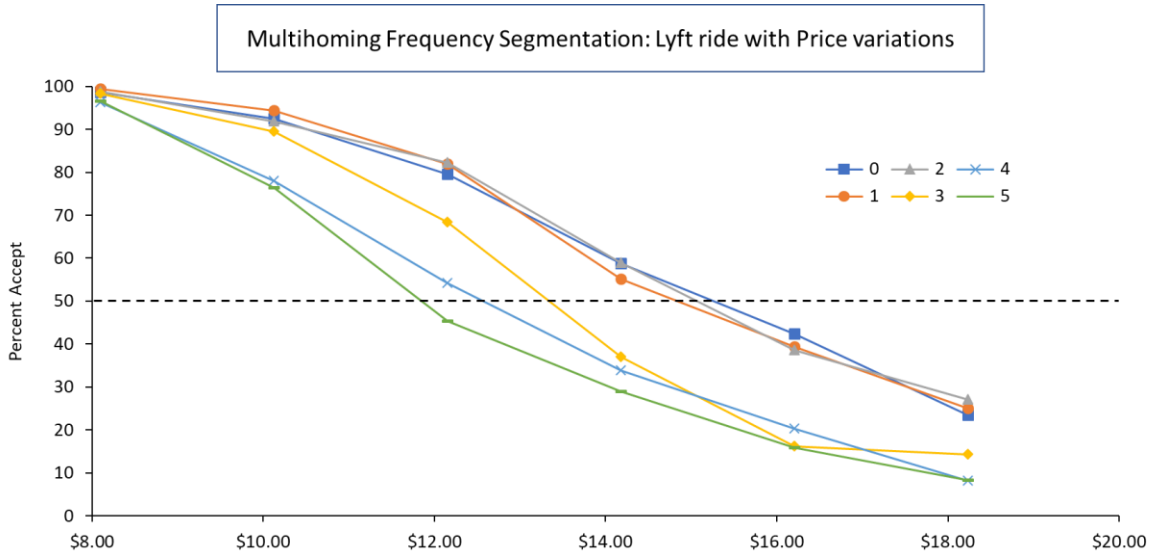


Figure 105 - Percent accepting rides with price adjustments, by claimed frequency of multihoming

		Price Level at which over 50% of segment has chosen to Multihome					
		Price Levels					
		$ 8.10	$ 10.13	$ 12.16	$ 14.18	$ 16.21	$ 18.23
Frequency Multihoming	0					X	
	1					X	
	2					X	
	3				X		
	4				X		
	5			X			

Figure 106 - Price levels where each multihoming frequency population loses half of its demand

Wait Time and Estimated Time to Drop-off had less drastic reductions in ride acceptances, with the most extreme case being 48% acceptance at a 10-minute time increase from the base case (2-minute wait, 12-minute estimated time to drop-off). Overall, those that claimed to multihome more in real life, did so as well as time increased – with a large exception at a certain point for those who claimed to multihome five of their five rides. This group experienced a sharp decline until reaching about 6 minutes above the base time level, where the rate of multihoming reduces sharply. This may have to do with a priority towards accepting a lower price for a higher wait time, but is a curious result as it was not shown by those that claimed to multihome four out of the last five rides, who continued to multihome at a steady rate.

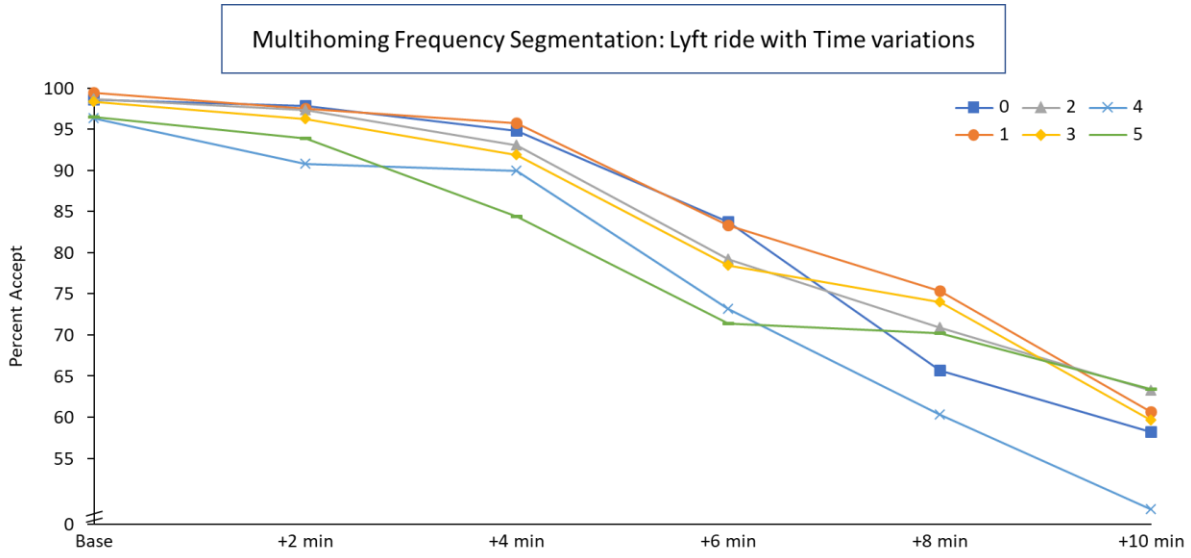


Figure 107 - Percent accepting rides with time adjustments, by claimed frequency of multihoming - Lyft

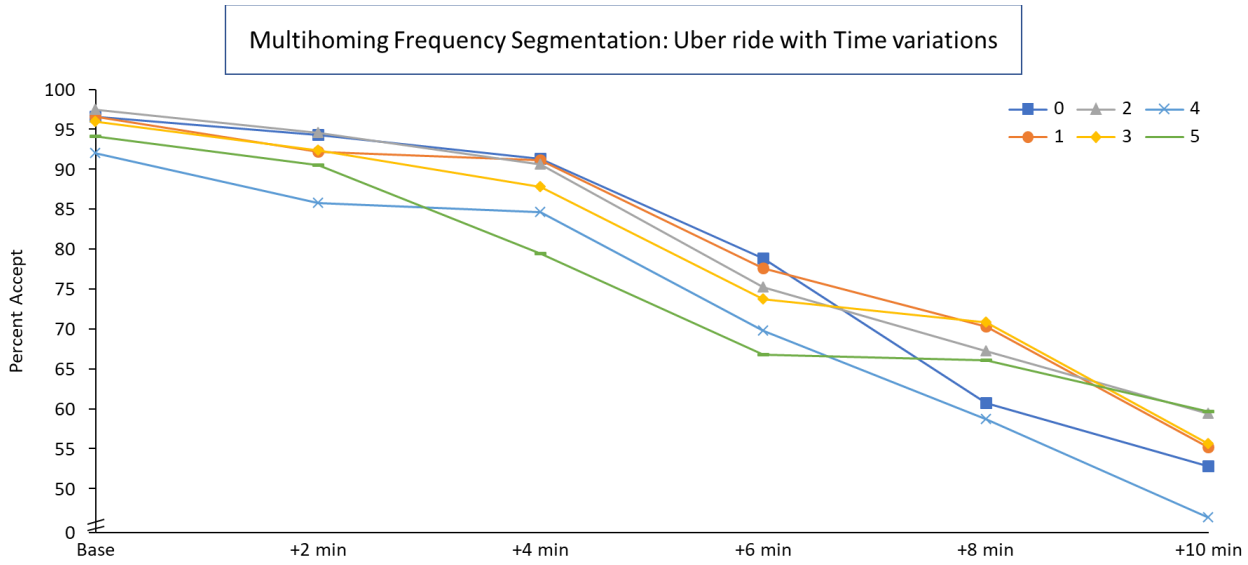


Figure 108 - Percent accepting rides with time adjustments, by claimed frequency of multihoming - Uber

After the conjoint survey, participants were asked whether they considered themselves more price-sensitive, time-sensitive, or about the same. The results of their decisions to accept rides were along the lines one would expect, which was encouraging. For price sensitivities, the self-claimed price-sensitive population had a steeper curve, and began multihoming at a quicker rate as prices increased. The time-sensitive population had a flatter curve and multihomed at a significantly lower rate. Those that claimed to care about price and time 'about the same,' fell in between. For Time-sensitivities, the results were inverse.

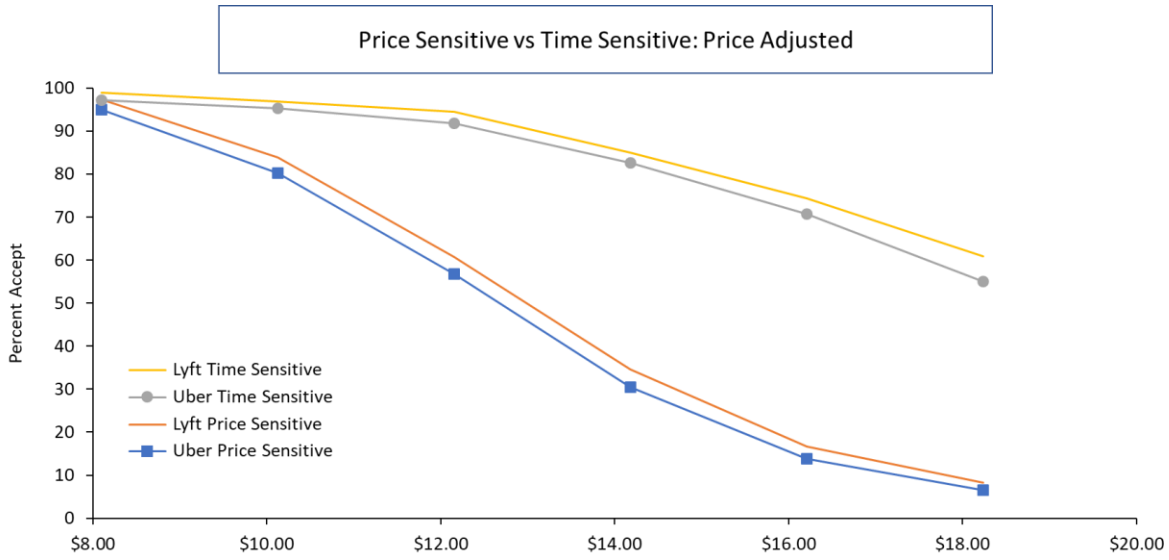


Figure 109 - Multihoming variations between price and time-sensitive riders

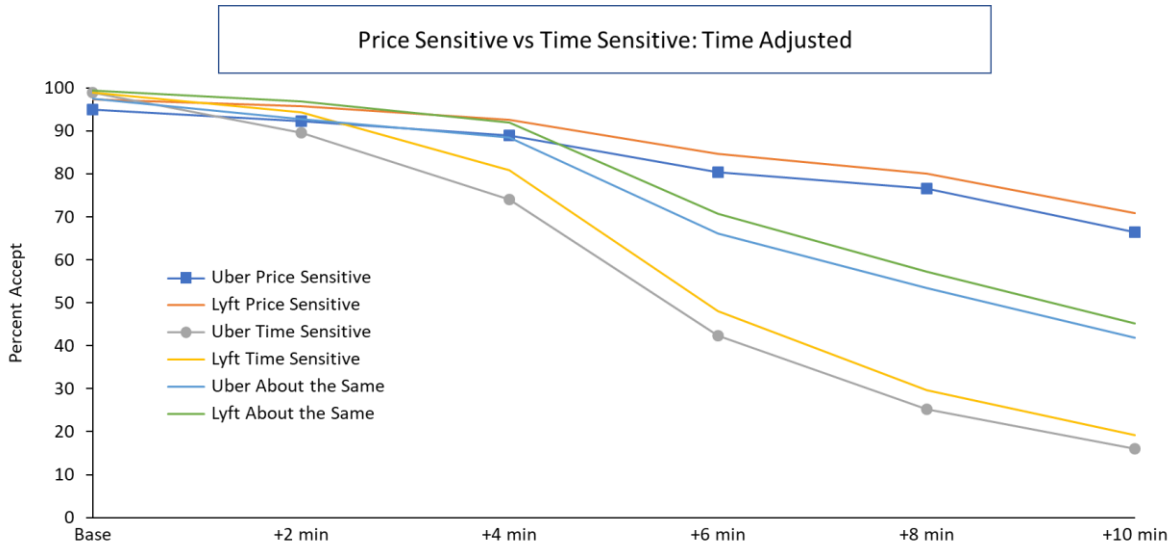


Figure 110 - Multihoming variations between price and time sensitive riders, time adjusted

After understanding along which lines multiple segments chose to multihome, an attempt was made to see if any external motivators influenced decisions for multihoming. Chief among them, were the three rideshare efforts seen in the previous qualitative survey: 3rd Party Partnerships, Company-provided Credits, and In-App promotions. The following shows the proportion of riders that reported receiving any of these benefits:

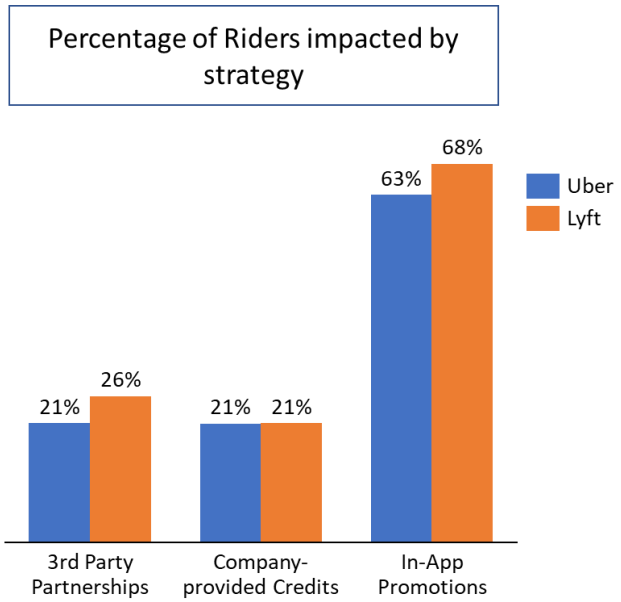


Figure 111 - Riders impacted by multihoming-reduction strategy

The results for price on riders with 3rd party partnerships were not clear cut. For Lyft riders in aggregate, those that were affected by 3rd Party Partnerships, only saw higher retention in the 3 levels between $10.13-$14.18. Uber riders affected by 3rd party partnerships saw higher retention rates in the last three price levels, $14.18-$18.23.

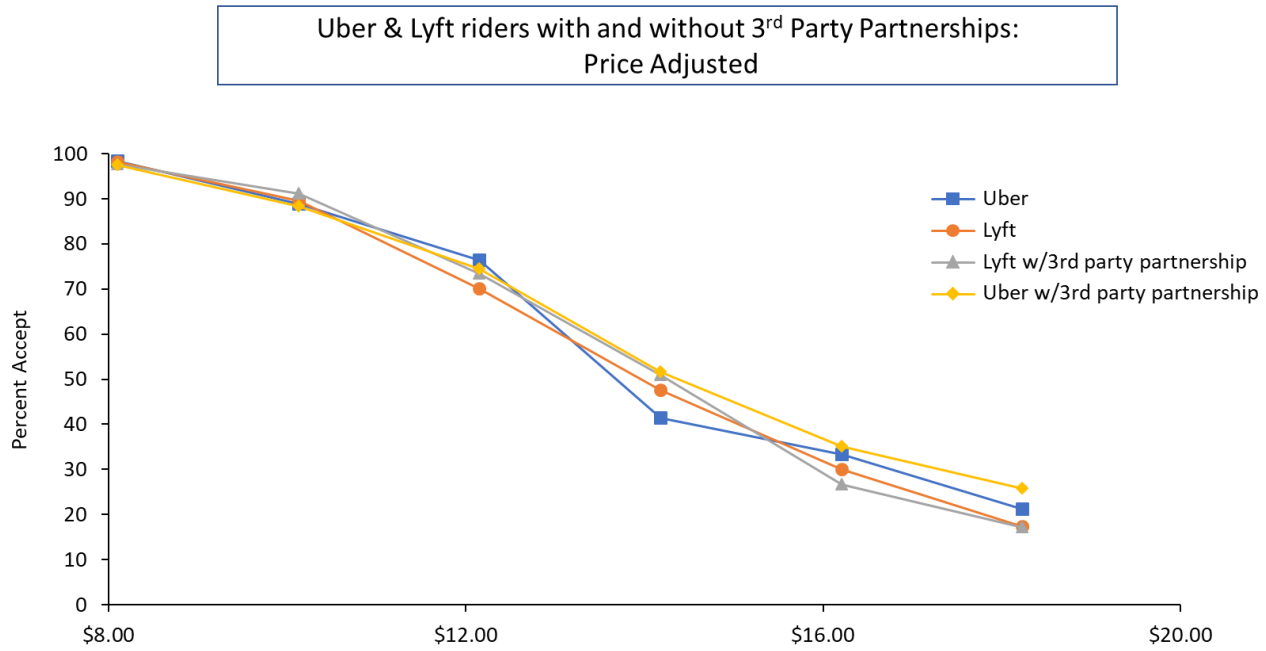


Figure 112 - Multihoming by riders with 3rd party partnerships, price adjustments

Despite the muddled results in aggregate for Uber and Lyft riders, there were segments where 3rd party partnerships seemed to have a large impact on their multihoming habits. For the 18-24-year-old age segment, there was a substantially higher rate of retention in riders for Lyft across all price levels. This was not found to be the case in riders that preferred Uber. For the 25-29-year-old segment, there was substantial impact across both Uber and Lyft riders. Uber alone saw some reduction in multihoming on the 30-35 age group in only the two highest price levels, and a more evenly spread reduction for the 36-45 age group. Outside of these age groups, those who received 3rd Party Partnerships did not display a reduction in multihoming. For the 56+ population, there were too few respondents that both fell in that age group and also had experienced any 3rd Party Partnerships to get clear results.

Age Groups with Reduced Multihoming Using 3rd Party Partnerships		
Age	Uber	Lyft
18-24		X
25-29	X	X
30-35	X	
36-45	X	
46-56		
56+		

Figure 113 - Age groups that showed reduced multihoming that used 3rd Party Partnerships

Multihoming rates with 3rd Party Partnerships also were broken down by income bracket, to see if any usage differences materialized based off of income. Based off of income, the results were muddled for nearly all income brackets for Uber, with the exception of those that earned less than $30,000. Those earning less than $30,000 that preferred Uber and benefitted from 3rd Party Partnerships, multihomed less across all price levels than their peers without 3rd Party Partnerships. With Lyft riders, several income brackets showed a lower tendency to multihome from riders that benefitted from 3rd Party Partnerships. All income brackets between $30,000 and $135,000, exhibited fewer multihoming among those with 3rd Party Partnerships compared to those without. It is curious to see a large discrepancy between the multihoming improvements seen in Lyft riders compared to Uber riders across income levels from those that utilize 3rd Party Partnerships. Many of the Lyft partnerships hone in on credit card users – especially high-end Chase Sapphire Reserve, Delta Skymiles members and Hilton Rewards members. These partnerships may impact riders more that fall in middle and high earning income brackets.

Income Groups with Reduced Multihoming Using 3rd Party Partnerships: Price		
Income	Uber	Lyft
< $30k	X	
$30-50k		X*
$50-75k		X
$75-100k		X*
$100-135k		X*
$135-150k		
$150k +		

Figure 114 - Income groups that showed reduced multihoming that used 3rd Party Partnerships
**finding was statistically significant*

When looking at multihoming tendencies with time increases among riders with 3rd Party Partnerships, there appeared to be no reduction in multihoming compared to their peers without 3rd Party Partnerships. What was found was actually the opposite from the price-based multihoming of this population. Those with 3rd Party Partnerships multihomed more in response to time increases than their peers. This could be due to the potential monetary gain earned (eg. 10x points on a Chase Sapphire Reserve), making them less price-sensitive but more aware of the time to wait or get to their destination.

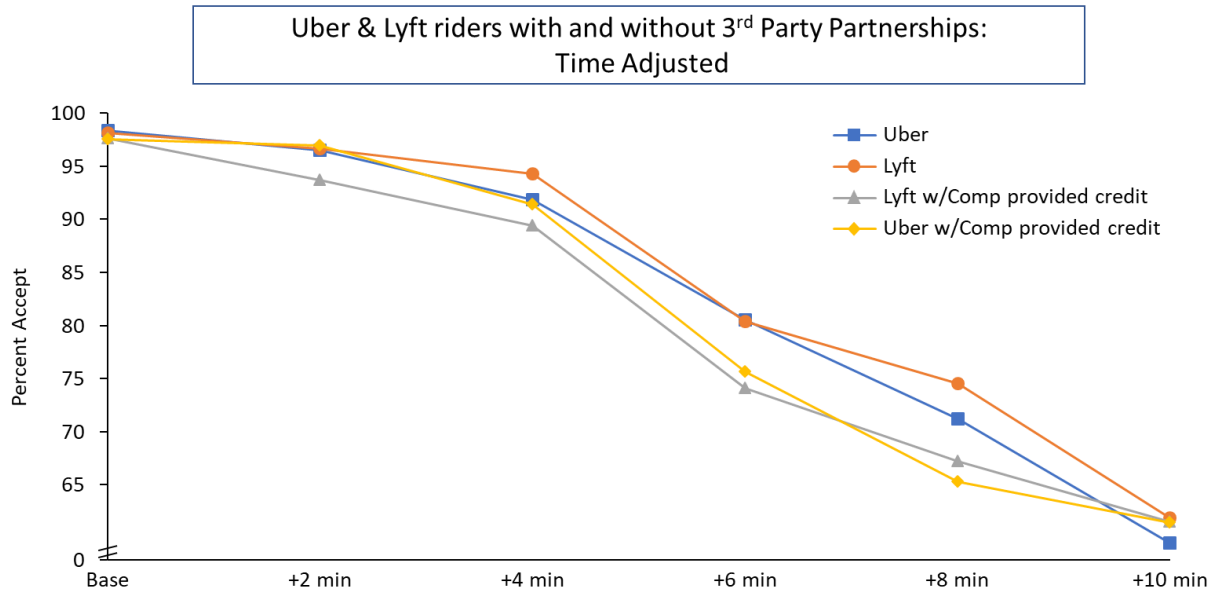


Figure 115 - Multihoming by riders with 3rd party partnerships, time adjustments

Segmenting these results along age lines, revealed that there were some age brackets that showed a reduction in multihoming – even if the overall population did not. For both Uber and Lyft, those in the 46-55 age bracket showed reductions – with sizable reductions in multihoming among Uber riders in the higher time levels. Uber riders with 3rd party partnerships also showed a higher retention in the 36-45 age group along the highest four time levels. No other age groups displayed any reductions in multihoming from users with 3rd party partnerships.

Age Groups with Reduced Multihoming Using 3rd Party Partnerships - Time		
Age	Uber	Lyft
18-24		
25-29		
30-35		
36-45	X	
46-56	X	X
56+		

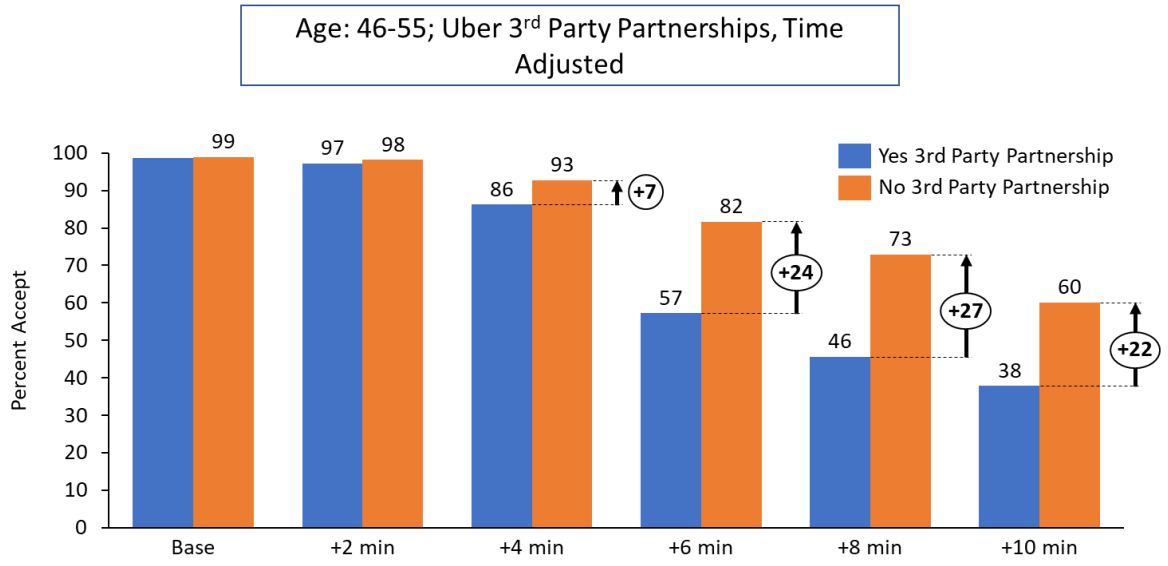
Figure 116 - Age groups that showed reduced multihoming that used 3rd Party Partnerships with time adjustments

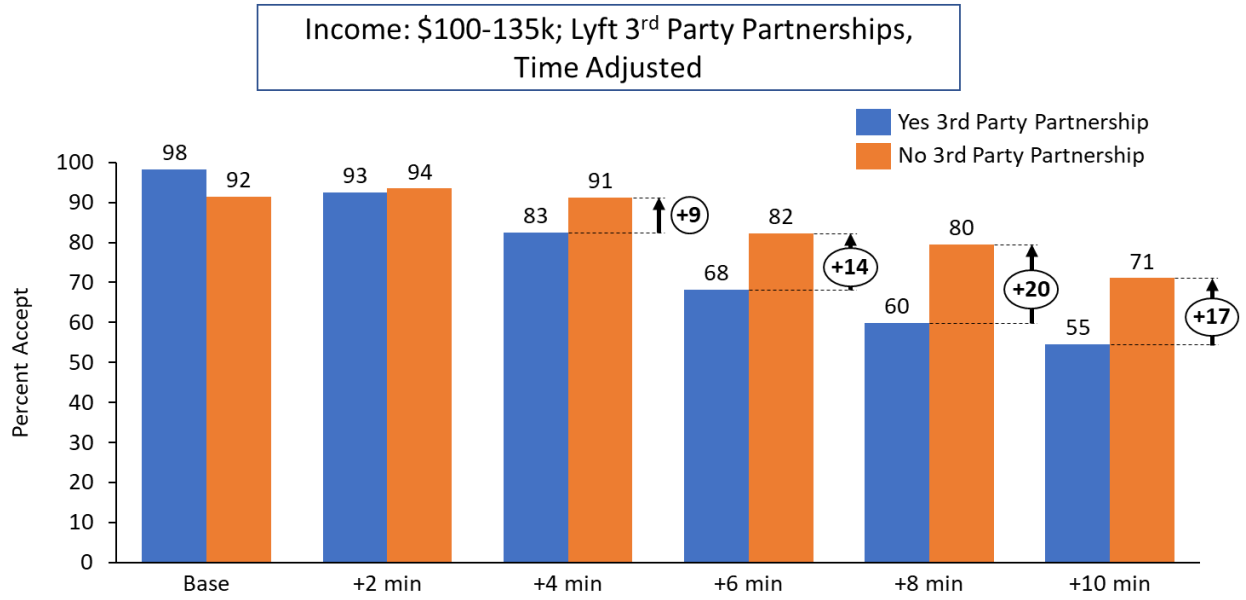
Segmenting off of income showed less of a difference between riders with 3rd Party Partnerships and those without. Lyft riders with 3rd Party Partnerships earning $30,000 - $50,000 multihomed less than their peers as time levels increased – especially in the highest three levels. For Uber, those with 3rd Party Partnerships earning less than $30,000 multihomed less in the highest time level.

Income Groups with Reduced Multihoming Using 3rd Party Partnerships - Time		
Income	Uber	Lyft
< $30k	X	
$30-50k		X
$50-75k		
$75-100k		
$100-135k		
$135-150k		
$150k +		

Figure 117 - Income groups that showed reduced multihoming that used 3rd Party Partnerships with time adjustments

Overall, the majority of segments showed little reduction in multihoming with 3rd Party Partnerships when time levels increased. In fact, most age and income groups showed *increased* multihoming with increases in time levels.





When looking at multihoming with price adjustments, Company-provided Credits had a larger discrepancy between multihoming occurring between companies at the aggregate level, but showed similarities when broken down further by segments. Lyft riders as a whole appeared to demonstrate little to no positive impact from company-provided credits when looking at all riders at aggregate. Uber riders in aggregate showed some benefit in the higher price levels ($14.18-$18.23).

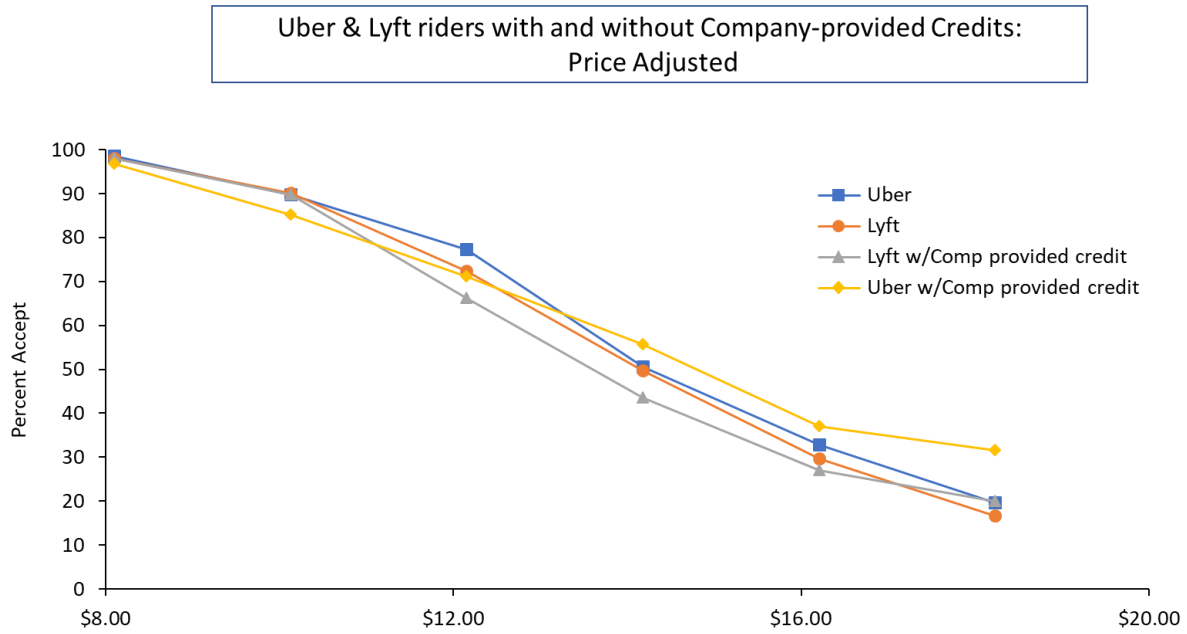


Figure 118 - Multihoming by riders with company-provided credits, price adjustments

Segmenting the riders by age for price adjustments, revealed increased retention from those within the 25-29 age group for Lyft as well as Uber. The 30-35 age group for Uber showed a large difference between retention of riders with company-provided credits over those that did not – especially in the higher price levels ($14.18-$18.23). For that age group, at the highest level, there was a difference of 36% in ride acceptance. There were substantial positive retention differences for the above 56 age group, however, the sample for that age group involved with company-provided credits was too small to draw conclusions.

Age Groups with Reduced Multihoming Using Company-provided Credits		
Age	Uber	Lyft
18-24		
25-29	X	X
30-35	X	
36-45		
46-56		
56+		

Figure 119 - Age groups that showed reduced multihoming that used company-provided credits with price adjustments

In addition to age segmentation, Company-provided Credit also showed differences within income brackets. Those that earned $30,000 - $75,000 in income for Uber, showed a steady increase in retention across nearly all price levels. Both Uber and Lyft riders between the $75,000 - $100,000

and $100,000 - $135,000 income ranges also showed increased retention among riders that used company-provided credits. A potential reason for the last two income brackets showing consistent impact, could be related to the salaries earned at the companies that Lyft and Uber have so far targeted the most for providing rides as an employee benefit.

Income Groups with Reduced Multihoming Using Company-provided Credits: Price		
Income	Uber	Lyft
< $30k	X	
$30-50k		
$50-75k		
$75-100k	X	X
$100-135k	X	X
$135-150k		
$150k +		

Figure 120 - Income groups that showed reduced multihoming that used company-provided credits with price adjustments

Next, multihoming habits from riders receiving Company-provided Credits, were evaluated as Wait Time and Estimated time to Drop-off increased in level. At the aggregate, it was found that these riders multihomed at a greater rate on Uber than riders that did not receive company-provided credits. For Lyft riders, this trend remained the same until the highest two-time levels, where those with company-provided credits ended up multihoming less than other Lyft riders.

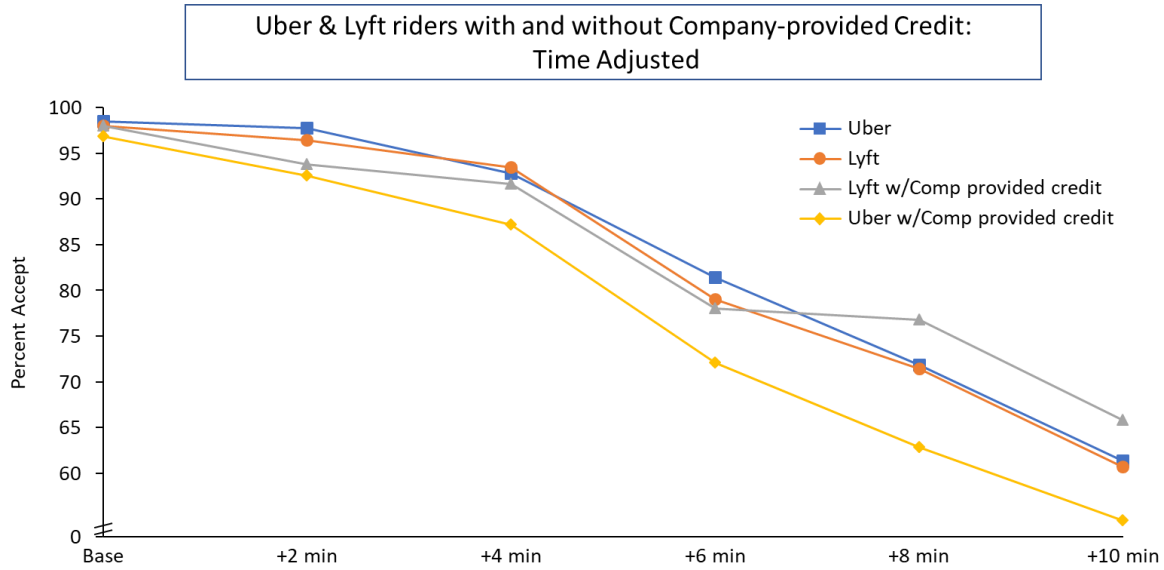


Figure 121 - Multihoming by riders with company-provided credits, time adjustments

Segmenting riders by age, for time increases, did not show much difference in multihoming by the populations receiving company-provided credits, with the only age group showing reduced multihoming being those in the 46-55 age group of Uber riders. All other age groups from Uber and Lyft did not show any reduction in multihoming by those receiving company-provided credits as time levels increased – nor did it show the substantial increased multihoming, as a reaction to time increases, found in those who benefitted from 3rd Party Partnerships.

Age Groups with Reduced Multihoming Using Company-provided Credit - Time		
Age	Uber	Lyft
18-24		
25-29		
30-35		
36-45		
46-55	X	
56+		

Figure 122 - Age groups that showed reduced multihoming that used company-provided credits with time adjustments

Breaking groups down by income also showed limited reduction in multihoming by those receiving company-provided credits. Lyft riders earning between $100,000 and $135,000 and receiving company-provided credits multihomed substantially less than their peers – especially in the highest three time levels.

Income Groups with Reduced Multihoming Using Company-provided Credit - Time		
Income	Uber	Lyft
< $30k		
$30-50k		
$50-75k		X
$75-100k		
$100-135k		X
$135-150k		
$150k +		

Figure 123 - Age groups that showed reduced multihoming that used company-provided credits with time adjustments

Finally, an analysis was conducted to see under which conditions riders that took advantage of In-App promotions chose to multihome compared to those who did not. In the previous survey, those who claimed to use In-App Promotions also claimed to multihome in greater frequency. The simulation results derived from the conjoint analysis reconfirms this trend, showing that the retention rate for both Uber and Lyft riders that use In-App promotions is lower (multihome more), than those that claimed to not use In-App promotions. This is likely due to these users being more likely to be price-sensitive, and in general desire to compare prices in a greater number of circumstances, as In-App promotions fluctuate over time.

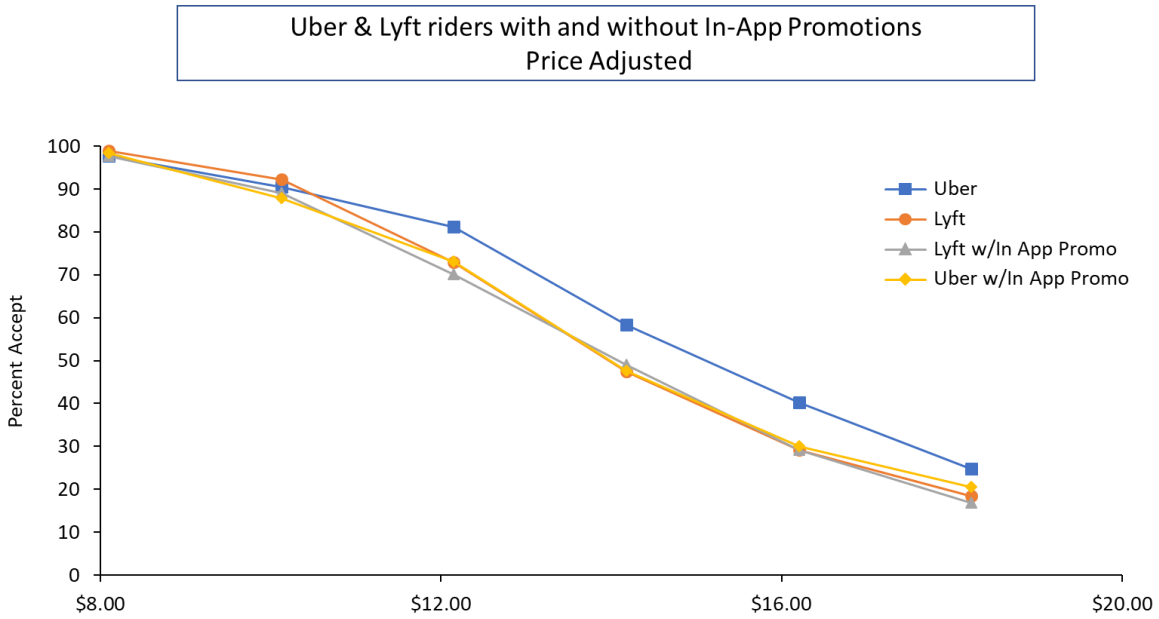


Figure 124 - Multihoming by riders with In-App promotions, price adjustments

Unlike with price increases, those benefiting from In App Promotions tended to multihome less with time level increases compared to their peers on both services. This could be for the same reasons as why these riders multihomed at higher rates when presented with price level increases; they are price-sensitive in general, and not time-sensitive. 69% of these riders claimed to be price-sensitive following the conjoint survey, compared to 9% that claimed to be time-sensitive. This would likely have them accepting rides with longer wait times or estimated times to drop-off, in the effort to achieve a cheaper ride. It is unclear whether or not the In-App Promotions have any impact on reducing the multihoming with increases in time levels, or if the riders are solely choosing the cheapest ride under the majority of conditions.

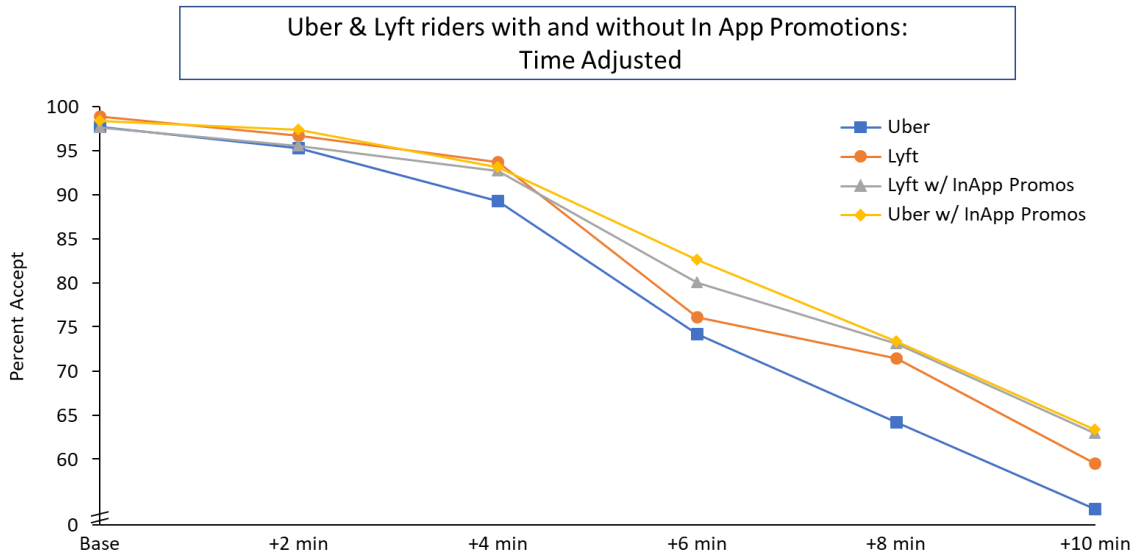


Figure 125 - Multihoming by riders with In-App promotions, time adjustments

Finally, to see if there were any differences in the general price or time sensitivities of the riders that benefitted from each of these three strategies, the results of what the participants claimed for each strategy are below. An interesting note was to find that their sensitivity makeup was roughly the same, providing potentially less noise for the overall results of effectiveness for each benefit.

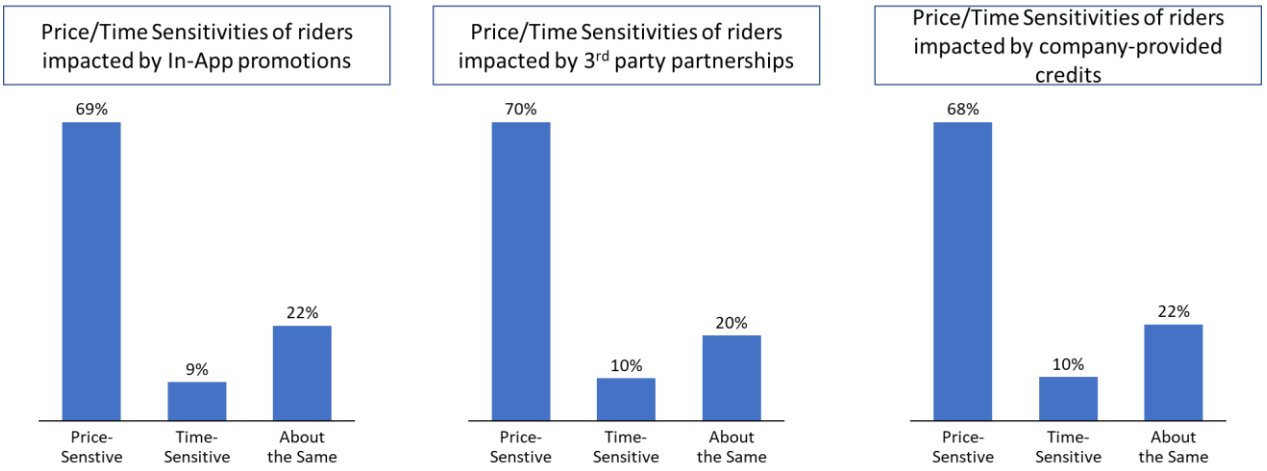


Figure 126 - Price/time-sensitivity of riders impacted by multihoming-reduction strategies

6.2 Overview of findings and conclusions

Q3: Can the attributes contributing to rider multihoming be quantified as an overall multihoming cost? Can they be manipulated?

The decision to multihome or not is on a spectrum for many riders, with those being more price-sensitive likely to choose to multihome at lower price intervals than those that are less price-sensitive. Those that are time-sensitive are likely to multihome at lower wait times/estimated times to drop off levels than those that are less price-sensitive. Regardless, those that claimed to have multihomed in four or five out of the last five rides, still were shown to accept rides outright under certain conditions, but choose to multihome at earlier levels than those that claimed to multihome less in life. Those that claimed to have multihomed for none or one of their last five rides, still generally hit a price point where they were motivated to search the rival service.

With price and time-sensitivities being on a spectrum, this study attempted to understand how riders that have been exposed to service benefits (3rd Party Partnerships, Company-provided Credits, and In-App Promotions), tend to be located on that spectrum, and what differences they exhibit in their multihoming decisions.

Overall, 3rd party partnerships and company-provided credits showed a promising connection with reduced price-based multihoming. Despite this, they showed very little relationship with reduced multihoming for increases in time levels. As 3rd party partnerships and company-provided credits often provide very explicit monetary benefits or savings, these can serve to reduce their visibility or importance of price. It could also run the risk of making these users focus more on the time it takes to wait for the ride, or arrive to their destination, as price becomes less important of a factor. This highlights the importance of maintaining driver liquidity for reinforcing rider retention. Even if a rider becomes less price-sensitive because of the benefits provided by a service (3rd party partnership/company-provided credit), does not necessarily reduce their expectation for a timely ride – and in fact may raise that expectation, as these riders sometimes multihomed at a faster rate than their peers when time levels increased. An example in the airline industry are Airline reward programs. A customer that is willing to pay (or have their company pay) for a more expensive flight on their preferred airline to build miles, could be less willing to accept a layover compared to a direct flight from a rival airline where they are not a member. With 3rd Party Partnerships and Company-provided Credits showing promising signs of reduced multihoming, yet used by less than 26% and 21% of riders respectively, there remains substantial room for scaling up the number of riders that could be affected by these two benefits.

In-App Promotions, although reportedly experienced by 63% of the Uber-preferring riders and 68% of the Lyft preferring riders that participated in this survey, seemed to have less of a clear connection to riders that had reduced multihoming habits. Riders that claimed to use In-App Promotions tended to multihome *more* than their peers when encountering increased prices for rides. This would seem to have the opposite effect that is desired by rideshare companies. Although they appeared to multihome less to increased ride time, it is not convincing that the In-App Promotions themselves are providing incentive to keep the ride, and is likely connected to these users being price-sensitive, and accepting longer rides that have a cheaper price. Although these riders are significantly more price-sensitive than time-sensitive, the reported rates of price-sensitivity are roughly the same across all populations that are impacted by the three strategies. That the In-App Promotion riders multihome in much higher numbers when there are price increases relative to when they have Company-provided Credits or 3rd Party Partnerships could be an indication that in-app promotions are an ineffective tool for retaining riders and reducing multihoming.

Below is a summary of the areas where multihoming from price increases were shown to be lower with the three strategies, across both services in regards to age and income.

	Reduced Uber Multihoming with Price increases [Age Groups]				
Strategy	**18-24**	**25-29**	**30-35**	**36-45**	**46-55**
3rd Party Partnerships		X	X	X	
Company-provided Credit		X	X		X
In-App Promotion		X			

Figure 127 - Reduced multihoming age groups with strategies employed by Uber - price increases

	Reduced Lyft Multihoming with Price increases [Age Groups]				
Strategy	**18-24**	**25-29**	**30-35**	**36-45**	**46-55**
3rd Party Partnerships	X	X			
Company-provided Credit		X			
In-App Promotion				X	X

Figure 128 - Reduced multihoming age groups with strategies employed by Lyft - price increases

	Reduced Uber Multhoming with Price increases [Income Groups]						
Strategy	**< $30k**	**$30-50k**	**$50-75k**	**$75-100k**	**$100-135k**	**$135-150k**	**$150k +**
3rd Party Partnerships	X						
Company-provided Credit				X	X		
In-App Promotion		X					

Figure 129 - Reduced multihoming income groups with strategies employed by Uber - price increases

	Reduced Lyft Multhoming with Price increases [Income Groups]						
Strategy	**< $30k**	**$30-50k**	**$50-75k**	**$75-100k**	**$100-135k**	**$135-150k**	**$150k +**
3rd Party Partnerships		X	X	X	X		
Company-provided Credit				X	X		
In-App Promotion						X	

Figure 130 - Reduced multihoming age groups with strategies employed by Lyft - price increases

7.0 CONCLUSION

7.1 Conclusions from analysis

The composition of rideshare riders is incredibly diverse - in background, motivation, habits, and preferences. This thesis sought to better understand the factors that inform the decisions riders make around their use of ridesharing platforms including: the choice to use one service or multiple, the costs and benefits of switching between multiple services, and factors that reduce multihoming behavior.

Rideshare services will have to continue to contend with competitors across two important dimensions:

1. Acquiring new singlehoming users
2. Attracting multihoming users, then *reducing* their multihoming behavior to the point of low-multihoming or complete singlehoming use

Singlehoming

Riders who chose to use a single service for ridesharing, tended to do so out of a) brand loyalty and/or brand repulsion, b) a feeling of stress associated with managing multiple services or having a clutter of apps, or c) a perception of excessive time and hassle associated with downloading or managing multiple services. For these riders, the perceived multihoming costs associated with the

above, are not worth the perceived benefits they would receive to use multiple rideshare services. These users elect to only use one service.

Company reputation and brand image had a substantial impact on singlehoming Lyft riders in particular, signaling that Uber still has a way to go in repairing their brand reputation for many riders. Despite this, Uber's reputation for many of its singlehoming riders is overall positive. Continued work to keep free of scandal may eventually allow the brand premium on Lyft to dissipate over time.

Stress and anxiety, was found to have a large impact on roughly half of the singlehoming population. The presence of many applications on their phone, and the perceived clutter it would create, was stressful enough to establish a psychological cost that reduced their inclination to multihome. Similarly, half of the singlehoming population cited stress from managing and deciding between multiple services as a reason to avoid using multiple services. These two psychological factors suggest that perceived burden caused by additional decision-making may be an innate barrier to multihoming. Regardless of how easy it may be for someone to download and switch between two apps for free, for many individuals the anxiety or stress of simply *having* the extra service or *deciding* between the services, is enough of a barrier to choose only one.

This, coupled with users that find the time and hassle to either download or switch between apps to be too much, should highlight to Uber and Lyft that there is a substantial pool of potential future customers that they have to only win over *once*, and likely would not have to necessarily provide repeated incentives once they've begun using the service. Because of this, rideshare services should emphasize new rideshare-user acquisition for marketing, to be the first to acquire them – otherwise risk losing them for good to their rival. This investment should continue as rideshare usage increases across the American population, and tapper off once the remaining market is saturated.

Ridesharing companies may benefit from targeting segments that are most likely to singlehome. Approximately half of riders above the age of 56 identified as singlehoming users, as well as 39% of those aged 46-55 and 43% of riders earning less than $30,000 (Figure 52). As ridesharing

becomes more widely used across the US population, focusing marketing outreach on promoting a positive brand image (Figure 40), on these demographics may help lock in riders early that will be less likely to multihome.

Multihoming

For multihoming riders, company reputation and brand image still remained influential on users, with increased importance for Lyft riders. This was reflected in the conjoint survey with a clear price (3%) and time (4%) premium for accepting Lyft rides. Riders with a self-identified preference for Lyft often chose to multihome at higher price/time levels for Lyft rides than for Uber rides.

Price by far has been the leading factor to encourage users to multihome between services. The results of this analysis showed that the majority of riders had higher sensitivities to price fluctuations compared to time fluctuations. After price, wait time was the next most important attribute when deciding to multihome, followed by estimated time to drop-off, and company.

Uber & Lyft Strategies to Reduce Multihoming						
	Network Bridging Strategies		Incentive-based Strategies			Exclusivity Strategy
Companies	Third Party Partnerships	Company-provided Credits	Pricing	In-App Promotions	Loyalty Programs	Exclusive Contracts
Uber	Retention seen in ages 25-45, and under $30,000 in income.	Both have shown strength in retention of those earning $75,000 - $135,000	Pricing has shown to influence preferred service, but has not shown reductions in multihoming	In-App Promotions have shown some influence in preference of service, but has shown increased multihoming with price increases	Not assessed	Not being utilized
Lyft	Retention seen in ages 18-29, and from $30,000 to $135,000					

Figure 131 - Summary of effectiveness of each strategy to reduce multihoming

Ultimately, with a non-differentiated service and low multihoming costs, it will be more difficult for either Lyft or Uber to achieve profitability. Today, with limited differentiation between platforms the primary factors that compel users to multihome are price and wait time – both costly levers for Uber and Lyft to differentiate on. A lesson from John Connelly of Crown Cork and Seal (**Appendix B:** A lesson in differentiation), is that even in the worst of commoditized markets, differentiation and profitability is possible. Where Crown Cork and Seal was able to differentiate

through focus and expert responsiveness and service to customers, Uber and Lyft can seek to find differentiation by other means.

Though representing a minority of riders in both the survey and the conjoint, riders benefiting from third party partnerships and company-provided credits often displayed substantial decreases in multihoming in response to price increases compared to other riders. Rather than price, this population showed an increase in time-sensitivity over other riders, and would multihome more when time levels increased. In contrast, in-app promotions generally did not seem effective in reducing multihoming, despite 63% of riders having access to these in-app benefits. In fact, in-app promotions were often connected with increased price-sensitivity and more multihoming in response to price increases.

Together, these findings suggest that rideshare services may benefit more from reducing reliance on in-app promotions. They could focus their efforts instead on expanding the number of users benefiting from third-party partnerships and company-provided credit, while simultaneously ensuring they have adequate driver promotions to maintain a reasonable level of driver liquidity to keep times low. Generally, wait times should be kept under 6 minutes, as multihoming appears to spike after that threshold (Figure 94).

Further analysis into segments that reduced multihoming behavior due to these benefits, could provide direction on how receptive these segments are to the programs, or to the degree of which these efforts have reached these segments as opposed to others. Deciding which segments are the most desirable to lock in to one's rideshare service should dictate the nature of companies partnered with – taking into account the types of users under their own networks or employment. Rideshare companies should assess through the lens of their own strategic priorities, as to which segments to focus on, however the findings from this research provide some recommendations.

Strategies and Recommendations:

1. **Rideshare services should expand their company-provided credits to more companies that hire workers with average salaries between $75,000 and $135,000 in urban areas**. Both Uber and Lyft displayed increased retention from riders using company-provided credits, earning between $75,000-$135,000 (Figure 129, Figure 130). The increased retention is a good indication that continued focus on rapidly expanding this outreach to companies that employ workers in this range could increase the number of lower multihoming (and potentially eventual singlehoming) riders that utilize their services. With this in mind, a special focus should be placed on companies in more urban environments – where parking is more expensive and space limited (helping employers). Along with this, urban riders showed a substantially higher frequency of usage of rideshare services, so focusing on companies located in cities will increase the potential revenue from these deals compared to companies outside of an urban area. Although $75,000 - $135,000 was the income range that had shown positive retention through these programs in this study, as both Uber and Lyft are competing for these companies, a service could potentially tap into adjacent segments of companies that employ incomes below $75,000 with less competition for deals on the onset. This would increase the number of riders impacted by these deals overall, and could encourage those that used rideshare less, to increase frequency in usage.

2. **Rideshare companies should expand third party partnerships to encompass a larger and more diverse userbase.** Third party partnerships have shown to increase retention of riders amidst price increases for both services; however, segments impacted between Uber and Lyft differ greatly. Lyft, has shown improved retention, with those earning between $30,000 – and $135,000 as well as under the age of 29. Uber showed higher retention with only those earning below $30,000, but across a wider range of ages (25-45). Uber should strive to expand their user base to take advantage of higher-spending riders who may use rideshare services more frequently (Figure 26). In evaluating potential partnerships, ridesharing services should prioritize partners with large user bases and ensure a *diversity* of partnerships to add further benefit to niche demographics. Both companies have gone after travel and credit card companies to lock in users (Delta, Hilton, Starwood, Chase

Sapphire Reserve, AMEX Platinum, etc.), but only represent a small, often overlapping, subset of the American population. Ridesharing platforms should build a portfolio of diverse partnerships to capture a variety of niche segments through differentiated services. Examples include activities and industries such as: sports, entertainment, grocery, local dining, retail, e-commerce. A portfolio approach to partnerships will help ridesharing platforms piece together a more loyal coalition of riders based on overlapping strengths of other differentiated brands and services that they already use – or would like to use.

3. **Network-bridging strategies should not be used in pursuit of less price-sensitive demographics.** Multihoming segments that seem to be the least price-sensitive, should be sought after last with network-bridging strategies, as they have shown to be ineffective with these groups (Figure 115). This was seen in riders over the age of 56, or earning over $135,000 in income. In the survey, these riders singlehomed the most, and had one of the highest proportions of low-multihoming riders. In the conjoint these riders also multihomed the least overall to price increases, and had nearly no positive additional retention from strategies as prices increased. To go after this segment in particular with partnerships or company-provided credits would be wasteful.

4. **Time-sensitive riders can be won through queue-skipping incentives.** Riders ages 30-35, or earning over $135,000 displayed the most time-sensitive behavior, and had the highest rates of multihoming as time levels increased. As retention of these groups could be accomplished by reducing wait time, increasing driver liquidity as a whole would reduce the multihoming of these groups. This *could* be achieved with many of the currently in place discontinuous incentives, or by cutting driver take-rates – but that wouldn't help with profitability. An innovative and potentially more effective way to retain these time-sensitive demographics, is to offer a way for them to be prioritized in the queue of available (or soon-to-be available) drivers. A 'jump to the front of the line' paid option would be a way to both keep these time-sensitive riders (who are as a whole willing to take higher priced rides), and bring in additional revenue per prioritized ride. This queue-skipping option could be made available on a per-ride basis, as well as part of a loyalty-based program. Those that do not want to subscribe to a Lyft or Uber rewards subscription, could

occasionally settle quickly for a faster ride by paying a queue-skipping fee. However, those that do sign up for the loyalty programs, would have free access to queue-skipping as part of their monthly subscription. Because of the speed in which queueing is accomplished with rideshare services (usually being paired seconds after request), this benefit would be most useful for airport pickups as well as pickups from shows, concerts, sporting games, and other large events. At these events, a larger queue can build up, and riders can be prioritized. An additional benefit from this pool of riders, is the added lock in that they would experience having already paid for preferential service. Much like Amazon Prime and Costco memberships spur increased loyalty in purchasing, so too could these programs in encouraging subscribed riders to continue to prioritize their service over others.

In conclusion, rideshare is currently a mostly undifferentiated and commoditized industry, where low multihoming costs allow for many riders and drivers to multihome to maximize their own value. This puts downward pressure on ridershare services' abilities to increase margins and improve overall profitability. Lessons from past commoditized industries suggest that finding a way to differentiate can set a firm apart, create a more loyal customer base, and allow for greater opportunities for reduced direct competition and profitability. For rideshare services, the discussed recommendations should serve to reduce the rider focus on price and time, and increase the overall perceived benefits for riders to use a single particular service in most circumstances. This should lock in more riders, increase rider retention and reduce multihoming. With less multihoming in their rider bases, the rideshare platforms could reduce other major expenditures (driver incentives and marketing), allow drivers to chase demand, and make further progress toward profitability.

7.2 Next steps

In the conjoint survey, the question that was posed for standardizing responses focused on user thresholds for rides that took place in fair weather conditions for trips to a social event. Further research could be done to compare these results to rider thresholds under other ride scenarios (trip types, night time trips, and variable weather conditions). One could expect that there would be some deviation in results based on differences in these scenarios.

Additionally, this study primarily looked into the multihoming habits of riders in the rideshare industry. Exploring driver habits would provide great insight on the second multihoming side of the market. Having both sides of the market analyzed would allow for a more comprehensive analysis of the total multihoming dynamics of this platform industry.

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Appendix A: Interview Topics/Questions

Background, Transportation Habits

1. Age, Occupation, what city do you live in? (No Name will be recorded)
2. What are your main methods for transportation? (Private vehicle, light rail, bus, walking, rideshare)
3. Do you use ridesharing services such as Uber, Lyft, both? How often do you use them?
4. How did you get to start using Uber/Lyft etc (friends, family, a promotion?). How long have you been using ridehailing?

Ridesharing Preferences:

5. What benefits do you enjoy from using ridesharing services?
6. Do you prefer one service over the other?
7. What makes you prefer that service?

Ridesharing Use Habits:

8. Can you describe the process for how you went about ordering your last ride?
9. How often do you check both apps before selecting a ride?
10. What factors do you take into account when choosing to accept a ride, or check the other service?
11. When deciding to accept a ride, how do you go about determining what a fair price is? Wait time?
12. Do you take advantage of any promotions or partnerships from either Lyft or Uber (Delta Airlines miles, rating price discounts, AMEX monthly credits, company credits, etc.)?
13. Are there any factors that reduce your desire or likelihood to switch between services when looking for a ride? (loyalty programs, ratings, third party services etc.)

Appendix B: A lesson in differentiation

In the late 1950's, Crown Cork and Seal, a tin-canning company, found itself to be the fourth largest player in a highly commoditized market. Metal-canning was a very undifferentiated product and therefore cost differentiation defined the market. Buyers of metal-can goods would often dual-source, and play suppliers off of each other to negotiate better deals – punishing packaging suppliers by cutting orders and buying from a competitor if costs weren't cheapest. Companies focused on economies of scale to cut unit costs to remain competitive. The tin-packaging industry at the time was a race to the bottom in both prices and margins. As such, the largest competitors in the market (American Can, Continental Can, and National Can), all began to diversify away from the metal-canning industry, into paper packaging, plastics, laminates, bottle closures, and more. John Connelly, the CEO of Crown Cork and Seal from 1957-1989, charted a different course (Gorgon, Reed, and Hamermesh 1988).

After saving the company from the brink of bankruptcy through massive cost-cutting, layoffs, and selling of factories and assets, Connelly devised a new strategy for the company. He chose a strategy of focus and differentiation. Instead of canning across all types of needs (pet food, vegetables, motor oil, etc.), Connelly focused on the two largest growth segments of canning (aerosols, and beverages) as well as their profitable crowns. He exited all other segments of the market. With their focus on two segments for canning, Crown Cork and Seal was able to provide a quality product, but also achieve similar economies of scale advantages with smaller lines than their competitors. Along with this, they also added extra equipment for each factory to allow excess capacity to increase responsiveness and flexibility (Gorgon, Reed, and Hamermesh 1988).

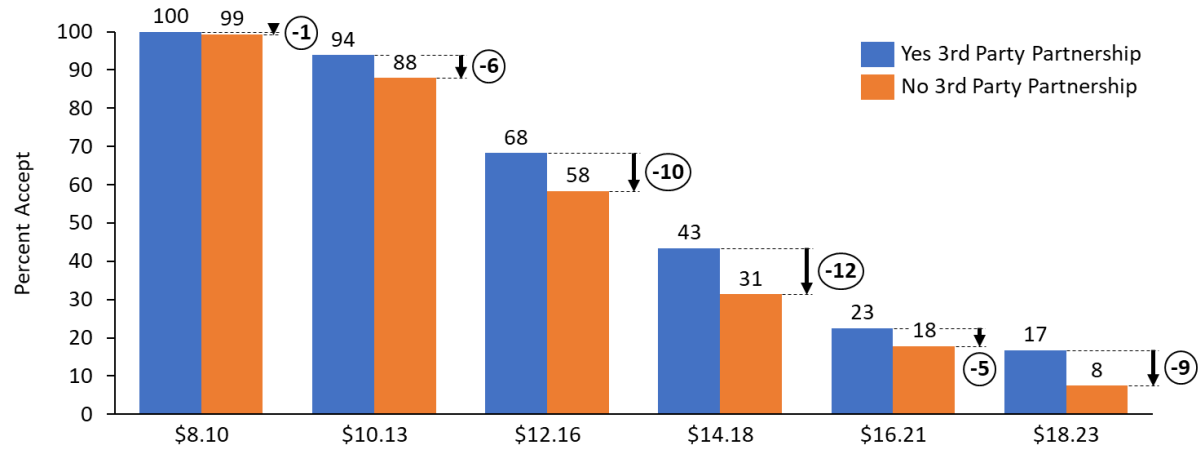
Connelly reorganized the company to focus on regional manufacturing teams that closely integrated marketing, sales, and a lean R&D directly with the manufacturing elements. Regional plants pooled customers, and kept transportation costs low. The outward facing sales and marketing could better understand intimate customer needs, as well as communicate capabilities that could address them. The R&D team would receive the customer information and find ways to tune the manufacturing processes to meet the specific demand. Through this integration, they greatly increased responsiveness to customer needs and provided an expert ability to craft customer-focused solutions. Crown Cork and Seal turned what was once a basic product, into a service – elevating the value through flexible customer attention and tailored solutions. Crown Cork and Seal found differentiation in a commoditized market (Gorgon, Reed, and Hamermesh 1988).

Although by revenues they were smaller than the three big can producers, under Connelly they were consistently more profitable. Their net income in 1976, 20 years since Connelly began, was 5.1% compared to their competitors at 2-3%. Return on Equity was 15.8% compared to their larger competitors at 7-11%. Crown Cork and Seal consistently outperformed their larger competitors in the canning market, where overall scale was king, by differentiating themselves through customer-centric service, and focusing on only a few high-growth segments. This company showed that even in the most commoditized markets, there remains hope as long as one can find a way to differentiate (Gorgon, Reed, and Hamermesh 1988).

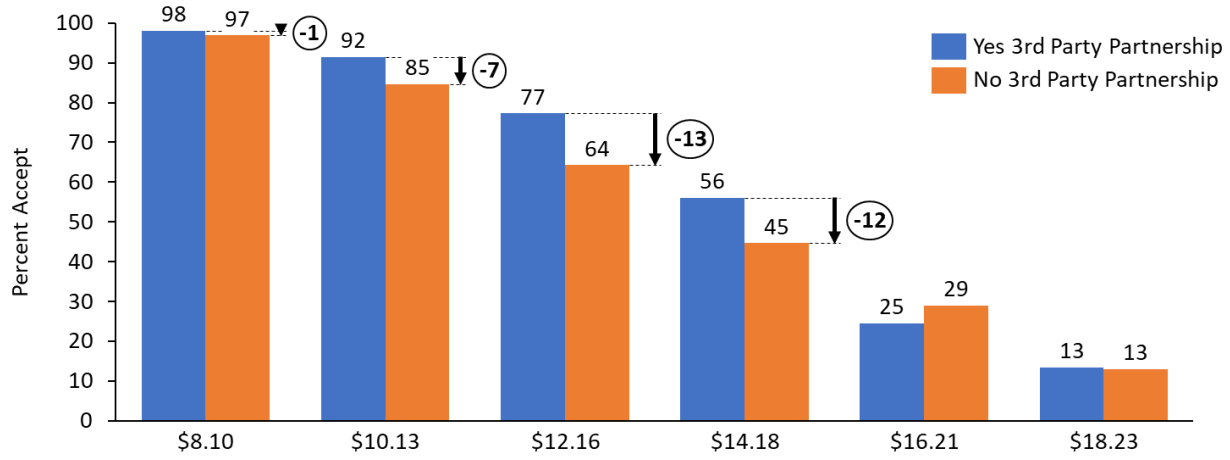
Appendix C: Graphs and Figures

3rd Party Partnerships

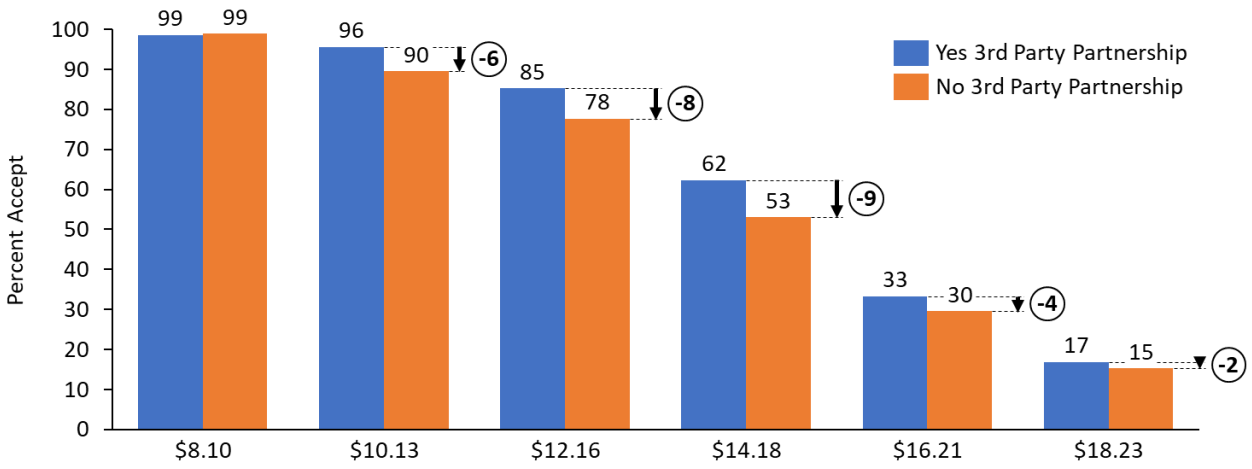
Age: 18-24; Lyft 3rd Party Partnerships, Price Adjusted



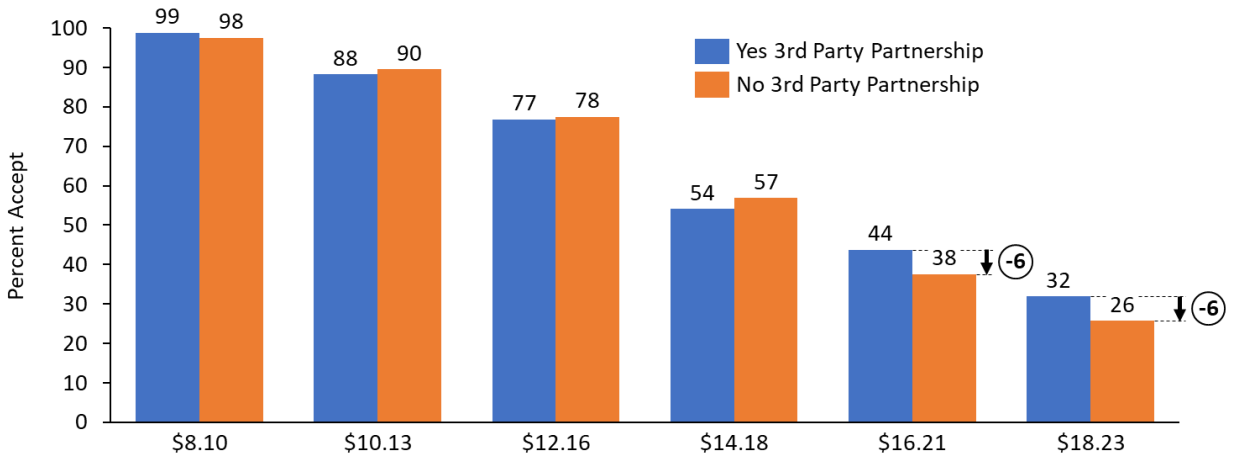
Age: 25-29; Lyft 3rd Party Partnerships, Price Adjusted

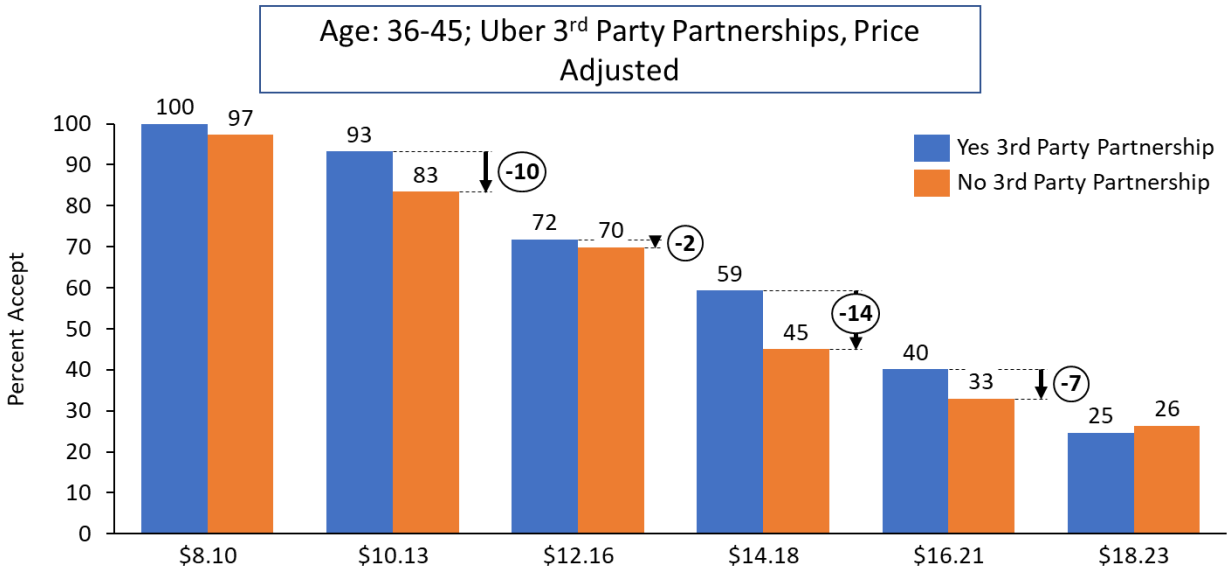


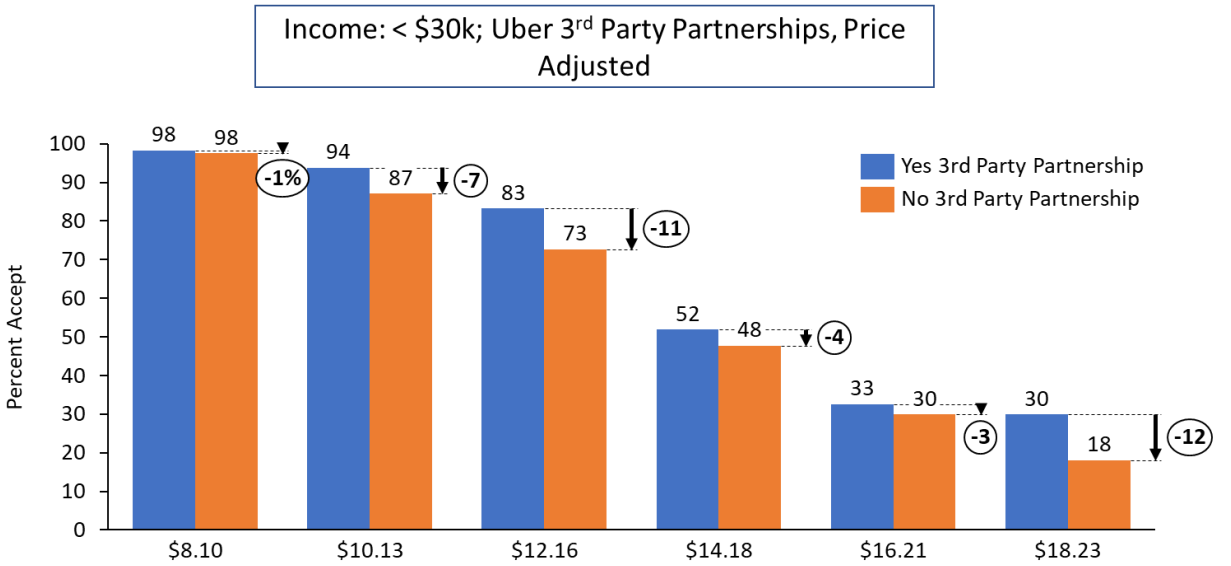
Age: 25-29; Uber 3rd Party Partnerships, Price Adjusted



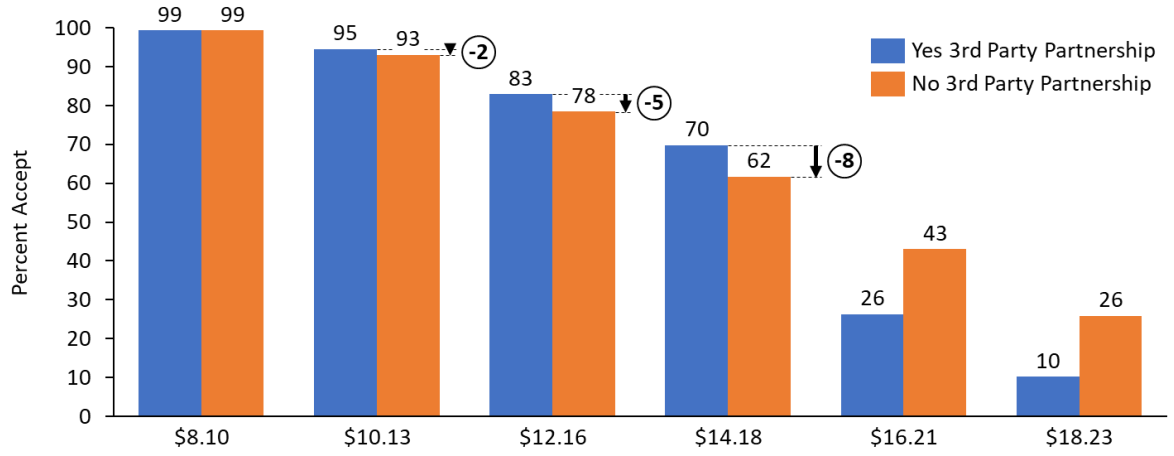
Age: 30-35; Uber 3rd Party Partnerships, Price Adjusted



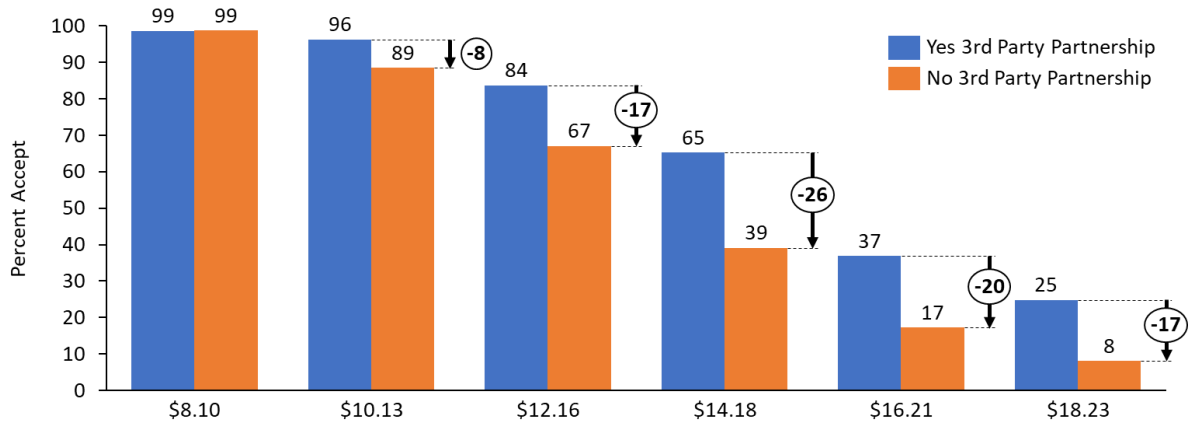

Age: 36-45; Uber 3rd Party Partnerships, Price Adjusted
Percent Accept
100
90
80
70
60
50
40
30
20
10
0
100
97
93
83
-10
72
70
-2
59
45
-14
40
33
-7
25
26
$8.10
$10.13
$12.16
$14.18
$16.21
$18.23
Yes 3rd Party Partnership
No 3rd Party Partnership


Income: < $30k; Uber 3rd Party Partnerships, Price Adjusted
Percent Accept
100
90
80
70
60
50
40
30
20
10
0
98
98
-1%
94
87
-7
83
73
-11
52
48
-4
33
30
-3
30
18
-12
$8.10
$10.13
$12.16
$14.18
$16.21
$18.23
Yes 3rd Party Partnership
No 3rd Party Partnership

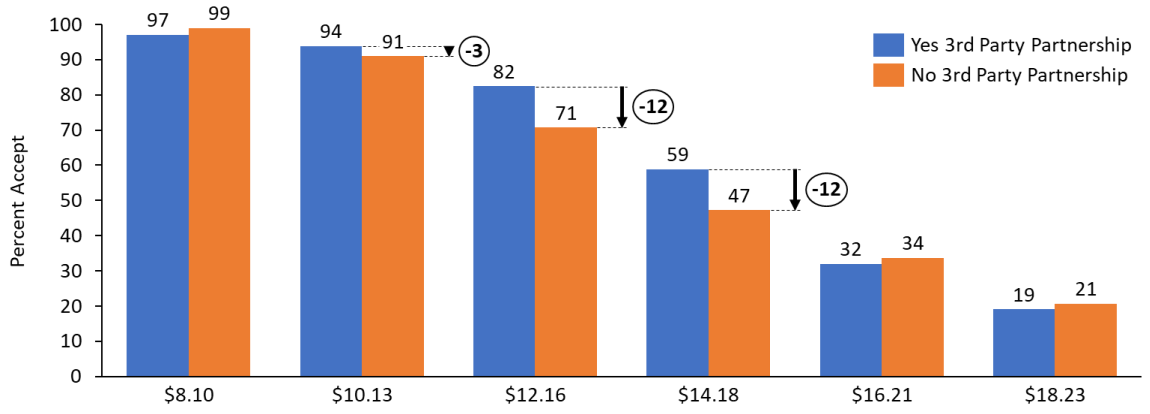
Income: $30-50k; Lyft 3rd Party Partnerships, Price Adjusted



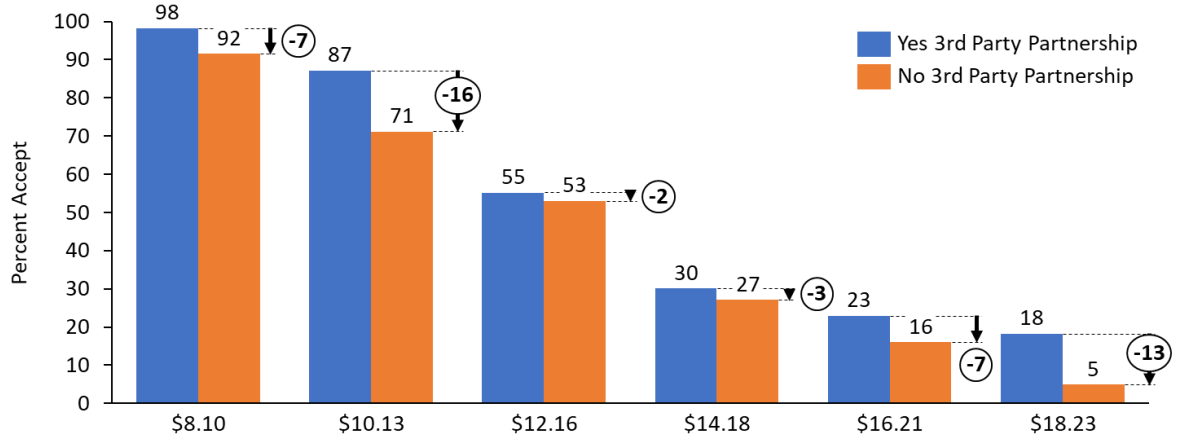
Income: $75-100k; Lyft 3rd Party Partnerships, Price Adjusted



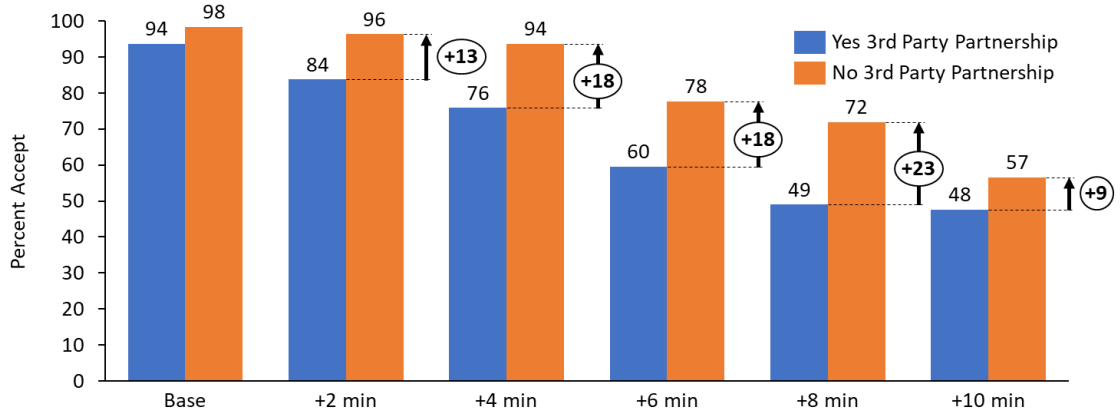
Income: $50-75k; Lyft 3rd Party Partnerships, Price Adjusted

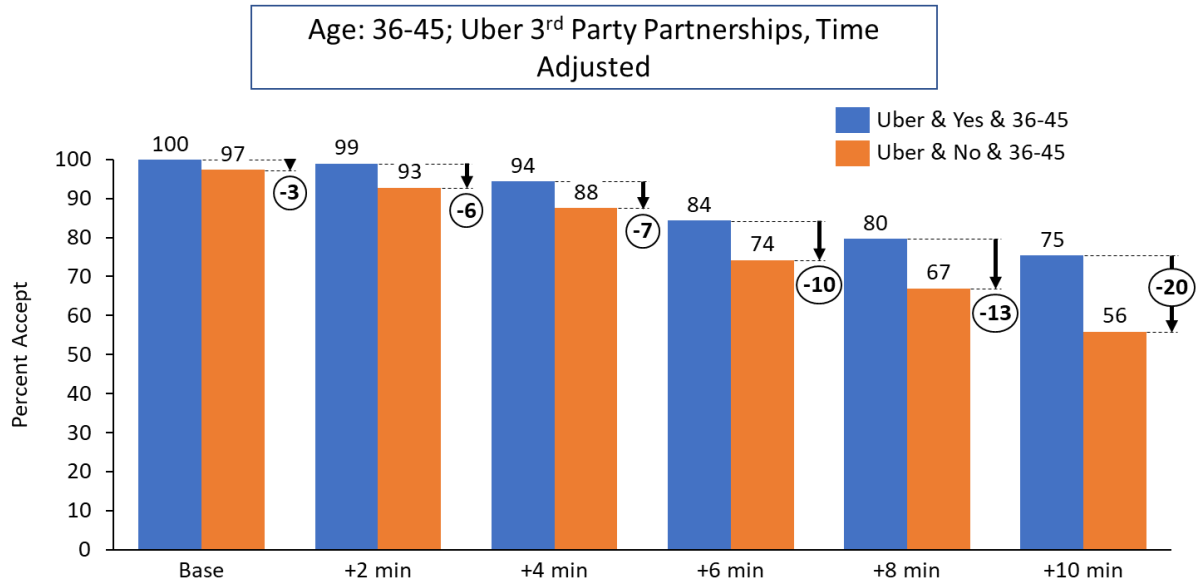


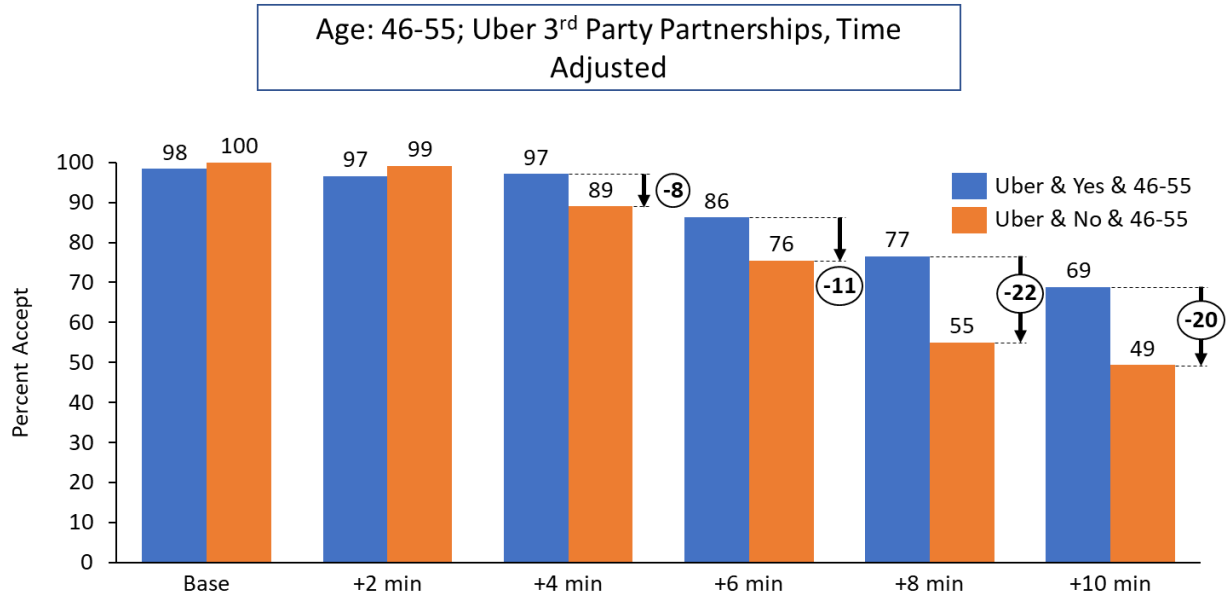
Income: $100-135k; Lyft 3rd Party Partnerships, Price Adjusted

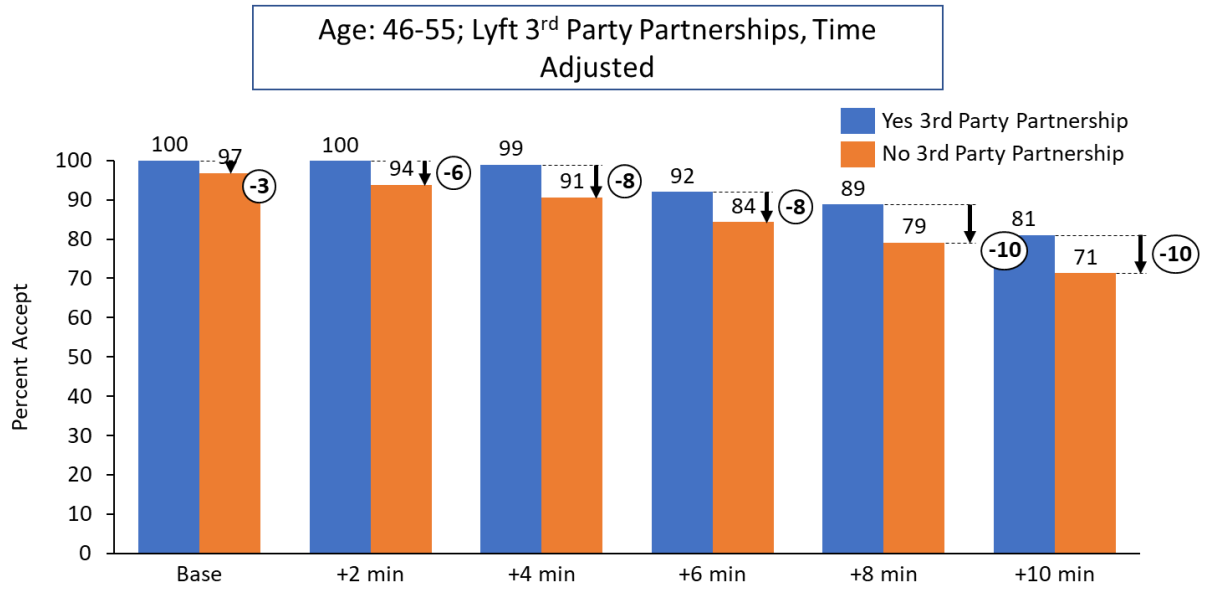


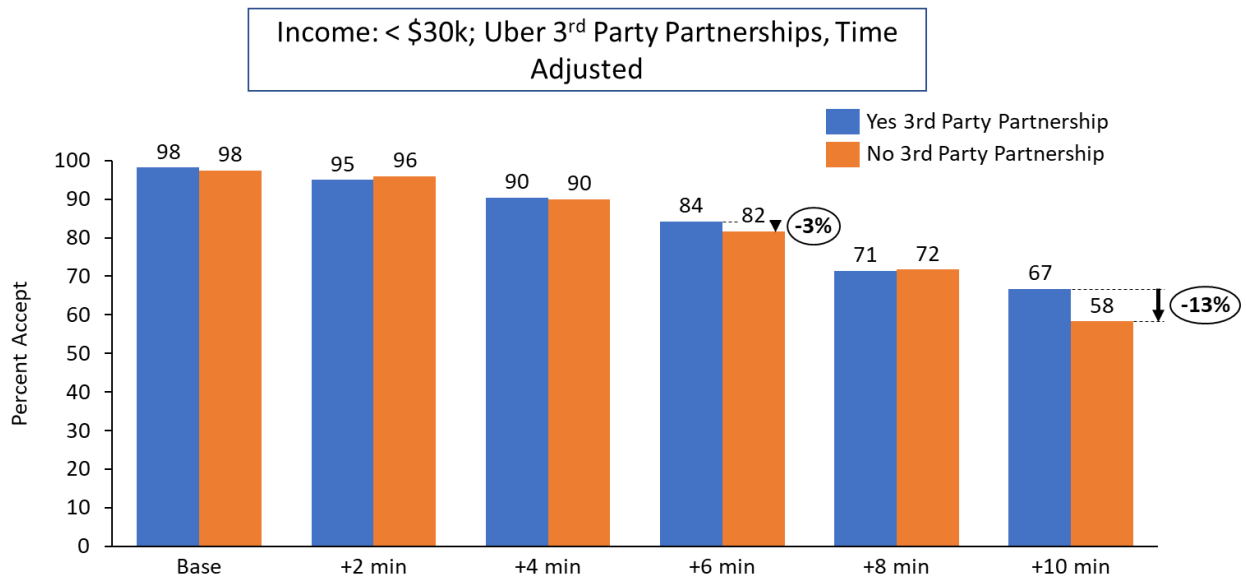
Age: 30-35; Lyft 3rd Party Partnerships, Time Adjusted

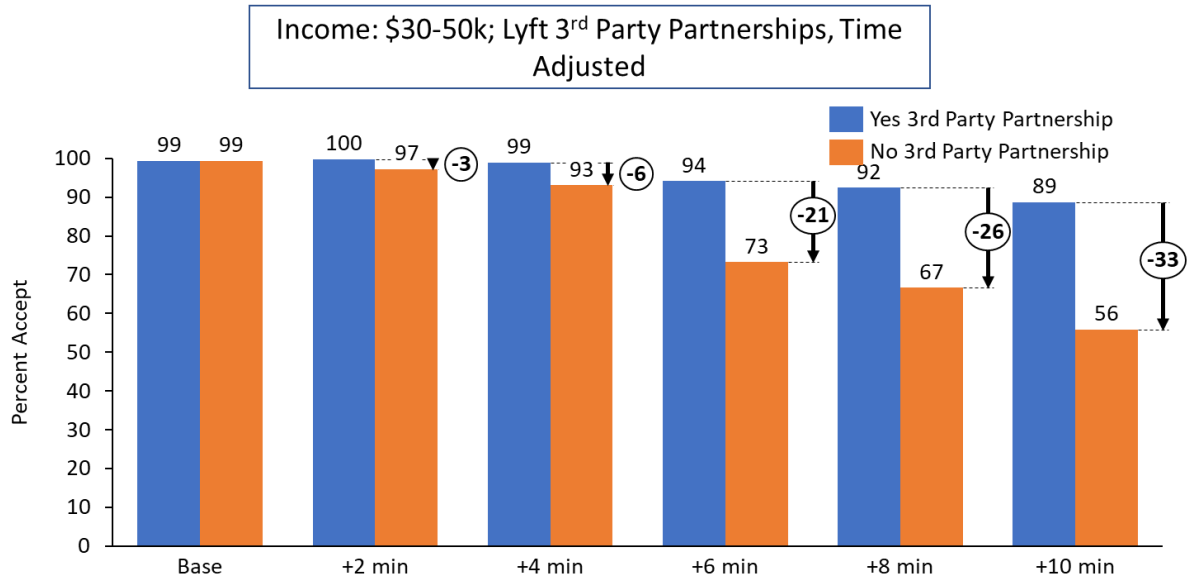


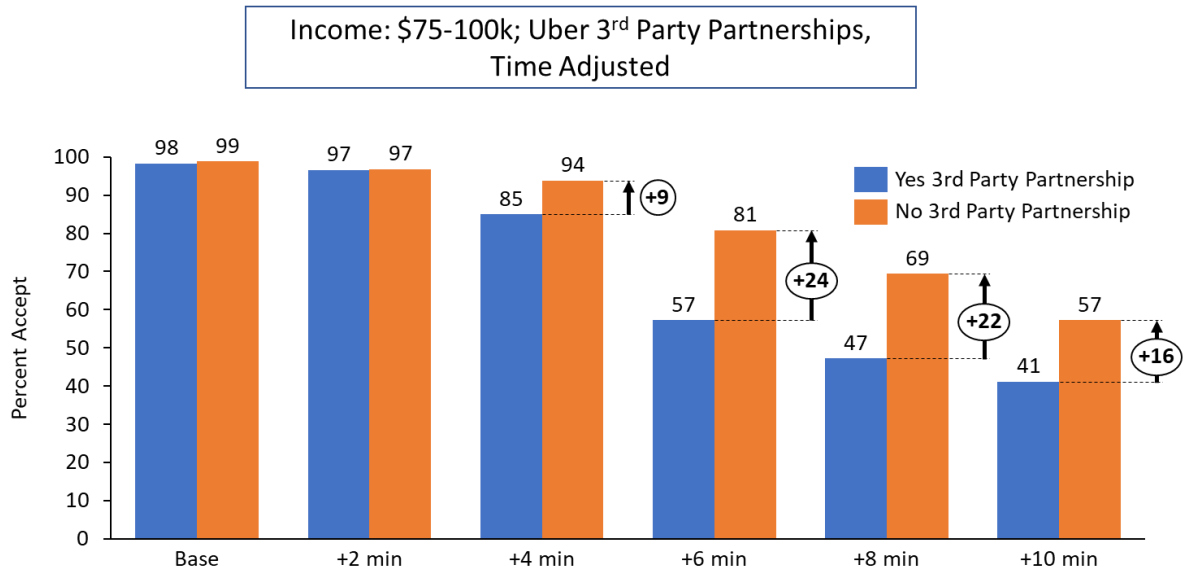

Age: 36-45; Uber 3rd Party Partnerships, Time Adjusted
Uber & Yes & 36-45
Uber & No & 36-45
Percent Accept
100
90
80
70
60
50
40
30
20
10
0
100
97
-3
99
93
-6
94
88
-7
84
74
-10
80
67
-13
75
56
-20
Base
+2 min
+4 min
+6 min
+8 min
+10 min


Age: 46-55; Uber 3rd Party Partnerships, Time Adjusted
Uber & Yes & 46-55
Uber & No & 46-55
Percent Accept
100
90
80
70
60
50
40
30
20
10
0
98
100
97
99
97
89
-8
86
76
-11
77
55
-22
69
49
-20
Base
+2 min
+4 min
+6 min
+8 min
+10 min

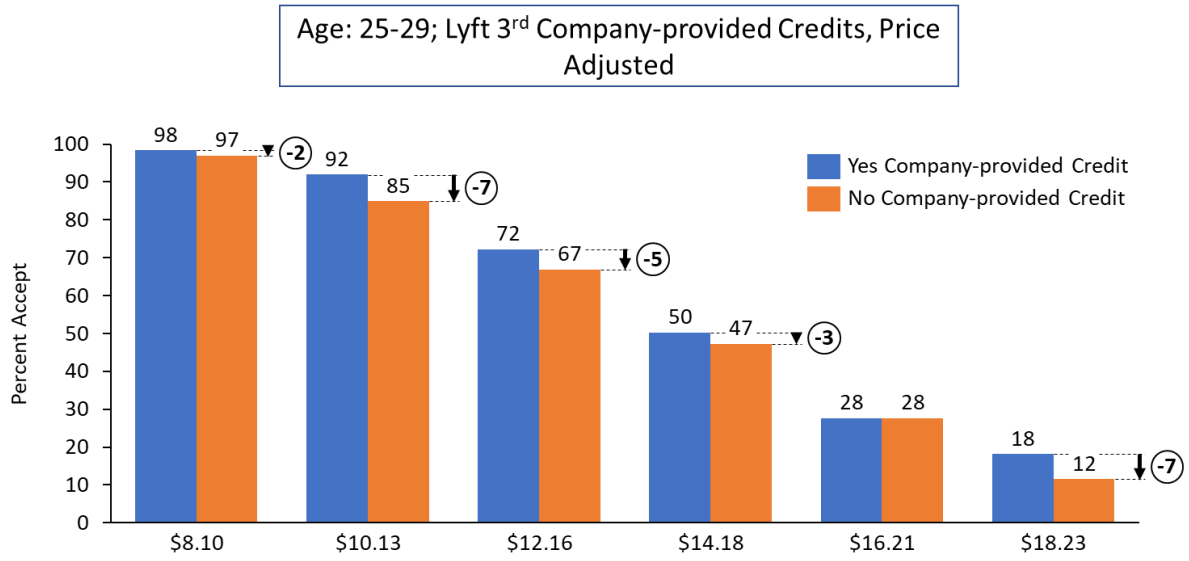

Age: 46-55; Lyft 3rd Party Partnerships, Time Adjusted
Yes 3rd Party Partnership
No 3rd Party Partnership
Percent Accept
100
97
-3
100
94
-6
99
91
-8
92
84
-8
89
79
-10
81
71
-10
Base
+2 min
+4 min
+6 min
+8 min
+10 min

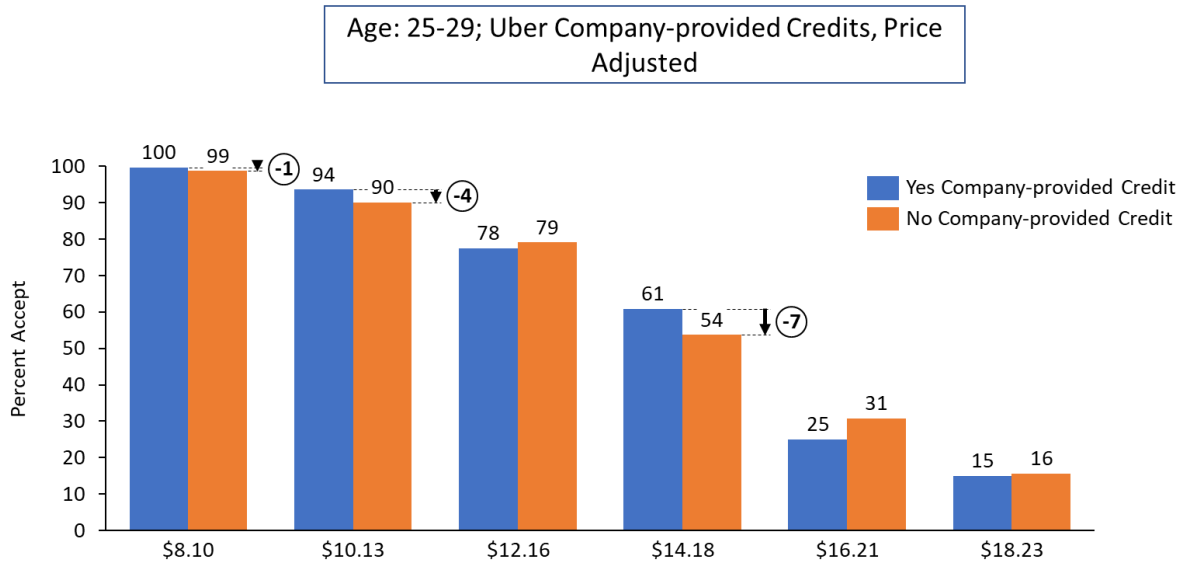

Income: < $30k; Uber 3rd Party Partnerships, Time Adjusted
Yes 3rd Party Partnership
No 3rd Party Partnership
Percent Accept
98
98
95
96
90
90
84
82
-3%
71
72
67
58
-13%
Base
+2 min
+4 min
+6 min
+8 min
+10 min


Income: $30-50k; Lyft 3rd Party Partnerships, Time Adjusted
Yes 3rd Party Partnership
No 3rd Party Partnership
Percent Accept
100
90
80
70
60
50
40
30
20
10
0
99
99
100
97
-3
99
93
-6
94
73
-21
92
67
-26
89
56
-33
Base
+2 min
+4 min
+6 min
+8 min
+10 min

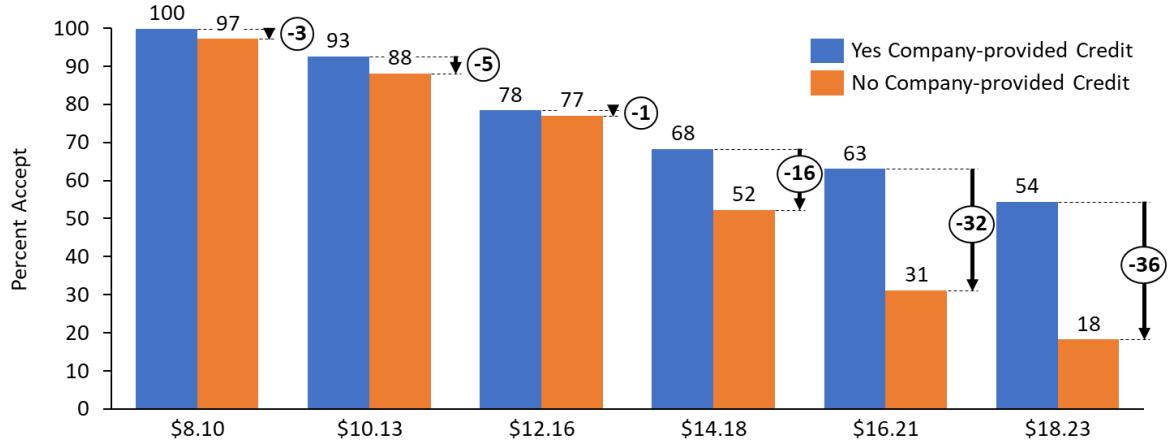

Income: $75-100k; Uber 3rd Party Partnerships, Time Adjusted
Yes 3rd Party Partnership
No 3rd Party Partnership
Percent Accept
100
90
80
70
60
50
40
30
20
10
0
98
99
97
97
85
94
+9
57
81
+24
47
69
+22
41
57
+16
Base
+2 min
+4 min
+6 min
+8 min
+10 min

Company Provided Credits

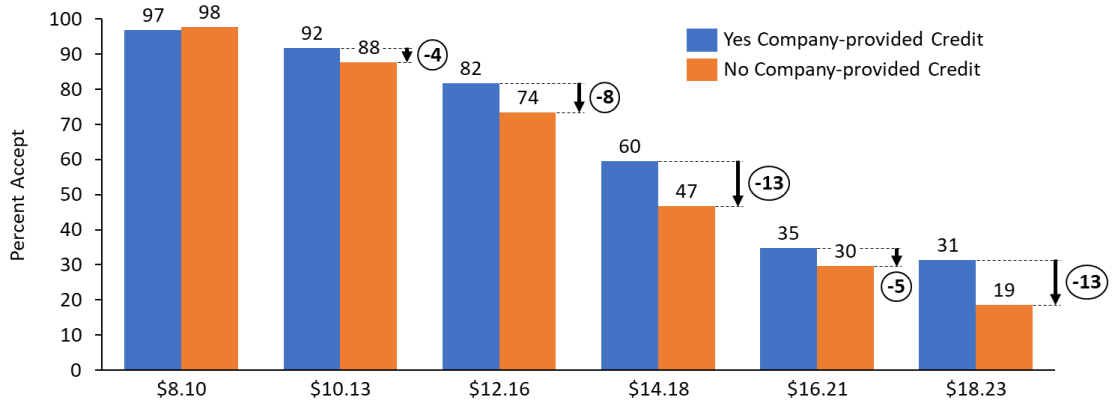




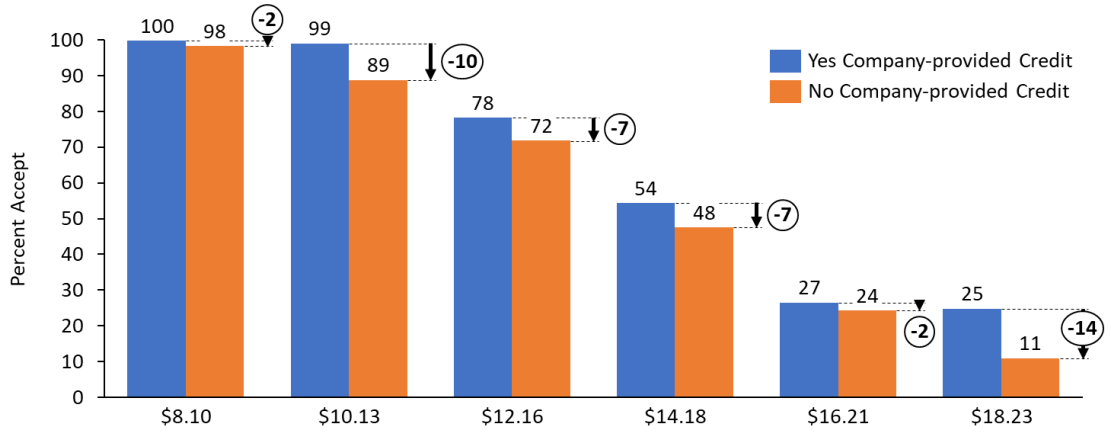
Age: 30-35; Uber Company-provided Credits, Price Adjusted

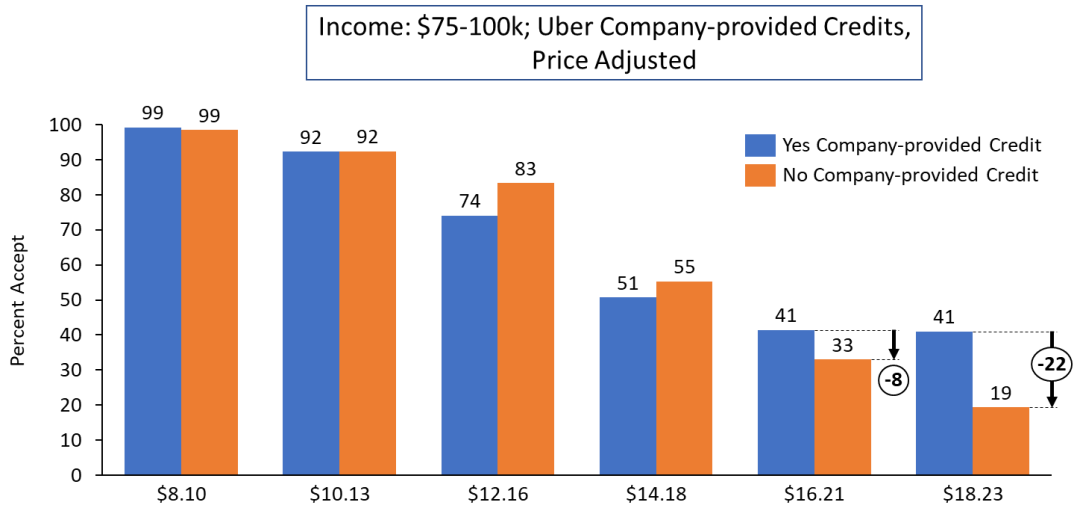


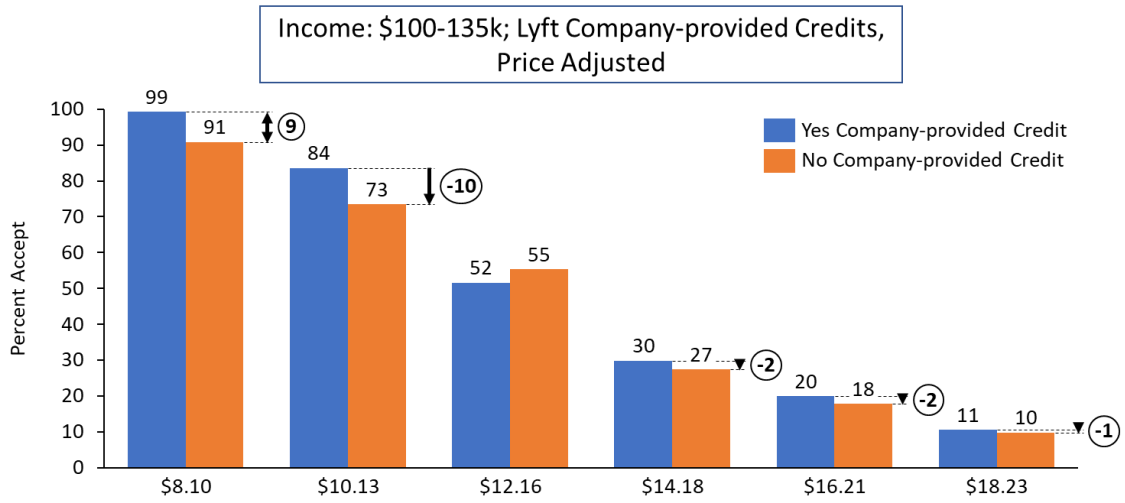
Income: < $30k; Uber Company-provided Credits, Price Adjusted

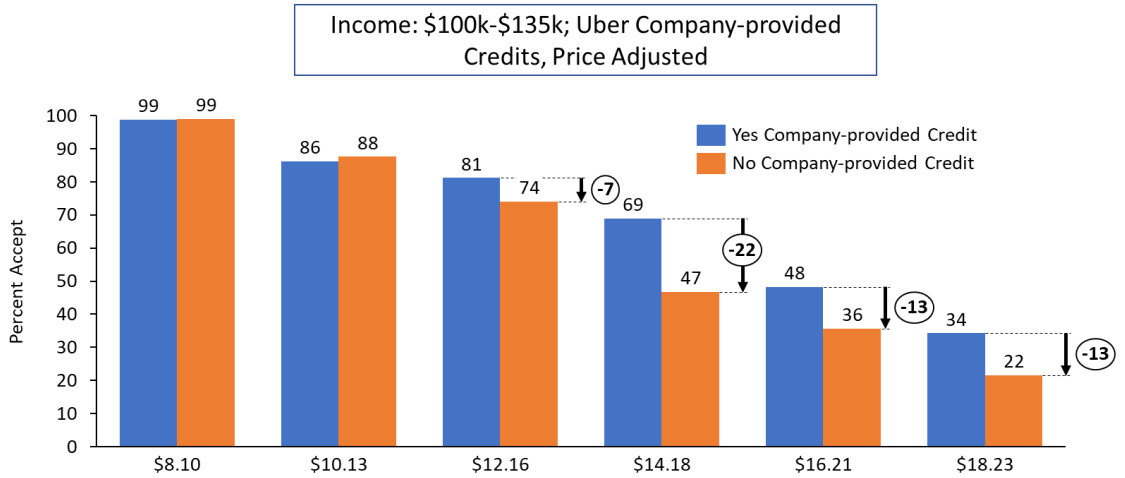


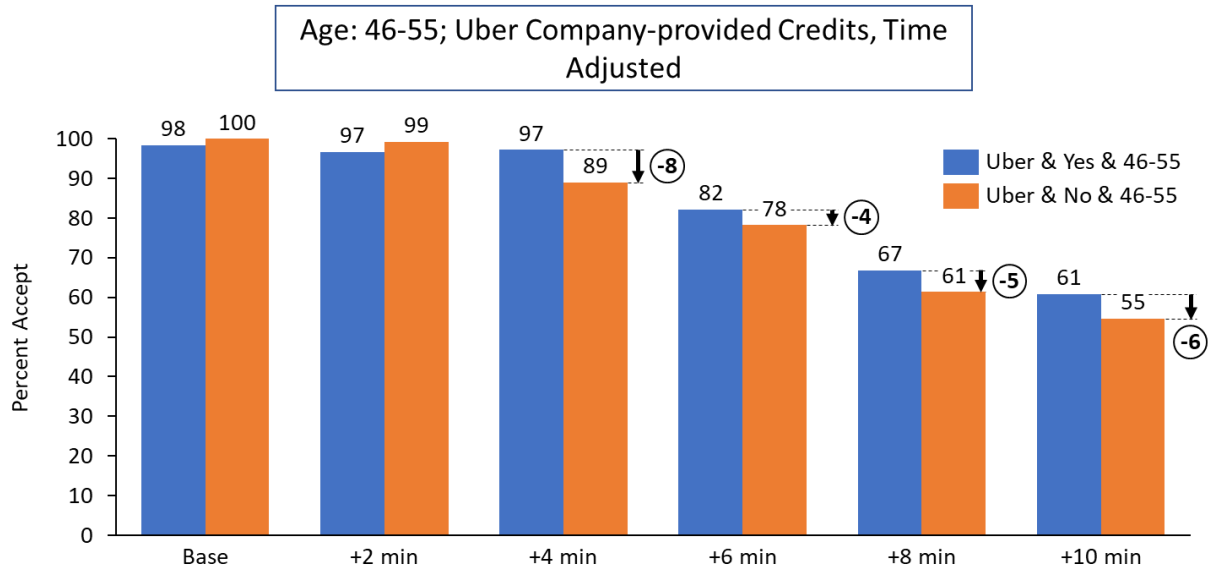
Income: $75-100k; Lyft Company-provided Credits, Price Adjusted

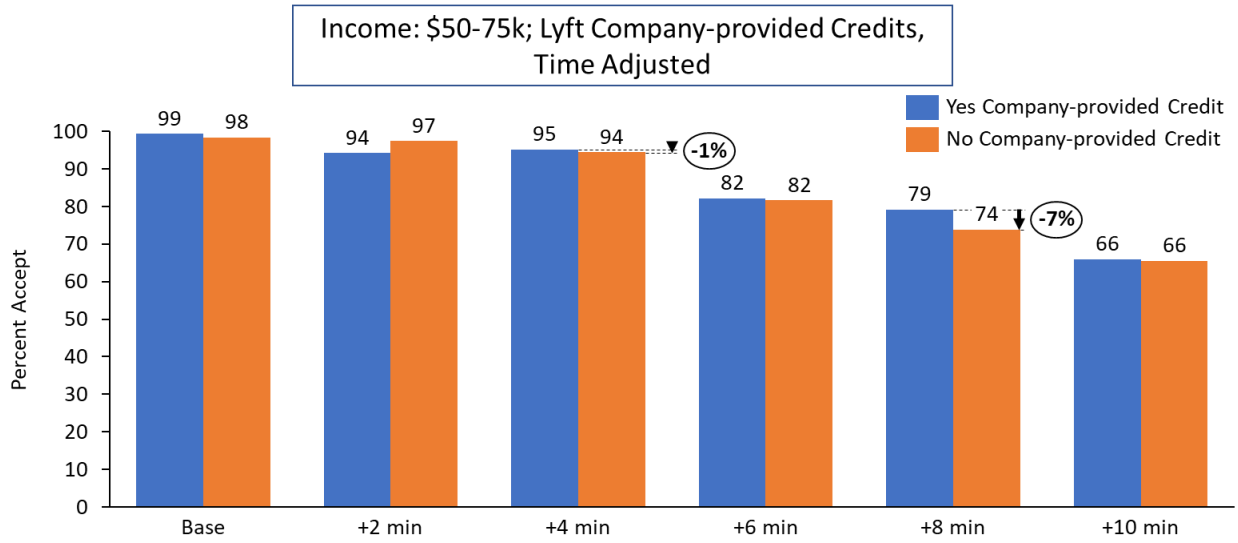


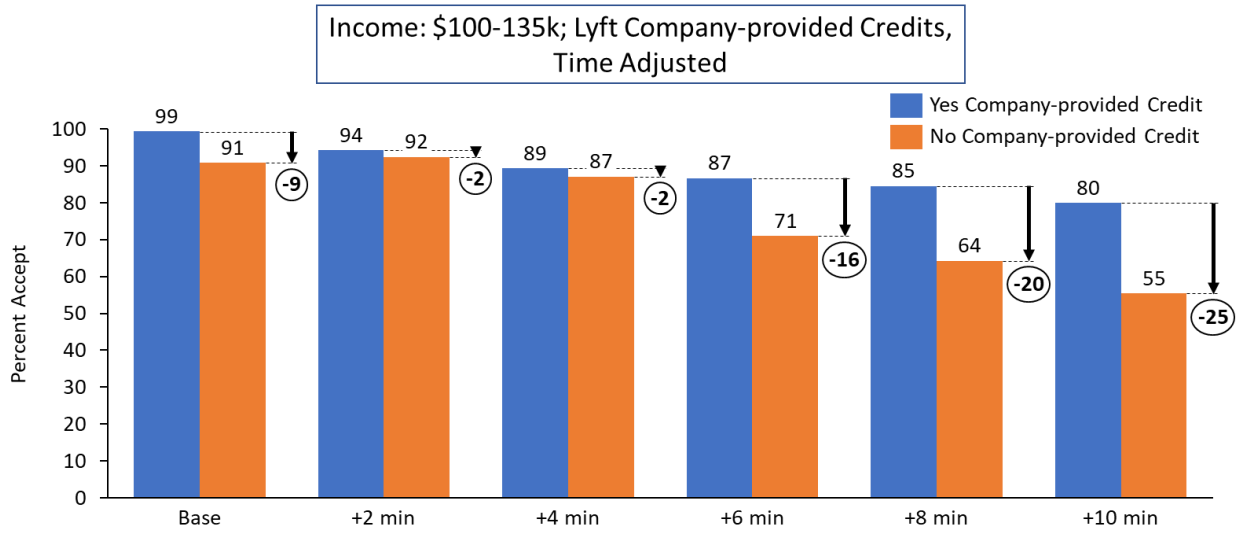

Income: $75-100k; Uber Company-provided Credits, Price Adjusted
Percent Accept
Yes Company-provided Credit
No Company-provided Credit
99
99
92
92
74
83
51
55
41
33
-8
41
19
-22
$8.10
$10.13
$12.16
$14.18
$16.21
$18.23


Income: $100-135k; Lyft Company-provided Credits, Price Adjusted
Percent Accept
Yes Company-provided Credit
No Company-provided Credit
99
91
9
84
73
-10
52
55
30
27
-2
20
18
-2
11
10
-1
$8.10
$10.13
$12.16
$14.18
$16.21
$18.23

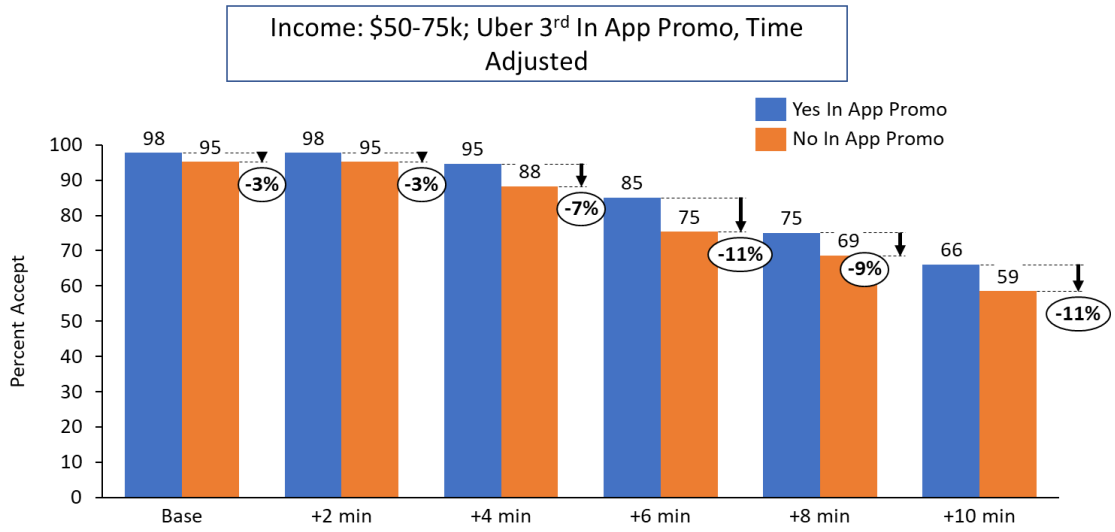

Income: $100k-$135k; Uber Company-provided Credits, Price Adjusted
Percent Accept
Yes Company-provided Credit
No Company-provided Credit
99
99
86
88
81
74
-7
69
47
-22
48
36
-13
34
22
-13
$8.10
$10.13
$12.16
$14.18
$16.21
$18.23

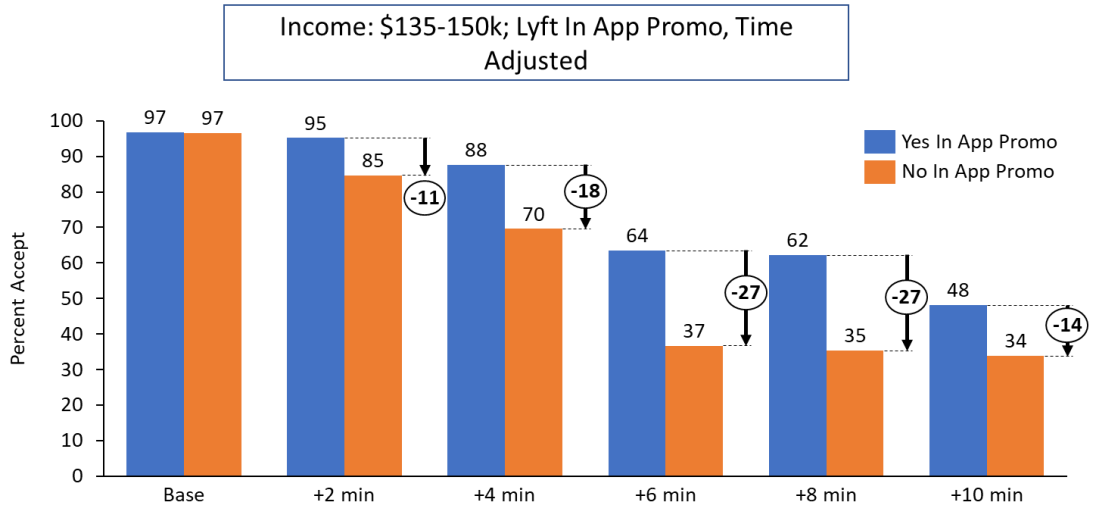

Age: 46-55; Uber Company-provided Credits, Time Adjusted
Percent Accept
100
90
80
70
60
50
40
30
20
10
0
98
100
97
99
97
89
-8
82
78
-4
67
61
-5
61
55
-6
Uber & Yes & 46-55
Uber & No & 46-55
Base
+2 min
+4 min
+6 min
+8 min
+10 min


Income: $50-75k; Lyft Company-provided Credits, Time Adjusted
Percent Accept
100
90
80
70
60
50
40
30
20
10
0
99
98
94
97
95
94
-1%
82
82
79
74
-7%
66
66
Yes Company-provided Credit
No Company-provided Credit
Base
+2 min
+4 min
+6 min
+8 min
+10 min

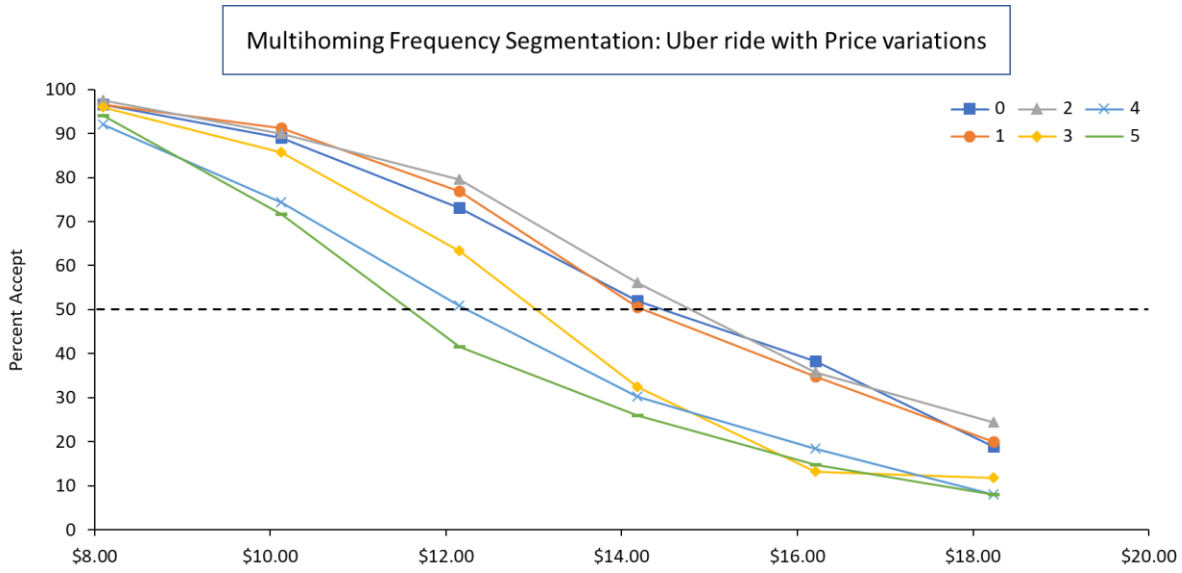

Income: $100-135k; Lyft Company-provided Credits, Time Adjusted
Percent Accept
100
90
80
70
60
50
40
30
20
10
0
99
91
-9
94
92
-2
89
87
-2
87
71
-16
85
64
-20
80
55
-25
Yes Company-provided Credit
No Company-provided Credit
Base
+2 min
+4 min
+6 min
+8 min
+10 min

In-App Promotions





Multihoming Frequency Uber



Income – Price Adjusted Uber