EFFECTS OF FLEXIBILITY AND SECURITY ON THE DECISION TO WORK FOR RIDE-SHARING SERVICES

By

Soo Jeong Hong

A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

Information and Media—Doctor of Philosophy

2018

ABSTRACT

EFFECTS OF FLEXIBILITY AND SECURITY ON THE DECISION TO WORK FOR RIDE-SHARING SERVICES

By

Soo Jeong Hong

Firms in the sharing economy have developed numerous innovative services. Using the power of advanced information and communication technologies and distributed computing, they have reorganized production of these services in ways that are altering the landscape of employment and working conditions more broadly. Although this transformation has provided participants with more degrees of flexibility in their work schedule and location, there is also evidence that an increasing number of individuals face unreliable income prospects and limited or no benefits.

This dissertation investigates the effects of granting providers of ride-sharing services, a menu of contracts with varying flexibility on their willingness to offer their services through a platform. Ride-sharing is one of the largest sectors in the sharing economy and can provide insights that can apply to other services in this emerging sector. Using a choice experiment with 406 participants, the study examines how diversification of contractual attributes (minimum required driving hours, minimum wage guarantee, benefit plans, and the amount of auto insurance deductible) affects drivers' willingness to work for the online platform. It also investigates whether service providers' preferences for flexibility and stability in the platform business are influenced by alternative employment options.

Results show that the willingness to work for ride-sharing generally increases when the ride-sharing company provides a minimum wage guarantee, a company-sponsored benefit plans, and technological features which protect drivers from unwanted incidents by passengers. Drivers are

willing to accept work conditions specifying minimum required driving hours for ride-sharing in return for the ability to participate in a ride-sharing company-sponsored benefits. Additionally, finding suggest a negative association between drivers' willingness to work for ride-sharing platforms and the perceived job flexibility of their primary job. A similar relation exists between the willingness to work for ride-sharing and perceived security of their primary job. Finally, the results show a positive association between the willingness to work for ride-sharing platforms and contract flexibility of workers' primary job.

Overall, the dissertation contributes to the research literature on the sharing economy, platform governance, and the emergent research on the role of work conditions on labor supply. It offers practical insights on how platform design and governance can contribute to more stable and extensive supply of services on the platform that can contribute to development of more sustainable and valuable business models.

I dedicate this work to my beloved family.

ACKNOWLEDGEMENTS

I acknowledge the continuous support and guidance of my dissertation guidance committee: Johannes Bauer (Chair), Brian Pentland, Elizabeth Quilliam, and Charles Steinfield. I gratefully acknowledge Johannes Bauer for his advice, insight, and consideration at every step for not only the dissertation process but also my entire doctoral program. I express my sincere gratitude to Brian Pentland, Elizabeth Quilliam, and Charles Steinfield for their feedback and comments that helped me to overcome obstacles along the way to reach this point.

In addition, I thank Emilee Rader, Jane Lee, Sevgi Baykaldı, James Battey, and Nina Capuzzi for their time and help in designing the effective instrument for this dissertation. I also extend thanks to Nancy Ashely, Linda Good, and Patricia Huddleston for their thoughtful service to support this study. I would also like to thank Tom Sager, Tse-min Lin, Matt Hersh, Jack Meyer, and Hyunjoong Kim for their help to keep me pursuing study that I want to dedicate myself to. Without them, I would not have reached this point.

I thank my parents, Seok Young Hong and Jung Won Park, for their unwavering love and unconditional support. They have always believed in me. I thank my sister, Yoo Lee Hong, for being a good friend and encouraging me with her three adorable kids.

Last, but certainly not least, I am thankful to my marvelous husband, Kwangjin Lee. My academic development and this dissertation would not have ever been possible without his endless love, support, and encouragement. He has always been there for me and shared my joy and tears from the beginning of my doctoral study.

Above all, I thank God for blessing me with His endless love and grace.

TABLE OF CONTENTS

LIST OF TABLES	vii
LIST OF FIGURES	viii
CHAPTER 1: INTRODUCTION	1
CHAPTER 2: INSTITUTIONAL AND THEORETICAL FOUNDATIONS	8
2.1. Research Context: The Sharing Economy	8
2.2. Platform Governance in the Sharing Economy Platform Ecosystem	11
2.3. Labor Supply and Flexicurity	15
2.4. Hypotheses	20
CHAPTER 3: DATA AND RESEARCH DESIGN	30
3.1. Data	30
3.2. Method and Dependent Variables	31
3.3. Independent Variables and Control Variables	37
3.4. Experimental Research Design	40
CHAPTER 4: RESULTS	42
4.1. Descriptive Statistics and Discrete Choice Analysis	42
4.2. Decision to Work and Working Conditions	47
4.3. Relations between a Ride-Sharing Job and Drivers' Primary Job	52
4.4. Additional Analysis	58
CHAPTER 5: CONCLUSION	60
5.1. Research Questions and Major Findings	60
5.2. Conceptual Contributions	61
5.3. Practical Implications	63
5.4. Directions for Future Research	68
APPENDICES	70
APPENDIX A Descriptions and Definitions of Variables	71
APPENDIX B Generalized Ordered Logit Estimation with Interactions: Paid Employed (Full Variables)	74
APPENDIX C Example of a Choice Set	77
BIBLIOGRAPHY	81

LIST OF TABLES

Table 1. Definitions and Description of Key Concepts 18

Table 2. Attributes and Descriptions 38

Table 3. Socio-Demographic Statistics 42

Table 4. Parameter Estimates from Random Parameters Models 46

Table 5. Willingness to Work, Mean [95% Confidence Interval] 47

Table 6. Anticipated Changes in Work Intention 48

Table 7. Generalized Ordered Logit Results: Full Sample 51

Table 8. Descriptive Statistics for the Drivers with the Other Primary Job(s) 52

Table 9. Generalized Ordered Logit Estimation with Interactions: Paid Employed 54

Table 10. Hypothesis Test Results 57

Table 11. Parameter Estimates from Latent Class Models (LCM) 59

Table B.1. Generalized Ordered Logit Estimation with Interactions: Paid Employed (Full Variables) 75

LIST OF FIGURES

Figure 1. Key Stakeholders of the Platform Businesses 2

Figure 2. The Trade-Off and Flexicurity Perspective 17

Figure 3. Framework and Hypotheses 29

Figure 4. Conceptual Plot for Ordered Response and Its Latent Variable 35

Figure 5. Example of a Choice Set 41

CHAPTER 1: INTRODUCTION

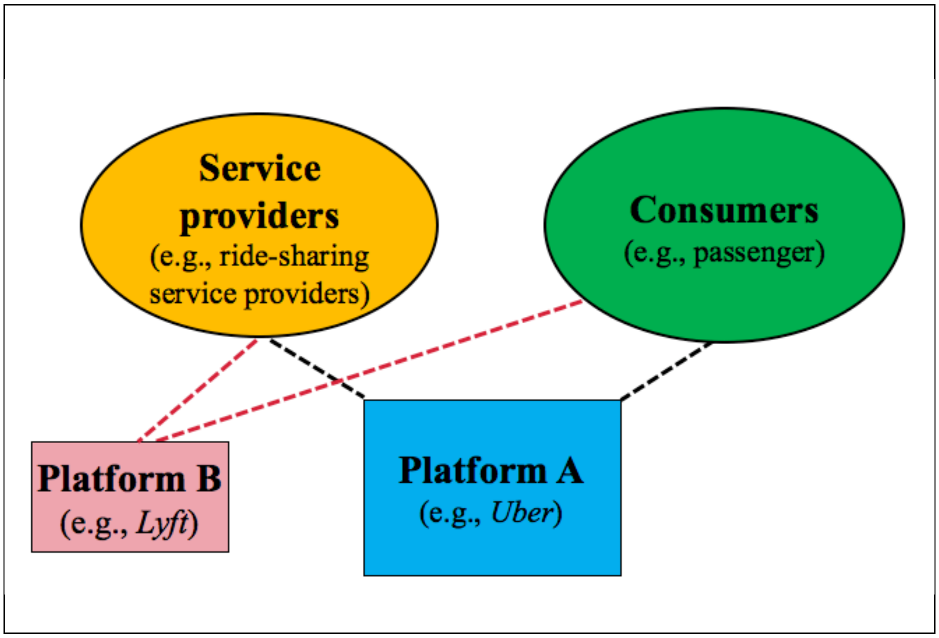
The emergence of innovative platform[1] businesses is transforming the nature of employment relations and the working conditions of participants in a growing part of the economy. These new digital intermediaries create value by facilitating transactions among decentralized market participants that were previously prohibited by high transaction cost (Hansen Henten, and Maria Windekilde, 2016). Often referred to as the "sharing" economy, this new class of activities comprises a broad range of services that are either based on the sharing of assets (e.g. apartments, cars), skills (e.g. consulting, crafts, driving), or both (e.g. ride sharing) (Farrell and Greig, 2016). One of the largest segments of this emerging set of economic activities is ride-sharing services such as *Uber*, *Lyft*, and *Gett*. Among them, *Uber* has become the alternative means of transportation for many users, reflected in a market valuation of $68 billion in December 2017.[2] To maintain a sustainable platform business, management must orchestrate not only information and communications technology (ICT) interfaces but also supply and demand on the platform (Sundararajan, 2012). The platform serves as a digital intermediary for service providers (e.g., *Uber* drivers using their cars, *Airbnb* hosts offering accommodation) and consumers (e.g., *Uber* passengers, *Airbnb* guests). Given multiple platforms similar in functions exist and the environment where many latecomers can rapidly emerge due to the relatively low dependence on physical assets, service providers and consumers not only can freely switch but can sign on with multiple platforms (Figure 1) to maximize their utility.

---

[1] In the field of IS, the term "platform" has been used to refer to organizational capability platforms, product family platforms, market intermediary platforms, or technology system platforms (Thomas, Autio, and Gann, 2011). Note that this study focuses on a platform as a market intermediary.

[2] There are two more recent valuations of *Uber*: one based on the bid price by SoftBank Corporation, which won the bid to buy a major stake of *Uber* in December 2017, is at $48 billion (https://www.wsj.com/articles/softbank-succeeds-in-tender-offer-for-large-stake-in-uber-1514483283), and the other one estimated based on the information related to the settlement between *Uber* and *Waymo* in February 2018 is at $72 billion (https://www.recode.net/2018/2/9/16996834/uber-latest-valuation-72-billion-waymo-lawsuit-settlement).

Figure 1. Key Stakeholders of the Platform Businesses



One of the challenges of the platform is to secure a sufficient supply of service providers who are willing to share their resources and work with the platform to offer services demanded by consumers. Understanding the motivations and deterrents of potential participants is essential to design the platform in ways to efficiently attract them and to scale the operation. This is complicated by the fact that service providers likely have heterogeneous motivations and diverse preferences for the kind of work arrangements that would provide the strongest incentive to partner with the platform. There is evidence that a main reason of the past and current fast influx of participants into the sharing economy is the value placed on the flexibility[3] of where and when to work (Hall and Krueger, 2015). Service providers can provide services whenever they want if there is demand for their labor and resources. Another reason is that the platform economy has lower entry barriers for service providers so that monetizing their idle resources (e.g. time, assets) has

[3] Workplace flexibility refers to the ability of workers to make choices influencing when, where, and for how long they engage in work-related tasks (Hill, Grzywacz, Allen, Blanchard, Matz-Costa, Shulkin, and Pitt-Catsouphes, 2008).

become easier than in traditional labor markets. Service providers simply need to satisfy conditions the platform may impose rather than regulations and policies. As technological advances aid in implementation of these transaction processes, the sharing economy has lowered costs of entry and exit, and substantially increased labor market flexibility.

However, at the same time, like other forms of contingent work, such as on-call labor, the platform economy offers lower security of than standard employment. Currently, platform owners typically treat service providers as independent contractors rather than as employees. Scholars examining the sharing economy have debated the possibility that participants working for the platform economy with low skills may be worse off in the long term because workers can be dismissed at any time. For instance, drivers for a ride-sharing service may be dismissed with a short notice or without a proper opportunity to appeal, based on a low consumer reputation rating. Similarly, they may lose their position due to a change in the business model such as adopting transportation services operated by self-driving vehicles. If they have not acquired other skills or resources for other jobs while working in the platform economy and lost their ride-sharing job, they may struggle in future labor markets more seriously than before working for the platform economy. This insecurity of work in the sharing economy may create unwanted negative economic impacts to sharing economy service providers. The impacts may include the net earnings smaller than the one from typical low-paid service jobs due to the short history of the sharing economy, incomplete legislation on the sharing economy, and fast change on the business structure.

Unlike employees under standard employment, the current situation in most jurisdiction is that sharing economy service providers are not protected by laws and regulations concerning minimum wage and employment benefit plans, important components of standard employment work conditions (Kalleberg, Reskin, and Hudson, 2000) which contribute to income security. The perception and reality of more secure working conditions may lead to more stable supply of services, as the Bureau of Labor Statistics (BLS, 2018) shows 55% of contingent workers prefer a permanent job. However, such conditions are currently not provided by the sharing economy platform owners.

Once a platform business passes the startup and growth phases where there are many alternative options available for service providers, platform management not only has to recruit new service providers but also must maintain relations to existing service providers to sustain the business. There is growing indication of conflict between stakeholders about the employment conditions of service supply, which may reduce supply. For example, *Uber* drivers have filed lawsuits totaling approximately two hundred million-dollars against *Uber* because the company regards drivers as independent contractors, not employees. The current state of *Uber* allows the company to avoid legal obligations to provide mandated benefit plans for employees. At the same time, some drivers do not see this as a crucial detriment given strong preferences for the flexible work schedule of the sharing economy.

Thus, platform management must develop governance models that balance these competing incentives. This requires a good understanding of service providers' heterogeneous preferences for stability and flexibility to efficiently minimize conflicts, reduce negotiation costs, and eventually grow and sustain service supply. The role of market participants' perception of labor market flexibility and stability on the platform economy has received only limited attention in prior research. Particularly interesting are the effects of heterogeneity in the supply of service providers and whether platform governance could address them effectively. This dissertation seeks to contribute to a better understanding of the prevalence of heterogeneous service provider preferences and how they affect platforms. To this end, it investigates whether diversification of contract conditions, offering additional combinations of job flexibility and security to service providers, would increase the willingness of service providers to partner with the platform and in turn, increase the total supply of service. This study focuses on the of ride sharing services, currently the largest segment of the sharing economy.[4] Findings hopefully will also shed light on similar issues in platform businesses more generally, including those providing space rental, food delivery, and errand services.

To measure these effects empirically, discrete choice experiment models are constructed to capture driver preferences for job flexibility and security. Using the random parameter logit, generalized ordered logit, and latent class logit models, the effects of other service features offered by the platform as well as the relationships between decisions to work and the flexibility and security of drivers' alternate job options are examined. A total of 406 active ride-sharing service providers and inactive providers (those who have provided ride-sharing services in the past but not during the past six months) were recruited in the United States through *Qualtrics* online panels (https://www.qualtrics.com/online-sample/). The total sample size is higher than the requirements derived from commonly used guidelines, such as those proposed by Orme (1998) and Johnson and Orme (2003).[5] The experimental approach allows examining how ride-sharing service producers' willingness to work would change under hypothetical working conditions of ride-sharing such as minimum wage, health insurance, and retirement options. Willingness to work is measured with three indicators: participation rate, driving hours, and anticipated work duration. I explore whether

[4] The rank can be found at https://index.co/market/sharing-economy/companies.
[5] Orme (1998) suggests 200 as a minimum number of subjects. Based on Johnson and Orme's guideline (2003), 125 responses are required (125 = N = 500×3/(6×2) = $500c/t{\times}a$ where c is the larget number of attribute levels, t is the number of choice sets, and a is number alternatives in each choice set). Permain, Swanson, Kroes, and Bradley (1991) recommend obtaining more than 100 subjects.

drivers are willing to change their current level of participation in response to changes in contract conditions.

I find that drivers' willingness to work for ride-sharing generally increases when the ride-sharing company provides a minimum wage guarantee, company-sponsored benefit plans, and technological features that protect drivers from unwanted incidents by passengers. Particularly, a minimum wage guarantee and company-sponsored retirement plan are consistently considered to be valuable for both active and inactive drivers. Regarding technological attributes, active drivers tend to care for a feature which prevents unwanted personal information disclosure more than inactive drivers do. The examination of the relationship between alternative jobs and sharing economy work found a negative association between drivers' willingness to work for ride-sharing and perceived job flexibility of their primary job. Likewise, a negative relation was found between the willingness to work for ride-sharing and the perceived security of the primary job. Finally, the results show a positive association between drivers' willingness to work for ride-sharing and contract flexibility of their main job.

My findings make three contributions to the research literature. First, this study extends received research by providing empirical evidence to understand which work conditions are important factors that increase service providers' utility. Previous studies have not explored this issue in depth. Second, this study adds to the literature on platform governance. Prior studies have focused on the relationship between platform owners and developers or between platform owners and consumers. This study explores reliance on contracts between platform owners and service providers as a tool to mitigate conflicts between them, viewing service suppliers as an active main player who have been often omitted or described as passive work condition acceptors in prior research. Finally, this study contributes to the literature on a recent perspective in labor economics asserting a positive relationship between flexibility and security (often referred to as “flexicurity”). This approach has gained traction in many countries as a possible response to the new work conditions in the digital economy. The dissertation provides first empirical evidence on the potential complementarities between the security of drivers’ main job and a sharing economy job with company-sponsored benefit plans. This relationship shows the sharing economy has a potential to play a role in complementing low security of drivers’ main job.

To my best knowledge, this is a first study examining the effects of granting service providers options to choose among various work conditions offering different security levels on the willingness to change their involvement in the sharing economy. Findings can help platform owners to develop governance approaches that facilitate sustaining a thicker supply of service providers.

The remainder of this dissertation proceeds as follows: Section 2 reviews relevant studies on the sharing economy, platform governance, and the flexicurity thesis. This forms the basis for the development of key testable hypotheses. Section 3 describes the data and research design, and Section 4 then reports results. Section 5 discusses contributions and suggests future direction of this research.

CHAPTER 2: INSTITUTIONAL AND THEORETICAL FOUNDATIONS

2.1. Research Context: The Sharing Economy

For the purposes of this dissertation, the sharing economy is operationalized as "a peer-to-peer online marketplace where individuals obtain, give, or share the access to goods and services, coordinated by third party intermediaries with a commission paid by participants (service providers or consumers or both), not involving an employment contract." This notion takes elements from Hamari, Sjoklint, and Ukkonen's (2015) and Sundararajan's (2013) definitions and adapts them to the set of problems that are of interest here.

The research literature on the sharing economy has grown rapidly and in parallel with its rise and impact on consumer markets (Zervas, Proserpio, and Byers, 2017), business strategies (Wan, Cenamor, Parker, and Van Alstyne, 2017), and labor markets (Sundararajan, 2016). One important theme is the factors that influence individuals' decision to participate in sharing economy services. Hamari *et al.* (2015) find that ecological sustainability, enjoyment, and economic gains increase strengths of consumers' motivation to participate in collaborative consumption in the sharing economy. In more specific areas, Möhlmann (2015) identifies cost savings, familiarity, service quality, trust, and utility are positively associated with consumer satisfaction in car-sharing (*car2go*) and accommodation-sharing services (*Airbnb*), and community belonging and utility are positively related to the likelihood of using the sharing economy option again. Determinants of consumer participation in previous studies mostly focus on various types of emotional components and economic gain. One notable study, on the supply side, conducted by Hall and Krueger (2015) find many *Uber* drivers participate in ride-sharing for flexible work schedule and more income stability. However, relatively little is known about factors that affect suppliers' participation in the sharing economy.

As several platform companies achieved remarkable successes, substantial body of literature has expanded the focus of sharing economy research to new and unique features of sharing economy business operating systems by addressing design aspects of platform ecosystems and their impact. Einav, Farronato, and Levin (2016) explore platform design which involves search, matching, transactions, and regulations. Regarding ride-sharing, studies by Chen, Mislove, and Wilson's (2015), and Castillo, Knoepfle, and Weyl (2017) examine characteristics of *Uber*'s surge pricing. Chen and Sheldon (2015) find effects of surge pricing on drivers' driving behavior, such as a lower quit rate. They discuss the general characteristics of surge pricing and the efficiency of the surge pricing model and corroborate that the surge pricing decreases demand and increases supply of ride-sharing services.

As the scope and use of sharing economy services has expanded and increased, interests of sharing economy researchers have broadened to the societal effects of increased adoption and consumption of sharing economy services. On one hand, scholars find positive effects of the sharing economy. In the case of ride-sharing, previous studies show that the entry of *Uber* in cities contributed to increased consumer welfare primarily due to a better coordination between drivers and passengers (Cohen, Hahn, Hall, Levitt, and Metcalfe, 2016; Cramer and Krueger, 2016) and positive externalities including a decrease in congestion (Li, Hong, and Zhang, 2017), reduced drunk driving (Greenwood and Wattal, 2017; Martin-Buck, 2017), lower crime rates (Dills and Mulholland, 2016), and a decline in consumer complaints about taxis (Wallsten, 2015).

On the other hand, many sharing economy scholars discuss potentially negative aspects of the sharing economy. There are two major concerns surrounding these new business models. A first aspect is concerning vague accountability frameworks may put sharing economy participants in danger (Calo and Rosenblat, 2017). In general, sharing economy companies have less stringent screening systems and require fewer qualifications to participate (Malhotra and Van Alstyne, 2014). Besides, there is a relatively high possibility of incidents lacking appropriate regulations to reconcile the incidents (Edelman and Geradin, 2015). Prior research documents numerous lawsuits filed against sharing economy companies for a variety of unexpected incidents (Crespo, 2016) where it is unclear who is the most culpable among service providers, platform owners, algorithm developers, consumers or a third party. A second concern is associated with unregulated competitive dynamics which may result in disruptive working conditions, and subsequent negative externalities (Graham, Hjorth, and Lehdonvierta, 2017; Parker, Van Alstyne, and Choudary, 2016; Scholz, 2016; Schor, 2016). In the competitive working environments, service providers often accept lower earnings (Narasimhan, Papatla, and Ravula, 2016) with lower protection (Edelman and Geradin, 2015). As a result, service providers may be relatively worse off, and in the long term, economic polarization may deepen (Schor and Attwood-Charles, 2017).

This study focuses on the second concern of working conditions with few safeguards. This is important in that maintaining level and quality of service supply is essential for sustainable platform businesses, and disruptive working conditions may exert a far-reaching influence to non-participants beyond a large and economically disadvantaged population directly involved in the sharing economy. Two recent statistics help assess the approximate scale of the sharing economy in the U.S. BLS data (2018) describes that 11% of all workers work under contingent and alternative employment arrangements. With an additional 10% being self-employed, BLS estimates that about 21% of workers could be attributed to this new segment of the economy. Note that this data defines the sharing economy narrowly by only counting primary (and not second) jobs in either contingent work arrangements or self-employment. Thus, the statistic (21%) could be regarded as a lower bound for the scale of the sharing economy in terms of the number of participants. The Federal Reserve System (2018), using a broader measure by including second jobs, reports that approximately 31% of the work force are active in the sharing economy.

To mitigate risks of work in the sharing economy, previous studies suggest several directions other than legislation. For example, Sundararajan (2016) emphasizes peer regulation, self-regulatory organizations, and data-driven delegation to regulate each other within the platform environment. Malhotra and Van Alstyne (2014) suggest community policing and self-regulating system to prevent companies' and service providers' from adopting unfair working conditions. However, most suggestions in prior research lack related empirical grounding that would provide an overview of service providers' preferences for working conditions, which could inform rational approaches. Hence, it is an unexplored and important empirical question that which working condition attributes are key factors to increase service providers' utility, locking them in a certain platform.

To fill this gap in the literature, this study discusses whether offering choices of employment conditions to service providers would affect the participation rate, working hours, and duration of work on the platform. By contributing new empirical research findings and developing managerial implications, it expands the focus of platform design and governance in the sharing economy to aid platform owners in designing service providers' participation and resolving conflicts between platform owners and service providers.

2.2. Platform Governance in the Sharing Economy Platform Ecosystem

The Information Systems field uses the term "platform" in multiple contexts of research without a clear consensus as to its definition. The four concepts the term frequently refers to are a platform organizational capabilities (Ciborra, 1996; Kogut and Kulatilaka, 1994), a stable center of a product family (Robertson and Ulrich, 1998), a market intermediary (Armstrong, 2006; Rochet and Tirole, 2006), or a technology system upon which service and applications can be built (Gawer and Cusumano, 2002; Manner, Nienaber, Schermann, and Krcmar, 2012). This study describes a platform as a market intermediary composed of "layered architecture of digital technology" (Yoo, Henfridsson, and Lyytinen, 2010) orchestrated by "governance rules that organize the ecosystem" (Parker, Van Alstyne, and Jiang, 2016). Likewise, several different concepts of "platform governance" have been proposed (e.g., De Reuver and Bouwman, 2011; Ghazawneh and Henfridsson, 2010). Manner *et al.* (2012) summarize common traits of platform governance described in the prior literature. Platform governance is "a multi-dimensional concept" controlling dynamically managed decision-making processes in a platform ecosystem (Busquets, 2010; Rudmark and Ghazawneh, 2011; Tiwana, Konsynski, and Bush, 2010), by using a structure, power, processes, and mechanisms (Tiwana *et al.*, 2010).

Tiwana (2009) implies that the purpose of platforms is to organize and coordinate wealth creation. Parker *et al.* (2016) clarify that the purpose of good platform governance is "to create wealth, fairly distributed among all those who add value." To achieve such fairness, platform owners must resolve conflicts among stakeholders of the platform community. Some of the conflicts in distributing the newly-created wealth may be considered as a broader form of the second-level digital divide[6] caused by digital inequality[7] (DiMaggio and Hargittai, 2001; Hargittai, 2001). As service providers and consumers carry out more transactions, small groups such as

---

[6] While the focus of the (first-level) digital divide mostly rests on a lack of accessibility to the Internet and other ICTs, the second-level digital divide, coined as more and more people acquire access to the Internet, may refer to a gap in people's level of skills for the Web use or other ICTs.

[7] Digital inequality suggested by DiMaggio and Hargittai (2001) refers to inequalities relevant to understanding the differences in access and use of information technologies.

platform owners who have acquired a high level of skills to take advantage of innovative ICTs are able to become relatively better off. Since many services demanded by consumers have been split to temporary and unstable microtasks, the importance of good governance has been thrown into a sharp focus.

While there exists substantial research on governance of the platform owner-developer relationship (De Reuver, 2009; Muller, Kijl, and Martens, 2011; Schlagwein, Schoder, and Fischbach, 2010; Tiwana *et al*., 2010) and the platform owner-consumer relationship (Jain, 2011; Robey, Im, and Wareham, 2008), the platform owner-service provider relationship has not been investigated in comparable detail (Manner *et al.*, 2012). Whereas previous studies offer frameworks to describe a platform ecosystem and principal players in it, service providers have often been omitted and are relegated to a passive role. For instance, Tiwana, *et al.*'s work (2010) develops a representative framework for platform-centric ecosystems by describing platform design, platform governance, and environmental dynamics as core concepts on the ecosystems. However, the framework does not explicitly describe the role of service providers and thus does not capture a full picture of the interactions in the sharing economy. The models of the sharing economy outlined by Puschmann and Alt (2016) and Van Alstyne, Parker, and Choudary (2016) include service providers but lack empirical work to examine how platform owners can grow and sustain service providers' participation. Since sharing economy service providers directly provide consumers with not only their labor but also access to their resources, the role of service providers in the sharing economy has increased. At the same time, boundaries between roles of consumers and service providers have become blurrier (Sundararajan, 2016) due to lowered entry barriers for service providers.

Given service providers' important role in the sharing economy, this study explores the factors influencing ride-sharing service providers' willingness to work on the platform, viewing service providers as an active decision-making group. The empirical research conducted allows new insights into the potential heterogeneous service providers' preferences.

Conceptually, this study analyzes contracts as a tool of platform governance that may be employed to manage conflicts and reconcile tensions between platform owners and service providers, in line with ideas suggested by platform cooperativism (Sholz, 2016). When there is a right to delegate between two or more parties, but when the incentives of the parties may conflict and there may be unobservable information asymmetry, a contract can be used to reduce transaction cost for monitoring moral hazard (agency theory, see Hölmstrom, 1979). Prior studies for platform businesses have examined laws (McNamara, 2015), norms (Eyal, 2014), architecture (Puschmann and Alt, 2016), and pricing (Benbya and Van Alstyne, 2010) as means of platform governance (Parker *et al.*, 2016). Recently, contracts governing relations among participants in the platform ecosystem have received increasing (but still limited) attention (De Reuver, 2009; Markus, 2007).

In the case of ride-sharing services, platform owners delegate the right to decide when and where to work to service providers, and service providers delegate not only the right to decide to whom they provide with their labor and access to resource, but also the right to decide how much they could earn. However, as most ride-sharing service companies currently do not offer diverse contract options when it comes to benefit plans, the interests of companies and service providers potentially are in conflict. Considering positive impacts of benefit plans on job satisfaction (Artz, 2010), granting service providers options to choose benefit plans is expected to grow their general involvement in ride-sharing. From the companies' perspective, this may contribute to maintaining stability and good quality of labor supply.

2.3. Labor Supply and Flexicurity

In traditional labor economics, individual labor supply is the outcome of two interrelated decisions: whether to work at all, and, if so, for how long to work. Although there are important differences in detail, mainstream and behavioral economic models generally model individual labor supply as the outcome of trade-offs (e.g., between work and leisure) and constraints (e.g., the need to sustain a family or assets).

Traditionally, the opportunity cost of leisure, wealth, and preferences are regarded as the most important components in decisions to work (Ehrenberg and Smith, 2014). The opportunity cost for an hour of leisure is the earnings one would have made if that hour had been spent working. The wage rate is typically considered the opportunity cost of one hour of leisure. Research on labor supply considers that wealth includes a bank balance, financial investment, tangible property, and workers' skills. Directly measuring individual study participant's wealth is usually not feasible, total income is often used as proxy for total wealth (Ehrenberg and Smith, 2014). Individual preferences influencing a decision to work are affected by a multitude of factors. Depending on individual demographic factors such as the worker's age, educational attainment, and number of dependents, workers' preferences for institutional aspects such as types of industry, flexibility of work hours, and benefit plans may vary.

Job flexibility and security[8] have long been studied as major institutional aspects influencing job satisfaction. There are two different perspectives of relationships between job

[8] Job flexibility refers to workers' ability to choose to structure a job as a standard salaried job, as a temporary position or as contract work (Hill *et al*., 2008), and job security refers to the extent to which job separations are

flexibility and security: the trade-off theory and flexicurity theory, the concept of which was initially proposed in the context of labor reforms by policy makers and academics in the Netherlands and Denmark in the late 1990s (Bredgaard and Madsen, 2018; Muffels and Luijkx, 2005). Figure 2 compares the two conceptual perspectives.

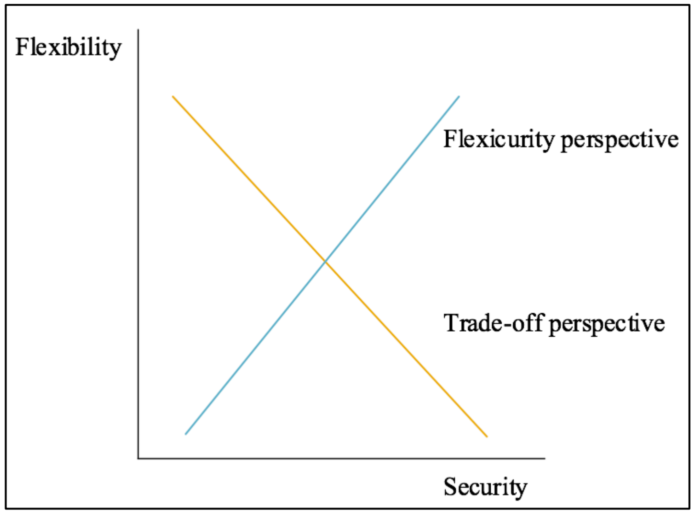
The first view conjectures that, other things being equal, a negative relationship exists between the degree of flexibility and security. In other words, a higher level of flexibility can only be reached by reducing the degree of job security. The flexicurity theory sees flexibility and security in a mutually supportive rather than a conflicting relationship (Madsen, 2002). At the labor market level, according to this hypothesis, employment flexibility can be achieved by enhancing security with social security and active labor market policies (The Employment Committee (EMCO), 2006). For example, a generous income security policy motivates risk averse workers to more proactively change jobs, contributes to high job flow, and in turn, increases the flexibility in managing the amount of workforce. Although there are a variety of opinions concerning the most effective components and formula of the flexicurity concept depending on countries and economic circumstances,[9] the core notion of the opinions is the complementarity of flexibility (employment flexibility[10]) and security (income security).

involuntary. The primary measure of job security is the rate of job loss (Boisjoly, Duncan, and Smeeding, 1998; Farber, 1996; Monks and Pizer, 1998; Valletta, 1999). Job stability refers to the duration of jobs (Jaeger and Stevens, 1999; Swinnerton and, Wial 1995).

[9] The flexicurity of Danish system was exemplified the best in terms of the execution of the flexicurity concept and its positive economic impacts before the outbreak of the global financial crisis in 2008 (Bredgaard and Madsen, 2018). Although after the onset of the crisis, the Danish flexicurity was once criticized for the sharply increased unemployment rate, long-term unemployment rate, youth unemployment rate due to its low levels of job protection, the flexicurity has been still modified and developed as one of the bases of the labor market policy in European countries.

[10] The employment flexibility refers to the flexibility in regulating the amount of labor by hiring and firing people employed (Wilczyńska, Batorski, and Sellens, 2016)

Figure 2. The Trade-Off and Flexicurity Perspective



Whereas much of the flexicurity discussion focuses on employment flexibility and income security at the labor market-level, this dissertation utilizes to concept to investigate firm level interactions. It explores how individuals' job flexibility and job security of their main job relates to activities in the sharing economy and how it may play a role in enhancing income security and employment flexibility in the long term. Following the flexicurity perspective conceiving the flexibility and security in the mutually supportive relationship, this study builds on a different conceptualization of flexicurity taking the sharing economy option into consideration: the assumption of this study is that if the sharing economy service companies structure contracts allowing service providers to choose the balance between flexibility and security in their work conditions, the flexibility and security of the service providers' main alternative job can be complemented by the sharing economy job playing a role of the social security net to some extent. And in this way, the sharing economy job may help workers change jobs optimizing the balance of flexicurity where their utility is maximized in the long term.

I employ two commonly used measures of job flexibility: perceived flexibility and contractual flexibility (see Table 1). Perceived flexibility is primarily used here and refers to the perceived ability of workers to make choices influencing when, where, and for how long they work (Hill *et al*., 2008). Contractual flexibility is determined by the types of actual employment contract. Contractual flexibility is low under a permanent contract and is high under a seasonal, temporary, or fixed-period contract (Muffels and Luijkx, 2005).

Table 1. Definitions and Description of Key Concepts

Terms	Definitions and descriptions
Flexibility	Job flexibility denotes the ability of to choose to structure a job as a standard salaried job, as a temporary position or as contract work, and for how long they engage in work-related tasks (Hill *et al*., 2008). This study uses two measures of flexibility, perceived flexibility and contractual flexibility in order to capture the two commonly used concepts. Perceived flexibility: The perceived ability of workers to make choices influencing when, where, and for how long they engage in work-related tasks (Hill *et al*., 2008). Contractual flexibility: Contractual flexibility is determined by an employment contract type. Contractual flexibility is low under a permanent contract and is high under a seasonal, temporary, or fixed-period contract (Buchan, 1998; Origo and Pagani, 2009).
Security	Job security refers to the likelihood of not losing a job involuntarily (Origo and Pagani, 2009). This study measures perceived job insecurity by using a widely used Likert-type question "How likely or unlikely is that you lose your job for some reason over the next twelve months?".

Other things being equal, both flexibility and security are desirable job conditions for workers when they decide to work. One conceptual framework, the security-potential/aspiration

(SP/A) theory, proposed by Lopes and Schneider (1987) and developed by Lopes and Oden (1999), may be applied for expecting the relationship between flexibility and security of drivers' primary job and ride-sharing option. The SP/A theory assumes that individuals' risk preference depends on their goal level and that individuals have two reference points, a minimum reference point which is for security or survival, and an aspiration reference point that modifies individuals' evaluation of alternatives. Once individuals' minimum reference point is achieved, their risk preference and accordingly, their decision-making changes.

Applying the implications of this theory, I conjecture that if the sharing economy offers service providers options to choose among alternative combinations of flexibility and security, it may help drivers increase both flexibility and security of their main job, complementing the flexibility and security of their main job. If participating in the sharing economy helps service providers get a job which is more secure as well as flexible than their previous job, sharing economy jobs contributes to enhancing the flexicurity perspective. Conversely, the level of flexibility and security of service providers' main job can also affect their willingness to work for sharing economy services. For example, if service providers' major job is not secure and if the ride-sharing company offers the right to choose benefit plans increasing job security, their willingness to work for ride-sharing would be higher. This study measures service providers' alternate main job in terms of job flexibility and security and identifies the relationship between the alternative job and the sharing economy option.

While much of prior flexicurity research has focused on job satisfaction depending on the different degree of flexibility and security (Ferrer-i-Carbonell and van Praag, 2006; Origo and Pagani, 2009), I emphasize how and whether the sharing economy option contributes to the supportive relationship between flexibility and security. If sharing economy service providers can add more secure working conditions to their employment contract conditions and if the security of their alternate job is low, the sharing economy option may increase the service providers' perceived security and eventually increase employment flexibility which allows them to more easily change jobs.

2.4. Hypotheses

Starting from gaps in research on the sharing economy, platform governance, and the flexicurity thesis, I investigate the effects of diversifying work contract conditions on service providers' supply intention. Such diversified contracts are potentially an useful tool of achieving important goals of platform governance in the sharing economy. They influence the balance of flexibility and security of sharing economy service jobs and hence overall supply of labor to such activities. Additionally, I examine the relationship between flexibility and security level of service providers' alternative job and their willingness to work for the sharing economy job with the various work conditions, which has not been studied in detailed. A key unexplored question is how the flexibility and security attributes of alternative jobs interplay with the flexibility and security conditions in the sharing economy. The work conditions to be examined in this study are not available for currently existing sharing economy jobs, but their necessity and appropriateness have been debated. Moreover, it is ambiguous whether workers' decision to work for the sharing economy is influenced by their needs for more income security, or by their preferences for flexibility. Farrell and Greig (2016) conclude that asset sharing contributes to increased income but jobs in the gig economy help mitigate fluctuations in the main job. Thus, which characteristics of workers' alternative job relate to their willingness to work for the sharing economy job with different work conditions is an interesting empirical question.

Most platform owners allow full flexibility in service providers' work schedule and location without requiring any specific required work hours. However, they usually do not support nor provide benefit plans, contributing to job security, for their service providers other than technological benefits for a safer or more convenient transaction system. The reason behind this uniform type of contract conditions, which does not grant a decision right to choose job security attributes, is related to sharing economy companies' treatment of workers as independent contractors not as employees. In the case of *Uber* drivers' two class-action lawsuits in California and Massachusetts, a federal judge has rejected *Uber*'s $100 million settlement due to the insufficient settlement amount, and the value of these claims has been estimated to be $1 billion by drivers' attorney.[11] In the United Kingdom in November 2017, a British employment tribunal ruled that ride-sharing service providers are considered employees of the platform company.[12] Considering these facts, ride-sharing companies might be well advised to prepare for the possibility of losing the cases or identify a way to mitigate the conflicts with service providers.

In essence this study explores whether a diversified contract can be an alternative to such form of legal conflict mitigation between platform owners and service providers while at the same time improve the supply of service providers. To this end, it examines drivers' preferences for different labor contract conditions. I construct an online survey-based choice experiment which contains hypothetical contract conditions relevant to flexibility and security to understand service providers' heterogeneous preferences for flexibility and security. The hypothetical contract conditions, which may influence perceived flexibility and security and eventually affect service providers' willingness to work, were identified based on a literature review, and interviews and

[11] For more details, see https://www.wsj.com/articles/u-s-judge-rejects-ubers-proposed-100-million-settlement-with-drivers-1471560362.
[12] For more details, see https://www.nytimes.com/2017/11/10/business/uk-uber-london.html.

pretests with ride-sharing service providers and a ride-sharing expert. Considering that the capacity of the human brain to comparing permutations of choice options with multiple attributes is not unlimited, only the seven most salient attributes are included in the choice sets. Furthermore, the maximum number of attributes that differ between two options in the choice set is limited three.

A set of attributes is composed of both contractual and technological dimensions of ride-sharing services. Contractual conditions include options that presently are generally not offered by ride-sharing services. To obtain an estimate of drivers' perceived value of technological attributes, I also include important technological features of ride-sharing apps that would not be available if a service provider chose to provide service outside the platform (for example to avoid paying a commission). The attributes were identified through a multi-pronged approach, including a review of the literature on job satisfaction (e.g., Artz, 2010; Barringer and Milkovich, 1998; Borleis, 1996), recent public discussions regarding ride-sharing (e.g., Crank, 2015; Zoepf, *et al.*, 2018), six interviews and 47 surveys of ride-sharing service providers and a ride-sharing expert.

The first hypothesis addresses the effects of a hypothetical contract condition which changes the level of flexibility on work intention. Requiring minimum work hours is a contract condition that directly reduces the flexibility of ride-sharing service suppliers. If a service provider accepts this condition of minimum work hours, platform owners may expect more stable supply of sharing economy services in work hours under the assumption that they will try to meet the required work hours. Some drivers may be willing to accept this condition in return for additional benefits from the company but without such offsets, the requirement will likely reduce the willingness to work for a platform. The overall effect of requiring minimum work hours on the anticipated participation rate, work hours, and period of service (the anticipated months of service provision) on the platform is expected to be negative in because workers' utility normally increases with the higher level of flexibility in work schedule. Thus, the first hypothesis is as follows:

> **H1**: Requiring minimum work hours is negatively associated with service providers' willingness to work.

The second set of hypotheses addresses whether ride-sharing service contractual attributes, which may increase stability of ride-sharing, can grow sharing economy service supply. Stability, referred to and measured as job duration, generally increases when the company pays higher wages or provides a means of short-term and long-term financial risk reduction such as an auto insurance with a lower deductible or retirement plans matched by the company (Currie and Maridian, 1999; Kalleberg, Reskin, and Hudson, 2000).

Whether drivers earn the minimum wage while working for ride-sharing is one of the controversial issues that has brought persistent debates and drivers' collective actions. Based on survey data, and detailed vehicle, insurance, and maintenance cost information, Zoepf, Chen, Adu, and Pozo (2018) estimate the median of the pre-tax hourly profit earned from ride-sharing is $3.37[13] after excluding expenses for ride-sharing.[14] They also report 74% of drivers' profit is lower than the minimum wage in their state. Drivers for ride-sharing have held demonstrations as an effort to increase their profits. Some ride-sharing companies such as *Gett* in the United Kingdom guarantees a fixed hourly rate by covering the difference between drivers' earnings and the fixed fare to avoid being criticized for paying unfair compensations. If there exist these concerns of low profits from ride-sharing after excluding costs for ride-sharing which discourages current and

[13] This estimation is based on the authors' initially released working paper (https://orfe.princeton.edu/~alaink/SmartDrivingCars/PDFs/Zoepf_The%20Economics%20of%20RideHialing_OriginalPdfFeb2018.pdf). The authors later announced a statement addressing this estimated hourly pre-tax profit may rise to $10 depending on calculation methods.
[14] Rolf (2016) estimates ride-sharing drivers' average monthly expense on their car, gas, and insurance is $965 in 2015.

potential service suppliers' willingness to work, guaranteeing a minimum wage for drivers might increase the willingness to work for ride-sharing platforms.

This study also examines the effect of granting an option to choose a ride-sharing company-sponsored health insurance or retirement plan matched by the company. Such plans are not currently offered by most ride-sharing service companies, on the supply of ride-sharing service providers (Rolf, 2016). As previous research finds a health insurance and retirement plan increase job satisfaction (Artz, 2010; Barringer and Michell, 1994), offering a health insurance and retirement plan is expected to increase the anticipated participation rate and the work duration for drivers who desire to benefit from these benefit plans because they must participate and keep working for ride-sharing to receive the benefits. However, the direction of effects on the anticipated work hours in the platform is ambiguous. On one hand, benefit plans would increase the overall willingness to work for longer hours on the platform due to workers' desire to work under the increased security conditions in the sharing economy. On the other hand, as the social safety net sometimes reduces individual desire to work, having the benefit plans may result in decrease in driving hours if the driver was working full time on the platform primarily for a certain level of financial security.

Given the mixed expected effect of benefit plans on work intention, main factors in worker's labor supply function such as other sources of income, flexibility and security of other jobs (Ehrenberg and Smith, 2014) are included for more accurate estimation of decision right effects.

The last contractual attribute of ride-sharing is the level of auto insurance deductible. Although ride-sharing service platform owners require all drivers to have their own auto insurance, Rolf (2016) finds 8% of drivers reported they did not carry an auto insurance while working for ride-sharing. Moreover, even if drivers carry a regular auto insurance, many insurance companies have shown reluctance to compensate for accidents occurring during ride-sharing because the probability of having a car accident increases when drivers are driving for ride-sharing as they drive more and providing a service to passengers may involve additional risks. Several lawsuits against ride-sharing companies filed by car accident victims[15] lends support to the insurance company's argument. To reduce this defect and accommodate lawmakers' pressure, *Uber* and *Lyft* currently provide an auto insurance policy with a $1-million coverage amount and a $1000 deductible and $2500 deductible, respectively, when drivers' ride-sharing app is active for ride-sharing. As a lower deductible typically entails a higher premium rate, understanding drivers' perception of the difference in a deductible amount may help ride-sharing companies improve efficiency in resource allocation.

The following set of hypotheses is derived from a presumption that one of the main barriers to increase labor supply to more hours or longer periods can be overcome by offering better working conditions in the ride-sharing service businesses:

> **H2a:** Guaranteeing a minimum wage is positively associated with service providers' willingness to work.
>
> **H2b:** Offering a health insurance sponsored by the ride-sharing company is positively associated with service providers' willingness to work.
>
> **H2c:** Offering a retirement plan matched by the ride-sharing company is positively associated with service providers' willingness to work.
>
> **H2d:** Offering auto insurance with a lower deductible is positively associated with service providers' willingness to work.

[15]See the detailed in Isaac, E. (2014). *Disruptive innovation: Risk-shifting and precarity in the age of Uber*. Berkeley Roundtable on the International Economy,[University of California, Berkeley], https://ekjlaw.com/practice-areas/commercial-vehicle/ride-sharing-accident/ and https://www.kairelaw.com/car-accidents/uber-lawsuits-settlements/

The third set of hypotheses explores how technical attributes the intermediary platform influence service providers' participation. Some ride-sharing platforms provide a passenger rating system and substitute phone numbers that are not available off the platform. A passenger rating system allows service providers to evaluate an individual passenger after each ride to manage lowly rated passengers. This system contributes to a safer and more credible work environment. A substitute phone number function shows a dummy phone number to drivers and their passengers when they communicate to locate each other. By eliminating the need to exchange ride-sharing participants' real phone numbers, this feature helps both parties protect their personal information and privacy. If a platform is not equipped with these technological attributes, service providers' desire to work may decrease. In other words, these technological attributes are expected to increase the participation rate, work hours, and period of service.

> **H3a:** Providing a passenger rating system on the ride-sharing service platform is positively associated with service providers' willingness to work.

> **H3b:** Providing a substitute phone number to protect personal information is positively associated with service providers' willingness to work.

Finally, I explore the relationships between characteristics of alternate jobs and willingness to work for ride-sharing service, using the hypothetical attributes approach. Many ride-sharing service providers have other primary jobs, and the degree to which they are willing to engage with the ride-sharing platform may be affected by the flexibility and security of their other job. Thus, there are potential effects of flexibility and security that need to be examined.

I measure two types of flexibility: the perceived flexibility and contract flexibility. I conjecture that when drivers have a primary job other than ride-sharing, they may show more interest in ride-sharing service provision if the flexibility of their primary job is higher. This is because having more flexibility in work schedule for one's job may indicate the driver can make time for ride-sharing more easily compared to people having a job with lower flexibility. However, if the flexibility of drivers' primary job is high due to their personal preference for flexibility, the drivers are not expected to choose a ride-sharing service attribute which reduces flexibility of ride-sharing. In this case, the perceived flexibility of the worker's alternative job and the interaction term between the perceived flexibility and the required driving hours for ride-sharing would be negatively associated with the willingness to work for ride-sharing.

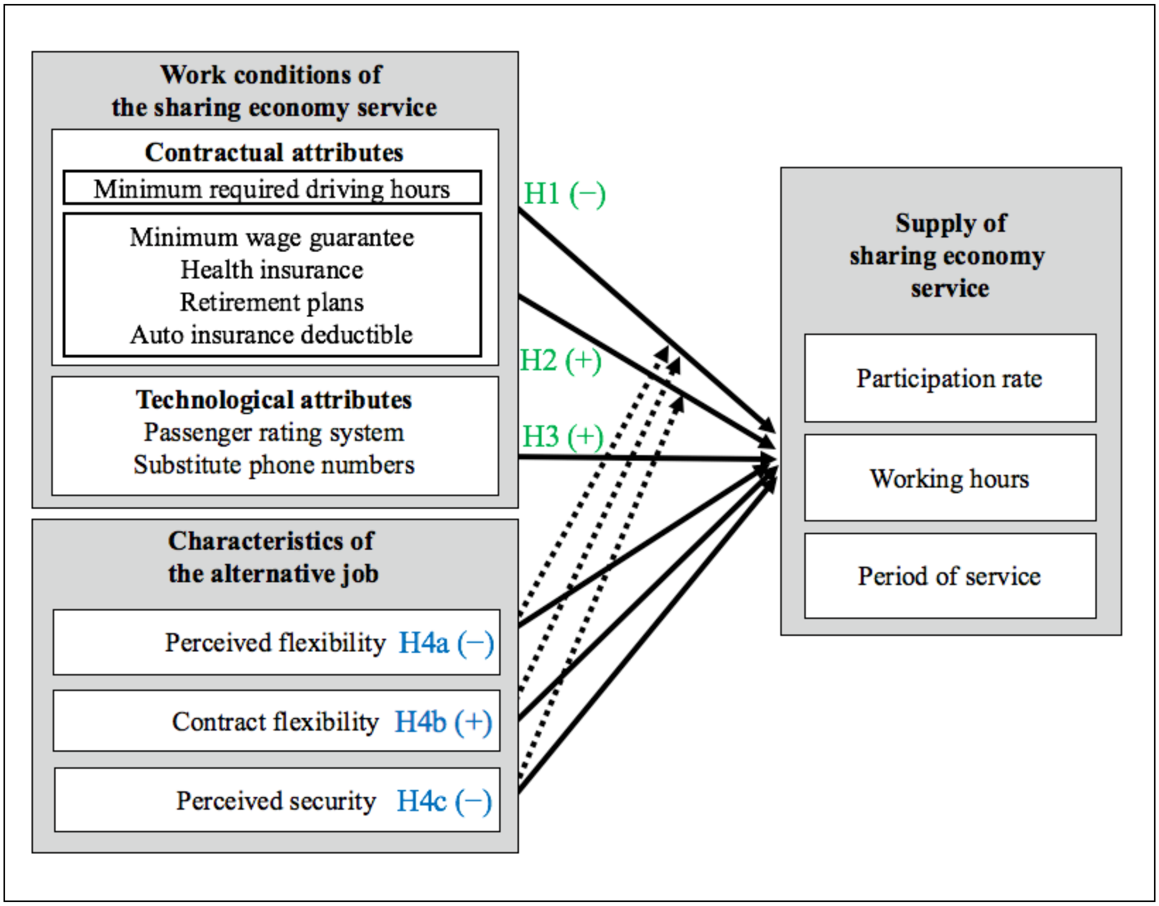
Contract flexibility, the other type of flexibility determined by the type of contract, is also expected to associated positively with the willingness to work for ride-sharing. If drivers' alternative job is based on a flexible contract (not permanent contract, e.g., temporary, seasonal, or fixed term contracts), the drivers may have a higher capacity to work more for ride-sharing. Contract flexibility can contribute to employment flexibility and higher employment flexibility may lead to easier dismissal as the Danish flexicurity system experienced during the financial crisis (Bredgaard and Madsen, 2018). Thus, as employees on a fixed-term or temporary contract (higher contract flexibility) may be more likely to feel they may involuntarily lose their job soon. In other words, there is possibility that higher contract flexibility is interpreted as the lower level of perceived security. If this is the case, the relationship between contract flexibility and willingness to work for ride-sharing would be positive, as I expect the negative relationship between perceived security and willingness to work for ride-sharing. However, if the contract flexibility plays a role of another measure for drivers' perceived flexibility of other job, the relationship between contract flexibility of other job and willingness to work for ride-sharing would be negative.

It is also unclear which types of workers, in terms of their perceived security of their main job, would prefer an attribute enhancing the security through the ride-sharing job. Applying insights from SP/A theory, introduced in Section 2.3., to ride-sharing services, if an individual perceives security of an alternative main job to be sufficiently high, it would increase the probability that a ride-sharing service attribute which contributes to the security does not increase service providers' utility. On the other hand, if the alternative main job does not fulfill this minimum reference point, the workers' perceived risk would rise, and their preferences for a security-related attribute of the ride-sharing service would increase. Thus, if the ride-sharing company matches some of drivers' retirement plan and their primary job is insecure, they are more likely to choose the ride-sharing company to work with. Based on these rationales, the following hypotheses are proposed:

> **H4a:** The perceived flexibility level of an alternative job is negatively associated with service providers' willingness to work for the ride-sharing service.
>
> **H4b:** The contract flexibility level of an alternative job is positively associated with service providers' willingness to work for the ride-sharing service.
>
> **H4c:** The perceived security level of an alternative job is negatively associated with service providers' willingness to work for the ride-sharing service.

Figure 3 shows the overall set of question explored in this study. Note that as this study uses cross-sectional data, it focuses on the cross-sectional associations among attributes.

Figure 3. Framework and Hypotheses



The expected signs of hypothesized relations are depicted in parentheses.

CHAPTER 3: DATA AND RESEARCH DESIGN

3.1. Data

I obtained survey-based online experimental data from ride-sharing service providers in the United States from *Qualtrics* online panels in April-May 2018. Data from *Qualtrics* generally tend to be higher quality than data from *SurveyMonkey* or *Amazon*'s *Mechanical Turk* in terms of generalizability as subjects can participate in research only if they are invited through *Qualtrics,* which reduces self-selection errors (Hagtvedt, 2011).

The instrument was reviewed and approved (Study ID: STUDY00000190) by the Michigan State University Institutional Review Board. The instrument comprises nine parts: introduction, screening questions, ride-sharing working patterns, current benefit plans, perceived importance of ride-sharing working conditions, attention filter, choice experiment, employment status, socio-demographic information questions. To consider the limited cognitive capacity of human brain for critical evaluation in the choice experiment, the number of total attributes is limited to seven, and the maximum number of attributes which display different levels between two options in the choice set is limited to three. Seven most salient ride-sharing attributes as working environments were identified through a literature review on job satisfaction, recent public discussions concerning ride-sharing, and six interviews with ride-sharing drivers and a ride-sharing expert. The initial instrument was revised through two pretests with 7 drivers and 40 drivers, respectively.

To compare differences in the preferences for attributes between active and inactive drivers, samples of similar size for each group were recruited (204 active and 202 inactive drivers). The total sample size of 406 is sufficiently larger than the sample size requirements (see Footnote 5 for more details) calculated based on the most commonly used rule of thumb proposed by Orme (1998), Johnson and Orme (2003). The unit cost per complete response was $15.

6,107 people attempted to participate in the online survey-based choice experiment. Among the participants, 133 people were not able to proceed since they live outside the United States, and 3,933 people were screened out since they have not worked for ride-sharing services. 681 inactive drivers were also screened out because the reasons they quit the ride-sharing service provision were not pertaining to work conditions of ride-sharing. 489 people did not pass an attention check, and other 485 people did not complete the survey. The total number of observations from 406 participants' responses is 7,308 (406 participants × 6 choice sets × 3 options).

3.2. Method and Dependent Variables

This study uses a choice experiment approach to analyze service providers' preferences for service attributes. The discrete choice experiment was developed by Lourviere and Hensher (1982), and Louviere and Woodworth (1983). This method is rooted in Lancaster's consumer theory (Lancaster, 1966) and random utility theory (McFadden, 1974). A key assumption of the Lancasterian approach to consumer theory is that individuals' utility is determined based on the characteristics of goods or services rather than on the goods or services themselves. Random utility theory assumes that decision makers choose one of the mutually exclusive alternatives, which delivers the highest utility in their choice set. In the sense that selecting a platform company to work with can be understood as selecting a product composed of work condition attributes by providing one's labor, the choice experiment has been often employed to analyze workers' decision to work (e.g., Cohn, Fehr, and Goette, 2014; Kolstad, 2011; Lanfranchi, Narcy, and Largeum, 2010; Mangham and Hanson, 2008)

I analyze two types of responses to gain a deeper understanding of drivers' decision to work: discrete and ordered categorical data. I use the discrete response to analyze drivers' general preferences for ride-sharing platform attributes, and use the ordered categorical data to test my hypotheses.

The first type of the dependent variable is discrete which is 1 when an option is chosen or 0 when the option is not chosen by a participant. For each option in a choice set, participants decide whether to work with the option. In this choice experiment, each choice set shows two options composed of work condition attributes, and participants choose an option which can increase their utility most. A participant can choose not to work under the work conditions described in the two options if either work option would not increase the participant's utility as much as the no work option. A passenger rating system and substitute phone numbers are also added as technological features composing work conditions only available on the platform. Drivers would not be able to use them if they provide services outside the digital platform. Including these attributes allows the examination of their importance in drivers' platform selection.

The relative importance of each work condition compared to the other conditions in the choice set is examined by running a random parameter logistic (RPL) regression as one of the most commonly used method of the discrete choice experiment due to its superiority for confirming heterogeneity in respondents' preferences. The random parameter logit allows heterogeneity as a continuous function of the random parameters underlying the distribution of the sample (Bhat, 1998; Nahuelhual, Loureiro, and Loomis, 2004), providing a reasonable level of accuracy using less detailed data (Anastasopoulos and Mannering, 2011).

The second type of responses is ordered categorical data which shows drivers' willingness to change in participation rate, work hours, and work duration. For the chosen work option in the choice set, the participant replies whether the participant *i*'s willingness to work (Y_{iat}) would decrease ($Pr(Y_{iat}=1)$), no change ($Pr(Y_{iat}=2)$), or increase ($Pr(Y_{iat}=3)$). The willingness to work

(Y_{iat}) is measured by an individual's anticipated participation rate (PR_{iat}), anticipated working hours (WH_{iat}), and anticipated working period (WP_{iat}). Using the generalized ordinal logistic regression model, the ordinal responses are analyzed to estimate the marginal effect of each variable on individuals' work intention for ride-sharing. Unlike the first type of discrete choice responses, this categorical data is not balanced as participants are asked to report their willingness to work only if they choose a work option. Reflective of this fact, the generalized ordered logistic regression was selected to examine ordered categorical responses following prior research (e.g., Origo and Pagani, 2009) in labor economics examining job satisfaction. The main advantage of the method is relaxing a restriction of the proportional odds assumption which assumes the effect of each predictor is identical across the categories of the work intention variable (Fu, 1998; Williams, 2006).

The discrete choice responses and work conditions attributes can be written as in equation (1).

$$U_{iat} = \alpha_i h_{iat} + \boldsymbol{\theta}' \boldsymbol{v}_{iat} + \varepsilon_{iat} \quad (1)$$

U_{iat} is a binary utility variable which is 1 for the chosen option in the choice set and 0 for unchosen options. This equation presents individual i's utility derived from choosing an alternative a among available alternatives that are included in a choice set C_{it} in a choice situation t (Loureiro and Umberger, 2007). h_{iat} is a vector of the minimum required weekly driving hours, and $\boldsymbol{v}_{iat}$ is a vector composed of other contractual attributes of a ride-sharing service and technological attributes of a ride-sharing application. α_i and $\boldsymbol{\theta_i}$ are assumed to be a vector of normally distributed random parameters that are driver specific. ε_{iat} is a Gumbel-distributed random error component. The Gumbel distribution is characterized by the scale parameter μ_i and the variance of Var(ε_{iat}) = $\mu_i^2(\pi^2/6)$. By the scale parameter μ_i, equation (1) is scale-free with the constant variance of ε_{iat} and can be simplified as:

$$U_{iat} = \boldsymbol{\beta}'\boldsymbol{z}_{iat} + \varepsilon_{iat} \tag{2}$$

Then, the probability of selecting an alternative a from a choice set C_{it} takes the form of

$$P_{iat} = \int \frac{\exp(\boldsymbol{\beta}'\boldsymbol{z}_{iat})}{\sum_j \exp(\boldsymbol{\beta}'\boldsymbol{z}_{ijt})} f(\boldsymbol{\beta}|\boldsymbol{\theta}) d\boldsymbol{\beta} \tag{3}$$

where $f(\boldsymbol{\beta}|\boldsymbol{\theta})$ is the distribution of the random parameters (Train, 2009).

Given utility's non-cardinal nature, marginal utility coefficients ($\boldsymbol{\beta}$) can be transformed into more meaningful values or implicit willingness to work for each of the attributes. A driver i's utility can be written as:

$$U_{iat} = \lambda_i h_{iat} + (\lambda_i \boldsymbol{w}_i)'\boldsymbol{v}_{iat} + \varepsilon_{iat} \tag{4}$$

where the utility coefficients are parameterized as λ_i = (α_i/μ_i) and $\boldsymbol{w}_i$ = $(\boldsymbol{\theta}_i/-\alpha_i)$. I assume λ_i follows a truncated triangular distribution spanning negative values and $\boldsymbol{w}_i$ follows a triangular distribution spanning positive values. λ_i is assumed to be negative considering the negativity of the expected association between the required work hours one's utility (yielding a negative estimated value of α_i), and a positivity of the scale parameter μ_i. By estimating $\boldsymbol{w}_i$, the willingness to work for each feature is estimated and compared. Reflective of the fact that a truncated triangular distribution is bounded, it is often adopted to avoid the problem of extreme values, implying unlimited high values in willingness to work, in long tails associated with other distributions such as log-normal or truncated normal distributions (Alfnes, Guttormsen, Steine, and Kolstad, 2006; Hensher and Greene, 2011).

For ordered categorical responses, the second type of dependent variable, following generalized ordered logistic regression, is modeled:

$$\ln(Y'_{iat}) = \ln\left(\frac{\pi_{iat}(\boldsymbol{x})}{1-\pi_{iat}(\boldsymbol{x})}\right) = \gamma_{0iat} + (\gamma_{1iat}X_1 + \gamma_{2iat}X_2 + \cdots + \gamma_{piat}X_p) \quad (5)$$

Each of the three dependent variables is classified into three values reflecting the effect of an option on the willingness to work: an individual i would decrease (Equation 6), not change (Equation 7), increase (Equation 8) the participation rate, weekly working hours, or future working period compared to individuals' current ride-sharing service provision patterns. X contains ride-sharing attribute variables, ride-sharing pattern variables, employment characteristics and individual characteristics variables, and β_{pi} is a coefficient associated with p^{th} predictor of an individual i. These three work intention variables (PR_{iat}, WH_{iat}, and WP_{iat}) and the latent variable of the willingness to work (Y^*_{iat}), are given by the following equations:

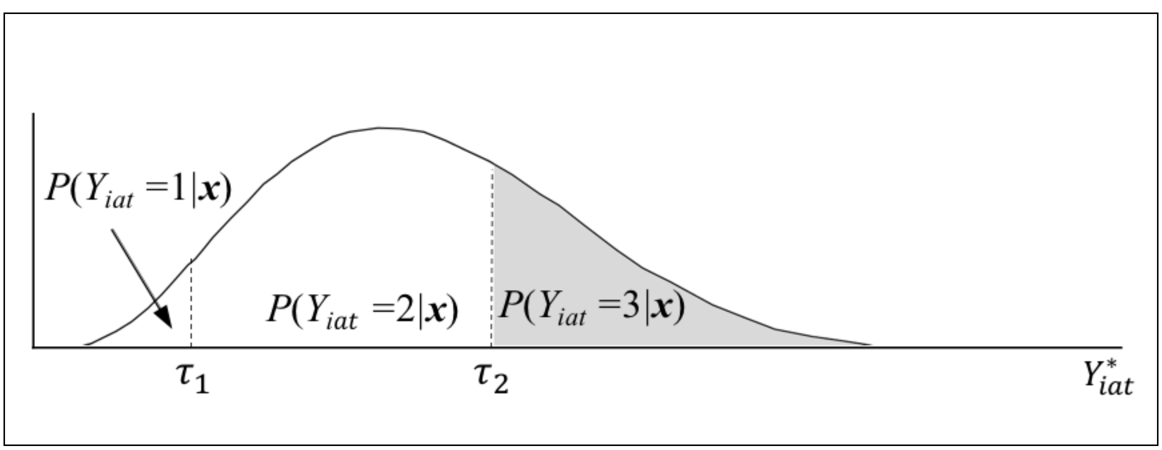
$$Y_{iat} = 1 \text{ if } -\infty < Y^*_{iat} \leq \tau_1 \quad (6)$$

$$Y_{iat} = 2 \text{ if } \tau_1 < Y^*_{iat} \leq \tau_2 \quad (7)$$

$$Y_{iat} = 3 \text{ if } \tau_2 < Y^*_{iat} \leq +\infty \quad (8)$$

where τ_1 and τ_2 are the thresholds of Y^*_{iat} which categorize different levels of individual's willingness to work.

Figure 4. Conceptual Plot for Ordered Response and Its Latent Variable



The generalized ordinal logistic regression can be re-written as

$$\Pr(Y_{iat} > \tau) = g(\boldsymbol{X\gamma_l}) = \frac{\exp(\boldsymbol{X_{iat}\gamma_l})}{1+\exp(\boldsymbol{X_{iat}\gamma_l})} \tag{9}$$

where g(·) is the logistic cumulative distribution function. Using this function, the probability of being in category 1, 2, or 3 is represented as:

$$\Pr(Y_{iat} = 1) = 1 - g(\boldsymbol{X}_{iat}\boldsymbol{\gamma_1}) \tag{10}$$

$$\Pr(Y_{iat} = 2) = g(\boldsymbol{X}_{iat}\boldsymbol{\gamma_1}) - g(\boldsymbol{X}_{iat}\boldsymbol{\gamma_2}) \tag{11}$$

$$\Pr(Y_{iat} = 3) = g(\boldsymbol{X}_{iat}\boldsymbol{\gamma_2}) \tag{12}$$

As an additional analysis for deeper understanding of drivers' preferences for working conditions by categorizing drivers into more homogenous classes, I use the latent class approach (a latent class logit model, LCM). LCM sorts the heterogeneity in respondents' preferences into *S* latent classes, and as a result, individuals' characteristics in each class become more homogeneous (Boxall and Adamowicz, 2002). This analysis allows understanding characteristics of more homogeneous classes when the RPL result shows heterogeneity in participants' preferences. The probability of selecting an alternative *a* in a situation *t* takes the form of

$$P_{iat} = [\textstyle\sum_{s=1}^{S} \exp(\boldsymbol{\beta_s}'\boldsymbol{z}_{iat}) / \sum_j \exp(\boldsymbol{\beta_s}'\boldsymbol{z}_{ijt})] M_{is} \tag{13}$$

where $\boldsymbol{\beta_s}$ denotes a parameter vector for a specific class *s*, and M_{is} is the probability of individual *i* falling into class *s*. M_{is} is modelled as

$$M_{is} = \exp(\boldsymbol{m}_s'\boldsymbol{k}_i) / \textstyle\sum_r \exp(\boldsymbol{m}_r'k_i) \tag{14}$$

where $\boldsymbol{m}_s$ denotes a parameter vector for members in the class *s*. $\boldsymbol{k}_i$ is a set of characteristics such as age, educational attainment, perceived flexibility, and perceived security that are expected to mainly influence individual *i* in the class *s*.

3.3. Independent Variables and Control Variables

The main independent variables of this study are hypothetical working condition-related attributes of ride-sharing and employment characteristics of individuals' primary job when ride-sharing is a secondary job.

The five hypothetical working conditions, which influence perceived job flexibility and security, capture whether the ride-sharing service company requires specified minimum driving hours per week for ride-sharing, provides a health insurance or/and retirement benefits, guarantees the minimum wage, and offers an auto insurance policy with a lower deductible than other ride-sharing companies. These are used to test the first two sets of hypotheses. The five most salient contractual attributes and two technological attributes of the ride-sharing app were identified based on the literature review for labor economics (e.g., Chen, Chevalier, Rossi, and Oehlsen, 2017; Employment Committee, 2006; Hall and Krueger, 2015; Remler and Glied, 2003), interviews and pretests with drivers and a ride-sharing expert.

The levels of the attributes were determined based on current practices of major ride-sharing apps. A choice set shows 40 hours, 20 hours, or 0 hour as the minimum required driving hour option considering 35-40 hours is the most common standard work hours for a workweek (Wight, Raley, and Bianchi, 2008). The deductible levels of $1,000 and $2,500 were chosen to reflect *Uber*'s and *Lyft*'s auto insurance policy, respectively (see Appendix C for the instruction of the choice experiment and an example of a choice set shown to participants).

The two technological hypothetical situations included in this study are whether a passenger rating system is available on the ride-sharing service app, and whether the app shows a substitute phone number to a passenger to protect the driver's private information. Six interviews and two pretests were conducted to identify important factors in ride-sharing service providers' work decision. The two pretests obtained 7 and 40 ride-sharing service providers, respectively.

Table 2. Attributes and Descriptions

Type	Service Attribute	Attribute Levels	Descriptions
Contractual attribute	Minimum required driving hours per week (*Hours*)	0, 20, 40	The ride-sharing service company may require a specified number of minimum driving hours per week of 0 hour, 20 hours, or 40 hours. Drivers can drive for a longer time than the minimum hours.
	Health insurance (*Health*)	Yes	The ride-sharing service company provides a health insurance with standard insurance coverage.
		No	The ride-sharing service company does not provide a health insurance with standard insurance coverage.
	Retirement (*Retirement*)	Yes	The ride-sharing service company matches some or all of your retirement plan.
		No	The ride-sharing service company does not match some or all of your retirement plan.
	Minimum wage guarantee (*Wage*)	Yes	The ride-sharing service company covers the difference between drivers' earnings and the minimum wage of your city if their acceptance rate is higher than 80%.
		No	The ride-sharing service company does not cover the difference between drivers' earnings and the minimum wage in your city.
	Auto insurance deductible (*Deductible*)	$1000	The ride-sharing company offers an insurance policy with a $1,000 deductible in case of an accident whether it was your fault or not, as long as a driver maintains auto insurance that includes collision coverage for that vehicle while not on a ride-sharing trip. The coverage amount is $1 million.
		$2500	The ride-sharing company offers an insurance policy with a $2,500 deductible in case of an accident whether it was your fault or not, as long as a driver maintains auto insurance that includes collision coverage for that vehicle while not on a ride-sharing trip. The coverage amount is $1 million.
Technological attribute	Passenger rating system (*Rating*)	Yes	A driver can evaluate an individual passenger after rides. Only highly rated passengers can use the application.
		No	A passenger rating system is not available.
	Substitute phone numbers (*Phone*)	Yes	The ride-sharing app shows a dummy phone number instead of drivers' actual phone number to passengers when they communicate the passengers.
		No	The app shows your actual phone number to passengers when the driver contacts them.

The employment characteristics of interest are perceived flexibility, contract flexibility, and perceived security. A flexible contract is considered a contract for seasonal, temporary, or casual jobs, and a fixed time employment (Origo and Pagani, 2009). Perceived flexibility of the alternative job is evaluated using the question "How likely or unlikely do you think it is that you are able to choose when, where, and for how long you work for your current primary job?" based on the definition of job flexibility (Hill *et al*., 2008). Perceived security of the alternative job is evaluated using the question "How likely or unlikely do you think it is that you might lose your current primary job for some reasons over the next twelve months?" following the previous literature (Origo and Pagani, 2009). Participants reply to these questions by choosing one of the four levels of likelihood: "Not at all likely," "Not very likely," "Quite likely," or "Very likely."

This study also employs control variables which present ride-sharing work patterns (self-reported average hourly wage of ride-sharing, weekly work hours for ride-sharing, and the percentage of the average annual income from ride-sharing) and demographic characteristics (age, gender, educational attainment, household income, individual income, and household size) frequently used in the labor economics literatures (Millan, Hessels, Thurik, and Aguado, 2013; Origo and Pagani, 2009). The survey instrument also collected an individual driver's current driving patterns (driving hours, average earnings per week, the proportion of income from ride-sharing, tenure, primary working location, expected job duration), current spending on a health insurance and retirement plans, the willingness to pay for a health insurance and retirement while working on the ride-sharing service platform, current alternative employment characteristics (job status, types of contract, hours of work, perceived flexibility, perceived security), and socio-demographic indicators (gender, age, educational attainment, household size, and individual and household income level).

3.4. Experimental Research Design

Since this study examines the effect of hypothetical work conditions on the willingness to work which is not observable, the following choice experiment was designed. The key working conditions included in the choice experiment are five contractual attributes (the minimum required driving hours per week, minimum wage guarantee, company-sponsored health insurance, company-sponsored retirement plan, and an auto insurance with different levels of deductible) and two technical attributes (a passenger rating system and substitute phone number function).

A full factorial experimental design would require $(3\times2\times2\times2\times2\times2\times2)^2$=36,864 choice sets for combinations of the seven attributes with multiple levels of each attribute and two choice options. To keep the number manageable, this study uses a fractional factorial design with six choice scenarios through D-optimal design and the OPTEX procedure in SAS 9.3 (see Figure 5 for an example of a choice set). 406 valid surveys yield a statistical sample of 2,436 choice sets (406 observations with six choice sets).

To present participants with choice-sets containing more varied options, I generated four different blocks which contains six choice sets. Each respondent was randomly assigned to one of the four blocks and six choice sets were given in a random order to avoid the situation where respondents' choices are affected by the order of the choice sets. Once a respondent chooses an option among three alternatives, the respondent decides to increase or decrease, or not to change driving hours and future work period for ride-sharing services for the option s/he chose.

Figure 5. Example of a Choice Set

Attribute	Option 1	Option 2
Minimum required driving hours per week	0 hour	0 hour
Health insurance The ride-sharing company provides your health insurance with average coverage.	No	No
Retirement The ride-sharing company matches all or some of your retirement plan.	No	No
Minimum wage guarantee The company covers the difference between your hourly earning and minimum wage if your acceptance rate is higher than 80%.	Yes	Yes
Passenger rating system You can evaluate a passenger after providing a ride.	No	Yes
Substitute phone numbers Your phone number is disclosed when you communicate with passengers.	No	No
Auto insurance deductible The company offers an insurance policy with a $1,000 or $2,500 deductible and a $1 million of a total coverage for ride-sharing.	$1000	$2500

- ○ I would choose Option 1
- ○ I would choose Option 2
- ○ I would not choose either option

CHAPTER 4: RESULTS

4.1. Descriptive Statistics and Discrete Choice Analysis

Table 3 displays socio-demographic statistics of the final sample of 406 ride-sharing drivers. The data shows that, overall, active drivers and inactive drivers have similar socio-demographic characteristics. The mean age of drivers in the final sample is 36 and 54% are male. 87% of participants have driven for Uber and 52% of participants for Lyft. Based on participants' self-reported responses, they have driven for ride-sharing for 1.4 years on average. The average number of weekly work was 33.4 hours, and the average hourly wage for ride-sharing was $20.08. 37% of participants have an alternative primary job(s) other than ride-sharing. Active drivers generally show shorter ride-sharing experience, longer weekly driving hours, and higher hourly wage than inactive drivers, which may imply that although the inactive drivers no longer drive or have not driven for ride-sharing, the level of their engagement with ride-sharing or dependence on ride-sharing was slightly higher than current active drivers.

Table 3. Socio-Demographic Statistics

Variables	All drivers	Active drivers	Inactive drivers
Number of individuals (A)	406	204	202
Number of observations (A × 18)	7,308	3,672	3,636
Age (mean ± st.dev)	35.9 (±11.9)	36.3 (±12.3)	35.6 (±11.4)
Male (%)	53.69	49.02	58.42
Educational attainment (%)			
Primary	5.17	3.43	6.93
Secondary	21.43	22.06	20.79
Associate	25.37	24.02	26.73
Undergraduate	32.51	33.33	31.68
Graduate/professional	14.53	16.16	12.38
Other	0.99	0.49	1.49
Household annual income (%)			
< 15,000	5.67	4.90	6.44
15,000-24,999	10.10	10.78	9.41

Table 3 (cont'd)

25,000-49,999	27.34	27.45	27.23
50,000-74,999	25.12	26.47	23.76
75,000-99,999	15.27	13.24	17.33
100,000-124,999	7.39	7.35	7.43
125,000-149,999	4.68	5.88	3.47
>150,000	4.43	3.92	4.95
City (%)			
New York City	15.02	13.73	16.34
Los Angeles	14.29	14.22	14.36
Chicago	7.39	4.41	10.40
San Francisco	5.42	4.90	5.94
Washington D.C.	3.45	2.94	3.96
Boston	2.71	2.45	2.97
Other cities	51.72	57.35	46.03
Race (%)			
White	66.50	67.65	65.35
Hispanic or Latino	13.79	14.22	13.37
Black or African American	13.79	9.31	18.32
Asian or Pacific Islander	4.19	6.86	1.49
Native American	0.74	0.98	0.50
Other	0.99	0.98	0.97
Ridesharing app experience (%)			
Uber	87.68	90.20	85.15
Lyft	52.46	56.37	48.51
Via	6.40	5.39	7.43
Others	5.91	3.92	7.92
Ridesharing service provision experience (years)	1.4 (±1.1)	1.3 (±1.1)	1.4 (±1.1)
Weekly driving hours for ridesharing	33.4 (±16.2)	29.6 (±16.1)	37.3 (±15.4)
Anticipated ride-sharing service provision period (years)	2.0 (±1.8)	2.0 (±1.8)	-
Hourly wage for ridesharing	20.1 (±10.7)	19.8 (±9.6)	20.3 (±11.8)
Other primary job (%)	37.4	48.0	26.7
Percentage of earnings from ride-sharing service	44.1 (±29.2)	43.0 (±30.4)	45.2 (±28.0)

The percentage of female respondents in the data is similar to the U.S. Census Bureau data for the U.S. population.[16] The proportion of participants whose educational attainment is an undergraduate or graduate degree is higher than that of the U.S. Census Bureau data in 2016.[17] The proportion of participants whose household annual income ranging from $15,000 to $99,999 (in the range of not extremely low nor high household income level) in this study is higher than that in the U.S. Census Bureau data.[18] The proportion of the drivers who work for or worked for ride-sharing primarily in the six largest cities in terms of active *Uber* drivers (Hall and Krueger, 2015) is 48% while the proportion of U.S. population in the cities is 5%.[19] The distribution of race is similar to the census data.[20] These comparisons may indicate that people whose educational attainment is an undergraduate degree, whose household income ranges from $15,000 to $99,999, and who primarily work in big cities are more likely to participate in ride-sharing.

Before presenting details of the findings, I examine which attributes of ride-sharing affect participants' decision to work to get a preliminary idea of drivers' preferences for each attribute using the most parsimonious model only investigating the relationship between platform attributes

---

[16] The data source is "Age and Sex Composition in 2010 (https://www.census.gov/prod/cen2010/briefs/c2010br-03.pdf)." More recent survey data from the Census QuickFacts (https://www.census.gov/quickfacts/fact/table/US/PST045217#qf-headnote-a) shows similar statistics of the gender composition. Hall and Krueger's survey (2015) examining Uber drivers shows a much higher percentage of male participants than my data and the U.S. census data.

[17] The data source is "Educational Attainment in the United States 2016 (https://www.census.gov/data/tables/2016/demo/education-attainment/cps-detailed-tables.html". The survey conducted by Hall and Krueger (2015) shows the proportion of respondents whose educational attainment is the undergraduate degree is higher than their proportion in the aforementioned U.S. census data.

[18] The data source is "Income and Poverty in the United States 2016 (https://www.census.gov/content/dam/Census/library/publications/2017/demo/P60-259.pdf." Hall and Krueger's work (2015) does not report participants' household income information.

[19] The data source is "City and Town Population Totals: 2010-2016 (https://www.census.gov/data/tables/2016/demo/popest/total-cities-and-towns.html)." Hall and Krueger's work (2015) does not include the distribution of city population in their sample.

[20] The census data is from https://www.census.gov/quickfacts/fact/table/US/PST045217#qf-headnote-a. Compared to the race distribution of my data and the census data, Hall and Krueger' survey data (2015) presents a much lower proportion of white respondents.

and drivers' preferences for the attributes. The discrete dependent variable, which indicates the drivers' utility for an option, is 1 when the option was selected or 0 when not selected).

The RPL model result in Table 4 shows that that all working condition attributes included in the choice set influence drivers' choices with expected directions. Drivers' utility decreases when the ride-sharing service company requires minimum driving hours (*Hours*), and their utility increases when the company provides a health insurance (*Health*), matches some or all of drivers' retirement plan (*Retirement*), guarantees the minimum wage of the city where they provide ride-sharing services (*Wage*), or offers an insurance policy with a smaller deductible (*Deductible*). A passenger rating system for safer work environments (*Rating*) and a substitute phone number for privacy protection (*Phone*) also increases drivers' utility. The relatively large magnitude of coefficients on *Health*, *Wage*, and *Retirement*, compared to the coefficients on the other attributes, in both active driver and inactive driver groups implies that guaranteeing the minimum wage and providing benefit plans may increase both groups' willingness to work for ride-sharing. *Deductible* does not significantly affect both driver groups' decision.

Regarding *Phone*, active drivers' utility increases when the company provides a function of the platform which shows drivers' dummy phone number to passengers, helping drivers avoid unnecessary interactions after ride-sharing service provision. However, inactive drivers are not significantly affected by the availability of this substitute phone number function. This may imply that while a service providers' private information protection function may not effectively re-motivate inactive drivers to work for ride-sharing, the platform providing the private information protection function may raise their willingness to work for ride-sharing services. The statistical significance on standard deviations of coefficients shows the heterogeneity in drivers' preferences for the corresponding attribute.

Table 4. Parameter Estimates from Random Parameters Models

Variable	All drivers		Active drivers		Inactive drivers	
Hours	-0.025***	(0.006)	-0.033***	(0.009)	-0.019**	(0.008)
Health	0.605***	(0.085)	0.526***	(0.114)	0.616***	(0.119)
Retirement	0.344***	(0.064)	0.269***	(0.085)	0.392***	(0.089)
Wage	0.461***	(0.051)	0.459***	(0.073)	0.506***	(0.074)
Deductible	0.145**	(0.068)	0.141	(0.092)	0.132	(0.105)
Rating	0.220***	(0.046)	0.225***	(0.064)	0.184***	(0.067)
Phone	0.179***	(0.051)	0.288***	(0.083)	0.078	(0.071)
Health × Deductible	0.116	(0.100)	0.067	(0.129)	0.215	(0.151)
Opt Out	-2.322***	(0.164)	-2.292***	(0.221)	-2.330***	(0.239)
STDEV(Hours)	0.074***	(0.005)	0.079***	(0.008)	0.072***	(0.008)
STDEV(Health)	0.636***	(0.088)	0.523***	(0.135)	0.582***	(0.136)
STDEV(Retirement)	0.591***	(0.088)	0.469***	(0.149)	0.504***	(0.136)
STDEV(Wage)	0.382***	(0.113)	0.407***	(0.142)	0.270*	(0.158)
STDEV(Deductible)	0.362***	(0.113)	0.243	(0.157)	0.585***	(0.121)
STDEV(Rating)	0.288***	(0.110)	0.354***	(0.126)	0.306**	(0.129)
STDEV(Phone)	0.043	(0.137)	0.468***	(0.168)	0.064	(0.132)
STDEV(Health × Deductible)	0.868***	(0.098)	0.600***	(0.148)	1.037***	(0.153)
N	406		204		202	
Log-likelihood	-2186		-1108		-1071	
Adj.pseudo R-squared	0.183		0.176		0.195	
AIC/N	1.809		1.839		1.796	

Notes: *, **, and *** denote statistical significance at the .10, .05, and .01 level, respectively. Standard errors are reported in parentheses. Parameters were estimated using NLOGIT 6.

Drivers' preferences for the attributes can be also presented in the unit of required driving hours for ride-sharing, which the drivers must relinquish for preferable working conditions. Table 5 shows how many required hours drivers are willing to work for ride-sharing to benefit from each attribute as a trade-off. On average, drivers are willing to work for ride-sharing for 8.1 hours, 6.5 hours, and 9.9 hours to benefit from a ride-sharing company–sponsored health insurance, retirement plan, and minimum wage guarantee, respectively. The willingness to work for a health insurance (13.2 hours), retirement plan (9.4 hours), and minimum wage guarantee (12.1 hours) is higher for inactive drivers than active drivers, meaning that inactive drivers demand financial security more than active drivers even if they need to sacrifice their flexibility.

Table 5. Willingness to Work, Mean [95% Confidence Interval]

Variable	All drivers		Active drivers		Inactive drivers	
Health	8.114***	[4.444, 11.785]	7.529***	[4.583, 10.475]	13.246***	[7.410, 19.083]
Retirement	6.516***	[4.821, 8.211]	4.573***	[2.400, 6.746]	9.391***	[6.079, 12.703]
Wage	9.857***	[7.786, 11.928]	6.424***	[3.867, 8.980]	12.068***	[7.964, 16.173]
Deductible	-0.484	[-3.328, 2.361]	-0.078	[-2.283, 2.127]	-0.655	[-5.278, 3.968]
Rating	7.021***	[5.294, 8.747]	3.373***	[1.364, 5.381]	7.686***	[3.828, 11.544]
Phone	3.109***	[0.775, 5.443]	3.248***	[0.961, 5.536]	0.710	[-3.443, 4.864]
Health × Deductible	11.668***	[7.272, 16.065]	4.950***	[1.591, 8.309]	10.149***	[2.873, 17.424]
N	406		204		202	
Log-likelihood	-2247		-1106		-1059	
Adj.pseudo R-squared	0.160		0.177		0.204	
AIC/N	1.859		1.837		1.777	

Notes: *, **, and *** denote statistical significance at the .10, .05, and .01 level, respectively.

4.2. Decision to Work and Working Conditions

The overarching interest of this study is to investigate the effect of attributes on change in drivers' willingness to work measured by change in the anticipated participation rate, driving hours, and work duration for ride-sharing. Table 6 summarizes participants' responses to different 12 ride-sharing work options (2 options × 6 choice sets) composed of different available attributes. The total number of observations indicates the total number of options in the choice experiment for which participants' willingness to work was revealed. Since I do not observe whether participants would change their willingness to work for the options they did not choose, the options which were not chosen are excluded from this analysis of changes in willingness to work.

Table 6. Anticipated Changes in Work Intention

Variables	All drivers	Active drivers	Inactive drivers
Number of individuals	406	204	202
Number of observations	2,858	1,458	1,400
Anticipated change in the participation rate (%)			
PR = 1: decrease	16.38	32.10	-
PR = 2: no change	47.80	67.90	26.86
PR = 3: increase	35.83	-	73.14
Anticipated change in the weekly working hours for ridesharing (%)			
WH = 1: decrease	18.61	36.49	-
WH = 2: no change	26.38	25.93	26.86
WH = 3: increase	55.00	37.59	73.14
Anticipated change in the working period for ridesharing in years (%)			
WP = 1: decrease	20.68	40.53	-
WP = 2: no change	27.12	27.37	26.86
WP = 3: increase	52.20	32.10	73.14

For an option in the choice set, an individual driver's participation rate is binary which is 1 if the platform option is chosen, and 0 if the platform option is not chosen. Because active drivers are already participating in ride-sharing, their current participation rate for the current platforms they are using is 1, and their participation rate cannot increase. Similarly, since inactive drivers' current participation rate, current driving hours for ride-sharing, and anticipated working period for ride-sharing are 0, the probability of decreasing inactive drivers' participation rate, working hours, and working period for ride-sharing is 0 and cannot decrease. However, for active drivers were able to reply that they would decrease their working hours or future working period for each option. These responses (decrease in work hours, decrease in work period) were coded as *WH* = 1 and *WP* = 1, respectively. Note that as the current involvement status in ride-sharing is different between active drivers and inactive drivers and as the focus of this main analysis rests in the anticipated change in the willingness to work, the same work decisions are differently interpreted depending on drivers' current involvement status. For example, if active drivers choose a work option in the choice set, their choices are interpreted as no change in the anticipated participation rate (*PR* = 2: no change). However, if inactive drivers choose a work option, their responses are coded as an increase in the anticipated participation rate (*PR* = 3: increase) as the drivers are not currently participating or marginally participating in ride-sharing service provision. Inactive drivers' willingness to increase their participation rate, working hours, and working period for ride-sharing are identically coded because if inactive drivers choose to participate in ride-sharing, that means their anticipated working hours and working period also increase.

Table 7 reports the generalized ordinal logistic regression results including major independent variables of interest, ride-sharing service attributes. As this study focuses on articulating which attributes may increase or decrease drivers' willingness to work, I present the marginal effects of each variable related to the decrease (1: Decrease) and increase (3: Increase) categories, omitting the no change (2: No change) category. The coefficients indicate the marginal effect of a corresponding variable on the probability of each category. Factors which decrease active drivers' participation rate and factors which increase inactive drivers' participation are examined. Active drivers who are already participating in ride-sharing cannot increase their participation rate, and inactive drivers who no longer work for ride-sharing cannot decrease their participation rate.

The first column shows marginal effects of each variable on the probability of active drivers' being in category 1 (1: Decrease in active drivers' participation rate). Active drivers are less likely to participate in ride-sharing when the number of minimum required weekly driving hours increases, holding other predictor variables constant. [21] Active drivers are less likely to participate

[21] The coefficient 0.54 is interpreted that the probability of decreasing active drivers' participation rate (Pr(1: Decrease in active drivers' participation rate)) rises by 0.54% when the minimum required weekly driving hours increases by 1 hour, holding other predictor variables constant.

in ride-sharing when the minimum number of required driving hours increases *ceteris paribus*.[22] However, the marginal effect of the minimum required driving hours on increasing active drivers' willingness to work is not statistically significant.

Active drivers are generally less likely to decrease their willingness to work for ride-sharing when the other ride-sharing attributes (health insurance support, retirement plan support, minimum wage guarantee, auto insurance deductible of $1,000, passenger rating system, and substitute phone number) are available on the platform option. An auto insurance providing a lower deductible has a marginal statistical significance on the probability of change in the working period only. When a deductible of an auto insurance decreases from $2,500 to $1,000, active drivers are less likely to decrease and more likely to increase working duration for ride-sharing.[23] However, the effect of the deductible amount on the active drivers' participation rate and working hours is not statistically significant. This may indicate that drivers viewing a ride-sharing job as a short-term job tend to place an insignificant value on a $1,500 difference in an auto insurance deductible provided by the ride-sharing service company.

Similar to active drivers, the probability of increasing inactive drivers' willingness to work is lower when the minimum required driving hours increases, and the probability is higher when the service company's health insurance support, retirement plan support, minimum wage guarantee, auto insurance deductible of $1,000, and passenger rating system become available. Consistent with the RPL parsimonious model analysis result, a substitute phone number does not increase the probability of increasing inactive drivers' willingness to work.

---

[22] The probability of decreasing active drivers' working hours and working period rises by 0.59% and 0.62%, respectively when the minimum required driving hours increases.

[23] The probability of decreasing active drivers' working period lower by 3.20% and the probability of increasing active drivers' working period rises by 2.89% when a deductible of an auto insurance decreases from $2,500 to $1,000.

Table 7. Generalized Ordered Logit Results: Full Sample

Variable	Active drivers										Inactive drivers	
	Participation rate		Working hours for ride-sharing				Working period for ride-sharing				Participation rate, working hours, working period	
	Pr(1: Decrease)		Pr(1: Decrease)		Pr(3: Increase)		Pr(1: Decrease)		Pr(3: Increase)		Pr(3: Increase)	
	Marginal effects (%)	z	Marginal effects (%)	z	Marginal effects (%)	z	Marginal effects (%)	z	Marginal effects (%)	z	Marginal effects (%)	z
Ridesharing attributes												
Hours	0.54***	5.40	0.59***	5.91	-0.14	-1.39	0.62***	5.93	-0.09	-0.89	-0.21**	-2.20
Health	-5.71***	-2.80	-5.56***	-2.98	5.47***	2.99	-8.39***	-4.11	5.10***	2.68	6.58***	3.51
Retirement	-2.37*	-1.79	-3.84***	-3.17	3.77***	3.17	-4.00***	-3.09	3.62***	3.09	3.25**	2.57
Wage	-4.35***	-3.86	-5.25***	-5.11	5.16***	5.09	-5.16***	-4.68	4.66***	4.65	3.74***	3.41
Deductible	-0.70	-0.39	0.15	0.09	2.38	1.34	-3.20*	-1.77	2.89*	1.77	2.91*	1.77
Rating	-3.69***	-3.26	-4.66***	-4.04	2.43**	2.13	-2.99***	-2.68	2.70***	2.68	3.11***	2.88
Phone	-5.09***	-4.50	-4.88***	-4.63	4.80***	4.63	-5.38***	-4.76	4.87***	4.74	-0.49	-0.43
Health x Deductible	-3.56	-1.49	-4.36*	-1.90	0.89	0.39	-1.60	-0.68	1.45	0.68	1.40	0.62
Ridesharing work patterns												
Hourly wage	-0.45***	-2.74	-0.47***	-3.32	0.46***	3.34	-0.16	-1.04	0.14	1.04	-0.23*	-1.85
Weekly work hours	-0.42***	-4.25	-0.32***	-3.31	0.51***	5.75	-0.29***	-3.09	0.26***	3.09	-0.18**	-2.14
Income percentage from ride-sharing	-0.08	-1.59	-0.06	-1.31	0.06	1.31	-0.02	-0.31	0.11**	2.28	0.27***	6.38
Employment characteristics												
Health insurance	-1.91	-0.55	1.11	0.34	6.40**	2.03	-2.56	-0.74	9.11***	2.92	2.03	0.63
Retirement plan	-5.39	-1.63	-4.69	-1.61	4.61	1.61	1.22	0.40	-1.10	-0.40	11.64***	4.10
Demographic characteristics												
Age	0.43***	4.43	0.38***	3.98	-0.37***	-3.94	0.16	1.59	-0.15	-1.59	-0.84***	-9.71
Male	-3.42	-1.40	-4.72*	-1.87	-0.90	-0.37	-6.13**	-2.31	-2.21	-0.91	-2.22	-0.97
Education	-0.97**	-2.43	-0.78**	-2.04	0.77**	2.04	0.09	0.23	-0.08	-0.23	0.55	1.60
ln(Individual income)	0.52	0.26	2.94	1.46	2.53	1.26	4.20*	1.95	4.69**	2.33	5.96***	3.20
ln(Household income)	2.90	1.32	1.64	0.81	-1.62	-0.81	1.12	0.51	-1.01	-0.51	-5.19**	-2.48
Household size	-0.95	-1.12	-2.00**	-2.35	0.37	0.44	-2.57***	-2.88	0.29	0.34	0.82	0.93
White	10.85***	3.90	11.19***	4.69	-11.01***	-4.72	12.63***	4.96	-11.42***	-4.96	0.11	0.05
N	1458		1458				1458				1400	
Log likelihood	-775		-1390				-1446				-678	
Pseudo R-squared	0.15		0.12				0.09				0.17	

Notes: *, **, and *** denote statistical significance at the .10, .05, and .01 level, respectively. Standard errors are reported in parentheses. Parameters were estimated using Stata 13.

4.3. Relations between a Ride-Sharing Job and Drivers' Primary Job

To explore the relationship between flexibility and security of drivers' primary job and the willingness to work in a ride-sharing job, I ran the generalized ordinal logistic regression on drivers having other primary job(s) employed for wage. Table 8 shows summary descriptive statistics of drivers having the other primary job(s). 152 drivers (37.4% of all drivers) have another primary job and 254 drivers (62.6%) view ride-sharing as their primary job. The paid employed evaluate perceived flexibility, contract flexibility, and perceived security of their primary job.

Table 8. Descriptive Statistics for the Drivers with the Other Primary Job(s)

Variables	All drivers	Active drivers	Inactive drivers
Number of individuals	152	98	54
Employment Status (%)			
Paid employed (A)	78.95	80.61	75.93
working 40 or more hours per week	55.92	55.10	57.41
working 20-39 hours per week	17.11	18.37	14.81
working 1-19 hours per week	5.92	7.14	3.70
Self-employed	11.84	13.27	9.26
Out of work and looking for work	0.66	0.00	1.85
Out of work and not currently looking for work	1.32	0.00	3.70
A homemaker	1.97	3.06	0.00
A student	2.63	2.04	3.70
Retired	2.63	1.02	5.56
Change in a primary job (%)			
Changed primary jobs	11.18	9.18	14.81
More flexible in work hours of the primary job	23.68	24.49	22.22
Reduced work hours of the primary job	15.79	13.27	20.37
Decreased in the probability of losing the primary job	17.11	16.33	18.52
Among the paid employed (A)	120	79	41
Perceived flexibility (%)			
PF = 1: not at all flexible	1.98	3.06	0.00
PF = 2: not very flexible	23.68	28.57	14.81
PF = 3: quite flexible	50.00	45.92	57.41
PF = 4: very flexible	24.34	22.45	27.78
Contractual flexibility (%)			
CF = 1: permanent contract	76.67	77.22	75.61
CF = 0: not permanent contract	23.33	22.78	24.39
Perceived security (%)			
PS = 1: not at all secure	31.88	35.87	23.91
PS = 2: not very secure	52.90	56.52	45.65
PS = 3: quite secure	7.97	5.43	13.04
PS = 4: very secure	7.25	2.17	17.39

Table 8 (cont'd)

Industry (%)			
Agricultural sector	0.66	1.02	0.00
Industrial sector	6.58	5.10	9.26
Services sector	61.84	66.33	53.70

The generalized ordinal logistic regression results of drivers having alternative primary job(s) appear in Table 9. The detailed results with other control variables such as ride-sharing work patterns and demographic characteristics, and the results of logit models without interaction terms are reported in the Appendix to this dissertation. The results without interaction terms show similar patterns to the results with interactions that are interpreted here.

In general, the results regarding the effect of hypothetical ride-sharing attributes in the choice experiment are consistent with the previous models for the full sample summarized in Table 8. The probability of increasing active drivers' willingness to work for ride-sharing (in anticipated work hours and work duration) is higher when the ride-sharing company offers a health insurance, retirement plan, minimum wage guarantee, or substitute phone number. For inactive drivers, the probability of increasing their willingness to work rises when the retirement plan, minimum wage guarantee, and passenger rating system are offered by the ride-sharing service company.

The statistical significance on the interaction term between *Health* and *Deductible* indicates that although an auto insurance with a lower deductible alone does not rise the probability of increasing active drivers' willingness to work, the probability rises when it becomes available with a company sponsored-health insurance together as contract conditions for a ride-sharing job.

Table 9. Generalized Ordered Logit Estimation with Interactions: Paid Employed

Variable	Active drivers										Inactive drivers	
	Participation rate		Working hours for ride-sharing				Working period for ride-sharing				Participation rate, working hours, working period	
	Pr(1: Decrease)		Pr(1: Decrease)		Pr(3: Increase)		Pr(1: Decrease)		Pr(3: Increase)		Pr(3: Increase)	
	Marginal effects (%)	z	Marginal effects (%)	z	Marginal effects (%)	z	Marginal effects (%)	z	Marginal effects (%)	z	Marginal effects (%)	z
Ridesharing attributes												
Hours	1.91***	3.85	1.41***	3.30	-0.43	-1.03	0.99**	2.15	-0.14	-0.37	-0.85	-1.13
Health	-3.69	-1.09	-8.70***	-2.82	8.27***	2.81	-6.65**	-2.01	5.49**	2.01	4.49	1.12
Retirement	-13.50	-1.56	-13.00*	-1.71	12.35*	1.72	-16.19**	-2.02	13.36**	2.02	15.04*	1.90
Wage	-5.35***	-3.28	-5.12***	-3.13	8.64***	5.53	-4.09**	-2.35	7.69***	5.06	6.15***	3.25
Deductible	0.55	0.21	-1.32	-0.55	1.25	0.55	0.08	0.03	-0.07	-0.03	-0.74	-0.25
Rating	-4.34***	-2.67	-5.11***	-3.14	1.04	0.64	-4.02**	-2.53	3.32**	2.53	5.78***	3.23
Phone	-4.66***	-2.86	-4.94***	-3.32	4.69***	3.31	-5.95***	-3.73	4.91***	3.69	0.10	0.05
Health x Deductible	-6.26*	-1.83	-2.81	-0.91	2.67	0.91	-3.16	-0.91	6.28**	2.16	6.34	1.60
Employment characteristics												
Perceived flexibility	9.62	1.61	0.35	0.07	-0.33	-0.07	-2.61	-0.50	2.16	0.50	-20.18**	-2.54
Contract flexibility	-6.27	-0.67	8.66	1.13	2.26	0.31	14.71*	1.76	0.75	0.11	21.76***	2.69
Perceived security	3.37	1.22	3.95	1.62	-3.75	-1.62	4.55*	1.73	-3.76*	-1.72	-11.19***	-3.32
Health insurance	0.00	0.00	-4.88	-1.15	4.64	1.15	-9.16**	-2.00	7.56**	2.00	-10.65	-1.35
Retirement plan	-4.04	-0.78	2.02	0.49	-1.92	-0.49	10.97**	2.44	-9.05**	-2.45	27.21***	3.27
Interactions												
Hours × Perceived flexibility	-0.40**	-2.15	-0.16	-1.01	0.15	1.01	-0.02	-0.12	0.02	0.12	0.30	1.25
Hours × Contract flexibility	0.05	0.17	-0.17	-0.69	0.16	0.69	-0.28	-1.04	0.23	1.04	-0.72***	-2.76
Retirement × Perceived security	2.85	1.15	2.66	1.21	-2.52	-1.21	3.20	1.37	-1.63	-0.83	-2.31	-0.92
Health insurance × Health	-3.94	-1.20	-2.61	-0.83	-8.36***	-2.77	-1.35	-0.40	-9.31***	-3.18	2.09	0.51
Retirement plan × Retirement	5.02	1.51	2.77	0.94	-2.63	-0.94	3.90	1.23	-3.22	-1.23	-4.84	-1.20
Controls: Ridesharing work patterns	Yes		Yes				Yes				Yes	
Controls: Demographic characteristics	Yes		Yes				Yes				Yes	
N	676		676				676				324	
Log likelihood	-341		-601				-617				-92	
Pseudo R-squared	0.23		0.18				0.15				0.53	

Notes: *, **, and *** denote statistical significance at the .10, .05, and .01 level, respectively. Standard errors are reported in parentheses. Parameters were estimated using Stata 13.

To examine the association between drivers' willingness to work and flexibility and security of drivers' alternative primary job, perceived flexibility, contract flexibility, perceived security and relevant interaction terms are added to the generalized ordered logit models. Perceived flexibility is not significantly associated with active drivers' participation rate but is negatively associated with inactive drivers' willingness to work. This may indicate that higher perceived flexibility of inactive drivers' primary job tends to demotivate their willingness to work for a ride-sharing job. Contrary to this effect of perceived flexibility, when one's contract becomes more flexible from a permanent to fixed-term, seasonal, or temporary contract, the probability of increasing inactive drivers' willingness to work for ride-sharing rises. This may be because the contract flexibility relates to perceived insecurity of their main job rather than perceived flexibility (the perceived ability of workers to choose when, where, and for how long they work). This positive association between the contract flexibility and inactive drivers' willingness to work is consistent the implication from the negative marginal effect of perceived security. When active drivers' perceived security level rises, the probability of increasing their work period also diminishes by a smaller percentage than for inactive drivers.

The interaction terms provide additional insights on the association between drivers' willingness to work for ride-sharing and their primary job. The negative coefficient on minimum required working hours and contract flexibility (*Hours* × *Contract flexibility*) indicates that when both increase, inactive drivers are less likely to increase their participation rate. In other words, drivers who work higher flexibility of their main job contract (not permanent contract) are slightly less likely to choose the minimum required working hours for other beneficial ride-sharing attributes. This prediction is not applied to the prediction of active drivers' willingness to work. The coefficient on *Health insurance* × *Health* for active drivers' working period is intuitive-drivers who already have a health insurance through their alternative primary job are unlikely to choose a ride-sharing job for a retirement plan provided by the ride-sharing company.

Table 10 summarizes the result of hypothesis tests. All analysis results considered, the hypotheses for the association with most contract conditions (the minimum required work hours (H1), minimum wage guarantee (H2a), health insurance (H2b), retirement plan (H2c)) and the willingness to work are generally supported for both active and inactive drivers. The hypothesis regarding a lower deductible of auto insurance (H2d) is not supported or marginally support when it comes to its effect on active drivers' working period and inactive drivers' willingness to work. The hypothesis regarding a passenger rating system (H3a) is supported more strongly for inactive drivers. However, a substitute phone number is more valuable for active drivers (H3b). The hypotheses regarding the perceived flexibility (H4a) and contract flexibility (H4b) are supported for inactive drivers, and perceived security (H4c) is supported for both active and active drivers.

Table 10. Hypothesis Test Results

	Hypothesis	Expected sign	Generalized ordered logit model specification 1				Generalized ordered logit model specification 2			
			Active drivers			Inactive drivers	Active drivers			Inactive drivers
			Willingness to work for ride-sharing			Willingness to work for ride-sharing in general	Willingness to work for ride-sharing			Willingness to work for ride-sharing in general
			Partici-pation rate	Driving hours	Work period		Partici-pation rate	Driving hours	Work period	
H1	Minimum required work hours	−	Supported	Supported	Supported	Supported	Supported	Supported	Supported	Not supported
H2a	Minimum wage guarantee	+	Supported	Supported	Supported	Supported	Supported	Supported	Supported	Supported
H2b	Company-sponsored health insurance	+	Supported	Supported	Supported	Supported	Not supported	Supported	Supported	Not supported
H2c	Company-sponsored retirement plan	+	Supported	Supported	Supported	Supported	Not supported	Supported	Supported	Supported
H2d	An auto insurance with a lower deductible	+	Not supported	Not supported	Supported	Supported	Not supported	Not supported	Not supported	Not supported
H3a	Passenger rating system	+	Supported	Supported	Supported	Supported	Supported	Supported	Supported	Supported
H3b	Substitute phone number	+	Supported	Supported	Supported	Not supported	Supported	Supported	Supported	Not supported
H4a	Perceived flexibility level of an alternative job	−	-	-	-	-	Not supported	Not supported	Not supported	Supported
H4b	Contract flexibility level of an alternative job	+	-	-	-	-	Not supported	Not supported	Supported	Supported
H4c	Perceived security level of an alternative job	−	-	-	-	-	Not supported	Not supported	Supported	Supported

4.4. Additional Analysis

Lastly, in order to understand characteristics of drivers by categorizing heterogeneous drivers into more homogeneous classes, I examine drivers' preferences for working condition attributes using LCM and investigate characteristics of each class. The statistical significance on the standard deviations of ride-sharing attributes in Table 4 implies heterogeneity in preferences for the attributes across drivers. I divide active drivers and inactive drivers into two classes, respectively. The LCM results in Table 11 shows that the probability of a randomly selected driver belonging to Class 1a, 1b, 2a, or 2b is 51%, 47%, 65%, and 30%, respectively.

The probability of being in the first class, financial stability seekers, increases as one is younger, more educated, and perceives lower security and higher flexibility from alternative primary jobs. Their utility would not statistically significantly decrease if the company requires minimum driving hours but provides a company-sponsored retirement plan, minimum wage guarantee, and a system which protects their private information. Active drivers in Class 1b consider flexibility in their work schedule for ride-sharing and minimum wage guarantee to be valuable.

Typical inactive drivers' decisions to work in Class 2a is influenced by all attributes. If a lower deductible is provided with a health insurance together, their utility statistically significantly increases although a lower deductible alone does not affect their utility. The last class are labeled as apathetic inactive drivers because their utility does not decrease even if they do not choose to work for ride-sharing (statistical insignificance on Opt Out). The two statistically significant coefficients in Class 2b imply they may re-participate in ride-sharing if a retirement plan is matched by the ride-sharing company and if the platform provides a passenger rating system.

Table 11. Parameter Estimates from Latent Class Models (LCM)

Variable	Active drivers				Inactive drivers			
	Class 1a		Class 1b		Class 2a		Class 2b	
	Financial stability seekers		Flexibility-sensitive part-time workers		Typical inactive drivers		Apathetic inactive drivers	
Hours	-0.018	(0.012)	-0.042***	(0.012)	-0.040**	(0.017)	-0.013	(0.025)
Health	0.279	(0.209)	0.215	(0.233)	0.583**	(0.296)	15.060	(59.040)
Retirement	0.429***	(0.165)	-0.070	(0.145)	0.534***	(0.205)	0.802***	(0.275)
Wage	0.350**	(0.137)	0.547***	(0.132)	0.675***	(0.168)	0.385	(0.262)
Deductible	0.170	(0.212)	-0.196	(0.187)	-0.350	(0.239)	15.348	(59.040)
Rating	0.233	(0.144)	0.187	(0.120)	0.275*	(0.165)	0.548*	(0.283)
Phone	0.576***	(0.203)	0.128	(0.133)	0.389**	(0.183)	-0.185	(0.258)
Health × Deductible	0.212	(0.262)	0.342	(0.236)	0.594**	(0.291)	-15.072	(59.040)
Opt Out	-3.533***	(0.654)	-0.628*	(0.365)	-3.758***	(0.649)	15.279	(59.040)
Age	-0.047*	(1.572)	-		-0.002	(0.030)	-	
Education	0.224**	(0.026)	-		0.179	(0.167)	-	
Perceived security	-0.184*	(0.102)	-		-0.304	(0.941)	-	
Perceived flexibility	0.001*	(0.104)	-		-0.223	(1.000)	-	
Class Prob.	0.513		0.471		0.654		0.301	
N	204				202			
Log-likelihood	-517				-235			
Adj.pseudo R-squared	0.200				0.339			
AIC/N	1.885				1.600			

Notes: *, **, and *** denote statistical significance at the .10, .05, and .01 level, respectively. Standard errors are reported in parentheses. The coefficients are estimated by NLOGIT 6.0.

CHAPTER 5: CONCLUSION

5.1. Research Questions and Major Findings

This dissertation contributes to several areas of research, including the literature on the sharing economy, platform governance, and recent discussions on the relations between flexibility and security of working conditions in the digital economy. This study addresses how contract conditions, especially the balance between flexibility and security of contract, affect service providers' willingness to affiliate with the platform. Although social concerns regarding service providers' long-term welfare have been raised by academics and government leaders, whether service providers are willing to reduce the flexibility in their ride-sharing work schedule for more benefit plans has been limitedly understood. In addition to the contractual attributes of ride-sharing, this study describes which technical attributes are related to drivers' willingness to work for ride-sharing. The dissertation adds the following findings to the existing literature.

First, it shows both active and inactive drivers are willing to accept conditions specifying minimum required driving hours for ride-sharing in return for the ability to participate in a company-sponsored health insurance (*Health*), a retirement plan (*Retirement*), and minimum wage guarantee (*Wage*). Drivers are not willing to work for the required hours to acquire a $1,500 lower deductible of auto insurance (*Deductible*) alone. However, they are willing to work additional hours if the company supports both a health insurance and an auto insurance with a lower deductible (*Health* × *Deductible)*. Among the five contractual attributes, an employer-sponsored retirement plan and minimum wage guarantee are consistently considered valuable to the majority of drivers across multiple logistic models.

Second, this study finds that active drivers place more value on a substitute phone number feature (*Phone*) than on a passenger rating system (*Rating*) compared to inactive drivers. In contrast, inactive drivers generally consider a passenger rating system more important than a substitute phone number. This suggests that inactive drivers are more concerned about unexpected incidents by passengers while providing ride-sharing services than active drivers. However, individual actively providing ride-sharing services perceive unexpected harm related to disclosing their personal information to passengers—incidents such as unwanted contacts and stalking that usually occur after providing services—as a more important risk.

Finally, I find that when drivers have a primary job other than ride-sharing, the perceived flexibility, contract flexibility, and perceived security of their primary job are statistically significantly associated with their willingness to work for ride-sharing. Inactive drivers' willingness to work for ride-sharing tends to increase as the level of perceived flexibility is lower, contract flexibility (not permanent employment contract) is higher, and perceived security is lower. Active drivers' willingness to work for ride-sharing is negatively, but marginally, associated with perceived security. In other words, the cross-sectional data shows that drivers are more likely to work for ride-sharing when their employment is not under a permanent contract and when they perceive their primary job less secure, while they are less likely to re-participate in ride-sharing when they sense higher flexibility from their primary job.

5.2. Conceptual Contributions

The dissertation also makes several conceptual contributions to research on the sharing economy, platform governance, and flexicurity. First, this study extends the received research literature on the sharing economy. Availability of service supply to meet consumers' demand is a necessary condition for sustained success in the sharing economy business. Despite service suppliers' important role, the conditions of securing sufficient participation have received only limited attention in prior sharing economy research. This study is a first attempt to investigate both active and inactive drivers' willingness to work depending on alternative specifications of work conditions. It allows a deeper understanding of service providers' preferences for benefit plans that are usually sponsored by an employer under standard employment contracts but typically not by ride-sharing platforms as well as for technical attributes of the platform design.

Second, this study adds to the literature on the platform governance. While previous research on platform governance has focused on the relationship between platform owners and developers as well as the relationship between platform owners and consumers, this study examines the relationship between platform owners and service providers. Particularly, this dissertation focuses on a contract between them, as a tool of platform governance, to decide ride-sharing work conditions which have been disputed and raising social concerns since the sharing economy services became prevalent. Firms have designed and used contracts in a way to reduce transaction costs (Williamson, 1996). The result of this paper suggests a possibility that structuring contracts allowing drivers to manage flexibility and security may transaction costs derived from conflicts between drivers and platform owners.

A third innovation of this dissertation is the examination of the relationship between the platform economy and other employment characteristics. The investigation into the relationship between service providers' preferences for service attributes and characteristics of their alternate jobs contributes to an individual level of the flexicurity perspective by showing a potential of the sharing economy with benefit plans playing a role of the social security net to some extent. The low security of one's main job can be complemented by a sharing economy job if the sharing economy company offers the right to choose the balance between flexibility and security level of the sharing economy job. And in the long term, facilitated by the flexibility or security of the sharing economy job, one may more easily change his or her main jobs to optimize the balance between flexibility and security, which also resulting in an increase in employment flexibility along with the flexicurity perspective at the labor market level.

This study generates first insights into whether the sharing economy can contribute to enhancing this supportive relationship from service providers' perspectives at the individual level. The empirical result shows that the drivers' willingness to work for ride-sharing are positively associated with perceived insecurity and contract flexibility (flexibility in employment status; lower under a permanent contract and higher under a fixed-term, seasonal, or temporary contract) of their main job, and negatively associated with perceived flexibility of their main job, assuming the ride-sharing service companies grant drivers the right to choose the balance between flexibility and security of the ride-sharing job. From this result, we may infer that the sharing economy job can contribute to maximize one's utility from the total level of flexibility and security of each economic activity.

5.3. Practical Implications

The study also has several practical implications. Although my dissertation has focused on ride-sharing services, the practical implications of this research goes far beyond one type of service in the sharing economy. It provides insights that apply to a range of companies that might face conflicts related to service providers' working conditions and concerns about the fairness of the distribution of benefits from sharing economy services. This study helps design supplier attraction and retainment strategies for companies that are not only labor intensive but also capital intensive and are considering a diversification of work contracts. Sharing economy companies have often been criticized for not fairly sharing their profits with suppliers. Based on a recent court decision, ride-sharing service providers are already regarded as employees of the platform company in U.K. Other law suits are pending in California and Massachusetts over *Uber* drivers' employment status and the stakes are expected to be high. In response to these developments, platform companies might be forced to offer other contracts, depending on how these legal disputes will be settled. In addition, there is a possibility that competition between platforms will lead to more differentiated employment options so that a platform may lose service providers to other platforms providing more favorable working conditions. Diversifying contract conditions may help platform companies better understand service providers' preferences and assist in developing more stable business models.

My dissertation suggests that more flexible contracts in terms of the degree to which a service provider is able to choose a mixture of flexible and secure working conditions. This is a form of cafeteria benefit plans (Barringer and Milkovich, 1998; Beam and McFadden, 1996) where the companies do not choose certain types of people to have certain types of working conditions, but choose the whole set of contract conditions drivers can select. My choice experiment is designed to explore how granting ride-sharing service suppliers rights to choose one of several fixed minimum working hour options (0, 20, or 40 hours per week) and rights to choose other benefits affects their willingness to work for the platform. Once drivers fulfill the minimum working hours they chose, they can earn more favorable working conditions from their point of view. From a broader perspective, my dissertation may inspire companies to design a platform that encourages suppliers to be more involved by providing the level of flexibility and security chosen by suppliers, in between current flexible working conditions and standard employment working conditions.

From the platform owners' side, one of the major advantages of granting service providers the right to choose benefit plans is increasing the possibility of involvement by securing suppliers and enhancing corporate image. The choice experiment results show inactive drivers tend to be willing to work for ride-sharing for longer required hours if this allowed them to benefit from a retirement plan matched by the ride-sharing company. This implies that giving a perception of secure job to drivers by granting the right to choose more secure work conditions would more effectively appeal to inactive drivers and may encourage them to work for a longer duration. Also, when benefits related to hedging financial risks are functionally overlapped with service drivers' own risk hedge plan to some extent, those benefits do not effectively impact on service providers' work intention. However, the effect of the benefits which do not effectively impact on the work intention becomes to have a significance influence when another type of benefit plans covering different types of risks. The result shows that a $1,500 difference in an auto insurance deductible itself generally does not significantly influence drivers' willingness to work for ride-sharing, however, the effect of the difference in a deductible amount is statistically significant when a company-sponsored health insurance is provided along with a lower deductible. Considering *Uber*'s current auto insurance deductible is $1000 which is $1500 lower than *Lyft*'s deductible, *Uber*'s lower deductible may more effective with other benefits. Moreover, sharing economy companies may be more competitive compared to other sharing economy companies by providing more favorable working conditions as consumers are also willing to pay more for the platform with more favorable working conditions for service providers (Hong, 2017). In this way, this dissertation contributes a deeper understanding some of the relevant factors and tradeoffs platform owners need to estimate and predict.

Other than the results of contractual attributes, the implications from the results regarding technological attributes may also extend more broadly to the sharing economy. One of my results shows that active drivers are more concerned regarding risks from their private information breach compared to risks from passengers, while inactive drivers show more concerns about passengers. My survey shows a majority (50.8%) of participants' concerns about ride-sharing services is related to safety. Establishing a physically safe environment for transactions is critical for the business promotion, and a passenger rating system is a core attribute which service providers who desire to better ensure their safety may rely on. Considering the importance of the service consumer rating system and inactive drivers' higher concerns regarding private information compared to concerns regarding passengers, one can infer that active drivers have encountered or concerned about private information misuse. Thus, assuring inactive drivers how effectively the passenger rating system works to establish safe work environments, and assuring active drivers how firmly their private information is protected would raise drivers' motivation to work.

Despite the advantages of adopting flexible benefit plans, it requires platform owners need to consider is the monitoring cost (in addition to the direct cost of benefit plans). Governance using new type of contracts inevitably incurs a governance practice cost (Williamson, 1981). Given the costly activities such as monitoring moral hazard or adverse selection, platform owners need to predict under which conditions increasing job securities would contribute to platform profitability net of monitoring and other costs. Platform companies need to reduce information asymmetry for this practice. This study examines associations between other primary job characteristics and the willingness to work for ride-sharing. Identifying and understanding this relationship can help the prediction of what type of people would choose what kind of working conditions.

Regulators and authorities should consider that many ride-sharing service providers work for ride-sharing as a primary means of living. My survey shows 63% of participants regard or regarded the ride-sharing job as their primary job. Particularly 73.3% of inactive drivers replied that they consider the ride-sharing job as their primary job when they worked for ride-sharing. However, whether the ride-sharing platform pays a minimum wage is still one of the most important and controversial issues and a recent study shows more than a majority of drivers earn less than the minimum wage (Zoepf *et al*., 2018). One of the main reasons behind this controversy is estimating cost relevant to sharing economy service provision is intricate. For example, although many sharing economy services involve the access to service providers' asset, it is often difficult to calculate depreciation expenses on the asset, other management expenses, and social cost. Policy makers could introduce measures that require platforms to notify drivers that they might not earn the minimum wage or compensate platforms which produce positive externalities from providing benefit plans. Policy makers also might want to monitor whether the rate for service provision reflects depreciation expenses and the intensity of labor. If a decrease in social welfare caused by less fair working conditions is expected, and on the contrary, giving more rights to service providers to choose their working conditions is expected to increase social welfare, policy makers may consider measures to support more flexible working conditions. Moreover, from inactive drivers' low attention to the risk of personal information disclosure, one can infer that inactive participants do not have significant concerns for re-entry and their low involvement may not be closely related to private information misuse in ride-sharing. Thus, considering the inactive participants' low perceived risk from information misuse, regulators should take more care of and monitor potential related issues to prevent misuse of personal information.

5.4. Directions for Future Research

The sharing economy continues to evolve. It would be intriguing to expand the research conducted here in two directions for future research. First, it would complement this dissertation to observe drivers' actual decisions to work in the long-term investigation because this study relies on cross-sectional data analysis for which showing causality is difficult. Thus, a long-term observation capturing dynamics between drivers' decision to work and working conditions would provide enriching insights of service providers' willingness to work. In addition, as this study focuses on work conditions that are not currently available on ride-sharing platforms, the choice experiment of this study examines drivers' cross-sectional work intention depending on the work conditions not their actual decisions. In other words, experimental outcomes and actual behavior may differ, and this imperfect alignment between experiment participants' response and behavior is the universal limitation of the experiment and survey. If researchers establish an environment where drivers' actual decision making under various work conditions is continuously observable, the researchers may elicit more insights including actual participation rate, driving hours, work duration, and dynamics of the relationship between sharing economy options and workers' other primary job.

Another suggestion is related to additional conditions that this study was not able to capture. Considering time constraints of participants in the online experiment, the instrument was revised multiple times to minimize confusion across participants. These revisions resulted in an experiment setting which only contains core descriptions of the choice experiment avoiding much detailed explanation of each work condition. For example, with regard to the minimum required driving hours per week, the ride-sharing company may allow drivers to work at any time of their liking or the company may require to plan drivers' work schedule in advance and follow the work schedule. Also, drivers' expectation of a standard health insurance coverage may differ. Moreover, different working condition attributes may be more valuable and more relevant to service suppliers depending on the type of service and asset they provide. Although these differences may affect drivers' work decision, my survey instrument does not capture them fully. Future studies may investigate drivers' work decision under more differentiated benefit plan conditions.

In sum, this dissertation increases our understanding of ride-sharing service suppliers, critically important players contributing to the sharing economy. This study provides a solid foundation for the design of contract conditions for ride-sharing providers that increase service suppliers' utility while improving the stability of service supply.

APPENDICES

APPENDIX A

Descriptions and Definitions of Variables

Appendix A. Descriptions and Definitions of Variables

Category	Service Attribute	Description/Definition
Ride-sharing attributes in the choice experiment	*Hours*	Minimum required driving hours per week 0 = if the ride-sharing service company does not require a specific minimum weekly driving hours 20 = if the ride-sharing service company requires 20 hours of minimum weekly driving hours 40 = if the ride-sharing service company requires 40 hours of minimum weekly driving hours Drivers can drive for a longer time than the minimum hours.
	Health	Health insurance 1 = if the ride-sharing service company provides a health insurance with standard insurance coverage 0 = if the ride-sharing service company does not provide a health insurance with standard insurance coverage
	Retirement	Retirement plan 1 = if the ride-sharing service company matches some or all of drivers' retirement plan 0 = if the ride-sharing service company does not match any of drivers' retirement plan
	Wage	Minimum wage guarantee 1 = if the ride-sharing service company covers the difference between a driver's earnings and the minimum wage of the driver's city if their acceptance rate is higher than 80% 0 = if the ride-sharing service company does not cover any difference between a driver's earnings and the minimum wage of the drivers' city
	Deductible	Amount of auto insurance deductible with the coverage amount of $1 million 1 = if the ride-sharing company offers an insurance policy with a $1,000 deductible in case of an accident whether it was the driver's fault or not, as long as the driver maintains auto insurance that includes collision coverage for that vehicle while not on a ride-sharing trip 0 = if the ride-sharing company offers an insurance policy with a $2,500 deductible
	Rating	Passenger rating system 1 = if the driver can evaluate an individual passenger after rides (only highly rated passengers can use the application) 0 = if the system is not available
	Phone	Substitute phone numbers 1 = if the ride-sharing app shows a dummy phone number instead of drivers' actual phone number to passengers when they communicate the passengers 0 = if the function is not available (the app shows the driver's

		actual phone number to passengers when the driver contact them)
Ride-sharing work patterns	*Hourly wage*	Average hourly rate for ride-sharing (USD)
	Weekly work hours	Average weekly work hours for ride-sharing
	Income percentage from ride-sharing	The percentage of income from ride-sharing (%)
Employment characteristics	*Perceived flexibility*	1 = Not flexible at all 2 = Not very flexible 3 = Quite flexible 4 = Very flexible
	Contract flexibility	1 = if the primary job contract is not permanent employment contract (fixed-term, seasonal, temporary) 0 = if the contract is a permanent employment contract
	Perceived security	1 = Not secure at all 2 = Not very secure 3 = Quite secure 4 = Very secure
	Health insurance	1 = if the participant has a health insurance 0 = otherwise
	Retirement plan	1 = if the participant has a retirement plan 0 = otherwise
	Industrial sector	1 = if the primary job is in industrial sector 0 = otherwise
	Services sector	1 = if the primary job is in service sector 0 = otherwise
Demographic characteristics	*Age*	Age
	Male	1 = if male 0 = otherwise
	Education	Years of education
	ln(*Individual income*)	log of individual annual income (including ride-sharing)
	ln(*Household income*)	log of household annual income (including ride-sharing)
	Household size	household size including the participant himself/herself

APPENDIX B

Generalized Ordered Logit Estimation with Interactions: Paid Employed (Full Variables)

Table B.1. Generalized Ordered Logit Estimation with Interactions: Paid Employed (Full Variables)

Variable	Active drivers										Inactive drivers	
	Participation rate		Working hours for ride-sharing				Working period for ride-sharing				Participation rate, working hours, working period	
	Pr(1: Decrease)		Pr(1: Decrease)		Pr(3: Increase)		Pr(1: Decrease)		Pr(3: Increase)		Pr(3: Increase)	
	Marginal effects (%)	z	Marginal effects (%)	z	Marginal effects (%)	z	Marginal effects (%)	z	Marginal effects (%)	z	Marginal effects (%)	z
Ridesharing attributes												
Hours	1.91***	3.85	1.41***	3.30	-0.43	-1.03	0.99**	2.15	-0.14	-0.37	-0.85	-1.13
Health	-3.69	-1.09	-8.70***	-2.82	8.27***	2.81	-6.65**	-2.01	5.49**	2.01	4.49	1.12
Retirement	-13.50	-1.56	-13.00*	-1.71	12.35*	1.72	-16.19**	-2.02	13.36**	2.02	15.04*	1.90
Wage	-5.35***	-3.28	-5.12***	-3.13	8.64***	5.53	-4.09**	-2.35	7.69***	5.06	6.15***	3.25
Deductible	0.55	0.21	-1.32	-0.55	1.25	0.55	0.08	0.03	-0.07	-0.03	-0.74	-0.25
Rating	-4.34***	-2.67	-5.11***	-3.14	1.04	0.64	-4.02**	-2.53	3.32**	2.53	5.78***	3.23
Phone	-4.66***	-2.86	-4.94***	-3.32	4.69***	3.31	-5.95***	-3.73	4.91***	3.69	0.10	0.05
Health x Deductible	-6.26*	-1.83	-2.81	-0.91	2.67	0.91	-3.16	-0.91	6.28**	2.16	6.34	1.60
Ridesharing work patterns												
Hourly wage	-0.50*	-1.76	-0.91***	-3.52	0.03	0.11	-0.59**	-2.18	-0.06	-0.23	0.91*	1.68
Weekly work hours	-0.50**	-2.56	-0.27	-1.46	0.83***	4.77	-0.18	-0.93	0.77***	4.61	-0.62**	-2.44
Income percentage from ride-sharing	-0.19	-1.54	-0.19	-1.58	-0.07	-0.60	-0.15	-1.16	-0.20*	-1.66	-0.07	-0.40
Employment characteristics												
Perceived flexibility	9.62	1.61	0.35	0.07	-0.33	-0.07	-2.61	-0.50	2.16	0.50	-20.18**	-2.54
Contract flexibility	-6.27	-0.67	8.66	1.13	2.26	0.31	14.71*	1.76	0.75	0.11	21.76***	2.69
Perceived security	3.37	1.22	3.95	1.62	-3.75	-1.62	4.55*	1.73	-3.76*	-1.72	-11.19***	-3.32
Health insurance	0.00	0.00	-4.88	-1.15	4.64	1.15	-9.16**	-2.00	7.56**	2.00	-10.65	-1.35
Retirement plan	-4.04	-0.78	2.02	0.49	-1.92	-0.49	10.97**	2.44	-9.05**	-2.45	27.21***	3.27
Industrial sector	-12.24	-1.46	-15.31*	-1.82	34.02***	4.55	-2.77	-0.31	28.27***	3.78	-10.57	-0.98
Services sector	-14.53***	-3.89	-17.51***	-5.06	16.63***	4.95	-12.45***	-3.02	19.00***	4.92	-23.59***	-3.48
Demographic characteristics												
Age	0.35***	2.68	0.18	1.42	-0.17	-1.41	0.19	1.31	0.09	0.62	-0.35	-0.95
Male	-11.15***	-2.75	-7.18*	-1.93	6.82*	1.92	-6.03	-1.48	4.98	1.48	-1.42	-0.26
Education	-1.35*	-1.77	-0.64	-0.91	0.61	0.91	-0.83	-1.08	0.68	1.08	0.88	1.10
ln(Individual income)	8.39***	2.76	8.21***	3.19	-7.80***	-3.19	8.41***	3.01	-6.94***	-3.01	-17.96***	-3.33
ln(Household income)	-1.76	-0.50	-2.72	-0.79	9.21***	2.87	-2.37	-0.64	10.70***	3.34	-10.76*	-1.71

Table B.1 (cont'd)

Household size	-3.98***	-2.63	-4.43***	-2.96	-0.59	-0.42	-6.89***	-4.31	1.06	0.75	3.54**	2.01
White	11.56***	2.71	12.00***	3.29	-11.40***	-3.29	8.16**	2.05	-6.74**	-2.04	-17.32***	-2.97
Interactions												
Hours x Perceived flexibility	-0.40**	-2.15	-0.16	-1.01	0.15	1.01	-0.02	-0.12	0.02	0.12	0.30	1.25
Hours x Contract flexibility	0.05	0.17	-0.17	-0.69	0.16	0.69	-0.28	-1.04	0.23	1.04	-0.72***	-2.76
Retirement x Perceived security	2.85	1.15	2.66	1.21	-2.52	-1.21	3.20	1.37	-1.63	-0.83	-2.31	-0.92
Health insurance x Health	-3.94	-1.20	-2.61	-0.83	-8.36***	-2.77	-1.35	-0.40	-9.31***	-3.18	2.09	0.51
Retirement plan x Retirement	5.02	1.51	2.77	0.94	-2.63	-0.94	3.90	1.23	-3.22	-1.23	-4.84	-1.20
N	676		676				676				324	
Log likelihood	-342		-591				-601				-103	
Pseudo R-squared	0.229		0.194				0.175				0.475	

Notes: *, **, and *** denote statistical significance at the .10, .05, and .01 level, respectively. Standard errors are reported in parentheses. Parameters were estimated using Stata 13.

APPENDIX C

Example of a Choice Set

Appendix C. Example of a Choice Set

Instruction:

Imagine you downloaded two different ride-sharing driver apps which were downloaded more than 100 million times. The app companies provide different work conditions and features. You will choose the most appropriate of the given two hypothetical options.

You will be provided with 6 choice sets, which contain the following 7 attributes of ride-sharing services:

- **Minimum required driving hours per week**: The ride-sharing company may require a specified minimum number of driving hours per week of 0 hour, 20 hours, or 40 hours. You can drive for a longer time than the minimum hours.
- **Health insurance**: The ride-sharing company provides a health insurance with standard insurance coverage.
- **Retirement**: The ride-sharing company matches some or all of your retirement plan.
- **Minimum wage guarantee**: The ride-sharing company covers the difference between your earnings and the minimum wage in your city if your acceptance rate is higher than 80%.
- **Passenger rating system**: You can evaluate a passenger after providing a ride.
- **Substitute phone numbers**: The ride-sharing app shows a dummy phone number instead of your actual phone number to passengers when you communicate with them.
- **Auto insurance deductible**: The ride-sharing company offers an insurance policy with a $1,000 or $2,500 deductible in case of an accident whether it was your fault or not, as long as you maintain auto insurance that includes collision coverage for that vehicle while not on a ride-sharing trip. The coverage amount is $1 million.

Let's assume you encounter a situation where you could drive for a ride-sharing service. Please choose the most appropriate of the given three hypothetical options. This choice set is the second set of the six choice sets. Please consider each individual choice set an independent decision.

Attribute	Option 1	Option 2
Minimum required driving hours per week	40 hours	40 hours
Health insurance The ride-sharing company provides your health insurance with average coverage.	Yes	Yes
Retirement The ride-sharing company matches all or some of your retirement plan.	Yes	Yes
Minimum wage guarantee The company covers the difference between your hourly earning and minimum wage if your acceptance rate is higher than 80%.	Yes	No
Passenger rating system You can evaluate a passenger after providing a ride.	No	No
Substitute phone numbers Your phone number is disclosed when you communicate with passengers.	No	No
Auto insurance deductible The company offers an insurance policy with a $1,000 or $2,500 deductible and a $1 million of a total coverage for ride-sharing.	$1000	$2500

I would drive with Option 1

I would drive with Option 2

I would not drive with either option

For the choice you just made, which attribute(s) influenced your choice the most? Please select all that apply.

- Minimum required driving hours per week
- Health insurance
- Retirement
- Minimum wage guarantee
- Passenger rating system
- Substitute phone numbers
- Auto insurance deductible

[The question below was displayed to active drivers who chose Option 1 or Option 2.]

For the option you just chose, would you expect to change your driving hours or driving period for the ride-sharing service, compared to your current situation?

	I would increase	I would decrease	I would not change my current working patterns
driving hours per week for the ride-sharing service	○	○	○
expected driving period (year) for the ride-sharing service	○	○	○

BIBLIOGRAPHY

BIBLIOGRAPHY

Alfnes, F., Guttormsen, A. G., Steine, G., and Kolstad, K. (2006). Consumers' willingness to pay for the color of salmon: a choice experiment with real economic incentives. *American Journal of Agricultural Economics*, *88*(4), 1050-1061.

Anastasopoulos, P. C. and Mannering, F. L. (2011). An empirical assessment of fixed and random parameter logit models using crash-and non-crash-specific injury data. *Accident Analysis & Prevention*, *43*(3), 1140-1147.

Armstrong, M. (2006). Competition in two-sided markets. *The RAND Journal of Economics*, *37*(3), 668-691.

Artz, B. (2010). Fringe benefits and job satisfaction. *International Journal of Manpower*, *31*(6), 626-644.

Barringer, M. W. and Milkovich, G. T. (1998). A theoretical exploration of the adoption and design of flexible benefit plans: A case of human resource innovation. *Academy of Management Review*, *23*(2), 305-324.

Beam, B. T., and McFadden, J. J. (2001). *Employee benefits*. Dearborn Trade Publishing.

Benbya, H., and Van Alstyne, M. W. (2010). How to find answers within your company.

Berger, T., Chen, C., and Frey, C. B. (2018). Drivers of disruption? Estimating the Uber effect. *European Economic Review*.

Bhat, C. R. (1998). Accommodating variations in responsiveness to level-of-service measures in travel mode choice modeling. *Transportation Research Part A: Policy and Practice*, *32*(7), 495-507.

BLS. (2018, June 7). Contingent and alternative employment arrangements Summary. *Washington, DC: United States Department of Labor, Bureau of Labor Statistics*. Retrieved from https://www.bls.gov/news.release/conemp.nr0.htm.

Boisjoly, J., Duncan, G. J., and Smeeding, T. (1998). The shifting incidence of involuntary job losses from 1968 to 1992. *Industrial Relations: A Journal of Economy and Society*, *37*(2), 207-231.

Borleis, M. W. (1996). The handbook of employee benefits. *Chicago: Irwin*.

Boxall, P. C. and Adamowicz, W. L. (2002). Understanding heterogeneous preferences in random utility models: a latent class approach. *Environmental and Resource Economics*, *23*(4), 421-446.

Bredgaard, T. and Madsen, P. K. (2018). Farewell flexicurity? Danish flexicurity and the crisis. *Transfer: European Review of Labour and Research*.

Buchan, J. (1998). Further flexing? Issues of employment contract flexibility in the UK nursing workforce. *Health Services Management Research*, *11*(3), 148-162.

Busquets, J. (2010). Orchestrating Smart Business Network dynamics for innovation. *European Journal of Information Systems, 19*(4), pp.481-493.

Calo, R. and Rosenblat, A. (2017). The taking economy: Uber, information, and power. *Columbia Law Review*, 1623-1690.

Castillo, J. C., Knoepfle, D., and Weyl, G. (2017). Surge pricing solves the wild goose chase. In *Proceedings of the 2017 ACM Conference on Economics and Computation* (pp. 241-242). ACM.

Chen, M. K., Chevalier, J. A., Rossi, P. E., and Oehlsen, E. (2017). The value of flexible work: Evidence from uber drivers (No. w23296). *National Bureau of Economic Research.*

Chen, L., Mislove, A., and Wilson, C. (2015). Peeking beneath the hood of uber. In *Proceedings of the 2015 Internet Measurement Conference* (pp. 495-508). ACM.

Chen, M. K., and Sheldon, M. (2015). Dynamic pricing in a labor market: Surge pricing and the supply of Uber driver-partners. *Working Paper.* University of California, Los Angeles.

Ciborra, C. U. (1996). The platform organization: Recombining strategies, structures, and surprises. *Organization science*, *7*(2), 103-118.

Cohen, P., Hahn, R., Hall, J., Levitt, S., and Metcalfe, R. (2016). Using big data to estimate consumer surplus: The case of uber (No. w22627). *National Bureau of Economic Research.*

Cohn, A., Fehr, E., and Goette, L. (2014). Fair wages and effort provision: Combining evidence from a choice experiment and a field experiment. *Management Science*, *61*(8), 1777-1794.

Cramer, J. and Krueger, A. B. (2016). Disruptive change in the taxi business: The case of Uber. *The American Economic Review*, *106*(5), 177-182.

Crank, A. L. (2015). O'Connor v. Uber Technologies, Inc.: The Dispute Lingers-Are Workers in the on-Demand Economy Employees or Independent Contractors. *American Journal of Trial Advocacy*, *39*, 609.

Crespo, Y. (2016). Uber v. Regulation:'Ride-Sharing'Creates a Legal Gray Area. *U. Miami Business Law Review*, *25*, 79.

Currie, J. and Madrian, B. C. (1999). Health, health insurance and the labor market. *Handbook of Labor Economics*, *3*, 3309-3416.

De Reuver, M. (2009). Governing mobile service innovation in co-evolving value networks. Dissertation. Technische Universiteit Delft.

De Reuver, M., Bouwman, H., Prieto, G., and Visser, A. (2011). Governance of flexible mobile service platforms. *Futures*, *43*(9), 979-985.

Dills, A. K. and Mulholland, S. E. (2016). Ride-sharing, fatal crashes, and crime. *Southern Economic Journal, 84*(4), 965-991.

DiMaggio, P. and Hargittai, E. (2001). From the 'digital divide'to 'digital inequality': Studying Internet use as penetration increases. *Princeton: Center for Arts and Cultural Policy Studies, Woodrow Wilson School, Princeton University*, *4*(1), 4-2.

Dutta, S. (2003). Capital budgeting and managerial compensation: Incentive and retention effects. *The Accounting Review*, *78*(1), 71-93.

Einav, L., Farronato, C., and Levin, J. (2016). Peer-to-peer markets. *Annual Review of Economics*, *8*, 615-635.

Ehrenberg, R. and Smith, R. (2014) *Modern Labor Economics: Theory and Public Policy*, Pearson Education, Inc.

Edelman, B. G. and Geradin, D. (2015). Efficiencies and regulatory shortcuts: How should we regulate companies like Airbnb and Uber. *Stanford Technology Law Review*, *19*, 293.

Employment Committee (EMCO) Working group on Flexicurity. (2006, May). Flexicurity, Retrieved from http://bancadati.anpalservizi.it/bdds/download?fileName=C_21_Strumento_4168_documenti_itemName_1_documento.pdf&uid=a6c3a9af-01bb-4607-b50a-d6d68451b1a2.

Eyal, N. (2014) *Hooker: How to build habit-forming products*, Toronto: Penguin Canada.

Farber, H. S. (1996). *The changing face of job loss in the United States, 1981-1993* (No. w5596). National bureau of economic research.

Farrell, D. and Greig, F. (2016). Paychecks, paydays, and the online platform economy: Big data on income volatility. *JP Morgan Chase Institute*.

Federal Reserve System. (2018, May). Report on the economic well-being of U.S. households in 2017-2018. Washington, DC, Board of the Governors of the Federal Research System. Retrieved from https://www.federalreserve.gov/publications/files/2017-report-economic-well-being-us-households-201805.pdf.

Ferrer-i-Carbonell, A. and van Praag, B. M. (2006). Insecurity in the labor market–The impact of the type of contract on job satisfaction in Spain and the Netherlands. *University of Amsterdam*.

Fu, V. K. (1999). Estimating generalized ordered logit models. *Stata Technical Bulletin*, *8*(44).

Gawer, A., and Cusumano, M. A. (2002). *Platform leadership: How Intel, Microsoft, and Cisco drive industry innovation* (Vol. 5, pp. 29-30). Boston, MA: Harvard Business School Press.

Gerber, E. M. and Hui, J. (2013). Crowdfunding: Motivations and deterrents for participation. *ACM Transactions on Computer-Human Interaction (TOCHI)*, *20*(6), 34.

Ghazawneh, A. and Henfridsson, O. (2010). Governing third-party development through platform boundary resources. In *the International Conference on Information Systems (ICIS)* (pp. 1-18). AIS Electronic Library (AISeL).

Graham, M., Hjorth, I., and Lehdonvirta, V. (2017). Digital labour and development: impacts of global digital labour platforms and the gig economy on worker livelihoods. *Transfer: European Review of Labour and Research*, *23*(2), 135-162.

Greenwood, B. N. and Wattal, S. (2017). Show me the way to go home: an empirical investigation of ride-sharing and alcohol related motor vehicle fatalities. *MIS Quarterly*, *41*(1), 163-187.

Hagtvedt, H. (2011). The impact of incomplete typeface logos on perceptions of the firm. *Journal of Marketing*, *75*(4), 86-93.

Hall, J. V. and Krueger, A. B. (2015). An Analysis of the Labor Market for Uber's Driver-Partners in the United States. *Princeton University Industrial Relations Section Working Paper*, 587.

Hamari, J., Sjöklint, M., and Ukkonen, A. (2015). The sharing economy: Why people participate in collaborative consumption. *Available at SSRN 2271971*.

Hansen Henten, A., and Maria Windekilde, I. (2016). Transaction costs and the sharing economy. *Info*, *18*(1), 1-15.

Hargittai, E. (2001). Second-level digital divide: Mapping differences in people's online skills. *arXiv preprint cs/0109068*.

Hensher, D. A. and Greene, W. H. (2011). Valuation of travel time savings in WTP and preference space in the presence of taste and scale heterogeneity. *Journal of Transport Economics and Policy (JTEP)*, *45*(3), 505-525.

Hill, E. J., Grzywacz, J. G., Allen, S., Blanchard, V. L., Matz-Costa, C., Shulkin, S., and Pitt-Catsouphes, M. (2008). Defining and conceptualizing workplace flexibility. *Community, Work and Family*, *11*(2), 149-163.

Hong, S. J. (2017). Assessing economic value of reducing perceived risk in the sharing economy: the case of ride-sharing services. *Proceedings of the 23th Americas Conference on Information Systems 2017.*

Hölmstrom, B. (1979). Moral hazard and observability. *The Bell Journal of Economics, 10*(1), 74-91.

Isaac, E. (2014). *Disruptive innovation: Risk-shifting and precarity in the age of Uber*. Berkeley Roundtable on the International Economy, University of California, Berkeley.

Jaeger, D. A. and Stevens, A. H. (1999). Is job stability in the United States falling? Reconciling trends in the current population survey and panel study of income dynamics. *Journal of Labor Economics*, *17*(S4), S1-S28.

Jain, A. (2011). Apps Marketplaces and the telecom value chain. *IEEE Wireless Communications, 18*(4), pp.4-5.

Johnson, R. and Orme, B. (2003). Getting the most from CBC. Sequim: Sawtooth Software Research Paper Series, *Sawtooth Software*.

Kalleberg, A. L., Reskin, B. F., and Hudson, K. (2000). Bad jobs in America: Standard and nonstandard employment relations and job quality in the United States. *American Sociological Review, 65*(2) 256-278.

Kogut, B., and Kulatilaka, N. (1994). Options thinking and platform investments: Investing in opportunity. *California Management Review*, *36*(2), 52-71.

Kolstad, J. R. (2011). How to make rural jobs more attractive to health workers. Findings from a discrete choice experiment in Tanzania. *Health Economics, 20*(2), 196-211.

Lancaster, K. J. (1966). A new approach to consumer theory. *Journal of Political Economy*, *74*(2), 132-157.

Lanfranchi, J., Narcy, M., and Larguem, M. (2010). Shedding new light on intrinsic motivation to work: evidence from a discrete choice experiment. *Kyklos*, *63*(1), 75-93.,

Li, Z., Hong, Y., and Zhang, Z. (2017). An empirical analysis of on-demand ride sharing and traffic congestion. *Proceedings of the 50th Hawaii International Conference on System Sciences 2017.*

Lopes, L. L. and Schneider, S. L. (1987). Risk Preference and Aspiration Level (No. WHIPP-27). *Wisconsin Human Information Processing Program Madison*.

Lopes, L. L. and Oden, G. C. (1999). The role of aspiration level in risky choice: A comparison of cumulative prospect theory and SP/A theory. *Journal of Mathematical Psychology*, *43*(2), 286-313.

Loureiro, M. L. and Umberger, W. J. (2007). A choice experiment model for beef: What US consumer responses tell us about relative preferences for food safety, country-of-origin labeling and traceability. *Food Policy*, *32*(4), 496-514.

Louviere, J. and Hensher, D.A. (1982). On the design and analysis of simulated choice or allocation experiments in travel choice modelling. *Transportation Research Record* 890, 11

Louviere, J. and Woodworth, G. (1983). Design and analysis of simulated consumer choice or allocation experiments: an approach based on aggregate data. *Journal of Marketing Research, 20*, 350-367

Madsen, K, (2002). The Danish model of "flexicurity" — a paradise with some snakes. In: Sarfati, H., Bonoli, G. (Eds.), *Labour Market and Social Protection Reforms in International Perspective. Parallel or converging tracks?.* Ashgate/ISSA: Alder- shot, pp. 243–265.

Malhotra, A. and Van Alstyne, M. (2014). The dark side of the sharing economy… and how to lighten it. *Communications of the ACM*, *57*(11), 24-27.

Mangham, L. J. and Hanson, K. (2008). Employment preferences of public sector nurses in Malawi: results from a discrete choice experiment. *Tropical Medicine and International Health*, *13*(12), 1433-1441.

Manner, J., Nienaber, D., Schermann, M., and Krcmar, H. (2012). Governance for Mobile Service Platforms: a literature Review and Research Agenda. In *ICMB* (p. 14).

Markus, M. L. (2007). The governance of free/open source software projects: monolithic, multidimensional, or configurational? *Journal of Management and Governance, 11*(2), pp.151-163.

Martin-Buck, F. (2017). Driving Safety: An empirical analysis of ridesharing's impact on drunk driving and alcohol-related crime. *Working Paper*. University of Texas at Austin.

McFadden D. (1974). *Conditional logit analysis of qualitative choice behavior.* In: Zarembka P, editor. Frontiers in econometrics. New York: Academic Press, p. 105-42.

McNamara, B. (2015). Airbnb: A not-so-safe resting place. *Journal on Telecommunication and High Technology Law*, *13*, 149.

Millán, J. M., Hessels, J., Thurik, R., and Aguado, R. (2013). Determinants of job satisfaction: a European comparison of self-employed and paid employees. *Small business Economics*, *40*(3), 651-670.

Möhlmann, M. (2015). Collaborative consumption: determinants of satisfaction and the likelihood of using a sharing economy option again. *Journal of Consumer Behaviour*, *14*(3), 193-207.

Monks, J. and Pizer, S. D. (1998). Trends in voluntary and involuntary job turnover. *Industrial Relations: A Journal of Economy and Society*, *37*(4), 440-459.

Muffels, R. and Luijkx, R. (2005). Job mobility and employment patterns across European welfare states. Is there a "trade-off" or a "double bind" between flexibility and security?. *Institute for Labour Studies, Amsterdam. Retrieved*, *25*(05), 2010.

Müller, R. M., Kijl, B., and Martens, J. K. J. (2011). A Comparison of Inter-Organizational Business Models of Mobile App Stores: There is more than Open vs. Closed. *Journal of Theoretical and Applied Electronic Commerce Research,* 6(2), pp.63-76.

Nahuelhual, L., Loureiro, M. L., and Loomis, J. (2004). Using random parameters to account for heterogeneous preferences in contingent valuation of public open space. *Journal of Agricultural and Resource Economics, 29*(3), 537-552.

Narasimhan C., Papatla P., and Ravula, P. (2016). Preference segmentation induced by tariff schedules and availability in ride-sharing markets. *Working Paper,* University of Wisconsin-Milwaukee, Milwaukee

Origo, F., and Pagani, L. (2009). Flexicurity and job satisfaction in Europe: The importance of perceived and actual job stability for well-being at work. *Labour Economics*, 16(5), 547-555.

Orme B. (1998). Sample size issues for conjoint analysis studies. *Sequim: Sawtooth Software Technical Paper*.

Parker, G. G., Van Alstyne, M. W., and Choudary, S. P. (2016). *Platform revolution: How networked markets are transforming the economy--and how to make them work for you*. WW Norton and Company.

Parker, G., Van Alstyne, M., and Jiang, X. (2016). Platform ecosystems: How developers invert the firm. *Working Paper*. Smithsonian Environmental Research Center.

Permain, D., Swanson, J., Kroes, E., and Bradley, M. (1991). Stated Preference Technique—A Guide to Practice, Steer Davies Gleave and Hague Consulting Group.

Puschmann, T. and Alt, R. (2016). Sharing economy. *Business and Information Systems Engineering*, *58*(1), 93-99.

Remler, D. K. and Glied, S. A. (2003). What other programs can teach us: Increasing participation in health insurance programs. *American Journal of Public Health*, *93*(1), 67-74.

Robertson, D. and Ulrich, K. (1998). Planning for product platforms. *Sloan Management Review*, *39*(4), 19.

Rochet, J. C. and Tirole, J. (2006). Two-sided markets: a progress report. *The RAND Journal of Economics*, *37*(3), 645-667.

Robey, D., Im, G., and Wareham, J. D. (2008). Theoretical Foundations of Empirical Research on Interorganizational Systems: Assessing Past Contributions and Guiding Future Directions. *Journal of the Association for Information Systems*, 9 (9), pp.497-518.

Rogers, B. (2015). The social costs of Uber. *The University of Chicago Law Review Dialogue*, *82*, 85.

Rolf, D. (2016). *The fight for fifteen: The right wage for a working America*. New Press.

Rudmark, D. and Ghazawneh, A. (2011). Third-party development for multi-contextual services: on the mechanisms of control. In *ECIS* (p. 162).

Schlagwein, D., Schoder, D., and Fischbach, K. (2010). Openness in the Orchestration of Ecosystems: A Resource-based Perspective. *Working Papers on Information Systems 10* (78), 1-IX.

Scholz, T. (2016). *Platform cooperativism. Challenging the corporate sharing economy.*

Schor, J. (2016). Debating the sharing economy. *Journal of Self-Governance and Management Economics*, *4*(3).

Schor, J. B. and Attwood-Charles, W. (2017). The "sharing" economy: labor, inequality, and social connection on for-profit platforms. *Sociology Compass*, *11*(8), e12493.

Sundararajan, A. (2012, October 22). Why The Government Doesn't Need to Regulate the Sharing Economy. *Wired*. Retrieved from http://www.wired.com/2012/10/from-airbnb-to-coursera- why-the-Government-shouldnt-regulate-the-sharing- economy/.

Sundararajan, A. (2013). From Zipcar to the sharing economy. *Harvard Business Review*, *1*.

Sundararajan, A. (2016). *The sharing economy: The end of employment and the rise of crowd-based capitalism*. MIT Press.

Swinnerton, K. A., and Wial, H. (1995). Is job stability declining in the US economy?. *ILR Review*, *48*(2), 293-304.

Thomas, L. D. W., Autio, E., and Gann, D. M. (2011). Architectural Leverage: Putting Platforms in Context. *Academy of Management Perspectives*, *28*(2), 198–219.

Tiwana, A. (2009). Governance-knowledge fit in systems development projects. *Information Systems Research*, *20*(2), 180-197.

Tiwana, A., Konsynski, B., and Bush, A. A. (2010). Research commentary—Platform evolution: Coevolution of platform architecture, governance, and environmental dynamics. *Information Systems Research*, *21*(4), 675-687.

Train, K. (2009). *Discrete choice methods with simulation*. Cambridge university press.

Valletta, R. G. (1999). Declining job security. *Journal of Labor Economics*, *17*(S4), S170-S197.

Van Alstyne, M. W., Parker, G. G., and Choudary, S. P. (2016). Pipelines, platforms, and the new rules of strategy. *Harvard Business Review*, *94*(4), 54-62.

Wallsten, S. (2015). The competitive effects of the sharing economy: how is Uber changing taxis. *Technology Policy Institute*, *22*.

Wan, X., Cenamor, J., Parker, G., and Van Alstyne, M. (2017). Unraveling Platform Strategies: A Review from an Organizational Ambidexterity Perspective. *Sustainability*, *9*(5), 734.

Wilczyńska, A., Batorski, D., and Sellens, J. T. (2016). Employment flexibility and job security as determinants of job satisfaction: the case of Polish knowledge workers. *Social Indicators Research*, *126*(2), 633-656.

Williamson, O. E. (1981). The economics of organization: The transaction cost approach. *American journal of sociology*, *87*(3), 548-577.

Williamson, O. E. (1996). Transaction cost economics and the Carnegie connection. *Journal of Economic Behavior and Organization*, *31*(2), 149-155.

Williams, R. (2006). Generalized ordered logit/partial proportional odds models for ordinal dependent variables. *Stata Journal*, *6*(1), 58.

Wight, V. R., Raley, S. B., and Bianchi, S. M. (2008). Time for children, one's spouse and oneself among parents who work nonstandard hours. *Social Forces*, *87*(1), 243-271.

Yoo, Y., Henfridsson, O., and Lyytinen, K. (2010). "The New Organizing Logic of Digital Innovation: An Agenda for Information Systems Research," *Information Systems Research, 21*(4), 724–735.

Zervas, G., Proserpio, D., and Byers, J. W. (2017). The rise of the sharing economy: Estimating the impact of Airbnb on the hotel industry. *Journal of Marketing Research*, *54*(5), 687-705.

Zoepf, S. M., Chen, S., Adu, P., and Pozo, G. (2018, February 1). The Economics of Ride-Hailing: Driver Revenue, Expenses, and Taxes. *Working Paper*. Massachusetts Institute of Technology (MIT) Center for Energy and Environmental Policy Research. Retrieved from https://teamstersafety.org/wp-content/uploads/2018/03/2018-005-Brief.pdf.