THE EXAMINATION OF THE GIG ECONOMY IN CANADA FROM 1976 TO 2021

DMITRY ALEKSEEV
Bachelor of Arts, Lomonosov Moscow State University, 2013

A thesis submitted
in partial fulfilment of the requirements for the degree of

MASTER OF ARTS

in

ECONOMICS

Department of Economics
University of Lethbridge
LETHBRIDGE, ALBERTA, CANADA

THE EXAMINATION OF THE GIG ECONOMY IN CANADA FROM 1976 TO 2021

DMITRY ALEKSEEV

Date of Defence: September 27, 2024

Dr. Richard E. Mueller Thesis Supervisor	Professor	Ph.D.
Dr. Duane W. Rockerbie Thesis Examination Committee Member	Professor	Ph.D.
Dr. Yuri Ostrovsky Thesis Examination Committee Member	Senior Research Analyst, Statistics Canada	Ph.D.
Dr. Pascal Ghazalian Thesis Examination Committee Member	Professor	Ph.D.
Dr. Danny Le Roy Chair, Thesis Examination Committee	Associate Professor	Ph. D.

DEDICATION

To the blessed memory of Alekseeva Hasana Sadykovna, who set the bar of excellence for me to follow suit, thank you.

ABSTRACT

It is currently important to provide practical recommendations to the Government of Canada in response to COVID-19 shocks to the labour markets on a global level as well as at a local/regional level. The gig labour market has been affected by the pandemic, but to date, there are no studies about the gig economy and its *implications on the labour market* in Canada. This project is one of the newest assessments of Canada's gig economy in the scientific literature.

Considering the fact that conventional labour market statistics and economic indicators are poorly suited to measuring work that is transacted via online platforms, the entire digital transformation of labour markets remains largely unobservable to policy makers and labour market researchers. The purpose of this thesis is to therefore take a long-term perspective to compare the gig labour market opportunities of today's young working populations with those of previous and future generations in Canada in the context of the rising gig economy. Consequently, the thesis aims to explore the main challenges, along with some opportunities, in applying the gig economy platforms in Canada. The gig-economy platforms portray themselves as intermediaries in the two-sided market of workers and jobs, rejecting the idea that such platforms are employers (Koonse & Waheed, 2020). Thus, detailed labour and employment data are necessary to conduct the research which will shed light on the gaps in this area.

The information about the conditions of the gig economy in Canada is extremely limited, at times even absent. As mentioned by Jeon and Ostrovsky (2020:3):

> Despite the significant share of gig workers (GWs) in the Canadian labour force, the impact of the COVID-19 pandemic on them is very difficult to assess because GWs cannot be identified in any of the main sources of employment data. Unlike traditional wage employees, GWs enter various non-standard work arrangements to complete specific tasks or work for a specific period of time and, therefore, their work loss is not captured by standard employment or wage indicators.

In view of this lack of data, it is impossible to identify the gig worker in the real labour market. Other scholars highlight that labour economic theory is no longer relevant (Ashford et al., 2018). Nevertheless, by using the linked Labour Force Survey master files at Research Data Center, this thesis offers as a means of filling the gap in knowledge in this topic.

This thesis has five chapters. The first chapter introduces the topic of the gig economy and the theory behind this new phenomenon. In Chapter 2, we reviewed the relevant literature and definitions of the gig economy. Chapter 3 outlines the study design, the data source, and the variables and analytical procedures used for the logit model estimations and for the summary statistics. Chapter 4 interprets the empirical results from this research. The final chapter presents the conclusions, study limitations, and relevant recommendations for the future studies on this topic.

ACKNOWLEDGEMENTS

Praise and thanks be to The Ever-Faithful God for seeing me through to a successful end of my study.

I would like to extend my deepest appreciation to Dr. Richard Mueller, my supervisor, for giving me the opportunity to work with him. I would further like to acknowledge and express my gratitude to Dr. Duane Rockerbie, Dr. Pascal Ghazalian and Dr. Yuri Ostrovsky for accepting to be on my thesis committee. Dr. Danny Le Roy, thank you for chairing my thesis examination committee. It is very fulfilling to associate with all of you. Equally important to acknowledge are all professors and staff of the Economics department, especially Dr. Kamar Ali, Dr. Alexander Darku, Dr. Stavroula Malla and Dr. Kien Tran. All of you provided unflinching support and guidance throughout my programme.

Dr. Richard Mueller assisted the results of this thesis from the initial idea, until the end. With the collaboration of Yuri Ostrovsky (Statistics Canada), we found out that the Canadian case study is the most relevant topic to research within an Alberta institution. Irene Wong who is an analyst at Research Data Centres Program at the University of Alberta patiently provided and walked me through the data application process and worked closely with me over the Methodology and Data part of the thesis. Another part of the analysis presented in this thesis was conducted at the Lethbridge Branch of the Prairie Regional Research Data Centre (RDC), a part of the Canadian Research Data Centre Network. The services provided by the Lethbridge RDC are made possible through the support of my supervisor, and the University of Lethbridge. All views expressed in this work are my own.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1: INTRODUCTION - THE THEORY BEHIND THE GIG ECONOMY

The absence of relevant labour legislation in the presence of all the new technologies has led to a reduction in real wages in the world's developing economies as well as a reduction in good opportunities for low-skilled employees and young workers. Young workers who prefer or are used to seeing their parents have a traditional, stable career path are being crowded out in some industries and even in innovative businesses. This thesis is interested in investigating which characteristics of the individual lead to the increased low-qualified gig labour economy in Canada. In this endeavor, it addresses what Canadians want to know, namely where the gig labour economy is right now in terms of a job comparison with work held by today's and future young generations and those of previous generations in Canada.

Employment can be viewed from the point of whether it offers growth prospects. For instance, the programming profession may provide growth prospects but working as a loader in a warehouse does not provide any prospects, nor do delivery or ridesharing jobs. In short, any work related to process support does not offer prospects.

One reason why Canada was chosen for study is because of the availability of the Labour Force Survey data. Secondly, in countries where technologies are created, high-tech jobs are also created. Therefore, one of the main goals for Canadian policy might be the establishment of a suitable environment for the development of new technologies, internet related companies and gig platforms in Canada and more specifically in the Western provinces.

The gig economy is a part of the digital transformation of the economy and a value creation process. Canada is under-involved in technology creation and partially dependent on the export of natural resources. So, the country runs a major risk of increasing income inequality if the natural resources industries are struggling, especially in Alberta. Currently Canada mainly acquires new technologies from outside the country or participates in a creation process as a collaborator.

Although the gig economy could lead to greater income inequality as new technologies reduce jobs for "middle class workers", the presence of the gig platforms simultaneously creates new jobs which offer both higher paid positions (i.e., programmers) and lower paid positions (i.e., delivery drivers). Even though some scholars claim that some of the new internet-platform mediated

companies lead to the creation of new jobs in Canada, the sum total of the complexity of the new technologies leads to a reduction in overall employment in the industrial industries in Canada, because the technologies replace workers as well as replacing “low quality” entrepreneurship.

This study offers a long-term perspective to compare the gig labour market opportunities of today’s young generation and working professionals with those of previous and future generations in Canada within the context of the rising gig economy. In terms of the internet economy, the gig-economy platforms portray themselves as intermediaries in the two-sided market of workers and jobs, rejecting the idea that they are employers.

1.1 BACKGROUND

In this section, we present an overview of the study and underscore the importance of the topic. Studies on labour economics matter. Canadian economist David Card, who won the 2021 Nobel Prize in Economics with Joshua Angrist and Guido Imbens, for work carried out on low minimum wages reached conclusions which have some relevance to the gig economy. Card won half the prize (Angrist and Imbens each received a quarter) for empirical labour market research. Card’s commitment to the empirical approach was noted, for example, by Harvard economist Richard Freeman (2006:1): “…it is a belief in the power of empirical economic science—in the ability to use statistics creatively to make inferences about how the economy operates.” Given the value of such empirical statistical science, a similar approach was used in this study to evaluate how the gig economy operates in Canada.

Card first became known in the early 1990s when he discovered, along with Princeton economist Alan Krueger, that raising minimum wages leads not to lower employment, but to higher employment. Card and Krueger drew this conclusion by examining employment in fast food restaurants in New Jersey and neighboring Pennsylvania after New Jersey raised the minimum wage in 1992, while Pennsylvania did not (Card and Krueger, 1994). As a result, in New Jersey, compared to Pennsylvania, employment increased. The researchers' conclusion caused reverberations, as it contradicted the standard models of supply and demand. Up until their contribution, it had been believed that an increase in the minimum wage would lead to an increase

in unemployment because employers would not want to continue paying higher wages for the previous number of jobs (Card and Krueger, 1994).

In 1996, the federal minimum wage was raised, as a result of which the minimum wage increased in Pennsylvania, but not in New Jersey (the minimum there already exceeded the new federal level). There was no drop in employment in Pennsylvania. The federal wage increases did not have a negative impact on employment in other states either. In California, the 1989 increase in the minimum wage from $3.35 to $4.25 (11% of state workers had wages below the minimum) led not only to higher wages for adolescents and other low-skilled workers, but also to an increase in employment (Card and Krueger, 1994). In the mid-1990s, Card investigated a non-standard situation in the labour market: in the United States in the 1980s wages fell, and employment rose, while in Europe both wages and employment remained at the same level. Card showed that this is largely due to the regulation of the labour market (Card et al., 1999). Though his research has since met with intense criticism, the data in the New Jersey case study was not that good as it was just collected over the phone - but we now know the later significance of his research. The similarities can be drawn with the gig economy – while the companies try to pay as low as possible to increase the demand on their services, the increase of the gig workers' payments would increase labour supply, which is the basis of the success of the gig economy companies yet this is still not considered.

Angrist's research with his colleagues Sydnee Caldwell and Jonathan Hall, analyzed the Boston taxi market and described the disruptive effect of mobile applications[1], a chief feature of the modern understanding of the gig economy. In Boston, "traditional" taxi drivers (not Uber or Lyft taxi drivers) are required to buy or rent licenses (the authors call it a "medallion lease") to be a taxi driver. They concluded that the presence of online platforms significantly reduced the price of the licenses and the costs for taxi customers due to the fact that taxi drivers had more choice in terms of whether to work for a platform or a traditional company (Angrist et al., 2017). For this reason, the thesis examines the size of the gig economy, which is increasing and disrupting many markets and

[1] Since the internet is now accessible both from a desktop and from a mobile phone, hereinafter we will use entities such as website and a mobile application as synonyms interchangeably.

the industries in Canada and our short historical review of the gig economy assesses how it has changed.

Relevant studies all around the world highlighted the importance of measuring the gig economy. Scholars from the Centre for Development Informatics assessed that 70 million gig workers were registered in 2015 globally by online labour platforms which facilitate remote forms of gig work (Heeks, 2017). In 2019, Queensland University of Technology published a report stating 7% of Australians participate in the gig economy (Cary, 2019). Another study reported that 10% of the US workforce participated in the gig economy in 2018 (FP Insider, 2018). According to a 2019 Bank of Canada report, 18% of Canadians worked in the gig economy for non-recreational reasons or as a hobby (Kostyshyna and Luu, 2019), with another 30% of respondents reporting their engagement in some form of non-standard work arrangements (Kostyshyna and Luu, 2019). The authors of the report calculated that the labour supply from the Canadian gig economy could be around 700,000 full-time jobs which is equal to 3.5 percent of the labour force. Around 2018, 15% of China's workforce, representing over 110 million people, was involved in the gig economy (FP Insider, 2018). Data from the Labour Force Survey (LFS) show that:

> . . . in 2018, 2.9 million Canadians were self-employed, up from 1.2 million in 1976. Self-employed workers accounted for 15% of total employment, up from 12% four decades earlier. The highest self-employment rate was in British Columbia (Yssaad and Ferrao, 2019:4).

Many of these self-employed are gig workers, and come under examination in this thesis. Recently, Garin et al. (2023) from the National Bureau of Economic Research discovered that only between 2019 and 2021 in the US did jobs performed through the gig platforms grow significantly by a minimum of 3.1 million new gig workers. The most extreme assessment was given by the McKinsey Global Institute in 2019, with an estimation that “between 20% to 30% of the working population in the US engaged in the gig economy in some way …”.

In 2019, the World Bank estimated that globally, fewer than 0.5% of people in the “active labor force” take part in the gig economy (World Bank, 2019). The most fundamental finding is that the gig economy is rising sharply, at an annual rate of 14% (Kassi and Lehdonvirta, 2016). For Canada, based on the data from the Canadian Employer-Employee Dynamics Database, Jeon, Liu and Ostrovsky identified a sharp increase in the share of the gig workers among all workers in the

period from 2005 to 2016 (Jeon et al., 2019) (see Figure 1). The same researchers found that gig workers "were about equally split between those who did gig work to supplement their wage employment and those who did not earn any wages or salaries and therefore relied primarily on their gig earnings" (Jeon and Ostrovsky, 2020).

Figure 1: Share of gig workers among all workers (men and women), from 2005 to 2016

Source: Jeon et al., 2019

Figure 1 shows the significance of the gig economy for economic research and this thesis as the share of gig workers among all workers in Canada and around the globe is rising sharply and consistently. Knowing the significance of a new type of economy as well as an informational vacuum, Kassi and Lehdonvirta made a significant practical contribution to the representation of the gig economy by introducing an interactive online gig economy map (the Online Labour Index):

> … because conventional labour market statistics and economic indicators are ill-suited to measuring work that is transacted via online platforms. The entire digital transformation of labour markets remains largely unobservable to policy makers and labour market researchers (Kassi and Lehdonvirta, 2018:241).

The International Labour Organization researched two types of gig economies, both of which have been studied extensively within the literature. The first type regards "work on demand via location-based platforms or applications (apps), which allocate tasks or services (to be executed offline) to individuals (with few given to the crowd e.g., local microtasking, e.g., Streetspotr) in a specific geographical area" (Mexi, 2019:3). Such industries of digital economy as home services (AskforTask as an example of a Canadian company), food delivery (Doordash and SkipTheDishes)[2], transportation and parking (Via and Lyft), accommodation (Couchsurfing and Airbnb), and grocery delivery services (Instacart and Doordash) are quite common in Canada, the US and other developed economies. Regarding the first type of gig economy some interesting scientific articles have been published in North America. The second type concerns "…crowd-sourcing that is - work platforms. The second type of digiwork is part of broader digitalization trends enabling decoupling of time and place from work." (Mexi, 2019:3 - 4). We research both types of the gig economy in Canada, but not its provinces as the work mediated by online platforms has emerged significantly (Garin et. al, 2023). Our point is that the gig labour economy has grown not only in Canada or North America, but throughout the world, especially in the fast-growing economies which we will consider further.

1.2 PROBLEM STATEMENT

What is crucial to bear in mind throughout this analysis is that there is nothing at the provincial level about the gig economy and gig labour as of September 2024, so we do not tackle this in the empirical part below, rather we concentrate on the national level. This research is one of the assessments of Canada's gig economy in the scientific literature.

Current studies to date do not evaluate the size of the gig economy in North America and specifically it is difficult to find an evaluation at the provincial level in Canada.

Considering the fact that conventional labour market statistics and economic indicators are poorly suited to measuring work that is transacted via online platforms, the entire digital

[2] SkipTheDishes is a Canadian online food delivery company initially headquartered in Winnipeg.

transformation of labour markets remains largely unobservable to policy makers and labour market researchers. The purpose of this thesis is to look at a long-term perspective to compare the labour market opportunities of today's young generations with those of previous generations in Canada in the context of the rising gig economy. Consequently, the thesis aims to explore the main challenges, along with some opportunities, in applying the gig economy platforms in Canada. The gig-economy platforms portray themselves as intermediaries in the two-sided market of workers and jobs, rejecting the idea that they are employers. So, the detailed labour and employment data is necessary to conduct the research which will shed light on the gaps in this area.

Using the linked Labour Force Survey master files at Regional Data Center will fill the gap in knowledge in this topic.

1.3 THESIS OBJECTIVES

The overall objective of the study is to evaluate various methodological uncertainties and the lack of vital up-to-date data that would allow for tracking the gig economy in Canada since 1976 until 2021. In essence, the research achieves two objectives. The first is to provide an explanation for the patterns of self-employed gig workers over a long period of time, and the second is to examine the demographic characteristics associated with the gig labor economy.

The thesis objectives are directly related to the conclusion section, to make sure it is easy to trace the answers from the empirical analysis. Firstly, we are going to review the relevant literature and the definitions it contains of the gig economy to discover the most complete definition of the gig economy. Secondly, we are curious if choosing to work as a gig worker is a wise decision, as well as what kind of risks it could bring and whether protection laws should be put in place, beginning with developed economies?

Third, regarding the assessment of Canada's gig economy and its size, detailed weighted summary statistics of paid employed versus gig workers, as well as paid secondary versus gig secondary jobs are going to be presented in two tables to answer all the fundamental demographic questions of Canada's gig economy.

Fourth, we are going to research marginal effects and logit standard error coefficients in the logit models as well as tests for different coefficient values on different variables to understand the determinants of the gig employment. More specifically, we will assess six models (marginal effects), four models for males versus females and two models for native Canadians and immigrants.

Finally, we will answer what kind of regulations could be implemented into the employment and labour law related to the gig labour market as well as explain our limitations and delimitations.

1.4 THESIS CONTRIBUTION

We therefore use the Labour Force Survey (LFS) from 1976 through to 2021 to update existing literature and fill in identified gaps in the scientific literature[3]. The LFS is:

> … a monthly survey which measures the current state of the Canadian labour market and is used, among other things, to calculate the national, provincial, territorial and regional employment and unemployment rates. The survey results are used to make important decisions regarding job creation, education and training, retirement pensions and income support (LFS, 2024).

Basically, the thesis accomplishes two goals. One is to explain the trends over time, and the second is to look at the demographic factors that are related to participation in the gig labour economy.

1.5 THESIS ORGANIZATION

This thesis has five chapters. This chapter introduces the topic of the gig economy and the theory behind this new phenomenon. In Chapter 2, we review the relevant literature and definitions of the gig economy. In Chapter 3, we describe the data and present summary statistics and subsequently highlight the models and estimation methods which are employed for the study.

[3] Other recent empirical research drawing on a survey or administrative data (Greig and Sullivan, 2020; Bracha and Burke, 2021; Jackson, Looney, and Ramnath, 2017; Lim, Miller, Risch, and Wilking, 2019; Farrell and Greig, 2016)

Chapter 4 interprets the empirical results from this research. The final chapter presents a detailed conclusion of key findings and offers relevant recommendations.

CHAPTER 2: LITERATURE REVIEW

In this chapter, we discuss relevant theoretical and empirical literature on the gig economy. We also discuss and present different definitions of the gig economy and the most relevant definition is chosen.

2.1 THE DEFINITIONS OF THE GIG ECONOMY

To establish a working definition of the gig economy in September 2024, the method employed involved moving from general to specific several times, in other words, we analyzed the basic definitions and moved from there to more complex constructs and finally identified the most complete definitions. This deductive approach allows for a robust classification.

The most common definition of the gig economy is probably in the Taylor Review of Modern Working Practices. Here, the gig economy tends to refer to people using apps to sell their labour. The most commonly used examples are Uber and Deliveroo but there are many and a growing number of gig internet platforms facilitating gig work in this way (Taylor et al., 2017).

This definition, however, does not cover the legal status of workers and their working conditions.

Gleim et al. (2019:142) identify the gig economy as: “a labour market of ad hoc, short-term, freelance, or otherwise non-permanent jobs.” This interpretation of the gig economy does not shed light on the new phenomena, but only indicates the temporary nature of the work, which was very typical for different periods of labour history. Later Graham et al. (2017:135) indicate: “The gig economy and digital labour as an economic development strategy to bring jobs to places that need them...”

This, however, is just a description of the market mechanism within the gig economy. In other words, there is no new knowledge or profound information in this definition, therefore we are going to explore other definitions to find a definition closely related to our analysis.

A sharper point of view emerged in a qualitative study which examined the gig economy in the Australian food-delivery sector. Barrat et al. (2020:1644) identified the gig online platforms

(and economy) as: "…labour market intermediaries sell labour effort to clients by creating triangular employment relationships." Barratt's definition cannot be called complete since it omits the role of the internet and mobile applications as well as how exactly the work is typically done (remotely/online/part-time etc.).

Tassinari, et al. (2017:2020) explored workplace solidarity among gig labour couriers and drivers in the United Kingdom and Italy and defined the term of gig economy as: "…the parceled nature of the small tasks or jobs (the 'gigs') that individuals are contracted to carry out by companies (often platforms) adopting this model of service provision" (Tassinari, et al., 2020:36). Again, this definition fails to mention the legal status of gig workers, their working conditions, and it does not elaborate on the role of internet platforms as intermediaries, or the fact that gig workers have a certain degree of flexibility.

Mexi (2019:1) identifies the gig economy:

> ... [it] is about creating opportunities for all to participate fully in a future of digital work that affords self-respect and dignity, security and equal opportunity, representation and voice. It is also about fostering inclusive platform-driven innovation, while meeting the changing needs facing businesses and securing sustainable economic growth.

The key notions here are self-respect and dignity, security and employee voice. Currently, however, this is far from reality. The discussion about the possibility of setting up a social dialogue between an employer and employee based on online instruments was elaborated on, but there were no real examples of how to perform that. However, Doordash and Transport Workers Union signed a charter of principles to ensure safety and fairness for gig workers in Australia[4].

Finally, Donovan (2016:1) defines the "gig economy" as:

> …the collection of markets that match providers to consumers on a gig (or job) basis in support of on-demand commerce. In the basic model, gig workers enter into formal agreements with on-demand companies to provide services to company's clients. Prospective clients request services through an Internet-based technological platform or smartphone application that allows them to search for providers or to specify jobs. Providers (gig workers) engaged by the on-demand company provide the requested service and are compensated for the jobs..

[4]https://doordash.news/australia/doordash-and-transport-workers-union-sign-charter-of-principles-to-ensure-safety-and-fairness-for-gig-workers-in-australia/

This is the most complete definition of the gig economy that I have been able to find thus far in the literature. The definition is guided by Gig Economy Theory, which falls under broader economic theories related to digital economies, labour market economy and two-sided market structures.

One useful addition to the last sentence of the definition is that the gig workers are project (gig)-based compensated. So, why exactly we have chosen this definition? It notes the intermediary nature of the internet platforms, the fact that the (online) work is done “to order”, the triangular nature of gig labour relationships (customer, employer and employee/gig worker), and the usefulness of smartphone applications.

Kalleberg and Dunn (2016) equalized such terms as the gig economy, the sharing economy, and the collaborating economy. But as we mentioned above, Donovan’s definition of the gig economy is the most advanced, so it is our used definition without dividing it into the gig, sharing or collaborating economy. It contains all the information which the previous definitions offer and guided by economic theory. The only information that we would have added to the definition is that workers use their own tools and assets to perform a gig job, so it works as their fixed capital. In the course of the thesis, we will rely on Donovan’s definition.

2.2 WHO ARE THE GIG EMPLOYEES?

A notable work by Mark Erlich, who was a member of the Council of Carpenters and researched the construction industry, discovered that misclassification was used decades ago as an instrument of employers for lowering wages and the problems raised at that time were quite similar to current problems of the gig economy. He pointed out that inherent to a business model of a gig business is that the gig employees are independent contractors, otherwise the model would not work (Erlich, 2021).

The essence and severity of the situation of gig workers is accurately reflected in Shor et al. (2020) where scholars argue strongly that the current economic theory of labour markets is outdated for the analysis of the current gig economy because it is digital companies that in fact have control over gig workers through utilizing the latest technologies. Whereas in the official

documents and statements about the worker-control problem, the opposite is stated. In conclusion, it appears that the competitive market theory, which is supposed to enable analysis of the gig economy, cannot account for the non-competitive conditions in which (without realizing) gig workers have been working during the past decades. Conducting 112 in-depth interviews, Shor et al. (2020:835) found that:

> When platform income is supplemental (i.e. the provider has multiple sources of income), satisfaction is higher, autonomy is greater, hourly wages are generally higher and conditions are better. By contrast, those who are dependent on the platform to fund basic living expenses express more dissatisfaction and experience more precarity.

Here we can find the income effect which is the change in the consumption of goods by consumers based on their income. So, if the consumer has multiple sources of income, it follows that life satisfaction is higher. Incidentally, the same consumer may spend less if their income falls.

Most Uber drivers in the UK are bottom income, male, first-generation immigrants. From their survey, Berger et al. (2019:437) determined the following:

> In contrast, immigrants are vastly overrepresented among Uber drivers. Among those reporting immigrant status some 82% state they immigrated to the United Kingdom, which is more than twice the share observed among the general London workforce.

This can likely be attributed to a few main factors, including that immigration to countries with high levels of education and wealth (like Canada or the United Kingdom) for young people usually begins through participation at an educational institution. During the initial years, it is extremely difficult for an immigrant to find a permanent full-time job, especially a first job. Companies are not eager to hire someone, who may not possess proficiency in the language, customs, habits, or behaviours of their clientele, considering not only that there is a higher risk of mistakes and disputes, but also the extra time needed to be spent training such an employee. To make matters even more difficult, since so many new immigrants are students, they are typically only available for part-time work - because of both time spent involved in their studies and a study visa/permit restrictions - making them far less desirable compared to someone who is available 24/7.

In contrast, all that is needed to be a gig worker, or more specifically a gig courier, is a desire to work and a driver's license, and it comes with the "benefit" of temporal flexibility which

many students find ideal. An example of the indiscriminate nature of gig platforms has been demonstrated by Doordash[5], who offered, in September 2021 (and many times before), a one-time payment of $300 to any existing courier who invited (via a web link) a new courier to work for Doordash. It is difficult to imagine an established ("formal") company offering not only "trust", but additional financial incentives to workers to recruit or attract other new workers. In light of said inferences and observations, it becomes clear why gig workers are disproportionately immigrants.

There is a precise description of a typical gig driver in London. According to the same authors, a snapshot of the London labour force in 2018 (see Table 1 below) looks as follows: The age group of Uber drivers consists of 40% aged 30-39 years and 32% aged 40-49 years, therefore 30-to-49-year old's account for 72% of Uber drivers. Whereas in the sample for all workers[6] the age group from 30 to 49 years old is only 53%. Female Uber drivers represent an insignificant 1% compared to 44% for all workers. Drivers are married in 70% of all cases and 64% of Uber taxi drivers have children, while among all workers only 51% are married, with those having children in their households accounting for an insignificant 42%. In the context of race, the three most common races driving for Uber are Black (23%), Pakistani (15%) and Bangladeshi (14%). These people typically emigrated from poor countries seeking a better life, but unfortunately, the only work they could find was in a gig company. Respectively, the share of immigrants among Uber drivers is 82%, while for all workers in London, as the largest metropolitan area in Europe, it is only 40%.

Table 1 - A snapshot of the London labour force, 2018.

Characteristics	Uber drivers (%)	All workers (%)	Self- employed (%)	Taxi, cab drivers, and chauffeurs (%)
Aged 18-29 years	12	23	13	0
Aged 30-39 years	40	30	25	26
Aged 40-49 years	32	23	26	33
Aged 50-64 years	16	22	29	35
Aged >65 years	0	3	8	6

[5] https://www.doordash.com/en-CA/

[6] This is the name of the group which consists of all the professions and jobs in London.

Characteristics	Uber drivers (%)	All workers (%)	Self- employed (%)	Taxi, cab drivers, and chauffeurs (%)
Female	1	44	34	3
Married	70	51	57	81
Children in household	64	42	42	63
Less than high school	13	24	28	66
High school degree	24	15	13	18
Some college	31	7	7	4
College degree	32	54	51	12
In education or training	9	18	12	3
Immigrant	82	40	47	72
Asian (any other)	10	3	2	5
Bangladeshi	14	2	2	14
Black	23	9	7	18
Chinese	0	1	1	0
Indian	5	7	6	3
Mixed/multiple	1	2	2	2
Other ethnic group	11	4	5	6
Pakistani	15	2	2	17
White British	6	51	48	21
Other White	16	18	24	13
Observations	1001	5603	985	56

Source: (Berger et al, 2019:438)

Detailed research funded by the Irish Research Council (Duggan at el., 2020) explores working conditions of gig workers and leaves no opportunity for refuting the exploitative nature of

internet platforms. Arguments about the possibility and benefits of working autonomously are broken down by researchers. The research exposes that it is not an employee who chooses his schedule, rather the gig-internet company only creates the ability to select certain intervals of working time (e.g., peak hours in the driving industries). The schemes of imperfection of information committed by the employer are also disclosed thoroughly. In the example of the taxi and food delivery platforms, Duggan at el. (2020) concluded that online companies are in fact implicitly deceiving their contract drivers into believing that they have temporal work flexibility.

Other evidence that investment in a vehicle (considered as an initial down payment) also takes place in the delivery market was found by renowned economists Cramer and Krueger. They found that UberX taxi drivers - those who use the most expensive vehicles in the market - have a significantly higher "capacity utilization rate" (Cramer and Krueger, 2016). So, in this case, the more expensive the car, the higher the capacity utilization (i.e., how intensively it is used) would be higher so that the return on investment is higher. In fact, this would have to be the case, or the driver would buy a less expensive car. This option is usually not available for low-income gig workers and drivers, especially for those who have just started their gig "career".

Van Doorn and Badger (2020) consider the gig economy as a self-learning system that operates at the expense of workers who continuously produce, are producing and will produce data. Machine learning, artificial intelligence, and other technologies in Industry 4.0 are at the heart of the exploitation of labour by machines. This strongly echoes the conclusions drawn by Marx in "Capital". As for the factor of "direct labour", according to Marx, its role decreases, not only in relation to constantly renewing technology, but also in the production of this new technology itself:

> "As large-scale industry develops, the creation of real wealth becomes less dependent on labour time ... than from the power of those agents that are set in motion during the working time and which themselves, in turn (their powerful efficiency), do not correspond in any way with the immediate working time required for their production, but rather depend on the general level science and from the progress of technology, or from the application of this science to production." (Marx, 2014:28)

Marx's ideas about the economy of the future as an innovative economy, an economy of knowledge, anticipated J. Schumpeter's theory of innovative development, which appeared more than half a century later. They deduce some of the latest concepts linking socio-economic progress in the 21st century with the network effects of constantly changing combinations of different types

of resources, primarily information and communication, as opposed to traditional concepts that emphasize building up material and resource potential. That is why Marx's resulting characterization of the transition to a new economy indicates that exchange value ceases to be a measure of use value.

Doorn's and Badger's conclusions do not end there. They also view data as a specific class of fixed capital – assets (or a particular asset class) that create surplus value. They call this process *dual value production:* "the monetary value produced by the service provided is augmented by the use and speculative value of the data produced before, during, and after service provision" (Doorn's and Badger, 2020:1476).

Is worth mentioning that the presented idea is that the very process of working on a digital platform is formed by algorithms (artificial intelligence/platform-based algorithmic controls) based on the legal conditions in a particular country. Wood et al. concluded that "these mechanisms of control can also result in low pay, social isolation, working unsocial and irregular hours, overwork, sleep deprivation and exhaustion" (Wood et al., 2019:56).

The article provides constructive criticism of such a perceived advantage as a free schedule, or as some call it temporal flexibility. There are only a few facts that can be mentioned in summary to support this criticism:

- Social isolation of working alone, and some types of loneliness;
- A dependence from the magnitude of work;
- A few days of gig work can be considered as a single standard full-time day;
- Unsocial gig working hours are common between gig workers (evenings, weekends, holidays and nights);
- Limited influence over their working time;
- Irregular and unpredictable gig working hours.

The above facts of constructive criticism of the gig economy show that gig workers in many cases and in many jurisdictions are closer to "victims" than independent contractors. Going forward with that, it is important to mention algorithmic control practices which were the focus of the article. It is clear that algorithms are designed to and are capable of controlling human beings. But

in Bucher et al.'s (2021) study, the authors showed that gig workers prefer to "pacify" the algorithm, and to ensure their stable partnership with the platform. This detail is shown in Figure 2.

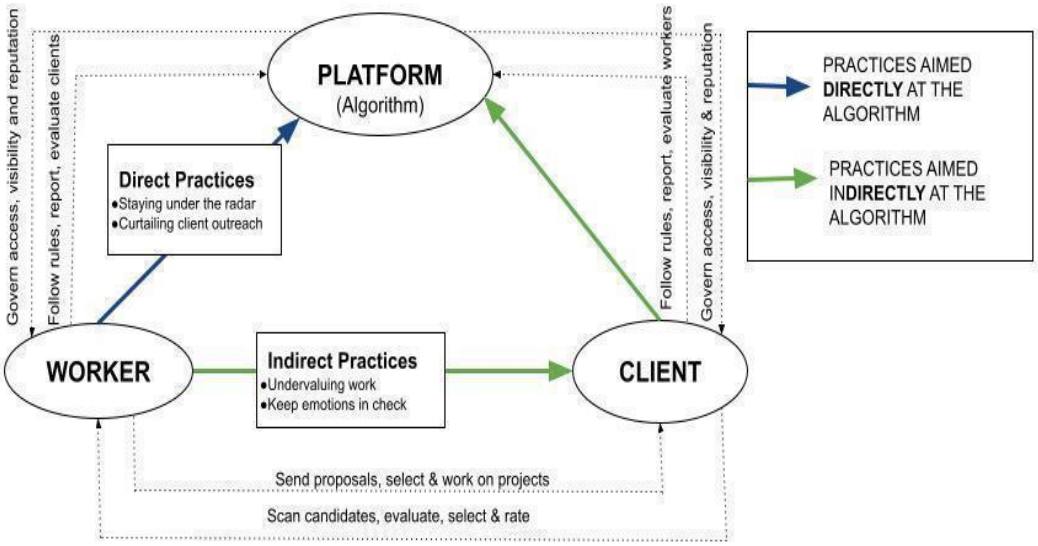

Figure 2: Direct and indirect compliance practices to "pacify" the algorithm

Source: (Bucher et al., 2021:57).

The platform environment is marked by a triadic relationship between algorithm, client and worker. The authors identified three main objectives of the algorithmic management that rely on algorithmic calculation: "Decisions that are at least in part derived through an algorithm encompass areas of access (managing hiring and people flow), visibility (proposing matches and facilitating searches) as well as reputation building (calculating job success scores)" (Bucher et al., 2021:2676).

A study about maintaining working relationships was conducted in Canada by Glavin et al. (2021). The scholars argued that gig work leads to such feelings as powerlessness and isolation among workers. They used data from two national cross-sectional studies of working Canadians: the 2019 and 2020 Canadian Quality of Work and Economic Life Studies. They concluded that financial vulnerability does not explain the isolation and loneliness among gig workers, but rather that it was connected to differences in skills and abilities to maintain meaningful work relationships with other gig workers. However, how one can maintain relationships, for example, between taxi

drivers, is not explained. In other words, the specifics and nature of the gig work was not fully taken into consideration in the article.

Gig platforms[7] are (often) global and available in any labour market, however, in the case of many gig platforms, like food delivery ones, the labour market is local. This is the basis for the platforms' intermediation between a local labour market, consumers, and restaurants which limits gig workers' ability to create unions and defend their rights. The phenomenon described by Barratt et al. (2020) is that in Australia (and indeed in many other countries), the delivery gig workers are majority male (91%) and work on a temporary basis (81%) - including those on international student or working holiday visas, so this has limited the creation of unions.

The comprehensive research of Burtch et al. (2018) revealed very important detail, namely that the presence of many internet-mediated service providers significantly affects the level of lower quality entrepreneurship as well as the number of jobless individuals. This is how Burtch wrote about it: "However, it is possible that some of the entrepreneurial ideas that are not pursued because of the availability of a gig-economy job might have otherwise blossomed into viable businesses that would have created jobs and led to useful innovations" (Burtch, et al., 2018:5516).

These findings seem consistent with the 2018 Labour Force Survey that collected data about the main reason for being a self-employed worker in Canada in that year. Results are presented in Table 2 below. It should be noted that the table shows all self-employed workers, and not just specified gig ones. In this table all self-employed workers included respondents aged 15 and older who reported being self-employed in their main job during at least the 12-month period under investigation, which is broader (and hence less precise) than the definition of gig workers that will be used in this thesis.

Table 2 - Top reasons for being a self-employed worker, Canada, 2018.

	The reason	Percent
1	Independence, freedom, being one's own boss	33.5
2	Nature of job - had to be self-employed	15.2
3	Work-family balance	8.6

[7] Some examples of the industries where the global platforms operate: transportation and delivery (often together), creator/influencer, online education and tutoring, other professional services.

4	Flexible hours	8.4
5	Challenge, creativity, success, satisfaction	6.6
6	Could not find suitable paid employment	5.0
7	Joined or took over family business	4.8
8	Control, responsibility, decision making	3.4
9	More money and unlimited income	3.2

Source: Yssaad and Ferrao (2019)

This thesis also examines the gig economy and the gig workers in Canada by using many relevant variables from LFS. The LFS is an extremely useful resource for answering the thesis questions.

The aspects of Table 2 above which support the idea that gig workers are independent contractors that they are independent of a boss/have more freedom, they exhibit the desire to have work-family balance, and/or they can seek whatever level of challenge/creativity/success/satisfaction they desire. In this vein, taking over the family business also falls under this category.

Other aspects of the table show that gig workers can suffer because the nature of their job forces them to be self-employed, and that they seemingly desire flexible hours (this is often a dishonest notion, an illusion, created by the gig platforms), and/or that they could not find other suitable paid jobs.

The reasons of control, responsibility, decision-making and more money and unlimited income could fall under the category of independent contractor or 'victim', depending on the circumstances by which someone is self-employed (i.e., if someone took over the family business to gain control and have decision-making in their job, this would fall under 'independent contractor'; but if someone began working for a gig delivery platform to gain control and make decisions, they may be considered a 'victim', as these companies and often their customers are monitoring and even punishing them for making the "wrong" decision, and the amount of control a gig worker truly has is debatable). People who choose to do a gig job usually do not have many business or employment opportunities and considering them as a "victim" in this paragraph should be seen as

standing in opposition to the idea of self-employed entrepreneurs, but should not be viewed in a negative context.

In reading the real comments from gig workers, it is clear that the increase in hourly wages within the gig internet economy was only due to the greater usefulness of the labour. Since short-term "one-hour" contracts involve the completion of a number of tasks in one hour (a form of a project), their labour productivity is higher. A drawback is that the workload[8] is much smaller meaning that workers have less total income. In other words, if we look at the number of hours worked, for example, taxi drivers can be more productive during a busy hour, and hence are more productive per hour actually worked, but can be less productive overall – and hence paid less, because drivers spend so much time idle. Those are the common issues that the gig employers had to face as explicitly explained by Waldkirch et al. (2021:2658):

> ... traditional workers don't have 8 nonstop hours of productivity every day. In most cases, they are still getting paid for bathroom/coffee breaks, time spent chatting with coworkers, etc. For us, we only get paid for time spent being productive, so an 8-hour workday is much more mentally exhausting.

It is probably worth conducting research which compares different gig platforms, types, and conditions of work. Summarizing all that which has been discussed above and the arguments for and against, it is clear that many gig workers become victims of circumstance and sometimes cannot leave the low-income trap. Garin et al. (2023:6) found that "even after the 1099-K[9] reporting thresholds become binding, only a small minority of platform workers earn more than $20,000 in annual gross platform earnings". When the gig workers started working for a gig transnational company, the artificial intelligence and advanced IT systems tracked workers every move to make the most out of their labour. Therefore, here in the analysis the gig workers are usually in the role of "victims" rather than independent contractors, but again as opposed to self-entrepreneurs.

[8] In the meaning of a gig job is not consistent, hence an employee's time is not worth as much as regular (and regulated) employment relationships.

[9] The 1099-K form reports payments and transactions from online platforms, apps or payment card processors in the US.

2.3 THE RISKY DECISION TO BE A GIG WORKER AND PROPOSED REGULATION

There is a fundamental link between hyper-flexible gig jobs, or as some economists call it "short-termism[10]". Why is this happening? Because all gig work is only work that supports the process - in other words, it supports the functioning of a certain business or business process. If we look at the entire spectrum of gig jobs, there is barely a single gig job that creates anything new. However, we have exceptions in some industries like the IT-industry and creative industries. In any case, the gig workers there are employed by the online platforms in contrast to creating their own (even small) businesses. In other words, workers in the gig systems are not in the loop of innovation. Since a gig profession is not related to development, this job is temporary. Temporary, in this sense, means lack of career growth (stable career path) and future prospects. It must be noted that the middle class in Canada and the US is about people working for the future, striving for career growth in order to improve their career status and increase income; career and professional growth are essential to a long-term increase in income and the ability to support a family and raise children.

From Petriglieri, et al. (2019), it is clear that young workers who prefer or are used to seeing their parents have a traditional stable career path are being crowded out in the gig economy. These young workers are sometimes frustrated from their experience in the gig economy because they expected better conditions and wages. It is quite different than the traditional work we have observed and participated in for ages - there is no employee obligation to a specific office or factory and there are no colleagues (usually gig employees do not communicate with each other in any circumstance, but as we mentioned above in some cases the workers establish their network of communications irrespective of circumstances). Indeed, it is hard to imagine how two food delivery men in, say, a mid-sized city like Calgary, would be able to communicate and spend time together at the same level as two office-based colleagues. Food delivery workers have no breaks together, no overtime together, and no water-cooler chats. In the gig economy, the workers lose their professional identities and landmarks.

[10] In general short-termism refers to an excessive focus on short-term goals at the sacrifice of long-term stability and success.

The workers know that there is no such thing as a career path in the gig economy, hence there is no hope of really improving their financial situation. This echoes Petriglieri, et al. (2019) who concluded that the gig employees who use gig platforms as an additional source of income are more satisfied with it compared to those who use the platforms as a main source of income.

The authors identified the root reasons for that. It turns out that the main reason is the absence of a worthy career path in the long-term perspective. To respond to these issues, the scholars conducted the following qualitative study: "… of independent workers who were facing chronic uncertainty about securing social and financial recognition, as well as about the stability and meaning of their work identities" (Petriglieri et al., 2019:125). According to the authors, another main difference between self-employment and working for a company is that an employee who works for a company is never alone. There is a system of support in the company everywhere. For each difficulty there should be somebody who can help. Whereas when somebody is his own boss, there is nobody who can offer support during difficulty: all the rewards and failures are on the shoulders of a self-employed person.

Other interesting ideas such as: "…gig workers do not need to invest in establishing a company and marketing to a consumer base, operating costs may be lower and allow workers' participation to be more transitory in the gig market" (Donovan et al., 2016:2) are worth considering in detail.

It is axiomatic that any undertaking requires investment. Usually gig workers are located in poor countries and do not have savings to invest. This also occurs in wealthy countries where people on low incomes may not have the funds to invest. Therefore, to be a gig employee is the main (and sometimes "the only") opportunity for them to generate income. However, after some period of being an employee the gig workers might save money to make investments in their own business which makes a gig work transitory for many entrepreneurial employees.

Articulating the main reasons why workers do informal jobs so far, the interview data provided showed that the necessity of making money is the central reason. It is clear that the unavailability of regular employment is one of the main motivators for seeking gig employment for Canadians. If the formal jobs in Canada had been demonstrating a gradual increase in previous years, there would not be such a significant increase in unemployment in Canada. (In 2020, the

unemployment rate in Canada was at around 9.6[11] percent (Statista, 2022)), while the adjusted unemployment rate was 7.6 percent in December 2021, making the first return to the pre-pandemic level (LFS, 2021). However, there has been no recent increase in these formal jobs, neither in Canada nor the US.

According to the survey (see Schor et al., 2020), the workers who have part-time employment as well as those looking for regular full-time employment have the biggest motivation to take on a gig job. As previously mentioned, this is because they have different sources of income. Money necessity is because of the negative consequences of weak conditions of the labour market such as job loss, reduced hours, reduced pay or stagnant wages. In the following chapters we will discuss a little about some of the events that have happened over the time period under analysis such as recent COVID-19 and the 2007-2009 financial crisis and how those events have affected the gig labour market.

An interesting point is that many gigs – driving, teaching online, cleaning, deliveries, making presentations, and renovating - are not lucrative and that modern IT technologies and the gig economy are reducing the real wages if the country[12] only uses those technologies but is not involved in the creation of the technologies. This can be supported by section 3.2. Wages and Informal Work Participation (Bank of Canada, 2019). In the latter (survey) most participants perceived that their wages were weaker than what they could obtain in a formal job. Specifically, 60% of informal workers reported that informal pay was lower than pay from a formal job they have or could have for a similar amount of time. Only 15% reported it was higher, while 25% reported it was about the same. From Tran and Sokas (2017), it becomes clear that not only do gig employees have a higher degree of anxiety due to a fear of losing their jobs compared to full-time employees, they also do not have such benefits as health insurance (either private[13] or public) and paid sick days.

[11] The statistics show the unemployment rate in Canada in 2018 was 5.91%, in 2019 it was 5.37%, and in 2020 it was 9.6% which is almost two times higher than the previous year. In fact, in 2021 the unemployment rate was projected to be 8.0% which is 48% percent above the 2019 level. However, 2019-2021 might not be representative because of COVID-19.

[12] An example of the country here can be Canada.

[13] Even if gig employers have private medical insurance, this is only due to their monthly/yearly payments for the insurance from their own expenses.

What ability does the gig economy have to offer workers a say in what they do, choice in scheduling, and some level of influence on the conditions of their work agreement, and what ability does the gig economy have to further the career - therefore the wages - of some workers? In this section it has been shown that being a gig worker is sometimes an unprosperous choice, so the necessary regulations should be implemented around the globe starting with the rich countries, so that some categories of gig workers would have a career path within a gig platform, therefore the benefits and prospects for long-term work. All regulations require a change in legislature.

Only some rich countries have substantial global demand for digital labour compared to poor countries which do not have the same demand (e.g., IT and creative industries). Hence, it would have to be possible to "regulate" the gig labour economy on a global scale, perhaps through the G20 format. The regulations might include but are not limited to an hourly wage, a contract hourly system (for example, a contract where a gig worker could work at least 40 hours per week by getting a minimum hourly wage in the worker's country of residence), vacation days, flexible benefits programs from the first days on the job, a pension plan, retirement planning programs and other common benefits. In other words, the definition and the benefits of a gig worker might be concretized. Different forms of gig employees' unions would also contribute to the workers' wellbeing.

Furthermore, Graham et al. (2017) interviewed some people and found that: "not only do market mechanisms seem to serve clients more effectively than workers, but the market itself is skewed in ways that can further exacerbate inequality among those seeking jobs" (Graham et al., 2017:153).

Following the logic of the article, the market mechanism has not been functioning ideally and such regulations should be adopted to alleviate exacerbating inequality among job seekers.

Interestingly, Kalleberg and Dunn made a notable conclusion about one of the most controversial proposals of the topic: "Social safety-net benefits - minimum wage and health, retirement, and unemployment insurance - need to be available for gig economy workers" (Kalleberg and Dunn, 2016:10).

This quotation again shows that stronger regulation should be accepted within active gig economy countries. Some important classifications were represented in the article. Based on their

ideas, it is possible to classify the online platforms for the regulation purposes which have been operating in North America, based on four categories: High Wage and High Worker Control, High Wage and Low Worker Control, Low Control and Low Wages, High Control and Low Wages (Figure 3).

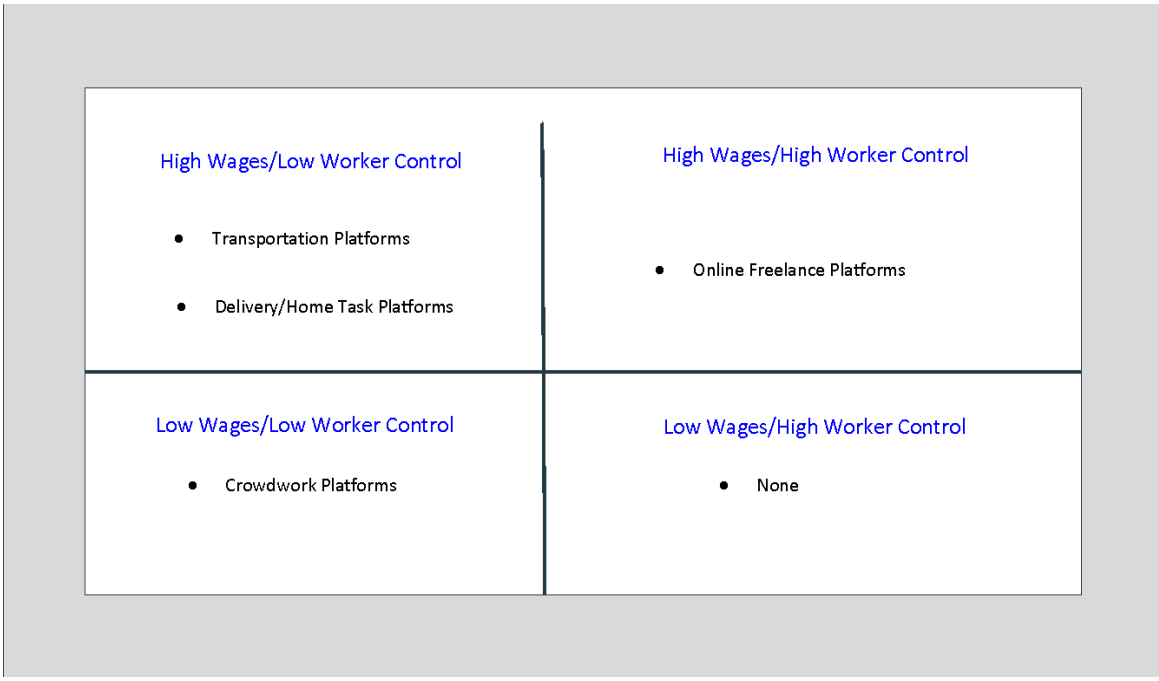

Figure 3: Job quality types in the gig economy

Source: (Kalleberg and Dunn, 2016:13)

To assess the scale of the gig economy in North America, which operates in Canada and the US as well as other countries, there are currently 73 American gig economy companies, two Canadian companies, one UK company, and one Israeli company, all based in their home countries. The developed stock and IPO market in the U.S. plays a crucial role in enabling gig startups like Doordash or Uber to grow into global corporations. As those who are gig workers are mainly an unprotected group, some labour regulation could be overall beneficial.

2.4 CONCLUSION FOR CHAPTER 2

The gig internet companies expedite clients to communicate and find labour opportunities within a predominantly uncontrolled world oversupply of labour. To be successful as a gig worker in the gig labour market the most important are the skills and platform reputation of gig workers.

The Bank of Canada (2019:ii) researched "the availability of additional labour resources from informal (gig) work". This quote touches on the supply side, which is not fully investigated in the official statistical documents. They also investigated the employment and hours worked by digital workers. It was precisely concluded that "income earned from informal activities tends to be lower than income earned in a formal job for an equivalent amount of time" (Bank of Canada, 2019:1). It means that the overall use of labour in the gig sector is less effective than in formal sector employment. The consequence of this is that in the gig sector the income is generally lower and unpredictable, though sometimes people could make more money per hour (if we consider comparable work) in the gig economy, for example during peak hours.

By using statistical data, the authors counted that in Canada:

> The magnitude of labour supply from informal (gig) work that could become available to the formal sector is sizable. It amounts to roughly 700,000 full-time equivalent (FTE) jobs or 3.5 per cent of the labour force on average over 2018Q3-2018Q4. This additional margin of labour market supply may be putting downward pressure on wages. (Bank of Canada, 2019:ii)

In the gig economy, human capital does not belong to the employer. A Canadian study that relates the gig economy to micro-credential education and online courses looks at them as developing in parallel. Wheelahan and Moodie (2021:1292) see micro-credentials as a new form of education which support the rapid development of the gig economy and hence the demand on partially educated labour calling it "gig credentials for the gig economy". It is true that many online education start-ups have been launched recently. However, as any statistics on gig employment show, there is not a single gig company which pays for advanced training courses, presumably because they are not interested in investing in human capital. In the gig economy those platforms are not interested in investing into human capital, basically because they are not employees by definition. The perception of employers is that there is less likely to be return on investments as the

resultant employee productivity that comes from employer-funded skill development is not oriented towards their company alone.

Firstly, in this chapter the definition of the gig economy was provided. The Congressional Research Service (2016) has the most complete definition of the gig economy that I have been able to find thus far in the literature. The definition is guided by Gig Economy Theory, which falls under broader economic theories related to digital economies, labour market economy and two-sided market structures. We will rely on this Congressional Research Service definition in this thesis.

Secondly, the question was who are the gig employees? People who choose to do a gig job usually do not have many business or employment opportunities and considering them as a "victim" should be seen as standing in opposition to the idea of self-employed entrepreneurs. In the following chapters we are going to focus exactly who is more likely to be a gig worker (for example, immigrants, less-educated population, etc.).

CHAPTER 3: METHODOLOGY

This chapter describes the data and the methodology used in this analysis.

The methodological framework for identifying gig workers in Canada is based on the Labour Force Survey (LFS). Knowing that the data for identifying the gig workers in Canada as well as any country in the world is not ideal, the thesis systematically identifies gig workers using the survey which is a unique study measuring the information of gig workers among all Canada's workers. More precisely, theoretical identification of individuals whose first and/or second job activity is categorized by Statistics Canada as full time/part-time unincorporated self-employment will be used as a proxy for identifying a gig economy in this thesis. Interestingly enough, a similar approach in 2023 was used by Garin et al. (2023), where the scientists proxied the platform-based gig economy labour force as self-employed independent contractors who were paid by the internet giants and those payments were disclosed to the US tax authorities. We would like to emphasize here that the top scientists from National Bureau of Economic Research used two years later the similar approach to proxy the gig economy.

The LFS is one of Canada's primary sources of labour market information and plays a crucial role in monitoring and analyzing the country's labour market conditions. Here are some key aspects of LFS.:

1. Data: The LFS sample data employs a cross-sectional design and probability sampling method that is based on a stratified multi-stage design, to collect monthly data on the labour market activities of Canada's working-age population including wages, employment estimates by public or private sector, union status of workers, and other relevant variables (Statistics Canada, 2019).

2. Purpose: The main purpose of the LFS is to collect the data on demographic trends, employment, unemployment, main paid employment including those who are self-employed unincorporated without employees, and other labour market characteristics of the Canadian population.

3. Sample survey: The survey collects data from a representative sample of Canadian households and individuals. It involves telephone and in-person interviews and covers a wide range

of labour-related topics, including employment status, age, hours worked, type of (economic) family, job type, gender, earnings, immigration history, educational achievement, and others.

4. Key indicators assessed: The LFS generates several key labour market indicators, including, but not limited to: the unemployment rate, labour force participation rate, and employment-to-population ratio. These indicators are critical for assessing the health and dynamics of the Canadian labour market, and in this thesis our focus is the gig labour market.

5. Geographic coverage: The survey provides data at both the national, partly provincial, territorial, and regional employment levels, allowing for the analysis of regional labour market variations within Canada, which has been carried out in this study.

6. Detailed additional information: In addition to the main data such as employment and unemployment data, the LFS collects demographic information about respondents, including but not limited to: age, sex, education level, student status, immigration status and years since the immigrant landed in Canada, and ethnicity. The LFS is a representative sample of the Canadian population aged 15 and over. This information is essential for understanding labour market disparities, which has also been done in this study.

7. Seasonal adjustment: Statistics Canada applies seasonal adjustment techniques to the LFS data to account for regular, recurring patterns and make it easier to analyze underlying trends.

As advised by Brochu (2021:347): “Given the large sample sizes of the LFS, a common approach to abstract from the non-independence issue, is to rely on data that are six months apart (or more), ensuring that the same individuals only appear once in the data.”

There are a couple of ways to approach the monthly/yearly data collection.

The first is to just include all months and years in the data set and then construct a dummy variable for each month of the year and use these in our regressions. The problem with this is that it will count many individuals more than once (up to six times, since each individual is in the survey for six months) and this means that the observations are not independent. In practice, this does not cause too many problems and can be used if sample sizes are small. But our sample is not small; it constitutes about 4 million observations.

Consequently, in this thesis we select the second way which is the period of the analysis (1976-2021) where two months, six months apart, for each year. The chosen months are March

and September to mitigate some of the seasonal effects. This way, all individuals in the sample are unique and this is considered as the better method.

Those who were self-employed (with missing income) were kept in the dataset to identify the gig economy. We had used them when we were running the models and regressions to see who is in self-employment, since the earnings data are missing (unavailable) for all self-employed.

The variables and conditions which are not relevant for research purposes were removed. We kept our eyes on the big picture. What we were trying to do is to look at the evolution of gig employment since 1976 using our proxy variable and also to look at the determinants of this gig employment at both the first and second jobs, and then how these have changed over time.

Next, the data covers the history of gig employment since 1976 using the LFS dataset. As we defined the gig economy as:

> …the collection of markets that match providers to consumers on a gig (or job) basis in support of on-demand commerce. In the basic model, gig workers enter into formal agreements with on-demand companies/customers to provide services to a company's clients. Prospective clients request services through an Internet-based technological platform or smartphone application that allows them to search for providers or to specify jobs. Providers (gig workers) engaged by the on-demand company provide the requested service and are compensated for the job. (Donovan, 2016:1)

This definition of gig workers also includes "non-gig (internet) workers"[14], for example, a self-employed electrician who is not incorporated and has no other employees, but still is not categorized as a legitimate gig worker and *this definition proxied by unincorporated with no employees/self-employment in our data. Overall, our methodology is consistent with the given definition, and this is the best we can do with these data.*

First, using LFS datasets two graphs were constructed: the dynamics of cowmain1 variable (class of worker, main job) which includes the ratio between those who have a main gig job from 1976 to 2021 versus those who have paid public or private employment (excluding self-employment); and the dynamics of the cowother1 variable (class of worker, other job) which includes the ratio between the second job in the gig economy from 1976 to 2021 versus the second job as a public or private paid employee from 1976 to 2021. The results are that both the percentage

[14] Though, there is no *official* definition and statistics on non-gig workers in Canada.

of those who have the main and the second gig jobs have increased since 1976, but not by too much.

Second, we are going to run six logit models to understand the determinants of the gig employment. For the study purposes it is important to mention that the data were drawn from the Labour Force Survey record layout and there are no North American Industry Classification System (NAICS) codes or wages for the second job. Nevertheless, in this thesis it is possible *to identify individuals whose first and second activity is part-time unincorporated self-employment, and that is used as a proxy for gig activity.*

This study specifies the logit models where individuals whose first and second activity (in other words - class of worker main or other job) is a full time or part-time unincorporated self-employment, which is used as a proxy for identifying a gig job. Full time self-employed unincorporated without employees are those who have a main paid gig job. Our view is fully consistent with Watson et al. (2021), because it is currently impossible to distinguish in statistics those similar but different subgroups (self-employed category, sharing economy workers, crowd workers, internet platform workers, independent contractors, contingent workers, etc.). Watson et al. (2021:338) analyzed 2,558 articles which were related to the gig economy, and concluded:

> Self-employed workers also could be categorized as gig workers which was reflected by self-employment being used to describe gig work in approximately one-third of the existing definitions. Many self-employed workers easily satisfy both the project-based and flexible primary characteristics of a gig worker…

The main methodology is a multivariate regression analysis using logit models because the methodology is applicable to assess such questions as:

- What is the probability of being a gig worker considering such variables as: age, type of economic family, education levels, student status, immigration status, multiple job holder status, a year of survey (from 1976 to 2021), years since immigration (for immigrants), and province. The dependent variable is whether or not a person is a gig worker (0 or 1).

- Who has the gig job as a second job based on the characteristics of the main job and the individual demographic characteristics? For example, who is more likely to have a secondary gig job based on age, earnings at the main job, number of hours at the main job, etc. The dependent variable is whether or not a person has a second gig job (0 or 1). The second gig

job, as with the main gig job, is defined as one who is self-employed unincorporated without employees, and the independent variables are age of the individual, type of economic family, the level of education, multiple job holder status, tenure of current job, usual hours worked per week, student status, a year of survey dummy (from 1976 to 2021), hourly earnings for the main paid job, and province.

- How have these changed over time from 1976 to the present?

Firstly, the summary statistics were calculated. Then it was a lot of thinking and testing which models are going to be used, where it became clear that multinominal and panel logit model estimations were not going to be used. The estimation of the logit models was chosen because there was a binary outcome variable, i.e., whether the individual is a gig worker or not. Considering what has been said we researched marginal effects and logit standard error coefficients in the logit models as well as tests for different coefficient values on different variables.

3.1 DATA AND SAMPLE RESTRICTIONS

The sample size is approximately 54,000 households per month, which translates to approximately 100,000 individual responses. Responding to the LFS survey is mandatory[15] (with very few exceptions) and thus records an average non-response rate of only ten percent for all eligible households (Statistics Canada, 2019).

Merging these monthly datasets gives a larger sample size for our analysis. Also, this period not only covers all periods under which all the researchers have analyzed LFS, but also covers recent years up to and including 2021.

The sample is limited by excluding those under the age of 18 and older than 64 years old living in one of the ten provinces (the three territories are eliminated). The LFS contains detailed information on the type of employment for both the first and second jobs (if applicable) that an individual holds. This allows the identification of those who are employed, as well as *various categories of self-employment, with those being unincorporated self-employed with no employees*

[15] https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=3701

used as a proxy for gig workers. Households (and the individuals therein) enter the survey in one of the twelve months of the year and remain in the sample for a total of six months, after which they are rotated out and another household is added. To avoid including the sample person more than once in the sample, only the months of March and September are utilized. The choice of these two months largely avoids problems with summer employment and other seasonal effects which may plague other six-month pairings.

a) Sample Selection Bias and the Heckman Two-Step Procedure.

Sample selection bias occurs when the sample uses for analysis is not representative of the population due to systematic exclusion of certain individuals or groups. In the context of Canada, where gig workers are identified using LFS, this bias could arise if gig workers who are less likely to participate in the survey (e.g., because they work irregular hours or lack stable contract with formal job registries) are systematically different from those included. This would lead to biased estimates when studying the gig economy. Garin et al. (2023) identify gig workers based on self-employed contractors' data in the US, but they acknowledged the potential for selection biases due to under-reporting or unregistered contractors. These issues can parallel the challenges we face in using LFS to identify gig workers in Canada. Our data excluded those who are unemployed. Thus, we are estimating a conditional probability, that is, the probability of being a gig worker given that the person is not unemployed.

One common econometric solution to address this issue is the Heckman two-step procedure (Heckman, 1974). This method corrects bias from non-random sample by estimating:

Firstly, Selection Equation: A first-stage probit model estimates the likelihood of an observation being included in the sample. In other words, the first stage regression would be a probit model that an individual is working (wage worker or gig worker), where Y = 1, or unemployed, and Y = 0. This generates the Inverse Mills Ratio (IMR), which reflects the non-random selection probability.

Secondly, Outcome Equation: The IMR is then included as a regressor in the main regression model to correct for the selection bias.

The idea behind Heckman's method is that by controlling for the factors that influence whether or not an observation is included, the second-stage model can provide unbiased estimates of the effect of interest (e.g., determinants of gig work).

This is not the case in our research, as we have studied the probability of being the gig worker, so called the first equation in Heckman two-step procedure. It could be relevant to apply this correction if we study how gig-work status affects wages or other outcomes of the Canadian population. As have been mentioned we use a nationally representative LFS and use proper weighting to represent the whole population of Canada as well as our sample is random.

However, the Heckman two-step procedure can be effectively applied to analyze various factors influencing gig work, including age, immigration status, earnings, and the role of temporary work arrangements as potential pathways to "stable" employment. The official survey may lack information about non-native Canadians (i.e. the immigrants), or they may misreport their information. The Heckman two-step procedure can help elucidate these relationships by correcting for sample selection bias, thereby providing more accurate estimates of the effects of immigration on gig work. We may estimate the first equation for the probability of being an immigrant, and then correct our main model. The Heckman two-step procedure can be instrumental in isolating the effects of these economic factors on gig work participation, allowing researchers to better understand the motivations behind individuals' choices to engage in the gig economy.

b) Simultaneity Bias.

Simultaneity bias occurs when one or more explanatory variables are endogenous, meaning that they are determined simultaneously with the dependent variable. In our study of the gig workers, simultaneity bias could arise if the factors determining someone's participation in gig work (e.g., earnings) are also influenced by their decision to take on gig work. For example, the relationship between earnings and gig work is inherently complex, as individuals may engage in gig work as a response to insufficient income from traditional employment, while simultaneously, the income generated from gig work can influence overall income levels. This bidirectional causality complicates the interpretation of correlations observed in our analysis, particularly regarding the relationships between being a gig worker and factors such as education or earnings. In other words, the presence of simultaneity bias can lead to underestimation of the effects of earnings or other

factors or demographic parameters of gig work, suggesting that our estimates may similarly underestimate the true impact. For instance, Patel and Waynforth (2022) highlight that individuals with disabilities often turn to gig work as a necessary source of income, which may be influenced by their limited access to traditional employment opportunities. This suggests that the decision to participate in the gig economy may be driven by both the need for immediate income and the structural barriers that limit access to stable employment.

To mitigate these concerns, it is crucial to employ instrumental variable estimation, which can help isolate the causal effects by addressing the endogeneity between income and gig work employment. It involves identifying a variable that affects the endogenous explanatory variable (earnings in our example) but does not directly affect the dependent variable (gig worker status in our example).

In addition to what has been said, an instrumental variable might be a policy change or regional economic condition that impacts gig work supply but is unrelated to individual income. We do not have this information as well as variables in our research. We also could employ the covariates from the previous period, but our data set is not of a panel structure.

We identify the Canadian-born group and the immigrant group respectively from the variables “CNTRYBTH” (country of birth) and “LANDIMM” (landed immigrant). The Canadian-born group are those who recorded their country of birth to be Canada. The variable “LANDIMM” has a universe of all those who indicate their country of birth not to be Canada and further indicates whether they are landed immigrants or not. The definition of the immigrant group are people born outside of Canada and who are landed immigrants (i.e., permanent residents or citizens but not those born as citizens outside of Canada). A single variable “YEAR SINCE IMMIGRATION” (YSM) is created for the two comparison groups: Canadian-born and immigrants. This YSM variable only applies to immigrants. For a Canadian-born, this number is coded to zero.

The “COWMAIN” (class of worker) variable includes: (1) public employee, (2) private employee, (3) private, self-employed incorporated with employees, (4) private, self-employed incorporated without employees, (5) private, self-employed unincorporated with employees, (6) private, self-employed unincorporated without employees, (7) private, working in a family business without pay. The categories from 3 to 5 and category 7 were eliminated to focus on (our definition

of) gig workers in comparison to paid employees. So, we identify private and public sector employees (categories 1 and 2) by the variable “COWMAIN” (class of worker) as well as self-employed unincorporated without employees (category 6).

We create a group of new entities: years since migration, year since migration squared, age squared, cowmain1, cowother1, immigrant status (yes/no), lnwage, multiple job holder status (yes/no).

Considering what has been done then, the data are not for the whole sample, in other words the data were cleaned. It does not include those who are not working, and we do not want these people as they are not relevant to this study. We have aggregated public and private employees as one group. We subsequently impose a sample restriction on the age of workers that is between 18 and 64 years, to capture the most active labour force, and eliminate workers who work less than 20 hours a week or more than 100 hours a week. We used the “EFAMTYPE” (type of economic family) variable in the regressions because this is much broader than the marital status of respondents and the number of people in a household. The final sample for the summary statistics for all workers contains 3,999,487 observations: with a total sample of 3,695,300 for main paid employment (excluded self-employed) and 304,187 for the gig workers. So, in the thesis around 8% of respondents are private, self-employed unincorporated individuals (gigs), and 92% are public and private employees.

The final sample for the summary statistics for the second employment/second gig job contains 88,170 observations: with a total sample of 63,197 for paid secondary job and 24,973 for the holders of the second (other) gig job. Also, the sample is diminished when using for example “HRLYEARN” (usual hourly earnings), because this variable was only introduced in 1996 and includes only employees with declared earnings.

To conclude what has been covered so far, our target population of the survey includes adults living in Canada within the ten provinces who either have main paid employment status (i.e., private or public sector) or have a main gig job (defined as unincorporated self-employed with no employees in the COWMAIN variable). *However, the ten different Canadian provinces were not considered (researched) separately and analyzed at a deep level on this thesis*. Secondly, the

analysis focuses on the second employment scenario which are those who have paid secondary jobs or other/secondary gig jobs.

3.2 STUDY VARIABLES DESCRIPTION

Since 1976, the LFS has followed a rotating panel approach. In the thesis we focus on the post-1976 period as the significant variable changes were introduced in 1976 (e.g., an updated questionnaire, rotation groups and unemployment insurance regions). In 1990 the education questions were considerably modified as well as the new questionnaire which was phased in 1996. It is worth mentioning that there is no wage data for the self-employed. Beginning in 2006, the LFS asked respondents if they were landed immigrants.

The dependent variable for this study is the COWMAIN variable for class of worker main job which we classified (grouped) into 2 categories: (a) combined private and public employees and (b) private self-employed unincorporated without employees (gig workers). Another dependent variable is the COWOTHER variable for the class of worker other job which we classified (grouped) into 2 categories: (a) other paid employment (paid secondary job) and (b) other - paid gig (self-employed unincorporated without employees).

Binary variables are coded to 0 or 1 for non-gig and gig-workers, respectively. We use this to look at, inter alia, those whose primary labour market activity is wage employment, but the secondary labour market activity is unincorporated self-employment. This data assisted in identifying the secondary self-employment activity to supplement wage employment, or what people often think of as “gig work”.

What variables were used as independent variables? Continuous variables: age of respondent, usual hours worked per week at main job and second job, tenure of current job, main/second usual hourly earnings. Categorical variables: gender, the level of education, multiple job holder status, student status, landed immigrant or Canadian, type of economic family, province of Canada in the context of the summary statistics where all workers had their main jobs and the summary statistics with the second employment has been researched.

The main categorical regressors are the “sex of respondent” (a variable to determine the difference between being male or female) and “LANDIMM” (a variable to determine landed immigrants/permanent residents). Prior to January 2006 the “LANDIMM” variable did not exist.

We control for the highest level of education. Our other control variables are categorized as demographic variables (sex, age squared, type of economic family), job characteristics (full-time/part-time job, main paid employment or main gig job, paid secondary job or other/second gig job), student status and survey period (year).

We found a strong collinearity between years since migration (YSM) and if a person was a landed immigrant to Canada, so we omitted them from the regressions, as regression results do not change qualitatively when using either variable.

3.3 EMPIRICAL MODEL

OLS is used when Y is a continuous variable. In our case, Y is a categorical variable, so the estimates obtained by the OLS will not satisfy the Gauss-Markov conditions (i.e., the error-term is not normally distributed and has heteroskedasticity).

Multinominal logit is used when Y takes on values (0,1,2,3…), of which there are two or more unique categories. In all the models, Y takes only a binary form and consists of 0 and 1, so we used the logit model. The outcome variable is regressed on a number of independent variables using the logit command and the appropriate survey weights (i.e., the “pweights” option in Stata).

Our binary choice model can be represented in the form of a latent variable model. A latent variable is a variable that is not fully observed. Latent variables can be incorporated into models with binary outcomes in two ways. In the first method, the latent variable represents an unobserved propensity for the event of interest to occur. In the second method, the latent variable reflects the difference in utility that arises if the event of interest occurs, assuming that the binary outcome is a result of individual choice. The latter approach emphasizes the need to differentiate between variables that change across different options for a given individual and variables such as socioeconomic characteristics that remain constant across options for a given individual. It is

important to note that the binary outcome follows a Bernoulli distribution. Latent variable models simply provide a justification for a specific functional form for the Bernoulli parameter.

In the index function formulation interest lies in explaining an underlying unobserved continuous random variable y*, but all we observe is the binary variable y, which takes value 0 or 1 according to whether or not y* crosses a threshold. Different distributions for y* lead to different binary outcome models.

Let y* be a latent (or unobserved) variable, such as class of worker main or class or worker other job. The natural regression model for y* is the index function model:

$y* = \chi' \beta + \mu;$

where χ – are factors that determine the decision to have a main or secondary gig job.

However, this model cannot be estimated because y* is not observed. Instead, we observe:

$y = \{1\ if\ y* > 0\ 0\ if\ y* \leq 0\}$ (a)

Where the threshold of zero is a normalization explained in the following:

Given (a)

Pr $[y = 1 \mid x] = Pr\ [y^* \geq 0] = Pr[\chi'\beta + \mu \geq 0]$ = Pr $[-\mu < \chi'\beta\ ]$ = F $(\chi'\beta\ )$ (b)Where F is the cdf of - μ, which equals the cdf of μ in the usual case of density symmetric about 0. In its standard form the logistic has cdf

λ(μ) = $\frac{e^{\mu}}{(1+e^{\mu})}$, $-\infty < \mu < \infty$

The density function λ′ (μ) = $\frac{e^{\mu}}{(1+e^{\mu})^2}$ is symmetric about 0, and a logistic random variable has mean 0 and variance $\frac{\pi^2}{3} \cong 1.814^2$

The logit model arises of the error μ is logistic distributed, since then (b) yields Pr $[-\mu < x\ ]$ = λ $(\chi'\beta)$. Note that β is scaled differently in the two models due to different V$[\mu]$.

Hence, our problem can be modeled empirically as a standard discrete choice model.

It is normal to do estimates for males and females separately (models 3.3.1. - 3.3.4. below and for immigrants and non-immigrants separately (models 3.3.5 - 3.3.6.)).

We use ib(x).educlev instead of educlev with x the value of the category that we wanted to eliminate (i.e., the base case)[16]. For example, it is Grade 11-13 (graduated) that we wanted to eliminate. Also, the same approach was used to such variables as: efamtype (type of economic family), student level. Now, all marginal effects are going to be relative to the base case.

When we added age to the model, we also added age squared (i.e., gen age^2 = age*age) since there is likely a non-linear relationship between age and gig employment.

We answered the question "who holds a gig job as their main job?". The outcome variable is the binary variable "gig" or in our case "cowmain" where cowmain = 0 for those in private and public sector employment (together) and cowmain = 1 for those in gig employment (i.e., where cowmain = 6 in the raw dataset) and the same for the second job conditional on having a first job. These are regressed on a group of independent variables using the logit command and the pweights option. We build up the models below, thinking about the factors that are theoretically and practically important in holding a gig job, more specifically: (1) what are the variables that influence one to have a gig job as the main job, and (2) what are the variables that are related to a second gig job, conditional on various factors, including some of the characteristics from the first job (e.g., wages, multiple job holder, varying hours, etc.).

The benchmark empirical equations are presented as:

1) logit model (model 1) by gender. We control for the age, immigrant status, province and survey period in model 1 as follows:

$$P(Y(cowmain=0,1)) = ß_0 + ß_1*age_{it} + ß_2*age^2_{it} + ß_3*immigrant_{it} + ß_4*province_{it} + ß_5*syear_{it} + e_{it} \quad (3.3.1)$$

2) logit model (model 2) by gender. We added immigrant status, years since migration and its square, and multiple job holder status to model 3.3.1 as follows:

$$P(Y(cowmain=0,1)) = ß_0 + ß_1*age_{it} + ß_2*age^2_{it} + ß_3*immigrant_{it} + ß_4*province_{it} + ß_5*syear_t + ß_6*yearImmigrated_{it} + ß_7*yearImmigrated^2_{it} + ß_8*MultipleJobHolder_{it} + e_{it} \quad (3.3.2)$$

3) logit model (model 3) by gender. We added tenure of current job, usual hours worked per week at main job to model 3.3.2 as follows:

[16] The list of variables are: efamtype (type of economic family), educlev (level of education), student (student status).

$$P(Y(cowmain=0,1)) = ß_0 + ß_1*age_{it} + ß_2*age^2_{it} + ß_4*province_{it} + ß_5*syear_{it} + ß_8*MultipleJobHolder_{it} + ß_9*tenure_{it} + ß_{10}*uhrsmain_{it} + e_{it} \quad (3.3.3)$$

4) logit model (model 4) by gender. We finally added hourly earnings in Canadian dollars in model 4 compared to model 3.3.3 as follows:

$$P(Y(cowmain=0,1)) = ß_0 + ß_1*age_{it} + ß_2*age^2_{it} + ß_4*province_{it} + ß_5*syear_{it} + ß_8*MultipleJobHolder_{it} + ß_9*tenure_{it} + ß_{10}*uhrsmain_{it} + ß_{11}*hourlyearn_{it} + e_{it} \quad (3.3.4)$$

5) logit model (model 5) by immigrant status. We control for the age, gender, year since immigration plus squared, and multiple job holder status as follows:

$$P(Y(cowmain=0,1)) = ß_0 + ß_1*age_{it} + ß_2*age^2_{it} + ß_4*province_{it} + ß_5*syear_{it} + ß_6*yearImmigrated_{it} + ß_7*yearImmigrated^2_{it} + ß_8*MultipleJobHolder_{it} + ß_{12}*female_{it} + e_{it} \quad (3.3.5)$$

6) logit model (model 6) by immigrant status. Model 6 is comprised of Model 3.3.5 and the following variables: tenure of current job, usual hours worked per week at the main job, and hourly earnings in Canadian dollars:

$$P(Y(cowmain=0,1)) = ß_0 + ß_1*age_{it} + ß_2*age^2_{it} + ß_4*province_{it} + ß_5*syear_{it} + ß_8*MultipleJobHolder_{it} + ß_9*tenure_{it} + ß_{10}*uhrsmain_{it} + ß_{11}*hourlyearn_{it} + e_{it} \quad (3.3.6)$$

The benchmark empirical equations were built in a stepwise fashion. To do so means that we added in variables as groups, one step at a time. We started with type of economic family in one estimate to see the results, and then started adding variables in groups (age, education level, student status, immigration status, multiple job holder scenario, year since the immigrants landed, etc.), and then finally we did estimates for males and females separately and for immigrants and non-immigrants separately.

We added one variable at a time, because that way we can see the effects of each on the outcome variable. For example, is it age plus gender that causes the probability of gig work to increase at the second job or is it that the hours at the main job are low?

The "HRLYEARN" (usual hourly earnings/$ß_{11}*hrlyearn_{it}$) variable is very useful when we look at gig work as a second job, indicating the earnings in dollars and cents only for those who are currently employed. Usual hourly earnings are not available for the main gig job. There was wage data for those in other gig jobs who were paid employees in their first jobs. We calculated the mean:

19.50 CAD for the paid secondary job and 23.90 CAD for the other/second gig job. In the case of the logit estimates for a second gig job, these wage numbers will be important for our analysis.

e_{it} is a random error term which is assumed to be normally distributed and independent of all the explanatory variables.

3.4 THE GENERAL TREND

Class of worker, main job dynamics.

In this section we look at the general trends within the gig economy from 1976 until 2021. We make a distinction between primary versus secondary participation in the gig economy. The starting point is the analysis of the cowmain variable.

As mentioned earlier, using LFS datasets two graphs were constructed. Those graphs were not removed from the Research Data Center in Edmonton: the dynamics of cowmain1 variable which includes the ratio between those who have a main gig job from 1976 to 2021 to those who have paid employment (excluding self-employment); and the dynamics of the cowother1 variable which includes the ratio between the second job in the gig economy from 1976 to 2021 to the second job as a public or private employee from 1976 to 2021.

From the graphs we do not see notable (crucial) changes from 1976 to 2021. However, the changes have been shown to be notable by many other papers. The same conclusion, for example, was found by Garin et. al (2023:2): “Interestingly, the broader 1099-contract[17] economy follows a different trend, declining during this period[18], suggesting the challenges for tax administration are largely concentrated among platform gig workers.” The authors concluded the considerable increase in the number of gig workers, more specifically from 1.5 million in 2018 to 5 million gig workers in 2021 (and the growth continued) (Garin et. al, 2023:35). Those results are consistent with Moore and Mueller (2002:791) where: “longer spells of joblessness favour self-

[17] The 1099-K form reports payments and transactions from online platforms, apps or payment card processors.

[18] Here they provided statistics about the platform jobs were done from 2019 to 2021 including COVID-19 period. The statistics showed the decline of gig jobs, while in fact only within 2 years the number of new people involved in the gig economy in the US increased at least 3.1 million.

employment" which was exactly what happened during the COVID-19 period of 2021-2022. Our literature review suggests that COVID-19 caused a reduction in working hours and a participation in the labour force, at the same time not having any significant effects on wages. Also, COVID-19 is believed to have caused a significant increase in the unemployment rate which in turn affected people to search for alternatives, often in the form of a gig job. This might cause a rise of the number of gigs from our data (2020-2021) and support our results from the collected data. In line with these findings, Fana et. al, (2020:400) discovered the impact of COVID-19 on self-employment in some EU countries where: "the proportion of self-employed in Poland almost doubles the EU average, followed by Italy."

Discussing the 2007-2009 financial crisis or the global financial crisis (GFC) it is crucial to comprehend the degree to which weakened labour demand during the crisis is related to personal transition into self-employment or narrower into the gig employment. A. Henley analysed the crisis and post-crisis growth in the self-employment from 2009 to 2013: "Levels of self-employment appear to be depressed in localities where the local labour market is weaker (*which is always the case during a crisis – italics mine)*, and encouraged where local spending power (earnings) is higher" (Henley, 2015:1317). In other words, Henley says that if we analyse push or pull factors, then during the specific 2007-2009 crisis in the UK, the perspective and fast developing local markets have more influence on the probability for self-employment or gigs rather than a depressed local markets even in times of crisis when some proportion of the population had lost their jobs. This is because the attractiveness of self-employment in his models demonstrate a strong dependence on earnings, that is to say higher earnings in self-employment area in let's say more economically prosperous local markets attract people to do gigs. Continuing Hanley's discussion it is straightforward that during a time high unemployment rate, more people search for an alternative for themselves often in a form of gigs. For example, more people today than yesterday who deliver food would reduce the price and their payment rates due to higher labour supply. The same is true for any gig job. Two effects are during a financial crisis: increased number of people who are willing to do gigs as well as decreased earnings in the gig economy because of higher supply of gigs.

Class of worker, main job dynamics.

The next consideration is the analysis of the cowother variable.

As we mentioned before, using LFS datasets two graphs were constructed, those graphs were not removed from the Research Data Center in Edmonton, but it can be noted here that there is a modest increase in those who do a gig job as a second gig job from 1976 to 2021 with a visible increase from 1980-1986 and then again from 1992-1999.

3.5 SUMMARY STATISTICS

The weighted summary statistics which are represented here contain mean/proportion, standard error, and the number of observations. We make a distinction between primary versus secondary earnings in the gig economy.

The LFS is a nonrandom sample and the final weighted sample size represents 3,999,487 individuals. Only results from the weighted sample are reported in the analysis below.

We start with the patterns in the summary statistics and what stands out the most, for example: males are more likely to be gig workers than females, and immigrants more than non-immigrants. In summary we analyzed 3,695,300 observations made on those who are paid employees.

The analysis is restricted to: workers who held a paid job (employed at work) or gig work; age of respondents (from 18 to 64) as of the end of the LFS reference week ; those whose the class of worker the main job is either public employee, or private employee or self-employed unincorporated without employees (our proxy for gig job); those whose actual hours worked per week at their main job is more than 20 hours, and those whose usual hours worked per week at their main job is more than 20 hours and less than 100 hours.

Detailed weighted summary statistics of paid employed, gig workers (Table 3), as well as paid secondary and gig secondary jobs, are presented below in Table 4.

Table 3 – Summary statistics for all workers, main job.

Summary statistics for all workers, main job		
Continuous Variables (mean)	Main- paid employment (excluded self-employed)	Main - paid gig (self-employed unincorporated without employees)

	Paid Employment	Main Gig Job
Usual hourly earnings	23.174	n/a
SE	(0.012)	n/a
Sample size	1,966,604	n/a
Age (age of respondent as of the end of LFS reference week)	38.467	42.874
SE	(0.008)	(0.029)
Usual hours worked per week at main job	38.615	44.367
SE	(0.005)	(0.037)
Tenure of current job	92.957	114.575
SE	(0.07)	(0.279)
Sample size	3,695,300	304,187
Categorical Variables (proportion)	Paid Employment	Main Gig Job
Sex/Gender		
male	0.556	0.639
SE	(0.000)	(0.001)
female	0.444	0.361
SE	(0.000)	(0.001)
Sample size	3,695,300	304,187
Respondents highest level of education ever completed		
Grade 8 or lower	0.050	0.087
SE	(0.000)	(0.000)
Grade 9-10	0.07	0.094
SE	(0.000)	(0.000)
Grade 11-13, non graduate	0.118	0.096
SE	(0.000)	(0.000)
Grade 11-13, graduate	0.158	0.159
SE	(0.000)	(0.000)
Some post-secondary education	0.079	0.067

SE	(0.000)	(0.000)
Trades certificate or diploma	0.126	0.128
SE	(0.000)	(0.000)
Community college, CEGEP	0.159	0.147
SE	(0.000)	(0.000)
University certificate below Bachelor's	0.02	0.022
SE	(0.000)	(0.000)
Bachelor's degree	0.164	0.136
SE	(0.000)	(0.001)
Above Bachelor's degree	0.055	0.064
SE	(0.000)	(0.000)
Sample size	3,695,300	304,187
Multiple job holder status		
Single job holder, not a job changer	0.962	0.934
SE	(0.000)	(0.000)
Single job holder, job changer	0.000	0.000
SE	(0.000)	(0.000)
Multiple job holder	0.038	0.066
SE	(0.000)	(0.000)
Sample size	3,695,300	304,187
Student status of the respondents		
Full-time student	0.016	0.005
SE	(0.000)	(0.000)
Part-time student	0.031	0.014
SE	(0.000)	(0.000)
Non-student	0.953	0.981
SE	(0.000)	(0.000)
Sample size	3,695,300	304,187

If a person is now, or has ever been, a landed immigrant (permanent resident) in Canada		
YES	0.093	0.109
SE	(0.000)	(0.001)
NO	0.898	0.885
SE	(0.000)	(0.001)
Sample size	3,695,300	304,187
Type of economic family		
Unattached individual	0.166	0.154
SE	(0.000)	(0.001)
Husband-wife, dual earner couple, no children or none under 25	0.192	0.208
SE	(0.000)	(0.001)
Husband-wife, dual earner couple, youngest child 0 to 17	0.268	0.297
SE	(0.000)	(0.001)
Husband-wife, dual earner couple, youngest child 18 to 24	0.072	0.063
SE	(0.000)	(0.000)
Husband-wife, single earner couple, husband employed, no children or none under 25	0.038	0.047
SE	(0.000)	(0.0005)
Husband-wife, single earner couple, husband employed, youngest child 0 to 17	0.076	0.08
SE	(0.000)	(0.000)
Husband-wife, single earner couple, husband employed, youngest child 18 to 24	0.02	0.015
SE	(0.000)	(0.000)
Husband-wife, single earner couple, wife employed, no children or none under 25	0.022	0.017
SE	(0.000)	(0.000)

Husband-wife, single earner couple, wife employed, youngest child 0 to 17	0.013	0.009
SE	(0.000)	(0.000)
Husband-wife, single earner couple, wife employed, youngest child 18 to 24	0.007	0.004
SE	(0.000)	(0.000)
Husband-wife, non-earner couple, no children or none under 25	0.009	0.007
SE	(0.000)	(0.000)
Husband-wife, non-earner couple, youngest child 0 to 17	0.001	0.001
SE	(0.000)	(0.000)
Husband-wife, non-earner couple, youngest child 18 to 24	0.004	0.002
SE	(0.000)	(0.000)
Single-parent family, parent employed, youngest child 0 to 17	0.036	0.032
SE	(0.000)	(0.000)
Single-parent family, parent employed, youngest child 18 to 24	0.018	0.013
SE	(0.000)	(0.000)
Single-parent family, parent not employed, youngest child 0 to 17	0.002	0.001
SE	(0.000)	(0.000)
Single-parent family, parent not employed, youngest child 18 to 24	0.003	0.001
SE	(0.000)	(0.000)
Other families	0.053	0.049
SE	(0.000)	(0.000)
Sample size	3,695,300	304,187
Province		
NF	0.015	0.01
SE	(0.000)	(0.000)

PEI	0.004	0.005
SE	(0.000)	(0.000)
NS	0.027	0.023
SE	(0.000)	(0.000)
NB	0.023	0.016
SE	(0.000)	(0.000)
Quebec	0.244	0.209
SE	(0.000)	(0.001)
Ontario	0.387	0.378
SE	(0.000)	(0.001)
Manitoba	0.038	0.045
SE	(0.000)	(0.000)
Saskatchewan	0.03	0.059
SE	(0.000)	(0.000)
Alberta	0.11	0.114
SE	(0.000)	(0.000)
BC	0.122	0.141
SE	(0.000)	(0.000)
Sample size	3,695,300	304,187

Source: Author's calculations from the LFS.

The usual hourly earnings for paid employment is $23.17. It means that individuals who work in the public or private sector in Canada typically earn $23.17 for each hour of work they perform. This hourly wage level can vary significantly depending on factors such as the location, industry, level of skill or experience required for the job, and other relevant factors.

The standard error (SE) in summary statistics is a measure of the variability or precision of a sample statistic or sample mean. It quantifies how much the sample mean is expected to vary from the true population mean on average. In our case, the standard error of usual hourly earnings is 0.012 which is a small standard error suggesting that the data collection process is consistent and has low variability, which is a sign of good data quality.

The average age of those who have paid employment is 38.5 years whereas for those who have a gig job it is close to 43 years. The gig employment tends to be older than paid employment and therefore the age difference between the two respondents on average is about 4.5 years. This is consistent with the study carried out by Berger et al. (2019) where the authors presented a snapshot of the London labour force where 40% and 32% percent of Uber drivers (72% overall) were aged from 30-39 to 40-49 years old compared to all workers (53% within those age groups respectively).

Regarding paid employment gender patterns, 56% of the respondents are males whereas females account for 44% of the entire weighted sample of 3.7 million observations. In contrast, in the main gig job gender distribution, 64% are males while females only comprise 36%. Berger et al. (2019:438) observed almost the same with 44% of females for "all workers group" and 34% for the self-employed in London. Those percentages are consistent with Tran and Sokas (2017) where women comprised only 13.8% of Uber drivers and only 8% of female taxi drivers. Similar results were obtained by Centero Maya et al. (2022). They interviewed male and female food delivery workers between the ages of 19 and 67, with males accounting for 88.5%, and females only 10.6%, with a small percentage of respondents deciding not to specify their gender. Ravenelle et al. (2021) carried out a study of gig work during COVID-19, interviewing those who in that moment earned money through internet platforms, and their findings were consistent with our statistics, here 54.2% of them were males, 44.3% were females and 1.5% were other.

For the usual hours worked per week at the main job, the average for the paid employment is 38.6 hours per week and 44.4 hours per week for the main gig job. Another comprehensive study was carried out by Reynolds and Kincaid (2023:74) in the US labour market. During the Covid pandemic they discovered an increase in weekly hours worked by the gig workers, due to such extremes in the labour market as layoffs and reductions and at wave 1 they asked respondents: "how many hours per week respondents usually spent on each type of work. At later waves, they asked how many hours they spent on each type of work in the previous week". The authors identified those who "gig-only": "(i.e., platform-dependent) workers as those who do not combine microtask work with wage-salary work or self-employment" (Reynolds and Kincaid 2023:71). The results are that 23.2 hours were spent per week on the gig job only which funded 35% of their

household income. Another study about the allocation of effort across primary and Amazon gig jobs found those characteristics of observed individuals. In terms of those who had two jobs (a main paid job and an Amazon gig job), males spent 51.9 hours per week (13.62 hours of which were worked for Amazon) and females spent 49.3 hours per week (14 hours of which were worked for Amazon) (Doucette and Bradford, 2019). Here it is clear that the gig hours per week are very high, however, due to the nature of the gig work, it is impossible to determine the exact number of hours per week.

Ng and Feldman (2013:306) in their qualitative research about the tenure of current job and performance identified tenure as: “the length of time in one position”. There are no published articles that directly compare the second paid job and the second gig job in the context of tenure of those jobs in the scientific literature.

Most of the respondents had a comparatively high tenure rate. The “tenure of current job” is a measure of how long (in months) someone has held their current (paid or gig) employment without changing it. From the summary statistics, public and private employees have been employed in their current or most recent positions for 93 months, whereas those who held a main gig job scored 114.5 months. Tenure of current job is probably connected to the age of respondents. Older workers may have longer tenures on average while shorter tenure may indicate an individual's career progression or career growth. As we remember, there is almost no career growth in the gig economy. Other significant factors which affect the tenure of the current job in the gig economy are outlined in a recent report:

> The report, which polled 315 U.S. based gig drivers working for rideshare and delivery companies, found that although the need for gig drivers is increasing, roughly 42% of drivers say it's possible they will leave gig work within the next 12 months due to low or unpredictable earnings (30%), lack of benefits (28%), and the rising cost of performing work tasks (27%). (PR Newswire US, 2023)

As a fact low earnings are usually associated with minimum wage jobs, part-time employment or jobs in the gig industries. According to the chosen definition, the collection of markets that match providers to consumers on a gig (or job) basis forms its essence, so in the report we have unpredictable earnings which occur when income fluctuates from one period to another, making it difficult to anticipate how much money will be earned in the future. This is a study of the Chinese gig (and paid) economy labour market. The authors concluded that the tenure for the first

paid employment has reduced since 1995 and their finding is that the Chinese tenure for the employees is lower than for the gigs in Canada (Yuan et al., 2019).

Another study is on how academia has entered the gig economy. Indeed, the number of part-time professors has increased dramatically. In 1975, around a quarter of professors were part-time, whereas by 2015 the number had more than doubled, reaching 57% of the contingent labour force (American Association of University Professors, 2018). Part-time positions in the gig economy are more common than full-time positions. The same trend of increasing part-time positions is also observed in the academia.

Next, we carry out the comparative analysis of the respondents' highest level of education, based on two other sources. Those are taxi drivers in the US by Hall and Krueger (2018), and precarious workers in New York undertaken at the University of North Carolina (Ravenelle et al., 2021). Our summary statistics numbers almost fully match up to those two studies.

Campion et al. (2020:170) gave the next definition of the multiple job status: “the act of working more than one job simultaneously, including working for employers and self-employment, wherein all tasks or sets of tasks are performed in exchange for or expectation of compensation”. This definition is fully consistent with our terminology and data collection. In terms of multiple job holder status, there is some evidence that: “Women between the ages of 20 and 24 were more likely to be multiple job holders, however, suggesting engagement in part time or flexible work may not be by choice” (Tran and Sokas, 2017: e64). Though we have not obtained the multiple job holder status by gender, our results are as follows: paid employees hold a single job (and do not change jobs during the reference week) for 96.2% of the respondents, while gigs hold a single job only for 93.4% of the participants, and hence 6.6% of the gigs are multiple job holders versus 3.8% in the employment scene. Why do those who are dealing with the gig economy tend to have a higher probability of having multiple jobs? The gig economy often offers flexibility in terms of work hours and location. Plus, gig workers may have diverse skills and expertise that make them suitable for different types of work. For instance, someone might work as a freelance web designer during the day and drive for a ride-sharing service in the evenings.

Sessions et. al. (2022) and Ilsoe et al. (2021) make similar observations that the rising gig economy contributed to the rising multiple job holder status, more specifically those who have

full-time employment could supplement their income with gigs. This can be understood as people's response to the income maximization problem, where they earn to their full potential by holding multiple complementary posts such as that of a higher-paying web-design gig job with a low-paying food delivery gig job. Ilsoe et al. (2021:212) provided the evidence that "descriptive statistics similarly indicate that multiple jobholding, where people increasingly combine a conventional low- or average-paid job with a low online income, has become more common on labour platforms in the last few years". Hafeez et. al (2023) directly pointed out that those who are involved in the gig economy tend to perform for many internet platforms and/or employees.

Our instrument of analysis is the official statistics, indicating that only 6.6 percent of the main gig job respondents are multiple job holders, and this number has been surprisingly stable over the last 30 years. Canadian research on whether secondary hours have changed is limited if not absent, but non-official interviews indicate this number is almost three times higher (Glavin, 2020). Glavin used the 2011 Canadian Work Stress and Health Study and the 2019 Canadian Quality of Work and Economic Life Study and found out that 20 % in 2019 is the relevant number for multiple job holders. This threefold difference is due to the fact that respondents are less likely to report the second (third etc.) job holding and experienced longer hours of work in 2011 compared to 2019. The lower probability to report is because the multiple job holding is shifting from the traditional industries (2011[19]) to the internet economy and the pervasive usage of mobile applications and the internet-enabled mobile applications.

Full-time and part-time students are 4.7% of the paid public and private employees while 95.3% of the respondents are not students. In contrast, in the gig economy, 98.1 % are not students (as we remember the gig workers tend to be older) and full/part-time students consist of 1.9% of gig workers. We see that the percentage of full-time students among paid employees is 3.2 times higher and the percentage of part-time students among paid employees is 2.2 times higher than within main gigs. Consistent with Hall and Krueger (2018) only 6.7 % of Uber's drivers were students before joining the gig platform, 5% of taxi (not the same as Uber) drivers were students

[19] Uber's services and mobile app launched publicly in San Francisco in 2011 (the history of Uber: https://www.investopedia.com/articles/personal-finance/111015/story-uber.asp), April 18, 2023.

and 10.1% of those who were part of some course of full-time study were all workers group. What are the factors that influence this?

The first factor again, could be that respondents might not report (correctly) their gig activities perhaps due to the outdated questions in the LFS about it. The gig economy encompasses a wide range of workers, including those from various age groups, backgrounds, and employment situations. While students make up a portion of gig workers, they are just one segment of this diverse workforce.

Most of the respondents in the sample were not landed immigrants: 89.8% were non-immigrants for the paid employment group and 88.5% were non-immigrants for the main gig employment group. In the LFS, the questions look as follows: “Are you now, or have you ever been a landed immigrant in Canada?” and “When did you first become a landed immigrant?”. This variable, as previously mentioned, was first introduced in 2006. Through external observation, we can see a disproportionate number of immigrants or race groups within such industries as taxi driving and food delivery. For example, it is 73.8% for the taxi drivers and chauffeurs (Hall and Krueger, 2018) who are not white non-Hispanic, compared to 55.8% of white non-Hispanic among all workers. Consistent with Ravenelle et al. (2021) non-white is 69.4% and 82% in the London’s taxi industry are non-white immigrants (Berger et al., 2019). As found in Jeon and Ostrovsky (2022), those men who were born outside Canada were 35.7% for male gig workers and 28.5% for women, respectively. In contrast, within all worker groups for those males who were born outside Canada, it was only 25.4%. An interesting moment from the last study was that: “Even immigrants who had been in Canada for 20 years or more were more likely to be identified as gig workers than Canadian-born workers” (Jeon and Ostrovsky 2022:1658).

However, we are aware that the percentage of immigrants in Canada might be higher than in other countries. Why is the proportion of immigrants in the many gig industries so high? There are several influencing factors:

- Immigrants, particularly newcomers to a country, may turn to gig work as a way to generate income quickly while they search for more stable employment opportunities or as they establish themselves in a new country;

- Immigrants often bring valuable language skills and cultural knowledge to gig work. For example, immigrants who are bilingual or multilingual may find opportunities in translation, interpretation, or language tutoring;
- Gig work can serve as a safety net for immigrants who face barriers in accessing traditional employment due to language proficiency, education, or work authorization issues;
- Some immigrants may have a work visa, while others may work informally in the gig economy. The legal status can play a role.

According to our analysis, males are more likely to be gig workers than females and immigrants[20] are more likely to participate in the gig economy than non-immigrants, the same is true for male immigrants who are more likely to have main paid gig jobs, rather than Canadian-born females.

The gig economy and the type of economic family are interconnected in various ways, as both aspects relate to how individuals and households earn (together) income and participate in the labour market. Type of economic family could be an important indicator of being a paid employee or a gig worker. This variable includes 18 categories. From our dataset we do not see considerable differences between the paid employees and gigs. Rather we see that a majority of respondents belong to husband-wife, dual earner couples, with a youngest child in the 0 to 17 group (26.8% and 29.7% for the main gig workers respectively). The second most common group is: husband-wife, dual earner couple, no children or none under 25 (19.2% for the employees and 20.8% for the gig workers) and then the unattached individuals' group[21] (16.6% and 15.4% for the main gig respondents). Such configuration as "husband-wife, dual earner couple, no children or none under 25" with the slightly higher percentage of the gigs, might support the age results of the descriptive statistics, where on average the main gig job holders are 42.9 years old and the main paid employment holders on average are 38.5 years old.

[20] The circumstances faced by domestic migrants in the gig economy are comparable to those of foreign immigrant workers in that they frequently speak different languages and do not have access to local support networks.

[21] An unattached individual is a person living either alone or with others such as roommates etc.

The comprehensive qualitative study by Brawley Newlin (2023) examined whether the demographic characteristics are correlated with economic dependence on gig work. This research is also consistent with our dataset results, where main gig workers have a higher percentage of such types of the economic families where the husband-wife (married) category is represented. This demographic trait indicated that rideshare drivers would be more economically dependent on their gig jobs.

Detailed weighted summary statistics for the second employment including paid secondary and gigs job are presented in Table 4 below.

Table 4 – Summary Statistics for the second employment/second gig job.

Summary statistics for the second employment/second gig job		
Continuous Variables (mean)	Other paid employment	Other – gig (self-employed unincorporated without employees)[22]
	Paid Secondary Job	Other: Gig Job
Age (age of respondent as of the end of LFS reference week)	36.002	40.466
SE	(0.047)	(0.065)
Usual hours worked per week at main job	35.671	37.835
SE	(0.035)	(0.054)
Tenure of current job	67.364	95.294
SE	(0.328)	(0.577)
Sample size	116,646	53,789
Usual hourly earnings	19.556	23.989*
SE	(0.058)	(0.106)
Sample size	63,197	24,973
Categorical Variables (proportion)	Paid secondary job	Gig secondary job

[22] Those who are categorized as class of worker other job (labelled on this table as other gig) are only considered paid employees in the first job. More specifically, this class of worker is limited to public employees or private employees. Any respondent who selected the other options (like self-employment) was not asked the follow-on questions about a second job.

Sex/Gender		
male	0.463	0.607
SE	(0.002)	(0.003)
female	0.537	0.393
SE	(0.002)	(0.003)
Sample size	116,646	53,789
Respondents highest level of education ever completed		
Grade 8 or lower	0.027	0.038
SE	(0.000)	(0.000)
Grade 9-10	0.044	0.053
SE	(0.000)	(0.001)
Grade 11-13, non graduate	0.082	0.071
SE	(0.000)	(0.001)
Grade 11-13, graduate	0.154	0.128
SE	(0.001)	(0.002)
Some post-secondary education	0.097	0.075
SE	(0.001)	(0.001)
Trades certificate or diploma	0.110	0.134
SE	(0.001)	(0.002)
Community college, CEGEP	0.212	0.181
SE	(0.001)	(0.002)
University certificate below Bachelor's	0.025	0.026
SE	(0.000)	(0.001)
Bachelor's degree	0.185	0.191
SE	(0.001)	(0.002)
Above Bachelor's degree	0.064	0.102
SE	(0.001)	(0.002)
Sample size	116,646	53,789
Multiple job holder status		
Single job holder, not a job changer	n/a	n/a
SE	n/a	n/a

Single job holder, job changer	0.015	0.004
SE	(0.000)	(0.000)
Multiple job holder	0.985	0.996
SE	(0.000)	(0.000)
Sample size	116,646	53,789
Student status of the respondents		
Full-time student	0.03	0.009
SE	(0.000)	(0.000)
Part-time student	0.049	0.032
SE	(0.000)	(0.001)
Non-student	0.921	0.960
SE	(0.001)	(0.001)
Sample size	116,646	53,789
If a person is now, or has ever been, a landed immigrant (permanent resident) in Canada		
YES	0.123	0.083
SE	(0.001)	(0.002)
NO	0.866	0.91
SE	(0.001)	(0.002)
Sample size	116,646	53,789
Type of economic family		
Unattached individual	0.211	0.172
SE	(0.001)	(0.002)
Husband-wife, dual earner couple, no children or none under 25	0.180	0.211
SE	(0.001)	(0.002)
Husband-wife, dual earner couple, youngest child 0 to 17	0.248	0.321
SE	(0.001)	(0.002)
Husband-wife, dual earner couple, youngest child 18 to 24	0.075	0.061
SE	(0.001)	(0.001)

Husband-wife, single earner couple, husband employed, no children or none under 25	0.022	0.028
SE	(0.000)	(0.000)
Husband-wife, single earner couple, husband employed, youngest child 0 to 17	0.056	0.072
SE	(0.000)	(0.001)
Husband-wife, single earner couple, husband employed, youngest child 18 to 24	0.015	0.010
SE	(0.000)	(0.000)
Husband-wife, single earner couple, wife employed, no children or none under 25	0.018	0.014
SE	(0.000)	(0.000)
Husband-wife, single earner couple, wife employed, youngest child 0 to 17	0.012	0.007
SE	(0.000)	(0.000)
Husband-wife, single earner couple, wife employed, youngest child 18 to 24	0.008	0.003
SE	(0.000)	(0.000)
Husband-wife, non-earner couple, no children or none under 25	0.007	0.004
SE	(0.000)	(0.000)
Husband-wife, non-earner couple, youngest child 0 to 17	0.001	0.000
SE	(0.000)	(0.000)
Husband-wife, non-earner couple, youngest child 18 to 24	0.003	0.001
SE	(0.000)	(0.000)
Single-parent family, parent employed, youngest child 0 to 17	0.046	0.041
SE	(0.000)	(0.001)
Single-parent family, parent employed, youngest child 18 to 24	0.027	0.015
SE	(0.000)	(0.000)
Single-parent family, parent not employed, youngest child 0 to 17	0.001	0.000
SE	(0.000)	(0.000)

Single-parent family, parent not employed, youngest child 18 to 24	0.003	0.001
SE	(0.000)	(0.000)
Other families	0.065	0.038
SE	(0.001)	(0.001)
Sample size	116,646	53,789
Province		
NF	0.010	0.007
SE	(0.000)	(0.000)
PEI	0.005	0.004
SE	(0.000)	(0.000)
NS	0.025	0.023
SE	(0.000)	(0.000)
NB	0.017	0.015
SE	(0.000)	(0.000)
Quebec	0.183	0.149
SE	(0.001)	(0.002)
Ontario	0.383	0.385
SE	(0.002)	(0.003)
Manitoba	0.055	0.056
SE	(0.000)	(0.000)
Saskatchewan	0.047	0.069
SE	(0.000)	(0.000)
Alberta	0.140	0.146
SE	(0.001)	(0.001)
BC	0.136	0.144
SE	(0.001)	(0.002)
Sample size	116,646	53,789

Source: Author's calculations from the LFS.
*These are the hourly wages for the first job in paid employment, in other words the wage data for the second job is the mean of the wage from the first job (for paid employees).

Next, we summarize and describe the central tendencies, variability, and distribution of the secondary employment.

On average those who have another gig employment are 40.5 years old, some 4.5 years older than those who hold the secondary paid job (36 years old). We could assume the factors which affect the 4.5 age difference are similar to the first job age difference. Older individuals who are established in their careers may prioritize work-life balance and may choose the second gig work that offers flexibility in terms of hours and location (for example, food delivery gigs offer that). Also, some older workers may delay retirement or transition into gig work before fully retiring. This can be a planned phase of their career, allowing them to gradually reduce their workload.

Usual hours worked per week at the main job differs between the two groups. Those who have other gig jobs worked a bit more at their main job 37.8 hours versus 35.6 hours of those who have a paid secondary non-gig job. The difference here is notable.

The tenure of the second job significantly varies between our two groups. From the summary statistics, paid secondary job holders were employed in their current or most recent positions for 67 months on average, whereas those who held a secondary gig job were employed for 95 months on average.

The tenure of the current job is probably more connected to the age of respondents.

In terms of usual hourly earnings, we analyzed all the respondents who have their first job as paid public and private employment. Then the same respondents were asked if they had a second job, resulting in two groups of those who have a second paid employment and those who have a second gig job. The results demonstrated that those with the second gig job earn $23.98 per hour versus $19.56 dollars for those with the second paid employment. However, these figures are money wages which are not adjusted for inflation and therefore not real wage. Why do gigs earn more?

Males represent 46.3% of those who had a second paid employment and 53.7% are women. For the other paid gig respondents (self-employed unincorporated without employees) 60.7% of them are males and 39.3% are females.

The general trend here for education level is that those with a secondary gig job are less educated except for those who hold a bachelor's degree or above. Firstly, the tendency is that there are slightly more of the least educated respondents among gig secondary job respondents. Speaking of grade 11-13 (graduated), those who are paid employees are more educated, more

specifically 15.4% compared to 12.8%. Some postsecondary education is also in favor of other paid employed respondents, 9.7% in comparison to 7.5%. However, the owners of a trades certificate/diploma are more likely to have a second gig job (13.4%) compared to 11.0% of second paid employees. This is not surprising, considering the 19.6% of occupational distribution in trades for male gig workers in 2016 (author's calculations from the LFS). Finally, significantly more respondents who are above Bachelor's degree in the second gig economy 10.2% versus 6.4% for the paid secondary job holders.

Multiple job holder status is hard to interpret, single job holders, job changers are 1.5% within the second paid employment group which is bigger and 0.4% within the gig secondary job holders which is therefore lower. By definition, single job holders, job changers are those who during the reference week were not employed in two or more jobs simultaneously. Here those respondents are probably in the transition from one job to another.

Within the paid secondary job group non-students represent 92.1%, part-time students are 4.9%, and the remaining are full-time students (3%). The gig secondary job respondents differ from the previous group: non-students represent 96.0%, part-time students are 3.2% and the remaining are full-time students (0.8%). As we discovered here, there are more full-time students within the second paid employment group which correlate with the age difference between the groups (gig workers are older than private and public employees).

Several studies have shown that there are larger proportions of immigrants in the gig economy compared to non-immigrants. In our dataset the difference tells a slightly different story, probably because here we are analyzing secondary employment. Landed immigrants who have a second gig job represent 8.3%, and landed immigrants who have a second paid employment are 12.3%. This appears to mirror the facts found by Holtum et al. (2022:298):

> Notably, non-migrants utilise their gig with Uber to support a partner in more secure employment, and sometimes even as a means to get another (more ideal) job off-the-ground. The migrant responses, however, demonstrate how their gig with Uber is far more essential to their household income.

As the non-immigrants in the previous research did their gig work to support their main salary earner, their partner, it means that immigrants, on the contrary, did their gigs as a second gig job, therefore the relative proportion of those who have a second gig job within the immigrant

group are lower. Considering our research results that the immigrants are found to predominate in those who have a first gig job, that is, they have already in the gig economy with their first job, and therefore the proportion of those immigrants who have the non-gig first job and also the second gig job is lower compared to non-immigrants.

The type of economic family analysis demonstrates the biggest type of family for both paid secondary job and other gig job groups is husband-wife, dual earner couple, youngest child 0 to 17 represent 24.8% for paid employees and 32.1% for gig workers. Unattached individuals are 17.2% within gig workers and 21.1% for paid secondary job holders. The third largest type of economic family is husband-wife, dual earner couple, no children or none under 25 consist of 18.0% for paid employees and 21.1% for gig workers. Analyzing other types of economic families and their percentile distribution within gigs and non-gigs, we have not found substantial differences and their proportion is actually small. Basically, the most common type is when both couples work and they have children.

CHAPTER 4: EMPIRICAL RESULTS

This chapter presents and discusses the results of the multivariate regressions that address the research objectives. The results will be presented in two main parts. Section 4.1 primarily addresses the question of whether those who have a main paid or gig job (models 1 and 2) and those who have a second paid job or second gig job (models 3 and 4) tend to be gig workers based on their demographic characteristics. As well as whether there are significant variations in the male and female coefficient estimates for each variable.

Section 4.2 assesses the differences in coefficient estimates for the immigrant and the Canadian-born groups. We named these model 5 and model 6.

4.1 MODEL ANALYSIS

Data analysis was carried out using the Stata software, version 18.0 (StataCorp. 2023. Stata Statistical Software: Release 18. College Station, TX: StataCorp LLC). We first described the samples of workers. These samples referenced main gig jobs and second gig jobs, by age and gender sub-groups (see Chapter 3). The dependent variable in the logistic regressions is a binary variable equal to one if the individual is employed in the gig labour economy, but zero otherwise. We estimate a baseline set of regressions, in which the independent variables are comprised of age, education group, tenure of current job, and immigration status for males and females independently.

4.2 RESULTS

Table 5 and Table 6 show the estimation results of the binary logit models. These are the logit models (with and without the variable years since migration) for the class of worker main gig job, and for the class of worker other (second) gig job. All models are estimated for both the male and female subsamples and the equality of coefficient estimates between the two models is tested in each case. According to the results obtained, the following variables were found to be statistically significant at the 5% significance level according to the probability value of the calculated Z test statistics ($p < 0.05$): age, immigration status, multiple job holder, tenure of current job, usual hours worked per week at main job, and usual hours worked per week at main job. Furthermore, despite the variations in coefficient values, we found that the significance level and sign of the coefficients (see Table 5 and Table 6) remain almost identical for males and females; hence, the results are qualitatively negligible, even though tests on the equality of the coefficient estimates (provided in columns 4, 7, 10, and 13 of Table 5 and columns 4 and 7 of Table 6) reveal that these differences are statistically significant at 5% level.

We have preference for the log-likelihood criterion given that it offered the most effective way to draw information. Initially our study generated the pseudo-R^2 value from 0.031 to 0.108. Due to this pseudo-R^2 value being relatively low, we opted for the log-likelihood criterion. While some

scholars[23] favour the use of pseudo-R^2 value, there is no strong evidence that models evaluated based on this criterion are the most appropriate. Indeed, Martin (2016) emphasizes that pseudo-R^2 measurements have limited value and that likelihood ratio tests are more informative for model comparison. Therefore, the analysis was carried out by selecting the most appropriate model based on the log-likelihood criterion.

Test for differences in coefficient estimates. We tested six models (see models from 1 to 6 in Table 5) for their differences on coefficient values for the variables age, immigration status, multiple job holder, tenure of current job, and usual hours worked per week at main job. These results were found to be statistically significant. If the F-statistic is bigger than critical value, then the null hypothesis that the differences between coefficients are equal to zero is rejected. In other words, the null hypothesis is that the coefficients are equal. We are going to look at p-value, if p-value is equal to zero, then the probability to accept the hypothesis is also zero. If for example Prob > F = 0.000, then they are different. What we have done is tested 6 models for male and female coefficient differences, one for males and one for females, with the immigrant dummy variable ("imm") in each.

Then we used the SUEST command in Stata to test for differences in coefficient values on the "imm" variable between men and women. We ran the models with all years first, including the "imm" variable, and then ran the test on the difference on the "imm" estimates for males and females. It should be emphasized that we only tested immigration on the basis of the observations since 2006 because from this date forward is the only time we could calculate "ysm2" and "ysm" (year since immigration variable). The "ysm" variable was specially created to carry out this research. There was perfect collinearity between "ysm/ysm2" and "imm", so we recoded all the "ysm" and "ysm2" values to zero (0) for non-immigrants, then the models worked.

As can be seen in Table 5, we analyzed four models separately for males and females. Separate models were built in a stepwise fashion for women and men. Each of the four models is

[23] Greene (2022) claims that pseudo-R^2 is not a suitable measure for assessing model prediction accuracy and does not provide information about explained variance ratio. The use of pseudo-R^2 value for comparing binary models is put forward by Long and Freese (2014) for selecting the model with the highest pseudo-R^2 value.

an extension to the previous model. The comparative analysis below gives the marginal effects of the predicted binary logit model. The first model (the base or basic model) uses a minimal number of factors, namely only demographic factors such as age, age^2, and whether a respondent was a landed immigrant. In other words, these are the only control variables. We also included time and province fixed effects. Within these four male and female comparisons, model 1 is the basic one (core model) (Table 5).

In Table 6 there are two separate models for immigrants and non-immigrants, and model 6 is an extension of model 5. Model 5 here is the basic one.

Table 5 – Marginal effects for males and females and their test differences.

Variables	Model 1		*Test*	Model 2		*Test*	Model 3		*Test*	Model 4		*Test*
	males	females	*bf = bm*	males	females	*bf = bm*	males	females	*bf = bm*	males	females	*bf = bm*
Age	0.005***	0.002***	0.000***	0.005***	0.001***	0.000***	0.0364***	0.0234***	0.002***	0.025***	0.021***	0.9313
	(0.000)	(0.000)		(0.000)	(0.000)		(0.001)	(0.001)		(0.002)	(0.002)	
Age sq.	-0.0004***	-0.0002***	0.000***	-0.00003***	-0.000003***	0.000***	-0.00038***	-0.00023***	0.002***	-0.000***	-0.000325***	0.9145
	(0.000)	(0.000)		(0.000)	(0.000)		(0.000)	(0.000)		(0.000)	(0.000)	
Immigration status (1 = immigrant)	0.021***	-0.004**	0.000***	0.039***	-0.002	0.000***						
	(0.001)	(0.000)		(0.002)	(0.001)							
Year since immigration				<0.000***	<0.000***	0.0171**						
				(0.000)	(0.000)							
Year since immigration sq				<0.000	-0.000***	0.000***						
				(0.000)	(0.000)							
Multiple Job Holder (1 = yes)				0.048***	0.044***	0.171	0.171***	0.123***	0.9777	0.181***	0.131***	0.7874
				(0.001)	(0.001)		(0.020)	(0.016)		(0.026)	(0.018)	
Tenure of current Job							0.000157***	0.000161***	0.2373	<0.000***	<0.000**	0.0992**
							(0.000)	(0.000)		(0.000)	(0.000)	

Variables	Model 1		*Test*	Model 2		*Test*	Model 3		*Test*	Model 4		*Test*
	males	females	*bf = bm*	males	females	*bf = bm*	males	females	*bf = bm*	males	females	*bf = bm*
Hours worked							0.00192***	0.00188***	0.1853	0.003***	0.002***	0.0490*
							(0.000)	(0.000)		(0.000)	(0.000)	
Log hourly earnings										0.006***	0.004***	
										(0.000)	(0.000)	
Province FE	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Time FE	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Pseudo R2	0.076	0.031		0.076	0.031		0.069	0.059		0.108	0.073	
Population size	535,450,036	418,006,737		535,450,036	418,006,737		19,362,117	19,000,351		10,558,002	12,917,960	

Source: Author's calculations from the LFS.

Notes: Average marginal effects are shown. Omitted categories are in parenthesis. Controls include all those listed in Table 5 and those are: age, age sq, immigration status, year since immigration and year since immigration sq, multiple job holder, tenure of current job, hours worked, and hourly earnings (log). Standard errors are in brackets, *** p<0.01, ** p<0.05, * p<0.1. The coefficients reported as zero are not actually be zero but rather highly close to zero because of a rounding error. Full results are available upon request.

Model 1. Starting with age, it is striking that it increases the probability of gig work, and the effect is more substantial for males rather than females. The age variable has a marginal effect of 0.005 for males. Increasing age by 1 year increases the probability of having a gig work by 0.5 percentage points for the males, but for the females it is 0.2 percentage points. If we analyze age^2, then there is no turning point. In other words, we made age squared to include nonlinearity. In our four models, the age^2 values are small but not equal to zero. In other words, in each of the four models, age has a nonlinear effect. The probability of having a gig main or second job increased for young respondents, but then reached a turning point and started decreasing. However, in the second case for females, the coefficient on age^2 is positive, meaning that in this model specification women are more likely to hold gig work as they age.

We see that having a main gig job is positively related to being a landed immigrant for males, however for females the margin is negative (-0.004). This is the first interesting result that immediately catches your eye. More specifically, the male immigrants are 2.1 percentage points more likely to have gig work compared with males born in Canada which is fully consistent with our previous analysis. The effect of immigrant status on females is negative and equals -0.4%. However, after controlling for years since immigration and multiple job holder status, women's immigration status does not seem to affect the overall likelihood of gig work.

The test of logit model 1 (by gender). We controlled for the age, immigrant status, province and survey period. In model 1 the results were as follows: test for different coefficient values on age – F(x) = 67.77 (Prob > F = 0.0000), test for different coefficient values on age^2 – F(x) = 37.44 (Prob > F = 0.0000), the most importantly the test for different coefficient values on *immigrant* – F(x) = 204.49 (Prob > F = 0.0000), the last ones are different as well as age and age^2; in other words, the current marginal effect for males (0.039) is different than the coefficient for females (-0.002).

Model 2. Now, what is the difference between the first model and the second model? We added into the second model additional variables; in other words, we added additional controls to the model. The control variables for the second model are: years since migration, years since migration^2, and we also included multiple job holder status. In fact, the second model is the same as the first model, with these additional variables added.

From model 2 it is clear that the year since immigration has a small effect on the probability of being in the gig economy. The probability of having the gig job for landed immigrants based on the marginal effects and movement from the first model to the second model grows significantly, almost twofold. After controlling for years since migration and multiple job holder status, women's immigration status does not seem to affect the overall likelihood of gig work and it is clear that the male coefficient for immigration status increases to 0.039, meaning that male immigrants are 3.9 percentage points more likely to hold a gig job than their Canadian-born counterparts. In other words, for male landed immigrants in Canada in the first model the marginal effect is 2.1 percentage points and becomes 3.9 in the second model. However, at this stage for females, inclusion of the year since immigration variable has little qualitative effect on the immigrant coefficient estimate. In other words, if we added more variables to control model 2, females in the model experience little immigration effect on being in the gig economy.

The multiple job holder status variable increases the probability of gig work by 4.8 percentage points for males and by 4.4 percentage points for females in model 2. The multiple job holder status has a significant effect for both genders thus increasing the probability of having a gig job.

The test of logit model 2 (by gender). We added immigrant status, and more importantly, year since immigration and year since immigration squared, and multiple job holder status. In model 2 the results were as follows: test for different coefficient values on age - $F(x) = 58.70$ (Prob > F = 0.0000), test for different coefficient values on age^2 $F(x) = 45.11$ (Prob > F = 0.0000), test for different coefficient values on immigrant - $F(x) = 79.21$ (Prob > F = 0.0000), test for different coefficient values on year since immigration $F(x) = 5.69$ (Prob > F = 0.0171), test for different coefficient values on year since immigration^2 $F(x) = 12.61$ (Prob > F = 0.0004). The landed immigrant marginal effect is different; in other words, the current coefficient for males (0.0039***) is different than the coefficient for females (-0.002). The test gives the coefficient $F(x) = 79.21$ with (Prob > F = 0.0000), but year since immigration coefficients are also different, but the difference is only in the 5% significance level, though at 1% significance level they are the same, because F (x) = 5.69 (*Prob > F = 0.0171*).

Model 3. Model 3 is for the second gig job only. The difference between the second and the third model is that we see the immigration status; in other words, whether a person is a landed immigrant is essentially only significant for males (in model 1), and hence we decided in models 3 and 4 to not include the immigration variable, but to control instead for other factors such as: tenure of current job, usual hours worked per week at main job and hourly earnings. Now in models 3 and 4 age becomes a more significant factor for predicting that an individual has a second job in the gig economy. We also see here that such a variable as multiple job holder significantly affects the probability of being in the gig economy, more specifically, multiple job holders increased from 4.8 percentage points (model 2) to 17.1 percentage points for males in model 3 and increased from 4.4 percentage points (model 2) to 12.3 percentage points for females. Tenure of current job in model 3 has a positive effect on the probability of being a gig worker; compared to someone with zero months of tenure, someone with 100 months of tenure at a job would have a 1.57 percentage points higher probability of holding a gig job (i.e., for males in model 3 (i.e., 0.000157 * 100 = 0.0157 or 1.57 percentage points). Definitely we expected those results, because those with multiple jobs are more likely to have a second job, and this holds for both models and for both males and females.

The test of logit model 3 (by gender)*.* We added tenure of current job, usual hours worked per week at main job, and multiple job holder status. In model 3 the results were as follows: test for different coefficient values on age – $F(x) = 9.23$ (Prob > F = 0.0024), test for different coefficient values on age^2 – $F(x) = 9.04$ (Prob > F = 0.0026) – age has the same coefficient but the age/age^2 marginal effects are different. In other words, the current coefficient for males (0.0364**) is very different from the marginal coefficient for females (0.0234**) and the test gives almost the same coefficients $F(x) = 9.23$ (Prob > F = 0.0024), and $F(x) = 9.04$ (Prob > F = 0.0026) respectively. The test for different coefficient values on multiple job holding $F(x) = 0.00$ (Prob > F = 0.9777), the test for different coefficient values on tenure of current job $F(x) = 1.40$ (Prob > F = 0.2373), the test for different coefficient values on usual hours worked per week at main job $F(x) = 1.75$ (Prob > F = 0.1853) show that there is no statistical difference between males and females.

Model 4. Model 4 is for the second gig job only. In the fourth model, we additionally introduce hourly earnings, and we see here that the hourly earnings have a positive influence on being a gig worker both for males and females. This says that the higher the wage from the first job,

the higher the probability of having a second job which is a gig job. As we know, the multiple job holder status variable increases the probability of gig work by 4.8 percentage points for males and by 4.4 percentage points for females in model 2. After controlling for tenure of current job in model 4, usual hours worked at main job and wages, we observed the effect of multiple job holding increasing to 18.1 percentage points for males and 13.1 percentage points for females, respectively. Accordingly in the final model 4, males with an increase in hourly earnings are 0.6 percentage points more likely to have gig work and females with an increase in hourly earnings are 0.4 percentage points more likely to have gig work.

The test of logit model 4 (by gender). Model 4 is the same as model 3 but we added hourly earnings. In model 4 the results were as follows: test for different coefficient values on age – $F(x) = 0.01$ (Prob > F = 0.9313), test for different coefficient values on age^2 – $F(x) = 0.01$ (Prob > F = 0.9145) show that the effect of these variables is not different between males and females. Next, the test for different coefficient values on multiple job holding $F(x) = 0.07$ (Prob > F = 0.7874), and the test for different coefficient values on tenure of current job $F(x) = 2.72$ (Prob > F = 0.0992) show the same for age, while the test for different coefficient values on usual hours worked per week at main job $F(x) = 3.87$ (Prob > F = 0.0490), and the test for different coefficient values on hourly earnings – $F(x) = 9.17$ (Prob > F = 0.0025) demonstrate the difference of the effect for males and females. The landed immigrant marginal effects are not available for this model.

To summarize, the likelihood of gig work increases steeply with age, before declining. Men are more likely to be affected by age/age^2 variables than women, however interestingly after controlling for the additional tenure and work experience characteristics in the augmented regression, the effect of age does not significantly differ between males and females, 3.64 percentage points for males versus 2.34 percentage points for females. As expected, such variables as tenure of current job, usual hours worked per week at main job, and hourly earnings are positively associated with gig employment for both males and females.

Table 6 gives the marginal effects of the predicted binary logit model for non-immigrants and immigrants. We now run model 5 and model 6 for immigrants and native Canadians (but not for males and females like in models 1-4). Now we need to analyze how these models differ.

Table 6 – Marginal effects for native Canadians and immigrants and their test differences.

Variables	Model 5		*Test*	Model 6		*Test*
	Non-Immigrant	Immigrant	*bim = bnon*	Non-Immigrant	Immigrant	*bim = bnoni*
Gender (female = 1)	-0.006***	-0.030***	0.000***	0.024***	0.012***	0.0110**
	(0.000)	(0.001)		(0.002)	(0.004)	
Age	0.003***	0.004***	0.7686	-0.000***	-0.000**	0.0876*
	(0.000)	(0.000)		(0.000)	(0.000)	
Age sq	-0.000***	-0.000***	0.5058			0.2378
	(0.000)	(0.000)				
Year since immigration	n/a	0.001***	0.000***			
	n/a	(0.000)				
Year since immigration sq	n/a	-0.000***	0.000***			
	n/a	(0.000)				
Multiple Job Holder (1 = yes)	0.054***	0.007	0.000***	0.179***	0.025	0.0124*
	(0.002)	(0.004)		(0.020)	(0.052)	
Tenure of current Job				<0.000*	<0.000	0.5825
				(0.000)	(0.000)	
Hours worked				0.002***	0.002**	0.8405
				(0.000)	(0.000)	
Hourly earnings (log)				0.003***	0.005***	0.000***
				(0.000)	(0.000)	
Province FE	Yes	Yes		Yes	Yes	
Time FE	Yes	Yes		Yes	Yes	
Pseudo R2	0.035	0.033		0.088	0.088	
Population size	304,208,715	89,980,873		12,202,008	3,947,184	

Source: Author's calculations from the LFS.

Notes: Average marginal effects are shown. Omitted categories are in parenthesis. Controls include all those listed in Table 6, and those are: gender, age, age sq, year since immigration and year since immigration sq, multiple job holder, tenure of current job, hours worked, and hourly earnings (log). Standard errors are in brackets, ***p<0.01, **p<0.05, *p<0.1. The coefficients reported as zero are not actually be zero but rather highly close to zero because of a rounding error. Full results are available upon request.

Model 5. We control for gender, age, and multiple job holder status. This is a basic model. Here we see that native females are 0.6 percentage points less likely to have gig work compared to native males. For the immigrants this difference between males and females is much more prominent: immigrant women have 3 percentage points less chance of having a gig job. This difference is significant (see column 4 in Table 6).

In model 5 age is also related to the probability of working in the gig economy, which is approximately the same for immigrants and non-immigrants.

The test of logit model 5 by immigration status. We tested for gender, age, year since immigration plus squared, and multiple job holder status. In model 5 the results were as follows: test for different coefficient values on gender F(x) = 171.11 (Prob > F = 0.0000), so here the coefficients are different. The probability to accept the null hypothesis that gender has no difference is zero, so we cannot accept this null hypothesis, therefore they are different. The test for different coefficient values on age F(x) = 0.09 (Prob > F = 0.7686) and hence the coefficients are not statistically different and therefore age affects immigrants and native Canadians in the same manner. The test for different coefficient values on age^2 F(x) = 0.44 (Prob > F = 0.5058) is consistent with the result for age. The test for different coefficient values on multiple job holding F(x) = 133.98 (Prob > F = 0.0000) show the different effects of these variables for immigrants and non-immigrants. The gender (sex) marginal effect is different; in other words, the current coefficient for non-immigrants (-0.006**) is very different than the coefficient for non-immigrants (-0.030**) and the test gives the coefficient F(x) = 171.11 with (Prob > F = 0.0000) which is significant at the 1% significance level.

Model 6. The model differs from the model 5 in that we do not control the model by gender and years since immigration, but we control tenure of current job, usual hours worked per week at main job, and hourly earnings. That is, we additionally introduce new variables in the same fashion

as we did in models 3 and 4, meaning that models 3 and 4 are somewhat similar to model 6, and models 1 and 2 are somewhat similar to model 5. Now we see that multiple job holder also moderately increase the probability of having a gig job. However, it has the most significant effect in the case where a person is not an immigrant, but it has no effect on the immigrant. At the same time, hourly earnings have a more significant effect on immigrants, rather than native Canadians.

The test of logit model 6 by immigration status. We tested multiple job holder status, tenure of current job, usual hours worked per week at main job, hourly earnings in Canadian dollars (log). In model 6 the results were as follows: test for different coefficient values on gender F (x) = 2.55 (Prob > F = 0.011), meaning that there are differences between female immigrants and female non-immigrants. Other tests for different coefficient values are on age F(x) = 2.92 (Prob > F = 0.0876), test for different coefficient values on age^2 F (x) = 1.39 (Prob > F = 0.2378), test for different coefficient values on tenure of current job F(x) = 0.30 (Prob > F = 0.5825), and test for different coefficient values on usual hours worked per week at main job - F(x) = 0.04 (Prob > F = 0.8405), show that there are no statistically significant differences at 5% level between immigrants and native Canadians. The test for different coefficient values on multiple job holding F(x) = 6.26 (Prob > F = 0.0124), and the test for different coefficient values on hourly earnings – F (x) = 21.94 (Prob > F = 0.0000) prove that the effect is different for immigrants and non-immigrants.

To summarize, gender has a much more dramatic effect on the probability of gig work for immigrants with females having 3 percentage points less probability of being gig employed. Age increases the probability of gig work as demonstrated in Table 6, but there is no significant difference for immigrants rather than non-immigrants. Multiple job holders and the tenure of current job variables are not significant predictors of gig work for immigrants, while non-immigrants who hold a multiple job holder status are 17.9 percentage points more likely to participate in gig work compared to non-immigrants with single job holder status and who are also not job changers. All of these results are fully consistent with our summary statistics. Each usual hour worked per week at the main job increases the probability of gig work by 0.2 percentage points for both immigrants and native Canadians. Furthermore, the hourly earnings variable is a significant predictor of gig employment for both immigrants and non-immigrants.

Overall, the tests on the equality of the b coefficients provided in the test columns 4, and 7 of Table 5 reveal that differences in immigration status between males and females and are statistically significant at 5% level. The tests on the equality of the b coefficient provided in test columns 4 and 7 of Table 6 reveal that differences in gender between immigrants and non-immigrants are statistically significant at least the 5% level.

CHAPTER 5: CONCLUSION

This research represents one of few assessments in the scientific literature on Canada's gig labour economy. More specifically, it addresses some of the demographic and labour market factors that are associated with the probability of being a gig worker (broadly defined) at both the primary job and (if applicable) the secondary job.

5.1 SUMMARY OF KEY FINDINGS

At the outset of this work, it was barely possible to identify the gig worker in the real labour market. To address this, we reviewed the relevant literature and the definitions it contained of the gig economy to discover the most complete definition of the gig economy. In the course of the thesis, we relied on the comprehensive Congressional Research Service definition of the gig economy. This definition is also consistent with the legal objectives of the gig economy. One useful outcome of this process was that we established that workers use their own tools and assets to perform a gig job, so it works as their fixed capital.

This study has found that a clear definition of the term "employee" and a clear definition of the term "independent contractor" in each country and its legislative system is necessary. After establishing the appropriate terminology, it was possible to identify the labour rights and obligations for the same categories of workers. In other words, we were able to analyze working conditions and company differences let's say for the Uber drivers in Canada, Australia, the UK etc., and hence we could compare working conditions.

By using many real-time examples, it has been shown that the gig platforms are often global and available in any labour market; however, in the case of many gig platforms, like food delivery ones, the labour market is local. This is the basis for the platforms' intermediation between a local labour market, consumers, and restaurants which ultimately limits gig workers' ability to create unions and defend their rights. Therefore, this difference must form the basis of a solid foundation for the legislative changes to support unprotected groups of gig workers. The need for gig workers' protection emerged in the extensive analysis that was carried out, and that showed in

one case gig workers worked for a gig transnational company, where artificial intelligence and advanced IT systems tracked workers' every move to take full advantage of their labour. This highlights that gig workers are usually in the role of "victims" rather than independent contractors as some might assume.

In section 2.3 it was shown that being a gig worker is a risky decision, so the necessary protective regulations should be implemented around the globe starting with the rich countries. The anticipated outcome of this is that some categories of gig workers would have a career path within a gig platform.

From the statistics on gig employment compiled in this thesis, there is not a single gig company which pays for advanced training courses, suggesting little if any interest in investing in human capital on the part of companies. In essence, in the gig economy those platforms are not interested in investing in human capital because workers are not employees *by definition*. The perception of employers is that there is less likely to be return on investments as the resultant employee productivity that comes from employer-funded skill development is not oriented towards their company alone.

To carry out the assessment of Canada's gig economy, firstly, the thesis examined the size of the gig economy, which is increasing. Next, we identified that this is disrupting many markets and industries in Canada and our historical review of the gig economy assessed how the gig economy has changed. The results are that both the percentages of those who have a main gig job and a second gig job have increased since 1976, but not by too much. Nonetheless, the changes are significant, as has been shown by many other papers, so changes in *LFS questionnaires are necessary* and must be implemented as soon as possible to reflect the gig economy reality.

Secondly, the overall objective of the study was to evaluate various methodological uncertainties and the lack of vital up-to-date data that would allow for tracking the gig economy in Canada since 1976 until the present day. In order to do so, we used the LFS from 1976 through to 2021 to update existing literature, and fill in identified gaps in the scientific literature. Summary statistics were calculated, and the thesis conclusion addressed the aforementioned fundamental questions regarding the statistics for all workers holding a main job:

- Males are more likely to be gig workers than females;

- Immigrants more than non-immigrants;
- Male immigrants are more likely to have main paid gig jobs, rather than Canadian-born females;
- Gig workers tend to be older than those in paid employment, more specifically 4.5 years older;
- The difference in average ages could be indicative of the demographic composition of the Canadian labour force. For example, a labour force with an average age of 43 may have a larger proportion of males, while a labour force with an average age of 38.5 may have a more balanced distribution across age groups;
- In terms of the usual hours worked per week at the main job, the average for the paid employment is 38.6 hours per week and 44.4 hours per week for the main gig job, so the gig workers contribute more working hours;
- Those who hold a main gig job may have longer tenures on average (114.5 months) compared to public and private employees (93 months);
- We carried out the comparative analysis of the respondents' highest level of education, based on three other sources, namely Ravenelle et al. (2021:904), and J. Hall and A. Krueger (2018:710), as well as Author's calculations. All the sources are consistent, i.e., having the similar results. For example, those who graduated from high school, some college (post secondary education/trade certificate/ diploma) constitute more than 50% of all gig employment;
- Paid employees hold a single job (and do not change jobs during the reference week) for 96.2% of the respondents, while gig workers hold a single job only for 93.4% of the participants, and hence 6.6% of the gigs are multiple job holders versus 3.8% in paid employment;
- It was discovered that respondents are less likely to report the second and subsequent job holdings and experienced longer hours of work because their multiple job holder status is shifting from the traditional (like assembly/mounting/moving/cleaning) industries to the internet economy;
- The percentage of full-time students among paid employees is 3.2 times higher and the percentage of part-time students among paid employees is 2.2 times higher than within main gigs;

- We calculated that the majority of respondents from both employees and gig workers belong to the husband-wife, dual earner couples, with a youngest child in the 0 to 17 age range (26.8% (employees) and 29.7% (gig workers) for the main gig workers respectively);

Our second gig employment results addressed the aforementioned fundamental research questions:

- On average those who have another gig employment are older (at least 40.5 years old) than those who hold the secondary paid job (at least 36 years old) perhaps due to being older individuals who are established in their careers, they may prioritize a work-life balance and so may choose a second gig job that offers flexibility in terms of hours and location, or they may delay retirement or transition into gig work before fully retiring;

- Those who have other gig jobs worked slightly longer at their main job - 37.8 hours compared to 35.6 hours of those who have a paid secondary non-gig job;

- It was calculated that paid secondary job holders were employed in their current or most recent positions for 67 months on average, whereas those who held a secondary gig job were employed for 95 months on average. A long-standing belief on the relationship between tenure and productivity has therefore been turned on its head by the gig economy. Here, the shorter tenure leads to increased productivity, instead of lower productivity;

- The other gig workers are more engaged to their second jobs than the other paid employees, and as a result those with the second gig job earn $24 dollars per hour versus $19.5 dollars for those with the second paid employment. However, $24 or $19 dollars (Table 4) is a wage which is not adjusted for inflation and therefore should not be considered a real wage;

- Males represent 46.3% of those who had a second paid employment and 53.7% are women. For the other paid gig respondents (self-employed unincorporated without employees), 60.7% of them are males and 39.3% are females;

- Significantly more respondents with qualifications above a Bachelor's degree in the second gig economy accounted for 10.2% versus 6.2% for the paid secondary job holders due to specific industries in which the second gig economy operates (indeed, for example, quite a substantial number of gig jobs can be in science, therefore the level of education matters);

- There are more full-time students within the second paid employment group which correlates with the age difference between the groups (gig workers are older than private and public employees);

- The non-immigrants usually engaged in gig work to support their main salary earner, that is, their partner, while immigrants, engaged in gig work as a second gig job, therefore the relative proportion of those who have a second gig job within the immigrant group are lower than non-immigrants;

- The biggest type of family for both paid secondary job and other gig job groups is the husband-wife, dual earner couple, with a youngest child in the age range 0 to 17. They represent 25% of paid employees and 32% of gig workers.

The entire digital transformation of labour markets has become more observable after this research.

Next, we ran six logit models to understand the determinants of gig employment. This study specified the logit models where individuals whose first and second activity (that is, class of worker main or other job) is full-time or part-time unincorporated self-employment. This was then used as a proxy for identifying a gig job. We researched the marginal effects in the logit models as well as tested for different coefficient values on different variables.

a) Marginal effects for males and females:

- The likelihood of gig work increases steeply with age, more specifically probability of having a gig main or second job increased for young respondents, but then reached a turning point and started decreasing. However, in the second case for females, the coefficient on age^2 is positive, meaning that in this model specification women are more likely to hold gig work as they age;

- Male immigrants are 3.9 percentage points more likely to have gig work compared with males born in Canada which is fully consistent with our previous analysis and the scientific literature;

- The multiple job holder status variable increases the probability of gig work by 4.8 percentage points for males and by 4.4 percentage points for females, but after controlling for tenure and wage this affect increases to 18.1 percentage points and 13.1 percentage points, respectively; those with multiple jobs are significantly more likely to have a second job, and this holds for both models and for both males and females;

- Individuals with an increase in hourly earnings are 0.6 percentage points/0.4 percentage points more likely to have gig work compared to paid work as a second job;

- Such variables as tenure of current job, usual hours worked per week at the main job, and hourly earnings are positively associated with gig employment at a second job for both males and females;

b) Marginal effects for native Canadians and immigrants:

- Canadian-born females are less likely to have gig work compared to Canadian-born males;

- Gender has a much more dramatic effect on the probability of gig work for immigrants with females having a 3 percentage points less probability of being gig employed;

- Age increases the probability of gig work, the effect is more substantial for immigrants rather than non-immigrants;

- Multiple job holders and the tenure of current job variables are not significant predictors of gig work for immigrants;

- Non-immigrants who hold a multiple job holder status are 17.9 percentage points more likely to participate in gig work compared to non-immigrants with single job holder status;

- Each usual hour worked per week at the main job increases the probability of gig work, as well as the hourly earnings variable is a significant predictor for both immigrants and non-immigrants;

It has been found that while gig companies try to pay as little as possible to increase the demand on their services, the increase in the gig workers' payments increases labour supply. Despite this being the basis of the success of the gig economy companies, this is still not considered by officials. Our recommendation is to change legislation in order to regulate the minimum payments for the gig workers in some industries.

The anticipated outcome of this is that some categories of gig workers would have a career path within a gig platform, and therefore the benefits and prospects for long-term work. The regulations might include but are not limited to an hourly wage, an hourly contract system (for example, a contract where a gig worker could work at least 40 hours per week by getting a minimum hourly wage in the worker's country of residence), vacation days, flexible benefits programs from

the first days on the job, a pension plan, retirement planning programs and other common benefits. In other words, the definition and the benefits of a gig worker might be concretized. Different forms of gig employees' unions would also contribute to the workers' wellbeing.

5.2 LIMITATIONS AND DELIMITATIONS

While this thesis contributes significantly to the literature about the gig labour economy in Canada, there are some limitations and delimitations of this study.

In the future, it is probably worth conducting research which compares different gig platforms, types, and conditions of work.

It has been concluded that the gig economy workers have many structural disadvantages by doing their jobs. Those structural problems are limitations in themselves and more specifically they are:

1. Misclassification means that there are no particular global and local classifications about the status of gig economy workers. In fact, the gig-economy platforms portray themselves as intermediaries in the two-sided market of workers and jobs, rejecting the idea that they are employers so that the gig workers are considered self-employed contractors.

2. The disparity of work means the performance of jobs is facilitated by using a variety of digital platforms (often at the same time, even at the same moment) to perform their jobs. In fact, the digital platforms may represent a distinct industry and even a distinct category of job.

3. The geographical dispersion of the workers and the platforms means before the existence of the gig economy, a job would be performed in a place on the same site that the work was ordered and paid. Now, due to the gig economy, work can be performed in any place across borders and government jurisdictions. It should be remembered that this appears to be unbeneficial for rich countries like Canada, because the funds go into the international labour markets instead of staying inside the country.

4. In the methodology section, two major econometric points were discussed. The first of these is sample selection bias along with a discussion of the Heckman two-step procedure

for mitigating this bias. The second of these is simultaneity bias. It was highlighted how not correcting for these two econometric issues would impact our results.

5. Finally, we had limitations to add economic variables that capture labour market conditions. However, if we analyze the relationship between the regions where the internet as well as the gig economy is growing and the fastest growing countries by GDP from 2000 to 2023, we have discovered those results. The fastest growing economies from 2000 to 2023 (World Bank) and from 2013 to 2023 (IMF) are: China, Vietnam, Indonesia, Philippines, Cambodia, India, Bangladesh, Rwanda, Ethiopia, Nigeria, Kenya, Qatar, the UAE, Israel, Chile, Peru as well as Sweden, Singapore and Taiwan (World Bank, 2023; IMF, 2024). This is the fact that one of the primary reasons for the rapid economic growth in these countries is the enhanced internet infrastructure and the specific government initiatives that promote the digital economy and gig economy. As a result, the adoption of new technologies and digital innovation have spurred productivity and economic diversification in those countries. Unfortunately, we did not have a chance to add that data into our models.

REFERENCES

American Association of University Professors (AAUP). (2018). Background facts on contingent faculty positions. https://www.aaup.org/issues/contingency/ background-facts

Angrist, D., J., Caldwell, S., and V. Hall, J. UBER VS. TAXI: A DRIVER'S EYE VIEW. NBER Working Paper Series, September 2017, URL: https://economics.mit.edu/files/13893

Ashford, S. J., Caza, B. B., & Reid, E. M. (2018). From surviving to thriving in the gig economy: A research agenda for individuals in the new world of work. Research in Organizational Behavior, 38, 23-41. https://doi.org/10.1016/j.riob.2018.11.001

Bank of Canada. Staff Analytical Note. The Size and Characteristics of Informal ("Gig") Work in Canada. June 2019. URL: http: https://www.bankofcanada.ca/2019/02/staff-analytical-note-2019-6/

Barratt, T., Goods, C., and Veen, A. (2020). 'I'm my own boss…': Active intermediation and 'entrepreneurial' worker agency in the australian gig-economy. Environment and Planning. A, 52(8), 1643-1661. https://doi.org/10.1177/0308518X20914346

Berger T., Carl Benedikt Frey C.B., Levin G, Santosh Rao Danda, Uber happy? Work and well-being in the 'Gig Economy', Economic Policy, Volume 34, Issue 99, July 2019, Pages 429–477, https://doi-org.ezproxy.uleth.ca/10.1093/epolic/eiz007

Bracha, A., & Burke, M. A. (2021). How big is the gig? the extensive margin, the intensive margin, and the hidden margin. Labour Economics, 69, 101974. https://doi.org/10.1016/j.labeco.2021.101974

Brawley Newlin, A. (2023). Methodological and demographic variation in estimates of economic dependence across two types of gig work. Occupational Health Science, https://doi.org/10.1007/s41542-023-00168-6

Brochu P. A Researcher's Guide to the Labour Force Survey: Its Evolution and the Choice of Public Use versus Master Files. Canadian Public Policy. Volume 47 Issue 3, September 2021, pp. 335-357. DOI: 10.3138/cpp.2020-046

Bucher, E. L., Schou, P. K., Waldkirch, M. Pacifying the algorithm – Anticipatory compliance in the face of algorithmic management in the gig economy. Organization. 2021;28(1):44-67. doi:10.1177/1350508420961531

Burtch G., Seth Carnahan S., N. Greenwood B. Can You Gig It? An Empirical Examination of the Gig Economy and Entrepreneurial Activity. Management Science, Volume 64, Number 12 (December 2018), pp. 5497-5520, http://ejournals.ebsco.com.ezproxy.uleth.ca/direct.asp?ArticleID=49D7BFCA5CA57440BA6F

Campion, E. D., Caza, B. B., & Moss, S. E. (2020). Multiple jobholding: An integrative systematic review and future research agenda. Journal of Management, 46(1), 165-191. https://doi.org/10.1177/0149206319882756

Canada: Unemployment rate from 2017 to 2027. URL: https://www.statista.com/statistics/263696/unemployment-rate-in-canada/

Canada Labour Force Participation Rate from August 2019 to June 2024. YCHARTS. URL: https://ycharts.com/indicators/canada_labour_force_participation_rate

Card, D., & Krueger, A. B. (1994). Minimum wages and employment: A case study of the fast-food industry in New Jersey and Pennsylvania. The American Economic Review, 84(4), 772. Retrieved from https://www.proquest.com/scholarly-journals/minimum-wages-employment-case-study-fast-food/docview/233021942/se-2?accountid=12063

Card, D., Kramarz, F., & Lemieux, T. (1999). Changes in the relative structure of wages and employment: A comparison of the United States, Canada, and France. The Canadian Journal of Economics, 32(4), 843-877. https://doi.org/10.2307/136408

Cary, R. (2019). "The so-called 'gig economy' changing the Australian workforce". Special Broadcasting Service. URL: https://www.sbs.com.au/news/article/the-so-called-gig-economy-changing-the-australian-workforce/21cd8rjw2

Centeno Maya A. L., Ana Heatley Tejada, Anahí Rodríguez Martínez, Alma Luisa Rodríguez Leal-Isla, Máximo Ernesto Jaramillo-Molina & Roberto Carlos Rivera-González (2022) Food delivery workers in Mexico City: a gender perspective on the gig economy, Gender & Development, 30:3, 601-617, DOI: 10.1080/13552074.2022.2131253

Cramer, J., & Krueger, A. B. (2016). Disruptive change in the taxi business: The case of uber. The American Economic Review, 106(5), 177-182. doi:http://dx.doi.org/10.1257/aer.p20161002

Donovan S.A, Bradley D.H., Shimabukuro J.O. Congressional Research Service. What Does the Gig Economy Mean for Workers? February 5, 2016. URL: https://fas.org/sgp/crs/misc/R44365.pdf

Doucette, M. H., & Bradford, W. D. (2019). Dual job holding and the gig economy: Allocation of effort across primary and gig jobs. *Southern Economic Journal, 85*(4), 1217-1242. https://doi.org/10.1002/soej.12338

Duggan J., Ultan Sherman U., Carbery R., and McDonnell A. Algorithmic management and app-work in the gig economy: A research agenda for employment relations and HRM. Human resource management journal, 01/2020, Volume 30, Issue 1, DOI.:10.1111/1748-8583.12258

Erlich M. Misclassification in Construction: The Original Gig Economy. ILR Review. 2021;74(5):1202-1230. doi:10.1177/0019793920972321

Fana, M., Torrejón Pérez, S., & Fernández-Macías, E. (2020). Employment impact of covid-19 crisis: From short term effects to long terms prospects. *Economia e Politica Industriale, 47*(3), 391-410. https://doi.org/10.1007/s40812-020-00168-5

Farrell, D., and F. Greig (2016). The Online Platform Economy: Has Growth Peaked?, JPMorgan Chase Institute.

Foreign Policy Magazine: htpp:// https://foreignpolicy.com/print-archive/?From=https%3a%2f%2fdigital.olivesoftware.com%2fOlive%2fAPA%2fForeignPolicy%2fAfterLogin.ashx

Garin, A., Jackson, E., Koustas, D. K., & Miller, A. (2023). The evolution of platform gig work, 2012-2021. Cambridge: National Bureau of Economic Research. https://doi.org/10.3386/w31273

Glavin, P. (2020). Multiple jobs? The prevalence, intensity and determinants of multiple jobholding in Canada. The Economic and Labour Relations Review, 31(3), 383-402. https://doi-org.uleth.idm.oclc.org/10.1177/1035304620933399

Glavin, P., Bierman, A, Schieman, S. (2021). Uber-Alienated: Powerless and Alone in the Gig Economy. Work and Occupations. 2021;48(4):399-431. doi:10.1177/07308884211024711

Gleim, M. R., Johnson, C. M., and Lawson, S. J. (2019). Sharers and sellers: A multi-group examination of gig economy workers' perceptions. Journal of Business Research, 98, 142-152. https://doi.org/10.1016/j.jbusres.2019.01.041

Graham, M., I. Hjorth, I., and Lehdonvirta V. Digital labour and development: impacts of global digital labour platforms and the gig economy on worker livelihoods. 2017, Vol. 23(2) 135–162, DOI: 10.1177/1024258916687250, https://journals-sagepub-com.ezproxy.uleth.ca/doi/pdf/10.1177/1024258916687250

Greene W. (2017) Econometric Analysis, 8th Edition. Pearson; 8th edition (March 30, 2017), 1176 pages.

Greig, F., and D. Sullivan (2020). The Online Platform Economy through the Pandemic, J.P. Morgan Chase Institute.

Hafeez S, Gupta C, Sprajcer M. Stress and the gig economy: it's not all shifts and giggles. Ind Health. 2023 Apr 1;61(2):140-150. doi: 10.2486/indhealth.2021-0217. Epub 2022 Mar 4. PMID: 35249894; PMCID: PMC10079501.

Hall, J. V., and Krueger, A. B. (2018). An analysis of the labor market for uber's driver-partners in the United States. Industrial & Labor Relations Review, 71(3), 705-732. https://doi.org/10.1177/0019793917717222

Heckman, J. (1974). Shadow prices, market wages, and labor supply. Econometrica, 42(4), 679-694. https://doi.org/10.2307/1913937

Heeks R (2017). Decent work and the digital gig economy: a developing country perspective on employment impacts and standards in online outsourcing, crowdwork, etc. Development Informatics Working Paper no 7. Manchester: Global Development Institute SEED, University of Manchester. Available at: http://hummedia.manchester.ac.uk/institutes/gdi/ publications/workingpapers/di/di_wp71.pdf

Henley, A. (2017). The post-crisis growth in the self-employed: Volunteers or reluctant recruits? *Regional Studies, 51*(9), 1312-1323. https://doi.org/10.1080/00343404.2016.1184753

Holtum, J., P., Irannezhad, E., Marston, G., & Mahadevan, R. (2022). Business or Pleasure? A Comparison of Migrant and Non-Migrant Uber Drivers in Australia. Work, Employment and Society, 36(2), 290-309. https://doi-org.uleth.idm.oclc.org/10.1177/0950017021103

Ilsøe, Anna, Trine P. Larsen, and Emma S. Bach. "Multiple Jobholding in the Digital Platform Economy: Signs of Segmentation." Transfer (Brussels, Belgium), vol. 27, no. 2, 2021, pp. 201-218.

IMF (2024). Report for Selected Countries and Subjects. World Economic Outlook Database, April 2024. URL: https://www.imf.org/en/Publications/WEO/weo-database/2024/April/weo-report?

Interview with David Card. The Federal Reserve Bank of Minneapolis. URL: https://www.minneapolisfed.org/article/2006/interview-with-david-card?fbclid=IwAR0gUSdpyHdTRbH5xZ63uBk3r0aEU4nqNVkYdzahU4-nW145buKxzSmygPI

Jackson, E., A. Looney, and S. Ramnath (2017). The Rise of Alternative Work Arrangements: Evidence and Implications for Tax Filing and Benefit Coverage, Office of Tax Analysis Working Paper #114

Jeon, S., Liu, H., & Ostrovsky, Y. Statistics Canada. Analytical Studies Branch. (2019). Measuring the Gig Economy in Canada Using Administrative Data. Statistics Canada = Statistique Canada. Analytical Studies Branch Research Paper Series. December 16, 2019. URL: https://www150.statcan.gc.ca/n1/pub/11f0019m/11f0019m2019025-eng.htm (chart 2)

Jeon, S., Ostrovsky, Y. The impact of COVID-19 on the gig economy: short- and long-term concerns. StatCan COVID-19: data to insights for a better Canada, 2020. URL: https://www150.statcan.gc.ca/n1/en/pub/45-28-0001/2020001/article/00021-eng.pdf?st=oYN6IhUU

Jeon, S., Liu, H., & Ostrovsky, Y. (2021). Measuring the gig economy in Canada using administrative data. *The Canadian Journal of Economics, 54*(4), 1638-1666. https://doi.org/10.1111/caje.12558

Jeon, S., Liu, H., & Ostrovsky, Y. (2022). Measuring the gig economy in Canada using administrative data. Canadian Tax Journal, 70(4), 932-933. Retrieved from https://login.uleth.idm.oclc.org/login?url=https://www.proquest.com/scholarly-journals/measuring-gig-economy-canada-using-administrative/docview/2769625490/se-2

Kalleberg, Arne L.; Dunn, Michael (2016). Good Jobs, Bad Jobs in the Gig Economy. Perspectives on Work, Vol. 20 (2016), pp. 10-13, 74-75 (6 pages). URL: http://michael-dunn.org/wp-content/uploads/2017/05/ALK-MD.-JQ-in-Gig-Economy.pdf & https://www.jstor.org/stable/26621129

Kässi, O. and Lehdonvirta, V. Online labour index: measuring the online gig economy for policy and research, p. 12. Paper presented at Internet, Politics & Policy, 22-23 September, 2016, Oxford. Available at: https://mpra.ub.uni-muenchen.de/74943/1/MPRA_paper_74943.pdf

Kässi O, Vili Lehdonvirta, Online labour index: Measuring the online gig economy for policy and research, Technological Forecasting and Social Change, Volume 137, 2018, Pages 241-248, ISSN 0040-1625, https://doi.org/10.1016/j.techfore.2018.07.056.

Koonse, T., and Waheed, S. (2020), Arizona Board of Regents for Arizona State University. Inside the gig economy. Issues in Science and Technology,36(3),94-95. https://www.proquest.com/scholarly-journals/inside-gig-economy/docview/2452125618/se-2.

Kostyshyna, O., Luu, C. "The Size and Characteristics of Informal ("Gig") Work in Canada". Bank of Canada. 2019, P. 3. URL: https://www.bankofcanada.ca/wp-content/uploads/2019/02/san2019-6.pdf

Labour Force Survey, December 2021. URL: https://www150.statcan.gc.ca/n1/daily-quotidien/220107/dq220107a-eng.htm

Lim, K., A. Miller, M. Risch, and E. Wilking (2019). Independent Contractors in the U.S.: New Trends from 15 years of Administrative Tax Data, SOI Working Paper.

Long, J. S., and J. Freese. 2014. Regression Models for Categorical Dependent Variables in Stata. 3rd ed. College Station, TX: Stata Press.

Marx, K. (2014). Capital. A Critique of Political Economy. Volume I. M.: Mann, Ivanov and Ferber, 2014. - 1200 p.

McKinsey Global Institute (2019). The gig economy has an identity problem and digital ID could fix it. URL: https://www.mckinsey.com/mgi/overview/in-the-news/the-gig-economy-has-an-identity-problem-and-digital-id-could-fix-it

Mexi Maria, Background paper for discussion at the ILO-AICESIS-CES Romania International Conference (Bucharest, 10-11 October 2019), Social Dialogue and the Governance of the Digital Platform Economy: Understanding Challenges, Shaping Opportunities. URL: https://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---dialogue/documents/meetingdocument/wcms_723431.pdf

Moore, C. S., & Mueller, R. E. (2002). The transition from paid to self-employment in Canada: The importance of push factors. Applied Economics, 34(6), 791-801. DOI: https://doi.org/10.1080/00036840110058473

Ng, Thomas W.H., Daniel C. Feldman, Does longer job tenure help or hinder job performance?, Journal of Vocational Behavior, Volume 83, Issue 3, 2013, Pages 305-314, ISSN 0001-8791,https://doi.org/10.1016/j.jvb.2013.06.012.
Pdf document: https://www.bankofcanada.ca/wp-content/uploads/2019/02/san2019-6.pdf

Patel, M., & Waynforth, D. (2022). Influences of zero hour contracts and disability – analysis of the 1970 British cohort study. SSM - Population Health, 19, 101182-101182. https://doi.org/10.1016/j.ssmph.2022.101182

Petriglieri G., Ashford S.J., Wrzesniewski A. Agony and Ecstasy in the Gig Economy: Cultivating Holding Environments for Precarious and Personalized Work Identities. Administrative Science Quarterly. 2019;64(1):124-170. doi:10.1177/0001839218759646

PR Newswire. (2023, April 18). Report: Gig Drivers Inclined to Leave Gig Work Amidst Rising Competition for Workers, Turnover. PR Newswire US. https://search-ebscohost-com.uleth.idm.oclc.org/login.aspx?direct=true&db=bwh&AN=202304180844PR.NEWS.USPR.PH71019&site=ehost-live&scope=site

Ravenelle, A. J. (2019). "We're not uber:" control, autonomy, and entrepreneurship in the gig economy. *Journal of Managerial Psychology, 34*(4), 269-285. https://doi.org/10.1108/JMP-06-2018-0256

Ravenelle, A. J., Kowalski, K. C., and Janko, E. (2021). The Side Hustle Safety Net: Precarious Workers and Gig Work during COVID-19. Sociological Perspectives, 64(5), 898-919. https://doi-org.uleth.idm.oclc.org/10.1177/07311214211005489

Reynolds, J., & Kincaid, R. (2023). Gig Work and the Pandemic: Looking for Good Pay from Bad Jobs During the COVID-19 Crisis. Work and Occupations, 50(1), 60-96. https://doi-org.uleth.idm.oclc.org/10.1177/07308884221128511

Schor, J. B., Attwood-Charles, W., Cansoy, M., Ladegaard, I., & Wengronowitz, R. (2020). Dependence and precarity in the platform economy. Theory and Society, 49(5-6), 833-861. https://doi.org/10.1007/s11186-020-09408-y

Sessions, H., Nahrgang, J. D., Baer, M. D. & Welsh, D. T. (2022). From Zero to Hero and Back to Zero. Journal of Applied Psychology, 107 (8), 1369-1384. doi: 10.1037/apl0000935.

Statistics Canada. Labour Force Survey (LFS). What is the Labour Force Survey. URL: https://www.statcan.gc.ca/en/survey/household/3701

Statistics Canada. Surveys and Statistical programs. Labour Force Survey (LFS). URL: https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getMainChange&Id=1542729

Statistics Canada. Labour Force Survey (LFS), January 2024. The participation rate analysis. URL: https://www150.statcan.gc.ca/n1/daily-quotidien/240209/dq240209a-eng.htm

Tassinari, A., Maccarrone, V. (2017). The mobilisation of gig economy couriers in Italy: Some lessons for the trade union movement. *Transfer (Brussels, Belgium), 23*(3), 353-357. https://doi.org/10.1177/1024258917713846

Tassinari, A., Maccarrone, V. Riders on the Storm: Workplace Solidarity among Gig Economy Couriers in Italy and the UK. Work, Employment and Society. 2020;34(1):35-54. doi:10.1177/0950017019862954

The Taylor Review of Modern Working Practices, 2017, URL: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/627671/good-work-taylor-review-modern-working-practices-rg.pdf

Tran, Molly MD, MPH, MA; Sokas, Rosemary K. MD, MOH, MS. The Gig Economy and Contingent Work: An Occupational Health Assessment. Journal of Occupational and Environmental Medicine 59(4): p e63-e66, April 2017. DOI: 10.1097/JOM.0000000000000977

Van Doorn, N. and Badger, A. (2020), Platform Capitalism's Hidden Abode: Producing Data Assets in the Gig Economy. Antipode, Vol 52, Issue 5: 1475 -1495. https://doi.org/10.1111/anti.12641

Waldkirch, M., Bucher, E., Kalum, Schou P. and Grünwald E., (2021) Controlled by the algorithm, coached by the crowd – how HRM activities take shape on digital work platforms in the gig economy, The International Journal of Human Resource Management, 32:12, 2643-2682, DOI: 10.1080/09585192.2021.1914129

Watson, G. P., Kistler, L. D., Graham, B. A., & Sinclair, R. R. (2021). Looking at the Gig Picture: Defining Gig Work and Explaining Profile Differences in Gig Workers' Job Demands and Resources. Group & Organization Management, 46(2), 327-361. https://doi-org.uleth.idm.oclc.org/10.1177/1059601121996548

Wheelahan, L., Moodie, G. Gig qualifications for the gig economy: micro-credentials and the 'hungry mile'. High Educ 83, 1279–1295 (2021). https://doi-org.ezproxy.uleth.ca/10.1007/s10734-021-00742-3

Wood A. J., The Taylor Review: understanding the gig economy, dependency and the complexities of control. New technology, work, and employment, 07/2019, Volume 34, Issue 2, P. 111-115. URL: https://onlinelibrary.wiley.com/doi/abs/10.1111/ntwe.12131

Wood, A. J., Graham, M., Lehdonvirta, V., and Hjorth, I. (2019). Good gig, bad gig: Autonomy and algorithmic control in the global gig economy. Work, Employment and Society, Volume 33(1), 56-75. https://doi.org/10.1177/0950017018785616

World Bank (2019). The Changing Nature of Work. Washington, DC: World Bank. doi:10.1596/978-1-4648-1328-3. License: Creative Commons Attribution CC BY 3.0 IGO URL:https://web.archive.org/web/20191006085426/http://documents.worldbank.org/curated/en/816281518818814423/2019-WDR-Report.pdf

World Bank (2023). GDP growth (annual %). URL: https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?end=2023&start=2001&view=chart

Yssaad L., and Ferrao V. Self-employed Canadians: Who and Why? Labour Statistics at a Glance. May 28, 2019. URL: https://www150.statcan.gc.ca/n1/pub/71-222-x/71-222-x2019002-eng.htm

Yuan B, Li J, Wu L, Wang Z. Multi-Level Social Health Insurance System in the Age of Frequent Employment Change: The Urban Unemployment-Induced Insurance Transition and Healthcare Utilization in China. Healthcare (Basel). 2019 Jun 13;7(2):77. doi: 10.3390/healthcare7020077. PMID: 31200482; PMCID: PMC6627781.