Measuring the gig economy in Canada using administrative data

Sung-Hee Jeon (*Statistics Canada*)

Huju Liu (*Statistics Canada*)

Yuri Ostrovsky (*Statistics Canada*)[*]

Preliminary results. Please do not cite or circulate.

Abstract

This study builds on recent US studies identifying gig workers based on the characteristics of work arrangements and how they are reported in tax data. We introduce a definition of gig work specific to the way work arrangements are reported in the Canadian tax system and estimate of the size of the gig economy in Canada using administrative data. Our estimates suggest that about 7.3% of all Canadian workers can be considered gig workers. We show that the share of gig workers among all workers has risen substantially between 2005 and 2016 and some of the increase coincided with the introduction and proliferation of online platforms. Our analysis highlights gender differences in the trends and characteristics of gig workers. By linking our administrative data sample to the 2016 Census microdata, we are also able to examine educational and occupational differences in the prevalence of gig workers.

Keywords: gig economy; self-employment; administrative data.

JEL classification: J21, J40, J46.

---

[*] Corresponding author: 24-J RHC, 100 Tunney's Pasture Driveway, Ottawa ON, Canada K1A 0T6. Email: yuri.ostrovsky@statcan.gc.ca; phone: 613-614-5911.

1. Introduction

The "gig economy" is a much-discussed global phenomenon. Although there is no widely accepted definition of the gig economy, the term broadly refers to less structured and non-traditional work arrangements. "Gig workers" are usually not employed on a long-term basis by a single firm; instead, they enter into various contracts with firms or individuals (task requesters) to complete a specific task or to work for a specific period of time for which they are paid a negotiated sum. This includes independent contractors or freelancers with particular qualifications as well as on-demand workers hired for jobs mediated through the growing number of online platforms or "crowdsourcing marketplaces" such as Uber, Lyft, Amazon Mechanical Turk, TaskRabbit, Upwork, Guru, Fiverr and Freelancer.

While non-standard work has long been part of the Canadian labor force, the ongoing evolution and penetration of new technologies cast the issue of non-traditional work arrangements in a 21st century context. There is continued speculation about the number of the gig workers in Canada in the mainstream and social media, and it has been suggested that as many as 20% to 30% of Canadians are employed in such arrangements (Global News 2018). However, there is little empirical evidence to support this claim. Strikingly, a recent University of Toronto report surveying the international literature on the gig economy found no peer-reviewed articles examining the Canadian labor market (Bajwa et al. 2018).

Partially addressing the growing need to estimate the size of the gig economy in Canada, the October 2016 Labour Force Survey (LFS) asked whether a respondent had offered or used any sharing services such as Uber, Lyft, Airbnb and FlipKey. According to this survey, a relatively small percentage of Canadian adults indicated that they offered peer-to-peer ride services (0.3%) or private accommodation services (0.2%) (The Daily 2017). A small number of external surveys have been

conducted to measure various elements of the gig economy at the local level. For example, a recent survey found that 9% of residents to the Greater Toronto Area worked through online platforms (Block and Hennessy 2017). However, those working through online platforms are just part of the gig economy since not all gig workers are online platform workers.

This study contributes to the recent literature on gig economy and non-traditional work arrangements by estimating the size of the gig economy in Canada using Canadian administrative data and by comparing the estimates based on the administrative data with more traditional estimates of incorporated and unincorporated self-employment based on survey data. The study builds on several recent studies using administrative (tax) data to measure the gig economy in the United States and to explain diverging estimates of the shares of self-employed workers in US survey and administrative data (Abraham et al. 2018; Katz and Krueger 2016, 2019).

The main new innovative methodological aspect of this study is that it introduces a clearly defined approach to identifying gig workers based on various Canadian administrative sources including individual and corporation income tax returns. This is the first Canadian study to systematically identify gig workers and measure their share among all Canadian workers. Furthermore, we seek to strengthen the methodology used in the US studies by drawing on information not available to the US researchers. In particular, we are able to expand the scope of our analysis to examine the characteristics of gig workers using information from linked administrative and 2016 Census microdata.

The study pursues several main objectives. The first main objective is to develop a methodological framework for identifying gig workers in Canada using detailed information from several linked administrative sources including information from individual and corporation income tax returns. Similar to gig workers in the United States, gig workers in Canada are likely to be the unincorporated

self-employed reporting business, professional, or commission income on their income tax returns. Our data allow us to identify such individuals and separate them from "traditional" employees receiving wages and salaries, the incorporated self-employed, sole proprietors (owners of unincorporated businesses), and partners in partnerships.[1]

The second main objective is to estimate the number of gig workers in Canada and the share of gig workers among all Canadian workers.[2] These estimates are important in themselves, but they also contribute to better understanding of broader self-employment trends in Canada and related measurement issues discussed in the recent literature. One of the questions we ask is whether we can observe the pattern of divergence between the estimated shares of unincorporated self-employment in administrative and survey data similar to the divergence observed in the United States. Our data allow us to compare such trends using both types of data from 2005 to 2016.

Finally, the third main objective of the study is to explore the main characteristics of gig workers using newly available linkages between administrative and census data. In particular, individual tax data can be linked to the 2016 Canadian Census of Population microdata files containing detailed information about (among other things) family characteristics, education and immigrant status for 25% of the total Canadian population.[3] The linked data further allows us to explore characteristics of gig workers, identify occupations and industries with particularly high or low prevalence of gig workers, and shed light on some of the key differences in how individuals report their self-employment activities in Census and administrative data.

---

[1] There are four types of business structures in Canada: sole proprietorships, partnerships, corporations, and co-operatives.
[2] We will provide a more formal definition of "workers" below.
[3] This information is based on the "long form" questionnaire randomly distributed to 25% of all Canadian residents.

2. A brief overview of reporting self-employment income in Canada

Tax returns in Canada are filed individually (although spousal and other family information has to be provided) and the filing rates are very high, above 90% for the adult population.[4] To file their tax returns for a particular year, Canadians submit a completed T1 *Income Tax and Benefit Return* to the *Canada Revenue Agency* (CRA) in the following year.[5] Permanent or temporary Canadian employees receiving wages report their annual wages and salaries based on the T4 slips (*Statement of Remuneration Paid*) they receive from their employers who also submit copies of the T4 records to the CRA.[6] On their T1 returns submitted to the CRA, individuals report their total T4 income from all T4 slips issued for a particular tax year as their "employment income" for that year.[7] Employment income other than wages and salaries, such as tips and gratuities, is reported as "other employment income."

The unincorporated self-employed use the T1 form to report their self-employment income from five principal activities associated with self-employment: fishing and farming income, professional income, business income, and commissions.[8] The unincorporated self-employed who report professional or business income (e.g., Uber drivers) attach a *Statement of Business and Professional Activities* (T2125 form) to their T1 forms. The T2125 form details all revenues and expenses related

[4] The estimate is based on internal reports. The coverage rates for the working population are likely to be much higher.
[5] The T1 form is roughly equivalent to the 1040 form in the United States.
[6] The T4 form is roughly equivalent to the W2 form in the United States.
[7] In addition to T4 slips, employers can also issue T4A slips (*Statement of Pension, Retirement, Annuity and Other income*) which contain boxes indicating payments made to independent agents as "self-employed commissions" or "fees for services." The T4A information is not currently available to the authors.
[8] Rental income, which is sometimes included among self-employment income sources, is also reported on T1 returns. In this study, those who receive rental income, but not any other self-employment income, are not included among the self-employed for consistency with other Statistics Canada definitions of the self-employed (e.g., Longitudinal Administrative Database) and the definitions of self-employment used in most other studies.

to the individual's unincorporated business and professional activities.[9] Self-employed owners of unincorporated businesses filing T2125 forms (sole proprietors) also have to report the *Business Number* (BN) of the business or businesses they own. Partnerships are subject to special rules concerning business formation and dissolution. Unlike a corporation, a partnership does not file an income tax return; all partnership income is allocated among the partners and reported on individual T1 returns.[10] Details about partnership income are reported in *Statements of Partnership Income* (T5013) submitted by each partner in a partnership.

Incorporated businesses submit T2 *Corporation Income Tax Returns* to the CRA. The main types of corporations in Canada are private corporations, public corporations (with shares publicly traded on the stock exchange), and corporations owned by the Crown. When private corporations file their T2 returns, they have to attach a Schedule 50 listing all shareholders with shares equal or exceeding 10%. In this study, all individuals listed on Schedule 50 forms are considered owners of incorporated businesses or the incorporated self-employed. Owners of incorporated businesses may also pay themselves wages and salaries in which case they receive T4 slips and report employment income on their individual T1 returns.

3. Data

The main administrative data source for the study is the *Canadian Employer-Employee Dynamic Database* (CEEDD) maintained by Statistics Canada. The CEEDD is not a single dataset but a data environment consisting of multiple administrative data blocks linkable through unique

[9] Individuals receiving income from home sharing (e.g., through Airbnb) report rental income on *Statements of Real Estate Rentals* (T776 form). If they provide additional services, such as laundry services or meals, they are also required to submit a T2125 form.

[10] However, incorporated partners report their partnership income shares on T2 returns.

individual and business identifiers.[11] Among the principal CEEDD components are the annual individual tax return files (T1) containing detailed and complete information about individuals' incomes from all sources, government transfers, benefits and taxes. The CEEDD T1 files cover all Canadian taxfilers and span the period from 1983 to 2016.

Among the T1 files received by Statistics Canada from the CRA is a file containing information on all individuals who report positive gross income for at least one of the following income types: farming, fishing, professional, business, commission or rental income (Statistics Canada 2011). The variables in the file correspond to the information collected from T2125, T5013 and various other attachments related to unincorporated self-employment and real estate activities. Using this file as its main source, Statistics Canada constructs *Financial Declaration* (FD) files better suited for analytical purposes. The FD files are annual files covering all unincorporated self-employed in Canada. They are currently available for the period from 2005 to 2016.

In addition to information from individual tax returns, the CEEDD contains information from corporate tax returns (T2 forms). As mentioned above, each private corporation filing a corporate tax return is also required to submit a Schedule 50 (along with the T2 form) which lists all shareholders with shares equal or larger than 10%.[12] Statistics Canada receives Schedule 50 files and these files are part of the CEEDD environment.

An important part of our analysis is based on the analysis of linked administrative and census data. Using the recently established concordance between unique individual administrative data and census data identifiers, CEEDD data can be linked to the 2016 Canadian Census of Population

[11] Individual identifiers are derived from Social Insurance Numbers (SINs) and business identifiers are derived from business numbers issued by the CRA.

[12] Unlike the shareholders of private corporations, the shareholders of public corporations are not business owners in any meaningful sense and are not considered self-employed in this study.

microdata files that cover randomly selected 25% of Canadian residents. This means that census data are available for a randomly selected 25% subsample of all workers. The advantage of having CEEDD files linked to the census file is that the linked data allow us to examine individual characteristics of gig workers in much more detail than it would be possible with just administrative data.

Our main analysis sample consists of all workers aged 15 and over in 2005-2016 T1 files. We define *workers* as all those who

(a) reported any employment income from T4 slips on their T1 forms or other employment income such as tips, gratuities or director's fees, or
(b) reported any (unincorporated) self-employment income, or
(c) were identified as owners of incorporated businesses through corporate tax returns.

The files range in size from 18,088,542 in 2005 to 20,419,262. In each annual T1 file, we identified gig workers using the definition introduced in the next section using information from the FD files. Our linked T1-Census analysis sample consists of 4,781,844 observations, which is about 23.4% of our main T1 sample in 2016.

4. Identifying gig workers using administrative and survey data

4.1 Administrative data

We propose to measure the share of gig workers in the Canadian labor force based on combined information from several administrative sources available in the CEEDD such as the T1 files, T2-Schedule 50 files, and Financial Declaration files containing detailed information about self-employment activities, incorporated and unincorporated business ownership. Our proposed methodology is consistent with the methodology and the typology of work arrangements outlined

in Abraham et al. (2018). The typology is based on several work arrangement characteristics relevant to distinguishing between various work arrangements including whether the person is paid wages or salaries, whether the work relationship can be expected to continue, and whether the person's work schedule and earnings are predictable. Abraham et al. note that gig workers are not wage employees, do not have a long term contract with any employer, do not have a predictable work schedule and do not have predictable earnings. Hence, according to their typology, gig workers are the unincorporated self-employed freelancers, day laborers, or on-demand/platform workers. In administrative data, gig workers can be (at least partially) identified depending on how they report their work arrangements to tax authorities. In the Canadian context, gig workers can be viewed as unincorporated self-employed who

(a) report business, professional and/or commission self-employment income on their T1 tax returns *and* attach at least one T2125 form on which they do not provide any Business Number,

(b) are not listed as proprietors of any private incorporated enterprises on any Schedule 50 forms attached to corporate tax returns (i.e., do not hold 10% or more shares of any private corporation),

(c) do not receive any partnership income and do not file a T5013 form.

The T2125 form required for reporting business, professional or commission self-employment income is key to our definition of gig workers. However, it is clear that not all self-employed individuals who file a T2125 are gig workers. Intuitively, unincorporated T2125 filers who operate an established business and can expect a certain degree of continuity and predictability in their work arrangements fall outside the gig worker category. In our analysis, the delineation line is drawn between those who have not registered their business with the CRA and therefore do not have a BN (gig workers) and those who do (other unincorporated sole proprietors reporting business, professional or commission self-employment income). Our definition is consistent with the work

arrangement typology in Abraham et al. (2018) who exclude unincorporated sole proprietors from the gig worker category.

An important element of our methodological strategy is the explicit recognition of the possibility that an individual can hold several jobs or be involved in multiple self-employment activities. While surveys usually focus on respondents' main labor market activities, tax data contain information about all individual's income sources, not matter how small. For many gig workers their "gig" activity is only part of their overall labor market activities. Our definition recognizes, for instance, that a gig worker reporting business income can also receive wages and salaries (T4) from wage employment or own an unincorporated firm for which he or she reports professional income on a separate T2125. Hence we can identify gig workers for whom their gig activity is the only source of income as well as those who use gig work to supplement their income from their main activities. In our empirical analysis, we measure the relative importance of gig work for individuals identified as gig workers. More specifically, we estimate the share of (net) gig income in the total earnings from paid employment and self-employment for each gig worker and examine the resulting density function. We also calculate the share of gig income in the total individual income for each gig worker.

As any other attempt to define as ambiguous a category of workers as "gig workers," our definition has its advantages and disadvantages. Among the advantages is its conceptual clarity based on specific parameters associated with the tax system and its reliance of the features of the tax system that have been stable in the past and are likely to remain stable in the future. Unlike survey questions about gig work, the definition of gig work based on tax information is free from the ambiguity associated with the individual interpretation of gig work and the uncertainty of the meaning of the term for different respondents. It is also more suitable for analytical analysis because administrative

data files are usually large and cover the whole universe of workers and firms. On the downside, tax data tell little about the nature of the job and lack information about work hours, hourly wages and job duration.

Our definition of gig workers comes with an important caveat. Canadian businesses are required to have a BN to report federal and provincial sales taxes (GST/HST) they collect when they charge their customers for goods and services they provide (see Supplementary Material). The exceptions are businesses that provide goods and services exempt from sales taxes (e.g., basic groceries, educational services, legal aid services, music lessons, etc.) and "small suppliers" whose total taxable business revenues do not exceed $30,000 per year. This requirement largely excludes T2125 filers with more than $30,000 in business revenue from the gig worker category. Our estimate of the number of gig workers would probably be higher in the absence of the $30,000 threshold. However, the business income of the vast majority of the unincorporated self-employed is well below $30,000. Grekou and Liu (2018) find that the median business income of the unincorporated self-employed in 2013 was $10,000. Our own estimates show that the $30,000 mark was above the 85th percentile of the total business income reported by T2125 filers. Hence, we are probably missing very few "potential" gig workers.

4.2 Survey data

The recent studies attempting to estimate the size of the gig economy in the United States are partly motivated by the observed divergence between recent self-employment trends in US administrative and survey data. This study also compares the Canadian unincorporated self-employment trends observed in administrative data with those observed in survey data. Much of the information regarding self-employment in Canada comes from the Labour Force Survey (LFS), which is a monthly Statistics Canada survey conducted since 1945. The LFS serves as the main source for

computing various official economic indicators such as employment and unemployment rates. (Responding to the survey is mandatory under the *Statistics Act*.) Workers in the LFS are classified into several categories such as private and public employees, incorporated self-employed with and without employees, unincorporated self-employed with and without employees, and private employees working in family businesses without pay. Hence, it is possible to identify the unincorporated self-employed with and without employees, but not specifically gig workers. However, a comparison between unincorporated self-employment trends in the LFS and in the CEEDD can offer some clues regarding recent changes in the size of the gig economy in Canada.

4.3 Linking administrative data to census data

An essential novel element of this study is that it exploits the advantages of administrative data linked to 2016 Census microdata to address several information gaps. One important limitation of tax data is the lack of demographic information. By linking individual tax data to census microdata we are able to overcome this problem and further explore some of the human capital characteristics of gig workers identified from the tax data such as their highest level of education and their main occupation. We are also able capture their demographics and family characteristics and get some idea about the type of work they do. By linking administrative data to census data we can also shed light on how individuals reporting self-employment income in tax data respond to census questions about self-employment. Whereas census questions usually pertain to main labor market activities, the administrative data also captures relatively minor work activities that are ignored by survey respondents. The distinction between the main and secondary work activities is particularly relevant to the analysis of gig workers.

5. Self-employment estimates in administrative, census and survey data

We begin our analysis by comparing the estimated shares of incorporated and unincorporated self-employed among all workers in 2016 using survey (LFS), administrative (CEEDD), and census microdata. Our objective is to compare and contrast the estimates from two sources most frequently used to estimate the extent of self-employment activities in Canada (LFS and Census) with the estimates from administrative data that only recently became available for a comprehensive analysis of various aspects of both incorporated and unincorporated self-employment. We also provide a direct estimate of the gig economy in Canada using administrative data based on the definition provided in the previous section.

The comparison across the three data sources reveals substantial differences among them in the estimated shares of self-employed workers in 2016 (Table 1). The share of incorporated self-employed in the census data (4.4%) is less than a half of the corresponding share in the CEEDD data (9.5%). The difference can be partly explained by the fact that in the census respondents are asked only about their main job whereas in the administrative data anyone with more than 10% share in an incorporated business is identified as incorporated self-employed. The LFS share of the incorporated self-employed is based on either the main or the secondary work activity, and is somewhere between the census and administrative data numbers (7.1%). Similarly, the census share of the unincorporated self-employed (7.5%) is just under a half of the administrative data share (14.6%) with the LFS estimate being closer to the census estimate than to the administrative data estimate (9.5%).[13] The results from different data sources also differ with respect to the estimated shares of the self-employed who have employees. Less than 4% of the unincorporated self-employed

[13] Our results echo the findings in Yssaad and Ferrao (2019) who estimate shares of self-employed in the Canadian workforce using the LFS but consider only respondents' main labor market activity.

in CEEDD appear to have employees, compared to 26.4% of those who reported being unincorporated self-employed in the census data and 12% of those identified as unincorporated self-employed in the LFS.[14] This result is consistent with the view that self-employment work is a relatively minor activity for many of those identified as the unincorporated self-employed through tax data, so the prevalence of employers among them is much lower than the prevalence of employers among the self-employed in census data for whom self-employment is their main labor market activity.

As mentioned above, one of the main strengths of the CEEDD is that it contains detailed information from multiple sources pertaining to individuals' self-employment activities and income sources. Using CEEDD data, it is possible to identify individuals whose labor market activities are consistent with the labor market activities usually associated with gig work and gig economy. Table 1 shows that the share of the unincorporated self-employed in 2016 who satisfy our definition of gig workers was about 7.3% or about half of all individuals with income from unincorporated self-employment. Among them, almost a half had no wage job and reported no employment income; more than a third (36%) had one wage job and about 15.6% had multiple wage jobs. Hence, those identified as gig workers were split almost evenly between those who had no other earnings except their "gig" earnings and those who supplemented their wages and salaries with the earnings from their gig activities.

Next, we looked at the relative importance of gig work for those identified as gig workers. First, we computed the *net* total annual gig income for each gig worker in 2016 and estimated the density of the gig income using a kernel density estimator (Figure 1). The median line corresponds to $4,109,

[14] The low estimate of the unincorporated self-employed with employees in the administrative data is consistent with other studies based on Canadian administrative data such as Green et al. (2016).

a very small amount and, for a substantial number of gig workers, the net total gig income is negative. We also computed the share of earnings derived from gig work in the total earnings for each individual and computed various percentiles of the resulting distribution (Table 2). The median share of the gig income in the total earnings is 75%, meaning that for about half of all gig workers, gig earnings represent more than three quarters of their total earnings. However, the median share of the gig income in the total annual income from all sources is much smaller (23%). For more than a quarter of all gig workers, their gig earnings are all they earn and about 90% of their total income.

6. Self-employment trends from 2005 to 2016

Much of the recent US literature on gig work is motivated by an apparent divergence of self-employment trends in survey and administrative data. Katz and Krueger (2019), for instance, show that while the share of unincorporated self-employed in the Current Population Survey (CPS) among all employed individuals declined from close to 9% in 1980 to just over 6% in 2017, the share of those filing Schedule C increased from about 9% to over 16% during the same period, and the divergence trend is likely to continue in the future. The US studies speculated that the diverging self-employment trends in survey and administrative data may be partially attributed to the growth of the gig economy not fully captured by traditional survey-based measures of self-employment.

Figure 2 shows estimated self-employment trends in Canada from 2005 to 2016 based on LFS and CEEDD data. The overall self-employment trend in the LFS was fairly stable, rising slightly from 16.9% in 2005 to 17.5% in 2009 and then falling back to 16.6% in 2016. The rate of unincorporated self-employment followed a roughly similar path but declined by a somewhat larger margin, from 10.4% in 2005 to 9.5% in 2016. However, the share of the incorporated self-employed increased during the same period, from 6.5% in 2005 to 7.1% in 2006, resulting in a smaller overall declined in the share of the self-employed.

In contrast to the LFS-based estimates, the overall share of the self-employed based on the CEEDD data steadily increased from 20.7% in 2005 to 22.3% in 2016 despite a slight decline in the share of the unincorporated self-employed from 14.9% to 14.6%. The increase in the overall shares reflected primarily the increase in the share of the incorporated self-employed, from 7.7% in 2005 to 9.5% in 2016. Figure 2 also shows that the decline in the share of the unincorporated self-employed between 2005 and 2016 was mostly due to the decline in the number of those reporting income from fishing and farming. When those with income from fishing and farming were excluded, the share of the unincorporated self-employed increased from 12.7% to 13.1%.

Figure 2 shows trends in the potential share of gig workers in the Canadian labor force based on administrative data. The share of gig workers in the Canadian labor force is measured as the ratio of individuals identified as gig workers to the total number of workers. Figure 2 shows an overall increase in the estimated share of gig workers from 4.9% in 2005 to 7.3% in 2016.[15] The numbers suggest that about 56% of unincorporated self-employed who reported business, professional or commission income in 2016 were gig workers as they did not report any BN associated with their self-employment activities.

A closer inspection of the gig worker trend reveals two sharp increases during the 2005-2016 period (Figure 3). The first increase corresponds to the 2008-2009 recession, and it was somewhat sharper for men than for women. The timing of the increase suggests that the growth in the share of gig workers during those years can be largely attributed to push factors such as declining employment prospects. While the share of female gig workers continued to increase immediately after the recession (2009-2012), the share of male gig workers slightly declined during that period.

[15] These percentages translate into about 890,700 gig workers in 2005 and about 1,487,740 gig workers in 2016.

The second sharp increase observed around 2012-2013 is less intuitive but may be related to the proliferation of online platforms in Canada that started around that time.[16] During the post-2012 period, the growth rate in the share of gig workers was higher for women than for men. The salient feature of Figure 3 is that, in all years, the share of gig workers was substantially higher among women than among men and the gap widened over time. In 2016, the share of female gig workers was about 8.4% while the share of male gig workers was about 6.2%.[17]

Each gig worker is linked to one or more of the three gig activities—business, professional, or commission—depending on the income source in the T2125 identifying him or her as a gig worker. Our data allow for breaking down the trends in the shares of gig workers by such activities (Figure 4). Those with business gig income account for a large majority of gig workers, and the overall trends in the shares of gig workers reflect primarily trends in this category of gig workers (Figure 4; top left). Although fewer gig workers report professional gig income (Figure 4; top right), the share of female gig workers reporting professional gig income increased from just over 0.8% to about 1.2% whereas the corresponding increase for male gig workers was much smaller.

Those filing a T2125 form are asked about the total income from all three activities but have to detail their incomes only from business and professional activities. The commission income is assumed to be the total income reported on a T2125 minus the business and professional incomes. It is possible that some gig workers filing T2125 choose to report small income amounts as "commission income" to reduce their filing burden even if these amounts should be more appropriately reported as business

[16] For instance, 2012 was the year in which Uber started its operations in Canada [CTV News, https://www.ctvnews.ca/business/uber-ride-share-taxi-or-tech-company-1.2044508].

[17] Our main sample is consistent with the LFS age restrictions and includes individuals 15 and over. Restricting the sample to those aged 18 to 64 had very little impact on the results (Appendix Figure A2).

or professional income. Regardless of the reason, the post-2010 period was notable for a rapid increase in this type of gig income (Figure 4; bottom left).

An important question often asked in the context of debates about gig economy is whether gig workers have more stable main jobs and do gig work primarily a secondary activity to supplement their income or to explore self-employment opportunities, or whether gig work is the main activity of gig workers and they do not generally receive wages or salaries. In Figure 5, the trends in the shares of gig workers are shown separately for those with and without wages or salaries (T4 slips). The trends in the left-hand side panel (gig workers with no wage earnings) spike around the recession in 2008-2009 but then remain relatively stable until another spike in 2012-2013. In contrast, the shares in the right-hand side panel (gig workers with wage earnings) increase virtually linearly from 2006 to 2016, showing only minor "bumps" around 2008-2009. The linear trend is particularly apparent among female gig workers with wages earnings. The trends in Figure 5 seem to suggest that although gig work has become generally more prevalent during the 2005-2016 period, those with no wage earnings respond more strongly to both push factors (recession) and pull factors (proliferation of online platforms).

Figure 6 breaks down the trends in the shares of gig workers by quintiles of the individual total annual income.[18] There has been little growth in the share of male gig workers in the two highest quintiles of total income, and only about 4% of all employed men in these quintiles were gig workers in 2016. In contrast, the shares of male gig workers in the two lowest quintiles have increased from about 5.6% to 10.3% in the fifth (highest) and 9.8% in the fourth quintiles. Among women, the growth rates in the two lowest quintiles of the total income were also higher than in other quintiles

[18] The cut-off points for the total income quintiles are computed separately for the total income distributions of all male and female T1 filers.

almost reaching 14% in the second quintile. However, the shares of gig workers in the two highest income quintiles also grew from about 4% to about 6%. An important reminder here is that the individual total annual income depends on several factors such as the hourly wage, total number of days or weeks worked, presence of other income sources and whether the individual worked mostly full or part time.

7. Characteristics of gig workers

7.1 Tax data

First, we consider the characteristics of gig workers available in tax data such as the age, the marital status, the area of residence and the industry of gig work. We have already noted key gender differences in the prevalence and trends of gig work. For this reason, we consider other characteristics of gig workers separately for men and women. Table 3 (upper panel) shows the distribution of gig workers in 2016 along several dimensions. The first two columns show the distribution of gig workers by different categories within each characteristic (e.g., age, marital status, etc.). The last two columns show shares of gig workers among *all workers* in each category.[19] The results suggest that no age group dominated the age distribution of gig workers and that gig workers were spread more or less evenly across the entire age spectrum. However, the share of gig workers among all workers was especially high in the "65 and over" category because fewer individuals in this age category worked and, when they did work, they were more likely to be gig workers than younger workers. About 60% of all gig workers in 2016 were married or cohabited while about 30% of male gig workers and 25% of female gig workers were single (never married). However, men

[19] For example, 9.5% of male gig workers were under 25 years of age (first column); the share of gig workers among all male workers under 25 was about 4.4% (third column).

(7.6%) and women (10.3%) who were divorced, widowed or separated were more likely to be gig workers than either married or single men and women.

Perhaps not surprisingly, the shares of gig workers among all workers are higher in provinces with three major Canadian urban centers—Québec (Montréal), Ontario (Toronto) and British Columbia (Vancouver)—where opportunities for gig work are greater (Table 3). However, Figure 7 showing gig worker trends separately for Montreal, Toronto, and Vancouver reveals substantial differences in the growth of gig work across the three metropolitan areas. In Montreal, the share of gig workers had been about the same as the overall Canadian share until 2012, but increased at a higher pace thereafter. In Toronto, the growth rate in the share of gig workers was higher than in other large metropolitan areas until 2009. However, the spikes in the shares of gig workers (around 2008 and 2012) were followed by relatively flat and even downward trends although, even in 2016, the share of gig workers in Toronto was well above the overall Canadian share (Figure 7).

Finally, Table 3 shows that most male gig workers (52.2%) and almost a half of all female gig workers (47%) belonged to the lowest two quintiles of the total income distribution. Among both men and women, the shares of gig workers in the lowest income quintile were more than twice as high as the shares of gig workers in the top income quintile.

Our data allow us to look at the distribution of gig workers by the industry specific to the gig work identified by the 2-digit NAICS code (20 industries). Table 4 shows that most male gig workers were found in "Professional, scientific and technical services" (16.7%), "Construction" (11.9%) and "Administrative and support, waste management and remediation services" (10%).[20] Female gig workers concentrated primarily in "Health care and social assistance" (18.6%) and "Professional,

[20] This category includes such activities as administration, hiring and placing personnel, preparing documents, providing cleaning services, and arranging travel.

scientific and technical services" (15.5%). Table 4 also shows that the industrial distribution of gig workers based on the industry of their gig work was very similar to the industrial distribution of gig workers based on their "main job" industry recorded in the census data (third and fourth columns). Looking at the shares of gig workers among all workers (last two columns), the industry with the highest share of male gig workers was "Arts, entertainment and recreation" (14.1%) which is the industry in which the term "gig work" has originated.[21] High shares of gig work were also observed in "Finance and insurance" (10.1%), "Educational services" (10.6%), and "Health care and social assistance" (10%). Among women, the industry with the highest share of gig workers was "Other services" (19.1%), a broad category that includes providing personal care and other services, organizing and promoting religious activities, and advocating various social and political causes. Also high are the shares of gig workers in "Art, entertainment and recreation" (16.4%) and "Administrative and support, waste management and remediation services" (16.3%).

7.2 Tax data linked to census microdata

From the researcher's point of view, one of the main drawbacks of tax data is the lack of information about individuals' education or other aspects of their human capital. We overcome this problem by linking our administrative data to the 2016 Census microdata. As explained in the data section, the resulting subsample is a 25% random sample of our main sample with several important variables, including the highest educational attainment, occupation, and immigrant status, added to the set of individual characteristics. We are particularly interested in measuring the strength of the correlation between participating in gig work and formal education, immigrant status, and main occupation.

[21] *Oxford Music Online* defines "gig" as "a term commonly applied to a music engagement of one night's duration only."

Just over a third of all male gig workers (34%) had a university degree and a similar share of gig workers had only a high school diploma or less (Table 3). However, the likelihood of being a gig worker was substantially higher among university graduates than for other men. The shares of gig workers are particularly high among men (10.6%) and women (14.0%) holding graduate degrees (Master's degree and above). In contrast, only 5.2% of men and 6.5% of women with a high school or lower levels of education were gig workers.

Given the high prevalence of immigrants in the Canadian labor force, an important issue is the involvement of immigrants in the gig economy. An advantage of linking administrative to census data is that census data allow for identifying immigrant workers. Table 3 shows that the shares of gig workers were considerably higher among immigrants, especially recent immigrants, than among Canadian-born workers. Even immigrants in Canada for 20 years or more were more likely to be identified as gig workers than the Canadian-born workers. However, the male-female differences in the shares of gig workers among all workers were not as large for immigrants—especially recent immigrants—as for the Canadian-born.

Finally, we also considered two occupational classifications available in the 2016 Census data. The first classification is based on the broad categories derived from the North American Occupational Classification (NOC) (Table 5; upper panel). According to this classification, 20% of male gig workers were individuals with main occupations related to "Trades, transport and equipment operations and related occupations."[22] Female gig workers concentrated in "Sales and service occupations" (22.8%) and "Occupations in education, law and social, community and government

[22] About 9.2% of the male gig workers and 9.9% of female gig workers reported not working in either 2015 or 2016 in the Census.

services" (21%). However, the shares of gig workers among all workers were the highest among workers with main occupations in "Arts and culture" (21.9% for men and 24.7% for women).

The second occupational classification is also NOC-based but it is more consistent with highest aggregation level in the International Standard Classification of Occupations (ISCO). It consists of 10 classes, the first three of which are homogeneous on skill level and the rest focus on skill type (Table 5; lower panel). According to this classification, just over 23% of all gig workers were workers whose main occupations were "Professional." Among women, however, the plurality of gig workers (23.9%) were in "Personal and customer information services." The highest prevalence of gig workers was observed among men and women in "Professional" and "Technical and paraprofessional" occupations.

8. Self-employment in the linked CEEDD-Census sample

Abraham et al. (2018) seek insights into the sources of the discrepancies between survey and administrative data estimates of self-employment by comparing data from both sources for the same people. Only about 42% of those identified as incorporated self-employed in the CEEDD and 41% of those identified as unincorporated self-employed report being self-employed in the Census (Table 6). Just over a third of the owners of unincorporated businesses report being unincorporated business owners in the Census. However, among those who report being unincorporated self-employed in both administrative and census data, the share of those who report having employees in census data is similar to the overall share of the unincorporated self-employed reporting having employees in census data (not linked to CEEDD).[23] The most intuitive explanation for this result is that the Census question pertains only to the main work activity essentially ignoring self-employment as a secondary

[23] These shares are shown in Table 1 in Section 5.

activity. This result is also consistent with Green et al. (2016) who reported that for about half of those reporting income from unincorporated self-employment, the main source of income is not the self-employment income but earnings from paid employment. This result is also consistent with the trends captured in Figure 2 showing that the share of individuals with unincorporated self-employment as a secondary activity has likely risen between 2005 and 2016 and this rise can be captured primarily through tax data.

9. Discussion

Despite some evidence of the divergence between self-employment rates in the Canadian survey and administrative data during the period from 2005 to 2016, the divergence trend appears less pronounced compared to a similar trend in the United States. As in the United States, administrative data identify a larger number of workers as self-employed compared to survey data as it captures any self-employment activities including occasional ones that may be ignored survey respondents. Although the prevalence of unincorporated self-employment seems generally higher in Canada than in the United States, survey data indicate a small but comparable decline in the share of the unincorporated self-employed between 2005 and 2016 in both countries. Unlike the survey data, the administrative data show an increase in the overall share of the self-employed and no decline in the share of the unincorporated self-employed in Canada. The main factor contributing to the rising share of the self-employed was the steady increase in the share of the incorporated business owners, from 7.7% in 2005 to 9.5% in 2016. The shares of unincorporated self-employed who reported business, professional or commission income in the administrative data remained quite stable during the 2005-2016 period (around 13%). This result stands in sharp contrast to US findings indicating a substantial increase in the share of people filing a Schedule C in US administrative data (Katz and Krueger 2019). However, despite the overall stability of unincorporated self-employment

rates in Canada, the share of unincorporated self-employed identified as gig workers increased steadily, reaching about 7.3% of all workers in 2016. Taken together, these trends seem to indicate an increase in gig work mainly as a secondary activity that does not require a strong labor market commitment or possibly as a temporary activity to provide financial relief at the time when opportunities for more traditional work arrangements decline.

A salient result in our analysis is related to the gender differences in the trends and characteristics of gig workers. Overall, women are more likely than men to participate in the "gig economy" and this result likely reflects the importance of flexible work arrangements for women trying to balance family and work (Jeon and Ostrovsky 2019). Compared to men, women's participation in the gig economy was less affected by the 2008-2009 recession suggesting that women's decision to do gig work may be less influenced by push factors (inability to find traditional employment) and more influenced by pull factors such as work flexibility and the opportunity to be "your own boss."

Another interesting finding in our analysis is related to the educational attainment of gig workers. Gig work appears to be most prevalent among highly educated men and women, especially among those with graduate degrees. It is likely that the proliferation of supply-driven crowdsourcing marketplaces such as Upwork and Freelancer has given highly specialized skilled workers (suppliers) a better opportunity to connect with potential employers and leverage their human capital. However, despite higher prevalence of gig workers among university graduates, more than a third of all male gig workers and almost a quarter of all female gig workers have only a high school education (or less), and only about a third of male and female gig workers have a university degree.

More than a third of all male gig workers are immigrants, which is a far larger share than the share of immigrants in the Canadian labor force (about 24% in 2016). The share of immigrants among female gig workers is smaller than the share of immigrants among male gig workers but, similar to

Canadian-born women, immigrant women, particularly those who have lived in Canada for more than 5 years, are more likely to be gig workers than immigrant men. The male-female difference in the prevalence of gig workers is particularly large for immigrants who have been in Canada for more than 20 years although our analysis does not allow us to conclude whether this is an assimilation (time) or a composition (cohort) effect. An interesting question for future research is whether gig work has an element of a labor market "stepping stone" for recent immigrants allowing them to gain Canadian experience that can be leveraged in their search for more traditional employment.

Our findings suggest that a "typical" male gig worker is married high school or community college graduate living in Ontario, working in various professional occupations related to sales, transport, trades or the provision of various services, and doing gig work to supplement income from wage employment. A typical female gig worker has a similar demographic and human capital profile but is more likely to work in occupations related to personal, customer or information services. However, gig workers are most likely to be found among those who are older, widowed or divorced, highly educated, live on the West Coast and work in arts and entertainment industry. The high prevalence of gig workers among artists and entertainers is probably not surprising as it is an inherent feature of the industry. Outside the arts and entertainment industry, however, no professional category dominates although the high prevalence of gig work among health professionals and educators is noteworthy. The occupational diversity of gig workers is another interesting finding that warrants further future investigation.

10. Conclusions

There is little consensus in the economic literature or the public forum regarding the exact meaning of the term "gig economy" and even less consensus about the size of the gig economy in the United States, Canada or other countries. No definition of a "gig worker" can fully reflect the

intricacy of modern work arrangements or the precariousness associated with each specific work activity. The proliferation of online platforms and crowdsourcing marketplaces connecting workers with employers through very flexible and often minimally-binding work arrangements has resulted in renewed interest in the "gig" aspect of the modern economy and motivated new attempts to identify and quantify the gig economy. Yet the same technological factors have amplified the complexity of the task of measuring the gig economy and intensified the need for new methodological approaches. Recent studies turned to administrative data in order to quantify the gig economy and identify its impact on broader self-employment trends in the United States and to reconcile discrepancies between self-employment estimates based on administrative data sources and more traditional survey databases. Abraham et al. (2018) introduced a methodological framework for identifying gig workers based on the characteristics of work arrangements and how they are reported in tax data.

Building on the recent US studies, this study contributes to the existing literature on gig economy by introducing the definition of gig work specific to the way work arrangements are reported in the Canadian tax system and estimating of the size of the gig economy in Canada using administrative data. Using our definition, an estimated 7.3% of all workers who are either wage-employed or self-employed in Canada can be considered gig workers. We show that the share of gig workers among all workers has risen substantially between 2005 and 2016 and some of the increase coincided with the introduction and proliferation of online platforms. An important contribution of our study is the analysis of the characteristics of the gig workers using administrative data linked to the 2016 Census microdata. Our analysis highlights gender, educational and occupational differences in the prevalence of gig workers.

Measuring the size of the gig economy in Canada is important in itself, but it is also important for understanding differences between survey data and administrative data estimates of the number of self-employment workers and how such differences impact productivity estimates. As administrative data become more prevalent in economic analysis reconciling differences between more traditional economic indicators based on survey data and recently available administrative sources becomes imperative. We argue that although some of the discrepancies observed in the United States can also be observed in Canada, the magnitude of the discrepancies appears smaller. We also point out that some of such discrepancies can be largely accounted for by minor labor market activities recorded in administrative data but probably ignored by survey respondents. The presence of minor labor market activities in tax data, however, makes it particularly suitable for perusing our research objectives.

Finally, an additional benefit of identifying gig workers using administrative data is that the data sources used in this study, such as individual and corporate tax data, will remain available with regular frequency in the future thus allowing for measuring the gig economy in Canada consistently over time. Such consistency is essential for painting an accurate picture of the evolution of the gig economy in Canada. Future research efforts will likely concentrate on how gig work is related to individuals' career paths, their efforts to balance work and family, and older workers' transitions to retirement.

References

Abraham, Katharine G., John C. Haltiwanger, Kristin Sandusky, and James R. Spletzer. 2018. "Measuring the Gig Economy: Current Knowledge and Open Issues." *National Bureau of Economic Research, NBER Working Paper 24950.*

Bajwa, Uttam, Lilian Knorr, Erica Di Ruggiero, Denise Gastaldo, and Adam Zendel. 2018. *Towards an understanding of workers' experiences in the global gig economy.* Dalla Lana School of Public Health: Universtity of Toronto.

Block, Sheila, and Trish Hennessy. 2017. *"Sharing economy" or on demand service economy?* Toronto, Ontario: Canadian Centre for Policy Alternatives Ontario Office.

CBC News. 2018. "Online gig economy is growing, but no one knows by how much." *CBC News.* November. https://www.cbc.ca/news/business/canada-s-digital-workers-1.4889691.

Global News. 2018. "This is why Canada's gig economy is changing the future of jobs." *Global News.* August. https://globalnews.ca/news/4389778/analysis-canadas-gig-economy/.

Green, David, Huju Liu, Yuri Ostrovsky, and Garnett Picot. 2016. *Immigration, Business Ownership and Employment in Canada.* Ottawa: Statistics Canada: Analytical Studies Branch, No. 375.

Grekou, Douwere, and Huju Liu. 2018. *The Entry into and Exit out of Self-employment and Business Ownership in Canada.* Ottawa: Statistics Canada: Analytical Studies Branch, No. 407.

Jeon, Sung-Hee, and Yuri Ostrovsky. 2018. "Balancing family and work: transitions to self-employment among new mothers." *Oxford Economic Papers* 71 (1): 47-72.

Katz, Laurence F., and Alan B. Krueger. 2016. *The rise and nature of alternative work arrangements in the United States, 1995-2015.* Cambridge, MA: National Bureau of Economic Research Working Paper 22667.

Katz, Laurence F., and Alan B. Krueger. 2019. *Understanding trends in alternative work arrangements in the United States.* Cambridge, MA: National Bureau of Economic Research Working Paper 25425.

Statistics Canada. 2011. "Methodology for the processing and estimation of unincorporated businesses (T1)." Internal report, Ottawa: Statistics Canada.

The Daily. 2017. *The sharing economy in Canada.* February.

The Globe and Mail. 2017. "The gig economy is here - and we aren't ready." *The Globe and Mail.* October. https://www.theglobeandmail.com/report-on-business/rob-commentary/the-gig-economy-is-here-and-we-arent-ready/article36678505/.

Yssaad, Lahouaria, and Vincent Ferrao. 2019. *Self-employed Canadian: Who and Why?* Ottawa: Statistics Canada: Labour Statistics at a Glance.

Tables

Table 1. Estimated shares of the self-employed among all workers using administrative, census and survey data, 2016

	Survey Data: LFS	2016 Census	Admin data: CEEDD (2016)
		shares	
Incorporated self-employed	7.1	4.4	9.5
Unincorporated self-employed	9.5	7.5	14.6
with employees (%)	*12.0*	*26.4*	*3.9*
with no employees (%)	*88.0*	*73.6*	*96.1*
Gig workers	…	…	7.3
gig workers with no other job (%)	…	…	*48.5*
gig workers with a single job (%)	…	…	*35.9*
gig workers with multiple jobs (%)	…	…	*15.6*

Source: Statistics Canada, authors' calculations.

Table 2. Distributions of the shares of "gig" income

percentiles	share of total earnings	share of total income
p1	-0.41	-0.45
p5	-0.06	-0.08
p10	-0.01	-0.02
p25	0.03	0.01
p50	0.75	0.23
p75	1.00	0.90
p95	1.00	1.00
mean	0.53	0.35
N	1,398,241	1,471,508

Note: individuals with non-positive total earnings (total income) are excluded. Source: Statistics Canada, authors' calculations

Table 3. Characteristics of gig workers in tax data and linked tax-census data

	shares of gig workers		shares of all employed	
	men	women	men	women
Tax data				
Age				
below 25	9.5	7.4	4.4	4.4
25-34	19.7	21.2	6.2	8.8
35-44	18.7	22.4	6.2	9.6
45-54	19.2	21.3	6.1	8.6
55-64	18.5	18.4	6.5	8.7
65 and over	14.5	9.4	8.7	10.9
Marital status				
married/common-law	60.4	60.6	6.4	9.1
widowed, divorced or separated	8.6	13.9	7.3	10.0
single	31.0	25.5	5.8	6.7
Region of residence				
Atlantic provinces	3.9	4.7	3.8	6.1
Quebec	24.3	24.9	6.6	9.3
Ontario	41.1	37.4	6.8	8.2
Prairies	14.1	16.6	4.7	7.6
British Columbia	16.2	16.1	7.5	9.7
other	0.4	0.3	2.9	5.7
Total income				
lowest quintile	27.7	24.0	10.4	11.8
2nd quintile	24.4	23.0	9.5	13.7
middle quintile	17.1	19.4	5.1	8.2
4th quintile	15.3	16.2	4.2	5.8
highest quintile	15.5	17.4	4.0	5.7
Linked tax-census data				
Highest level of educational attainment				
high school or less	34.1	27.9	5.2	6.5
some postsecondary	31.8	37.4	5.6	9.1
Bachelor's degree	21.5	22.8	7.6	8.5
graduate degree	12.5	11.9	10.6	14.0
Immigrant status				
Canadian-born	64.9	71.7	5.3	8.1
non-permanent resident	1.6	1.0	7.0	6.4
in Canada for less than 5 years	4.8	3.4	9.7	9.1
in Canada for 5-9 years	5.5	4.5	9.4	10.1
in Canada for 10-19 years	9.0	7.6	8.8	9.6
in Canada for 20 years or more	14.2	11.8	7.8	9.1

Source: Statistics Canada, authors' calculations.

Table 4. Industrial distribution of gig workers in 2016 and the shares of gig workers among all workers, by industry

2-digit NAICS	CEEDD data: % of gig workers		CEEDD-Census (main job industry): % of gig workers		CEEDD-Census (main job industry): shares of all workers	
	men	women	men	women	men	women
Did not work	…	…	9.2	9.9	5.5	7.4
Agriculture, forestry, fishing and farming	2.1	0.9	1.8	1.0	3.6	6.3
Mining, oil and gas extraction	0.2	0.1	0.7	0.3	2.0	4.2
Utilities	0.2	0.1	0.4	0.2	2.5	3.3
Construction	11.9	1.3	11.7	1.5	6.5	7.3
Manufacturing	1.9	1.5	5.4	2.3	3.0	4.3
Wholesale trade	1.2	1.2	2.5	1.2	3.6	4.8
Retail trade	4.3	9.4	6.3	6.5	4.2	4.8
Transportation and warehousing	7.7	1.2	6.2	1.5	6.2	5.8
Information and cultural industries	3.1	1.8	3.3	1.9	9.0	9.3
Finance and insurance	5.8	3.4	5.1	3.5	10.1	6.3
Real estate, rental and leasing	8.5	7.0	2.3	1.8	8.4	10.1
Professional, scientific and technical services	16.7	15.5	9.6	8.3	8.4	11.8
Management	0.1	0.1	0.1	0.1	3.3	3.8
Administrative and support, waste management and remediation services	10.0	12.5	6.0	6.5	8.7	16.3
Educational services	3.7	5.4	7.2	10.6	10.5	9.1
Health care and social assistance	5.3	18.6	5.9	22.9	9.7	10.7
Arts, entertainment and recreation	8.1	6.8	4.3	3.8	14.1	16.4
Accommodations and food services	1.1	1.3	3.4	3.6	4.3	4.1
Other services	8.1	12.1	4.9	9.9	8.8	19.1
Public service		…	3.7	2.9	3.7	4.2

Source: Statistics Canada, authors' calculations.

Table 5. Occupational distribution of gig workers in 2016 and the shares of gig workers among all workers, by main occupation

	% of gig workers		share of all workers	
	men	women	men	women
2016 NOC				
Did not work	9.2	9.9	5.5	7.4
0 Management occupations	8.5	4.8	4.4	5.4
1 Business, finance and admin	10.4	16.6	7.8	6.8
2 Natural and applied sciences	7.5	1.7	4.9	5.2
3 Health occupations	4.2	10.9	11.0	8.9
4 Occupations in education, law, etc.	9.3	21.0	8.6	11.7
5 Occupations in art and culture	8.6	9.1	21.9	24.7
6 Sales and service occupations	17.0	22.8	6.1	7.9
7 Trades, transport, etc.	20.0	1.3	5.2	6.9
8 Natural resources, agriculture, etc.	2.7	0.7	5.1	7.3
9 Occupations in manufacturing and utilities	2.6	1.0	2.9	3.6
STC classification (related to ISCO)				
Did not work	9.2	9.9	5.5	7.4
Management	8.5	4.8	4.4	5.4
Professional	23.1	23.4	9.8	10.5
Technical and paraprofessional	10.8	15.2	8.0	12.6
Administration and administrative support	5.2	13.1	5.9	6.4
Sales	7.2	6.5	6.1	5.4
Personal and customer information services	10.7	23.9	6.0	10.0
Industrial, construction and equipment operation	10.5	0.5	5.0	8.3
Workers and labourers	9.5	0.8	5.5	6.2
Natural resources, agriculture, etc.	2.7	0.7	5.1	7.3
Occupations in manufacturing and utilities	2.6	1.0	2.9	3.6

Source: Statistics Canada, authors' calculations

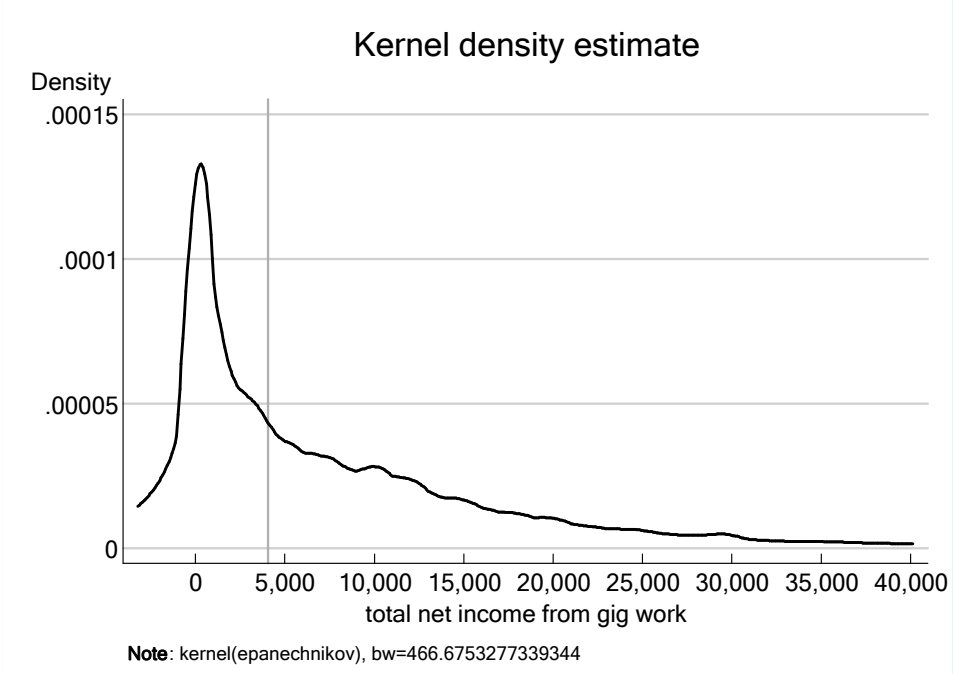
Table 6. Employment and self-employment in the linked CEEDD-Census data

	2016 Census main job status conditional on the CEEDD self-employment status			
	employee	incorp.	unincorp.	
2015 CEEDD			*with emp.*	*no emp.*
incorporated	0.45	0.32	0.05	0.05
unincorporated	0.50	0.07	0.08	0.26

Source: Statistics Canada, authors' calculations.

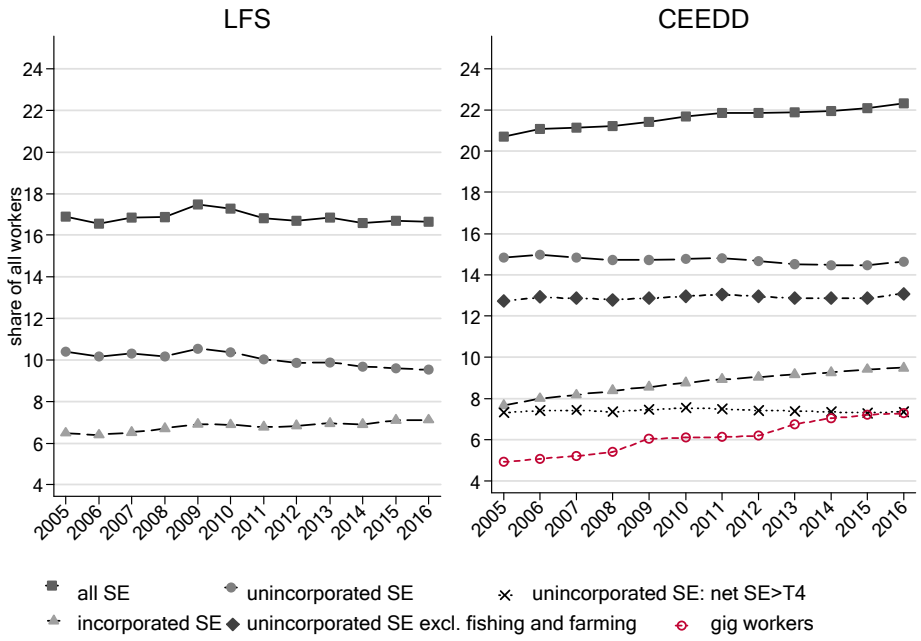
Figures

Figure 1. The estimated density function of the total business, professional and commission income among "gig workers."



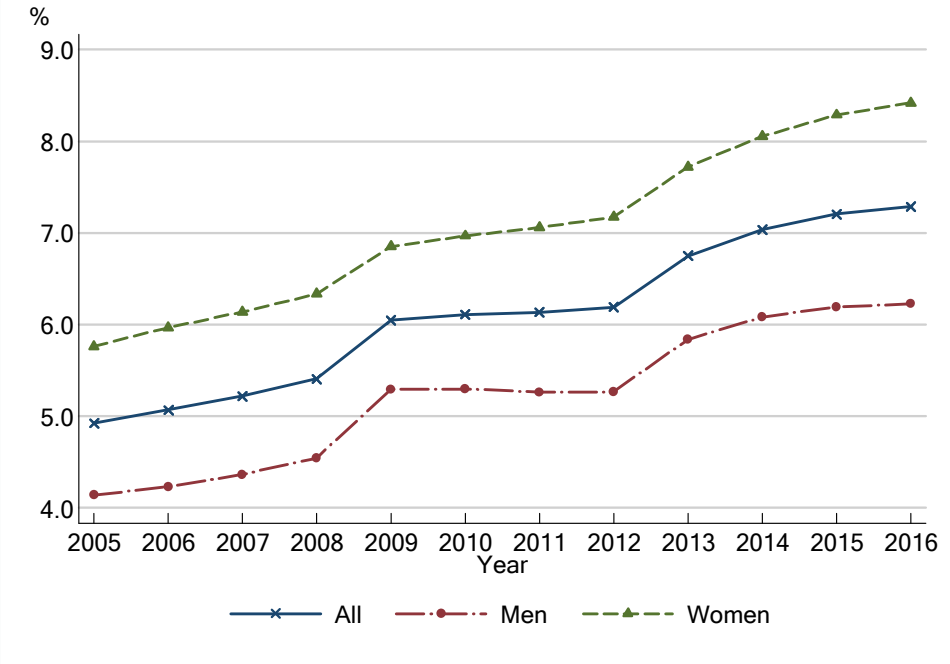
Note: The vertical line corresponds to the median gig income ($4,109). To avoid long tails, the graph shows only the distribution for incomes between the 5th and 95th percentiles. Source: Statistics Canada, authors' calculations.

Figure 2. Changes in the shares of self-employed workers (SE) among all workers from 2005 to 2016 in survey and administrative data (age>=15)



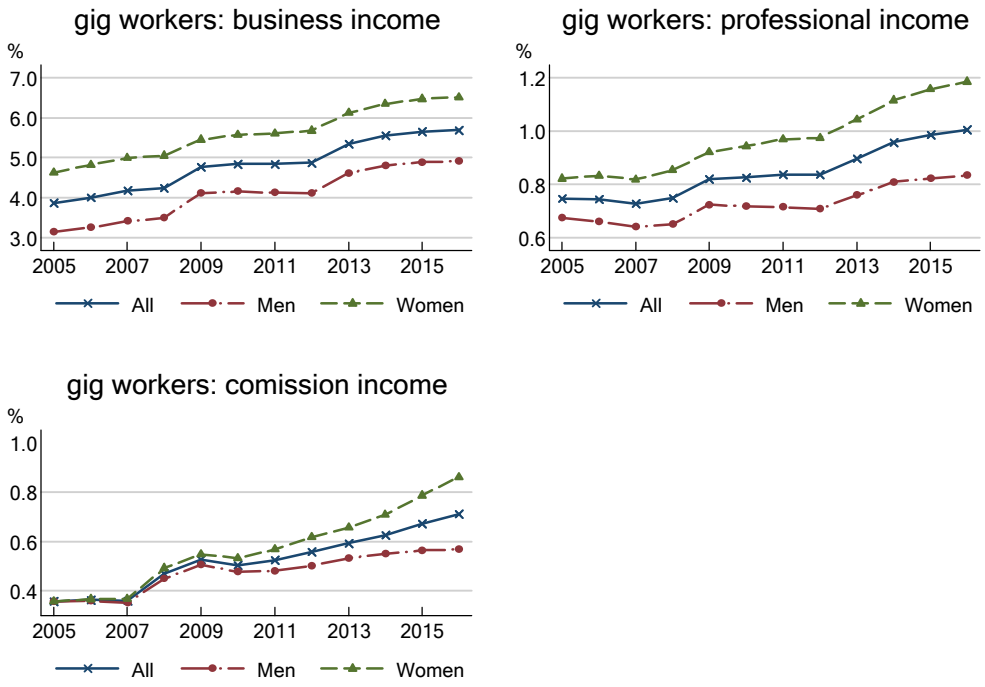
Source: Statistics Canada, authors' calculations.

Figure 3. Trends in the share of gig workers among all workers, 2005-2016, by sex



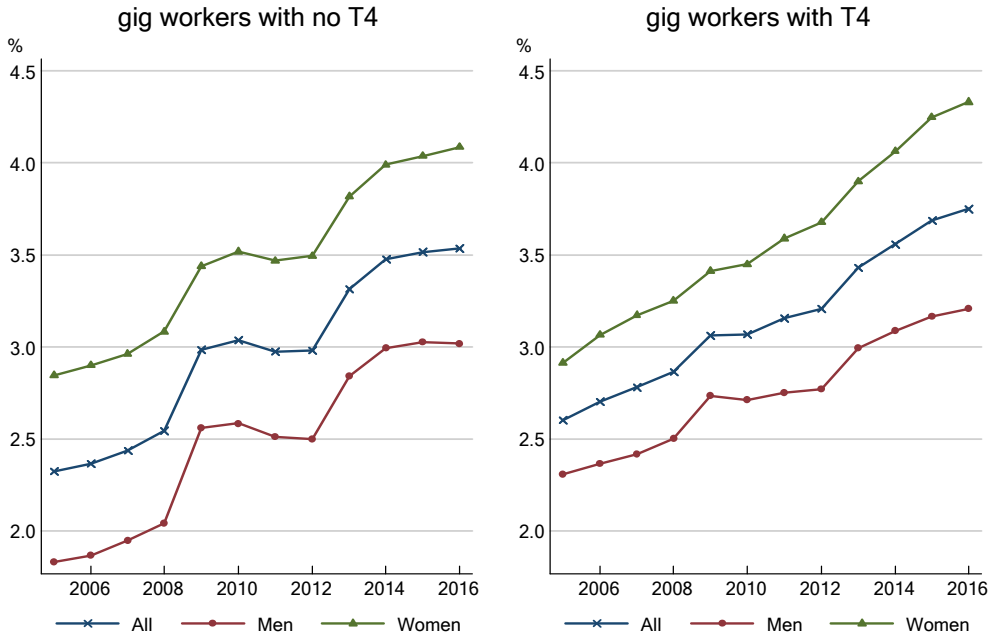
Source: Statistics Canada, authors' calculations.

Figure 4. Trends in the share of gig workers, by income type and sex, 2005-2016



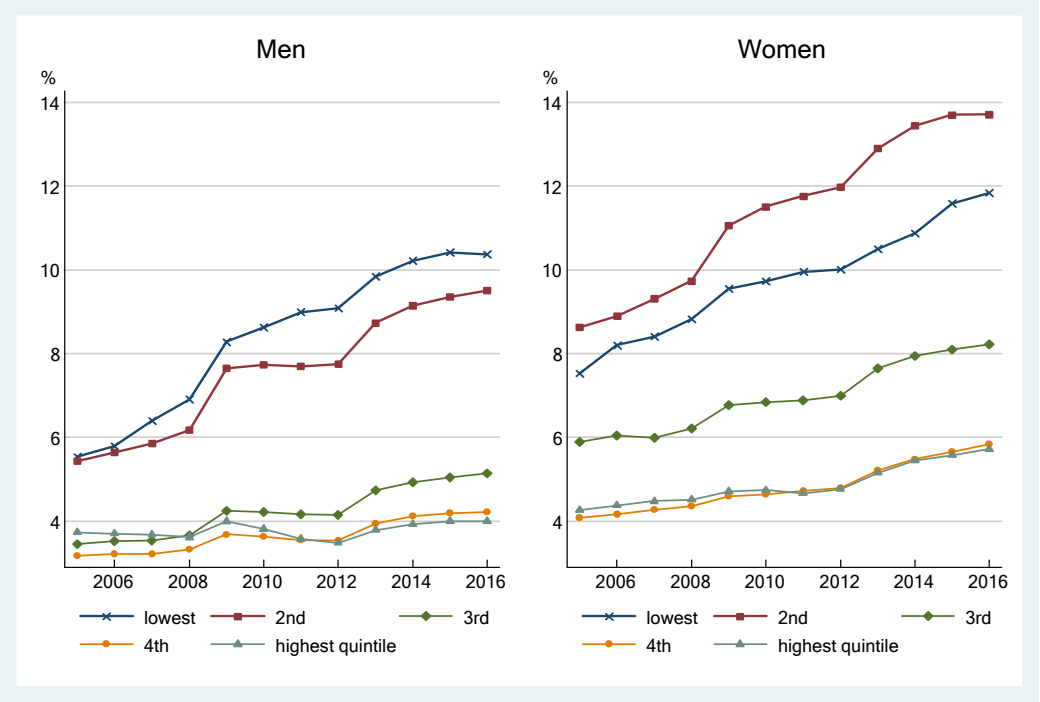
Source: Statistics Canada, authors' calculations.

Figure 5. Trends in the shares of gig workers with and without wage employment earnings, 2005-2016



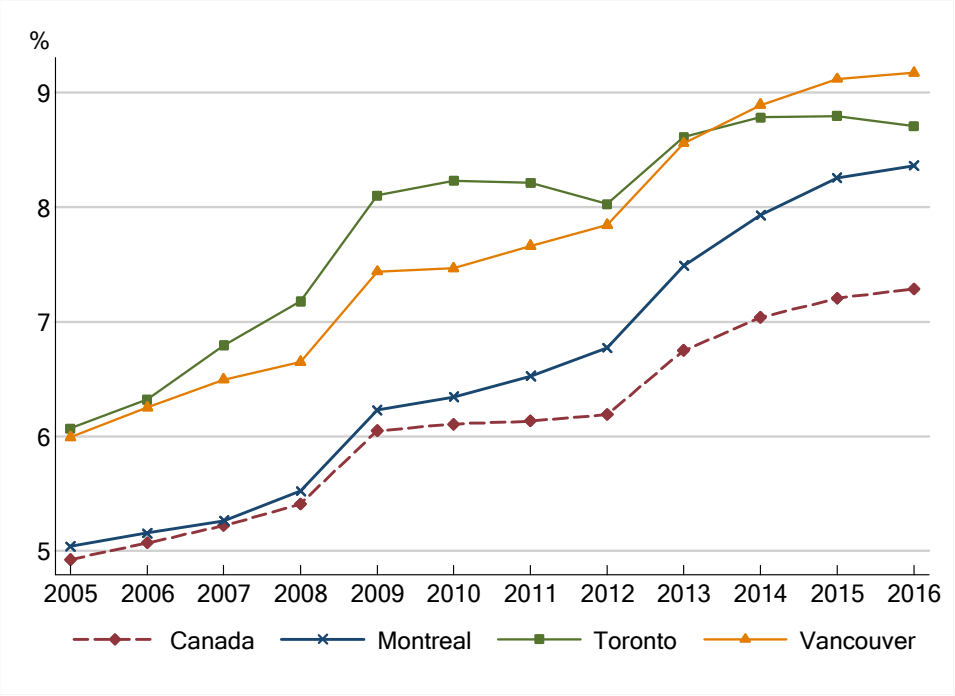
Source: Statistics Canada, authors' calculations.

Figure 6. Trends in the share of gig workers, 2005-2016, by total income quintile



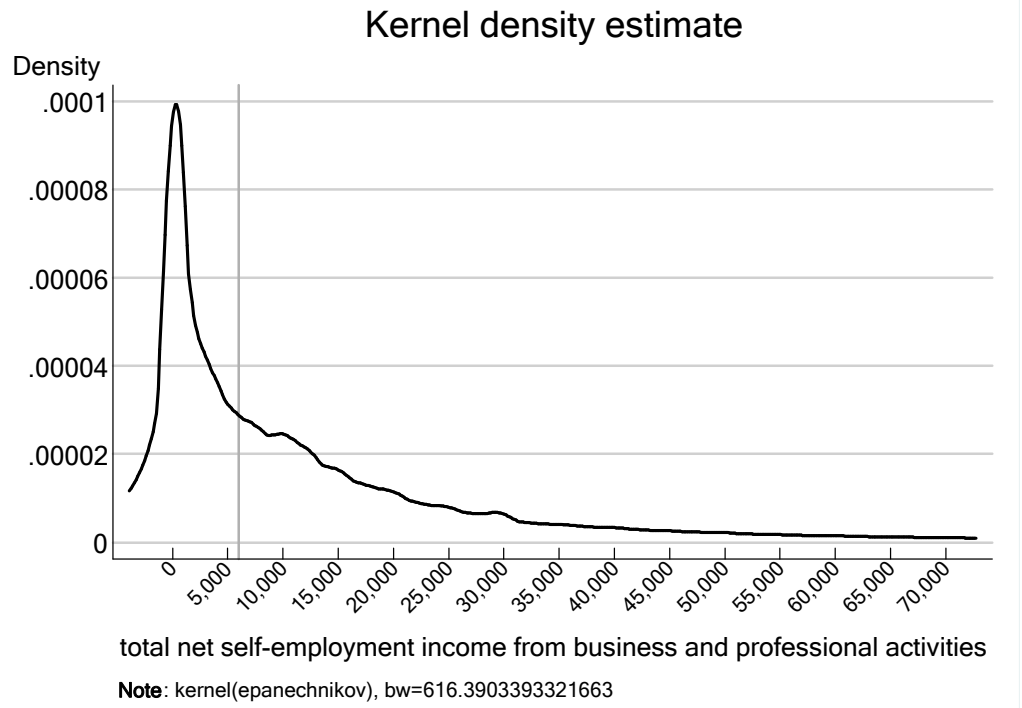
Note: The cut-off points for the total income quintiles are computed separately for the total income distributions of all male and female T1 filers. Source: Statistics Canada, authors' calculations.

Figure 7. Trends in the share of gig workers, 2005-2016, by CMA



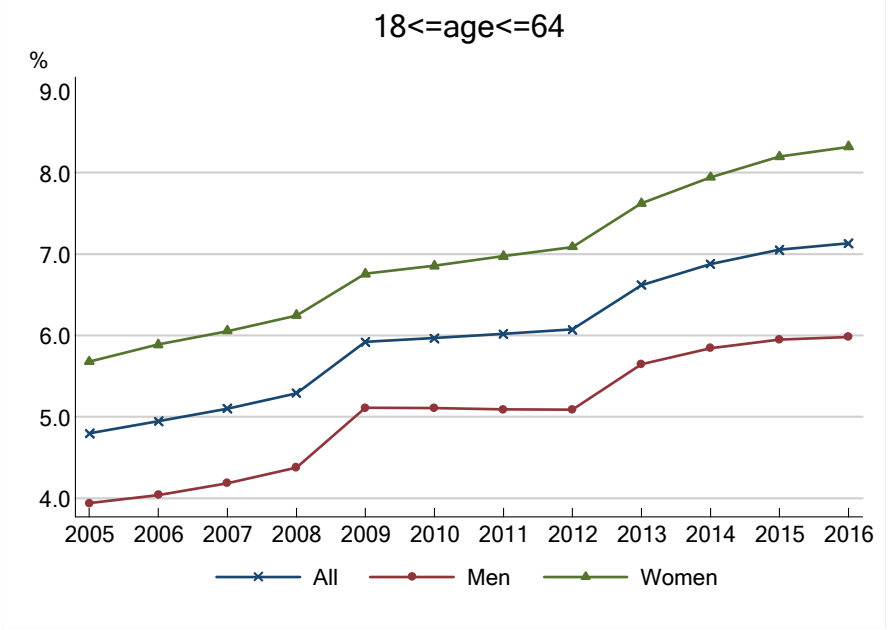
Source: Statistics Canada, authors' calculations.

Appendix Figure A1. Total income from business and professional activities (business, professional and commission) for the unincorporated self-employed filing a T2125 form.



Note: the vertical line corresponds to the median income ($6,010). To avoid long tails, the graph shows only the distribution for incomes between the 5th and 95th percentiles. Source: Statistics Canada, authors' calculations.

Appendix Figure A2. Trends in the share of gig workers for individuals 18 to 64



Source: Statistics Canada, authors' calculations.

Appendix Figure A3. Percentage of permanent and temporary jobs in the LFS.