THE SOCIAL AND SPATIAL DIVISIONS OF PRECARIOUS LABOR

THE SOCIAL AND SPATIAL DIVISIONS OF PRECARIOUS LABOR

By

WAAD KHOGALI ALI, HBSC., MA.SC.

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AUTHOR: Waad Khogali Ali
Honours Bachelor of Science (University of Toronto)
Master of Applied Science (Ryerson University)

SUPERVISOR: Dr. K. Bruce Newbold & Dr. Suzanne E. Mills

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ABSTRACT

The dissertation is composed of four manuscripts, positioned within the field of economic geography. Manuscript one broadly examined how precarious forms of employment (PFEs) are spatially patterned within multiple scales and across a range of geographies. The results suggested that different PFEs exhibited distinct spatial patterns across space and scale. For example, temporary and involuntary part-time work was more prevalent in Atlantic Canada and became gradually less prevalent moving westward. In contrast, part-time employment and employment in multiple jobs were more common in western Canada than in central and Atlantic Canada. The results also confirmed that all PFEs (except for involuntary-part-time work) were more common in rural and small-town areas, and less common in large urban areas. Second, using logistic regression models, results showed that the prevalence of PFEs was reinforced by factors such as immigration status, gender, age, education, and income. These models further confirmed that spatial patterns of PFEs were robust in finer scales i.e. CMAs (census metropolitan areas) and urban/rural geographies even when controlling for socio-demographic and socio-economic effects.

Manuscripts two and three builds on the findings in manuscript one by examining how PFEs are spatially patterned across social locations of gender and immigration status, respectively. Results showed that the east-west and urban-rural patterns observed in manuscript one were partially distorted when the analyses were disaggregated by gender and immigration status. The robustness of these spatial distortions was confirmed using

logistic regression models. The fourth manuscript sought to understand the spatial characteristics influencing the spatial variations of temporary employment using ordinary least squares (OLS) regression models. Key findings revealed that CMA/CAs (census metropolitan areas/census agglomerations) characterized by large shares of manufacturing, utility, and management occupations were significantly negatively associated with temporary employment. Conversely, CMA/CAs with high shares of sales and service occupations were positively associated with temporary employment. Generally, population characteristics (measured by metropolitan areas characterized by a high share of Asian immigrants, low-income earners, and employment insurance beneficiaries) contributed more to explaining positive temporary employment estimates than industry characteristics.

RÉSUMÉ

Cette dissertation comprend quatre articles portant sur la géographie économique. Le premier article examine succinctement comment les Formes Précaires d'Emploi (FPE) se composent spatialement à travers différentes échelles et une variété de géographies. Les résultats suggèrent que différentes FPE ont des compositions spatiales qui varient dans le temps et l'espace. Par exemple les emplois à temps partiel temporaires et involontaires sont prévalant dans les provinces de l'Atlantique et se réduisent graduellement vers l'Ouest. Inversement, les emplois à temps partiel et travailleurs avec plusieurs emplois sont plus fréquents à l'ouest du Canada. Les résultats confirment également que toutes les FPE (à l'exception des emplois involontaires à temps partiel) sont plus présentes dans les zones rurales et les petites villes et moins fréquentes dans les grandes aires urbaines. A l'aide de modèles de régression logistique, les résultats montrent également que la prévalence de FPE est renforcée par certains facteurs tels que le statu d'immigration, le genre, l'âge, le niveau d'éducation ainsi que le salaire. Ces modèles confirment que les caractéristiques spatiales des FPE sont robustes à échelle fine; e.g. RMR (Régions Métropolitaines de Recensement) et aires urbaines/rurales; même en prenant en compte les effets socio-démographiques et socio-économiques.

Le deuxième et le troisième article sont basés sur les résultats du premier article en examinant comment les FPE se caractérisent spatialement en fonction du genre et du statu d'immigration. Les résultats montrent que la répartition Est-Ouest et Urbain-Rural observée dans le premier article est partiellement modifiée lorsque les analyses sont

désagrégées selon le genre et le statu d'immigration. La robustesse de ces distorsions spatiales est confirmée par les modèles de régression logistique. Le quatrième article porte sur les caractéristiques spatiales qui influencent les variations spatiales des emplois temporaires en utilisant la méthode de régression des moindres carrés ordinaires (MCO). Les résultats montrent que les RMR/AR (Régions Métropolitaines de Recensement/Agglomération de Recensement) qui sont caractérisées pour une large part de professions de fabrication, d'utilité publique et de gestion sont significativement corrélées avec l'emploi temporaire. Inversement, RMR/RA avec de larges parts de professions de vente et de service sont corrélées positivement avec l'emploi temporaire. Généralement les caractéristiques de population (mesurées dans les aires métropolitaines à forte proportion d'immigrants asiatiques, de travailleurs à bas salaire et de prestataires d'assurance-emploi) ont davantage contribué aux corrélations positives par rapport aux caractéristiques des industries.

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To all my friends, thank you for enriching my life with your thoughtful and kind ways. I look forward to enjoying our continued friendship. Finally, to my family, thank you for your continued support, care, and guidance.

PREFACE

This dissertation is a collection of four manuscripts that have been submitted or will be submitted for publication in peer-reviewed journals. Chapter two/ manuscript 1 was derived from the analysis carried out in chapter three/ manuscript 2 , therefore there exists a slight overlap between the contents in these two chapters. The substantive manuscripts included in the dissertation are as follows;

Chapter 2: Ali, WK., Newbold, KB., and Mills, S. (2019). Spatial dimensions of precarious employment in Canada. Submitted to *Canadian Journal of Regional Science*

Chapter 3: Ali, WK., and Newbold, KB. (2019a). Gender, precarious employment and space: Evidence from the Canadian Labor Force Survey.

Chapter 4: Ali, WK., and Newbold, KB (2019b). Geographic variations in precarious employment outcomes between immigrant and Canadian-born populations.

Chapter 5: Ali, WK., and Newbold, KB. (2019c). An analysis of spatial characteristics influencing the spatial patterns of temporary employment in Canada

The various research activities including; the design, implementation, analysis and write up of all four manuscripts were carried out by the dissertation author. The author's

supervisors Professor K. Bruce Newbold and Professor Suzanne E. Mills assisted with guidance in research ideas and editorial reviews for all four manuscripts. Members of the author's supervisory committee, Professor Robert Wilton and Professor Stephanie Premji provided feedback and guidance at all stages of the dissertation. While all four manuscripts are co-authored by the author's supervisors, the sole responsibility for the content of each manuscript rests with the dissertation author.

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CHAPTER 1: Introduction

1.1 Statement of the problem

Precarious employment is a defining feature of the Canadian labor market with far-reaching implications on the health, social relations and economic well-being of Canada's working population (Lewchuk et al., 2013, Lewchuk 2017; Vosko 2006, 2010). This kind of employment is associated with notions of job insecurity, limited or non-existent employment benefits, and low wages (Cranford et al., 2003a, 2003b; Fudge and Owens 2006; Kalleberg 2018; Rodgers 1989; Standing 2011,2015; Vosko 2003).

Within the literature, the concept of precarious employment has considerably varied. According to Cranford et al. (2003b), the main conceptualization of precarious employment in Canada has been through 'non-standard forms of employment' (also see Krahn 1995, 1991) i.e. employment that differs from permanent full-time employment. This includes temporary employment, part-time employment, involuntary part-time employment, and employment in multiple jobs.

According to Statistics Canada (2015), temporary employment has a proposed end date or will end as soon as a specified project is completed. e.g. contract or casual jobs; part-time employment carries less than 30 hours per week of paid work; involuntary part-time employment include persons who could not find employment with 30 or more hours per week because of 'economic slack' or for the reason that full-time employment could not

be found; and multiple jobholders include working persons who are employed in two or more jobs simultaneously, often in other nonstandard work arrangements such as temporary and involuntary part-time employment.

One disadvantage of relying on definitions of 'nonstandard work' is that it is an indirect measure of labor market insecurity (Cranford et al., 2003b). Another disadvantage is that there is growing heterogeneity within the form of employment captured in the definition of 'non-standard work'(e.g. self-employment and temporary employment) (Cranford et al., 2003b). This, in turn, makes it difficult to asses the growth of labor market insecurity (Cranford et al., 2003b). Other studies have conceptualized precarious employment beyond the definitions of non-standard work. For example, Rodgers (1989) lists four dimensions' of 'precariousness' in the labor market. The first dimension is instability i.e. short/limited working arrangements or high risk of employment loss. The second dimension involves insecurity i.e. less control of workers' wages or working conditions as works progressively become insecure. The third dimension is lack of protection i.e. the absence of worker protection through collective bargaining or by law within the workplace. Finally, the fourth dimension involves economic vulnerability i.e. low income/poverty. In a similar vein Standing (2011) examines seven types of labor market security under 'industrial citizenship', common amongst the precariat (i.e. a social class formed by people employed in precarious employment and have no control of their work). They include; labor market security, employment security, job security, work security, skill reproduction security, income security, and representation security.

With respect to measurement, precarious work has been measured by either form of non-standard work i.e. precarious form of employment (PFE) (Cranford et al., 2003; Krahn 1991, 1995) or using detailed characteristics of employment security (Gallie et al., 2017; Lewchuk 2017). The distinction between the form (that captures non-standard work) and characteristics measures of precarious employment are as follows; form measures are widely available using census data and rely on a "binary classification" of employment form (e.g. temporary vs permanent employment) while characteristics explore the ' detailed' degree of insecurity of the forms (e.g. use of indexes to examine the effects of temporary, part-time, self-employment, etc. on social relations, etc.) (Lewchuk 2017). While characteristic measures tend to be a more nuanced measure of labor market insecurity, they were not feasible to measure in this study due to data limitations in census datasets, ultimately resulting in the use of form measures as proposed by Krahn (1991, 1995). Furthermore, although forms of precarious employment (that captures non-standard work) are a limited indicator of labor market security, Cranford et al. (2003b) and Fudge and Vosko (2001) stress on their broader significance in understanding labor market insecurity. Cranford et al. (2003b pg. 9) for example writes " …still, an analysis of non-standard forms of employment is important because as long as the standard employment relationship is the basis for extending labor and social protections to workers… these employment forms (as well as work arrangements) will be linked to precarious employment. A more complete portrait of insecurity in the Canadian labor

market must, therefore, consider the relationship between employment forms and dimensions of precarious employment."

A substantial body of literature has established that certain social groups including women, immigrants, and racialized groups have a greater propensity of being engaged in precarious work in comparison to host populations that are also likely to work in precarious employment (Cranford et al., 2003a, 2003b; Standing 2011, Noack and Vosko 2011; PEPSO 2015; Vosko et al., 2003, 2009)[1]. These social groups face multiple challenges such as ethnocultural barriers, household gender relations, credential recognition issues, and discriminatory employment practices that keep them in precarious employment settings (Bauder 2003a, 2003b; Goldring 2009; Ley 2003; Man 2004; Noack and Vosko 2011; Piore 1979; Premji et al., 2014; Peter 2001; Spalter-Roth and Hartmann 1998; Teelucksingh and Galabuzi 2007). Spalter-Roth and Hartmann (1998), further state that some women may seek to be employed in flexible employment contracts based on their 'care work' responsibilities, ultimately providing the flexible labor supply that meets employers demand.

While studies such as those referenced in the preceding paragraph identify social groups (such as women, members of racialized groups and immigrants) that are particularly at risk of precarious employment, none explicitly approach their research problem from a spatial/geographical lens. Several studies in the literature have established that space is a

[1] These studies either use form or characteristic measures of precarious employment

significant factor shaping labor market outcomes (Jacquemond and Breau 2015; Peck 1996; McDonald 2009; Massey 1984, 1994; Massey and Allen 1984; Soja 1980; Strauss 2018). McDonald (2009 pg. 211) for instance affirms the importance of examining the influence of space in suggesting that "precariousness is created not just by specific job characteristics but by the spatial contexts in which such work occurs. Precarious employment affects individuals in particular locations and is shaped by spatial dynamics." More so " the spatial dimension is part of the dynamic that creates and maintains precarious employment and determines its distribution." McDonald (2009 pg. 212). It is within this context that I examine the spatial dimensions of precarious forms of employment in Canada. In doing so, I capture the salience and complex implications of how and why precarious employment is patterned across Canada's landscape.

By and large, the findings of this dissertation have significant implications for policy and planning as it could better inform the formulation of place-based policies that target Canadian geographies where precarious employment is prevalent in aggregate or along gender and immigration axes. Neumark and Simpson (2015) insist that there is a plausibility that broader economic policies may fail to achieve some of the 'distributional goals' of place-based policies. This is corroborated by several studies that have shown empirical evidence on the positive impacts of place-based policies in enhancing economic performance (Busso et al., 2013; Freedman 2012; Givord et al., 2013; Ham et al., 2011; Hanson 2009; Kolko and Neumark 2010; Reynolds and Rohlin 2014).

1.2 Background context

The sections below provide the contextual background behind the conceptual framework of this dissertation. In the first three subsections, I provide a broad overview of the theoretical literature on; why uneven spatial distribution of economic activity exists in the first place; factors such as flexible capital accumulation that shape the patterning of uneven development, and the effects of flexible accumulation in restructuring labor markets into flexible forms i.e. precarious employment.

In the last three subsections I draw attention to the literature on; the growth of precarious employment under current labor market restructuring and social locations with the greatest propensity of being engaged in precarious work. Lastly, I make the case for the consideration of space in the study of precarious employment both conceptually and empirically.

1.2.1 Theory on the geography of capitalism and uneven development

One of the fundamental questions in the economic geography literature is why the uneven spatial distribution of economic activity exists in the first place? Marxist geography offers one way to explain differences in economic activity. The suite of scholarship positioned within this strand of critical geography has explored the dynamics and determinants of uneven development that has yielded a spatially differentiated pattern of class differences, wage rates, and labor outcomes (Harvey 1975; Massey 1984; Smith 2008). Harvey (1975, 2014) specifically looked into how capital accumulation and

circulation produces and reproduces the patterning of uneven economic development. Capitalism, as Harvey (2014, pg. 7) writes is "any social formation in which processes of capital circulation and accumulation are hegemonic and dominant in providing and shaping…social life." This argument is established in his "spatial fix" thesis where he reconstructs Karl Marx's theory of the geography of capitalist accumulation (Harvey 1975, 1982, 1985, 2001).

The idea of the spatial fix was to show that "(a) capitalism could not survive without being geographically expansionary (and perpetually seeking out "spatial fixes" for its problems), (b) that major innovations in transport and communication technologies were necessary conditions for that expansion to occur (hence the emphasis in capitalism's evolution on technologies that facilitated speed up and the progressive diminution of spatial barriers to movement of commodities, people, information and ideas over space) and (c) its modes of geographical expansion depended crucially upon whether it was the search for markets, fresh labor powers, resources (raw materials) or fresh opportunities to invest in new production facilities that was chiefly at stake." (Harvey 2001 pg. 25-26). The spatial fix thesis suggested by David Harvey is the basis of uneven geographic development that is continuously transformed during "the continuous restructuring of spatial configurations through revolutions in value" (Harvey 1982, pg. 426). Whether Capitalism "spatial fix" as explained by Harvey (1975) will continue to expand or has reached its saturation point is an open question for discussion.

On the other hand, Smith (2008 pg. 6) insists that uneven geographical development "derives specifically from the opposed tendencies, inherent in capital, toward the differentiation but simultaneous equalization of the levels and conditions of production." The tendency towards equalization according to Smith (2008) occurs as a result of capitalism's spatial expansion, resultantly drawing workers into wage-labor relations that are often precarious. Furthermore, the tendency towards differentiation involves the spatial division of labor at various scales; they include; (a) the general societal division of labor (and capital) into different departments; (b) the division of labor (and capital) in particular various sectors; (c) the division of the social capital between the various individual capitals; (d) the detail division of labor within the workplace (Smith 2008). In a similar vein, Massey (1984) examines how the 'combination' of different 'spatial structures of production' merge to form the 'spatial division of labor' that shape patterns of uneven economic development. Put in other words, the geography of capitalism could be imagined in terms of the continuous 'depositing of investment' across landscapes (Massey 1984). Sometimes these investments are deep and other times shallow (Massey 1984). These investments interact with spatial structures of production to influence the division of labor and produce geographies/patterns of uneven development (Massey 1984).

1.2.2 Flexible capital accumulation

The patterning of uneven development (mentioned above) across space is further intensified by the "flexible accumulation of capital "(Harvey 1990). Harvey (1990)

characterizes flexible accumulation as follows; 'flexible accumulation, as I shall tentatively call it, is marked by a direct confrontation with the rigidities of Fordism. It rests on flexibility with respect to labor processes, labor markets, products and patterns of consumption. It is characterized by the emergence of entirely new sectors of production, new ways of providing financial services, new markets and above all, greatly intensified rates of commercial, technological and organizational innovation." (Harvey, 1990, pg. 147). The regime of flexible accumulation is maintained through labor control' (i.e. through a combination of repression, habituation, co-optation, and co-operation) within the workplace and throughout society (Harvey 1990).

It is well established that the response of flexible accumulation was widespread under the Fordist Keynesian system (Harvey 1990). When we compare economic regimes under the Fordist Keynesian system to that of post-Fordism (Neoliberalism) we observe contrasting economic systems with diverse effects on labor relations. Under the Fordist-Keynesian system, economies were primarily (but not only) regulated at the level of the nation-state and employment under SER was characterized by permanent and full-time employment contracts, often protected by collective bargaining arrangements. More so, workers generally had one employer and access to benefits and entitlements (Fudge and Owens 2006; Fudge and Vosko 2001; Rodgers 1989; Schellenberg and Clarke 1996; Tilly 1996; Vosko 2000)[2]. This was the basis of the Standard employment Relationship (SER) model of employment. According to Harvey (1990), this system of production was inflexible

[2] Note that not all groups of workers had SER under the Fordist-Keynesian system

and encountered difficulties (rigidities) in terms of both long term and large-scale fixed capital investments in mass production systems, and labor markets, labor allocation, and labor contracts. These rigidities under Fordism paved the way to a new form of flexible accumulation (under Post-Fordism) with consequential effects including; labor market restructuring, fast destruction, and reconstruction of skills and the rollback of union power (Harvey 1990).

1.2.3 Flexible firms and labor market segmentation

The restructuring of the labor market under conditions of flexible accumulation is also examined by other authors who write on Labor Market Segmentation (LMS) theory (Bauder 2001; Doeringer and Piore 1971; Gordon,1972; Gordon et al., 1982; Hiebert 1999; Peck 1996; Piore 1979; Vietorisz and Harrison 1973; Wilkinson 1981). These works can be agglomerated in terms of a simple twofold breakdown, i.e. the segmentation of labor demand, and the segmentation of labor supply.

With respect to segmentation of labor demand, Peck (1996) and Piore (1979) insists that pressures of flexibility are causing firms to restructure and segment their workforce into a dual element i.e. a core element that is relatively secure and a peripheral element with workers engaged in precarious employment. The amount of labor provided to peripheral workers always fluctuates to demand requirements (Peck 1996). Other demand-side causes of segmentation according to Peck (1996) include fractionalized industry structures and labor control strategies utilized by employers. Bauder (2001 pg. 39) on the

other hand conceptualizes the demand side of LMS theory in a spatial context when he states that "demand-side approaches remain popular especially as explanation for spatial divisions in the labor market. For instance, the segmentation of inner-city minorities in the USA is often seen as an effect of industrial restructuring and decentralization of employment…This demand-side approach expresses spatial divisions in the labor market as an accessibility issue whereby segmented jobs are unevenly arranged in space and simply not available in some places like inner cities." Processes underlying the spatial division of labor is illustrated by Kandel and Parrado (2005) who show how the rapid restructuring of the meatpacking industry in rural Midwest and Southeast, USA, has channeled the migration of Hispanic immigrants in rural areas to fill labor shortages within the precarious secondary segments of the industry. Nelson et al. (2015) comparatively illustrate how precarious labor regimes filled by Latino and Latina immigrants have been reinforced in rural spaces (Georgia and Colorado) in the face of rural gentrification.

With respect to the segmentation of labor supply, Peck (1996) maintains that the supply of workers into the labor market is socially regulated in terms of household division of labor (in shaping labor market participation) and the stigmatization of women, immigrants, and ethnic minorities as "precarious' secondary workers. The stigmatization of certain social groups as secondary workers is evident in Hiebert (1999) study where he provides evidence of labor market segmentation across space within Canadas largest metropolitan areas (Toronto, Vancouver, and Montreal). Key findings in Hiebert (1999)

study showed that racialized women and men were over-represented in secondary occupations, and racialized immigrant women were persistently trapped in low paid insecure (precarious) employment. Hiebert (1999) further finds that segmentation took different forms within these large metropolitan areas, resulting in uneven gender and ethnic patterns across space. The broader spatial differences uncovered in Hiebert (1999) study "reinforce rather than undermine gender and ethnic patterns: groups that capture the most desirable jobs in one place tend to replicate their success in other places, while groups in less advantageous positions appear to have little to gain by migrating to other urban labor markets" (Hiebert 1999 pg. 364).

1.2.4 Spread of precarious employment

The restructuring of labor markets has been widespread across industrial economies. This is affirmed by statistics from the International Labour Organization that indicate that 1.4 billion workers were employed in vulnerable forms of employment in 2017 (ILO 2017), a number which includes "workers [that] have a lower likelihood of having formal work arrangements [full- time stable jobs] and are therefore more likely to lack elements associated with decent employment such as adequate social security" (ILO 2010, pg.18). Globally, this figure is projected to grow by 11 million per year (ILO 2017). In Canada, the likelihood of being employed informal work arrangements is also declining. In 2015 for example, less than half of the employed population (49.8%) aged 25 to 54 worked in full-time, full-year jobs (Statistics Canada 2017a). More so, the period from 2005 to 2015 saw an overall shift from full-time, full-year employment to precarious part-time work

(Statistics Canada 2017a). The spread of precarious employment has been documented in Canada (and elsewhere) by numerous authors (Field et al., 2018; Jacquemond and Breau 2014; Krahn 1991,1995; Noreau 1994; Vosko et al., 2009) from the 1970s to the 2000s. This is reflected in figure 1.1 with the growth of non-standard work since 1997.

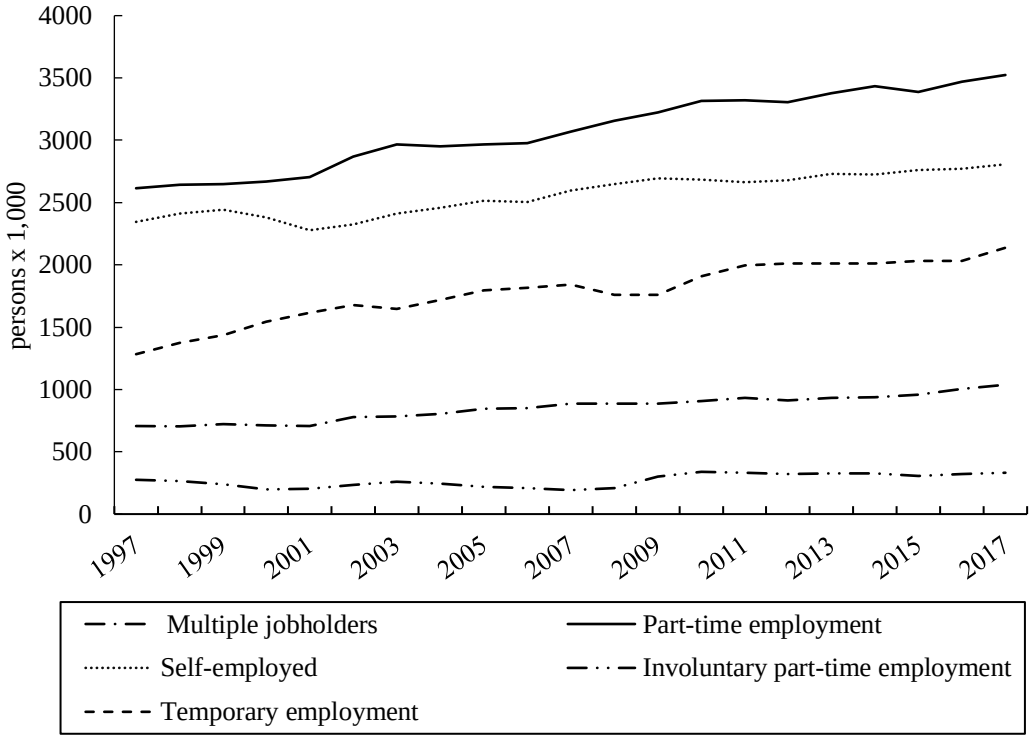

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Figure 1. 1: Growth of non-standard work by category, Canada, 1997-2017.

Source: Statistics Canada, tables 282-0002, 282-0036, 282-0012, 282-0014, and 282-0080.

Krahn's work is notable due to similar measures of precarious employment as this dissertation (i.e. the form measure). Moreover, Krahn (1991, 1995) builds the case that Canada has experienced increased precarious employment, as the results in his study illustrate the growth in precarious employment from the 1970s through the 1990s using

the General Social Survey (GSS). With respect to temporary employment, Krahn (1995) notes that 8% of employees identified themselves as temporary workers in 1989, increasing marginally to 9% in 1994 and following the 1990-92 recession. Recent studies using the LFS further reveal that the growth of temporary employment outpaced permanent ones from 1997 to 2017 (5.3% versus 1.4% respectively) (Fields et al., 2018)

Moving to part-time time employment rates, Krahn (1995) also observed that this form of paid work increased slowly during the 1970s, followed by an accelerated trend in the 1981-82 recession (from 13% in 1981 to 15% in 1983). While part-time employment rates were stable between 1983 and 1990, they rose to 17% following the 1990-92 recession, before stabilizing at approximately 19% from 1994 to 2015 (Statistics Canada 2017b). Recent statistics show that from 2015-2016, part-time employment accounted for most of the annual labor growth with an increase of 80,000 (+2.4%) jobs, in comparison to 53,000 (+0.4%) jobs for to full-time employment (Bourbeau and Fields 2017). More so, the last time part-time employment increases surpassed those of full-time was in 2009 (Bourbeau and Fields 2017). After all economic lag effects from the 2008 financial crisis were evident in 2009.

Partly because of the growth in part-time employment in the previous decade, the number of people holding multiple jobs has also increased (Krahn 1995). Specifically, of the total labor force, between 1989 and 1994, multiple job holders from 5% to 7%, respectively. Among people aged 25 to 54, 5.6% worked multiple jobs, while just 4.3% of people 55

and older worked multiple jobs. Furthermore, updated statistics using LFS data on multiple job holding shows that the proportion of employed in this type of paid work in 2016 was 5.5%, a slight increase from 2015 (+0.2 percentage points), and the highest on record using comparable LFS data since 1987, with youth aged 15-24 more likely to work multiple jobs (7.2% in 2017) (Bourbeau and Fields 2017).

While Krahn (1991, 1995) shows the growth of non-standard forms of employment in the early 1990s, other authors e.g. Vosko et al. (2003) state that non-standard work stabilized in the latter half of the 1990s. Cross (2015) on the other hand further points that the share of precarious "contingent" workers in Canada has not increased significantly in the 20th century and that any increases in precarious work are not due to structural labor market changes but as a result of lifestyle choices and demographic shifts. He insists on this when he writes "the share of those jobs [precarious] has not increased significantly and, anyway, the vast majority of people who work part-time do so voluntarily, not for lack of other options. Meanwhile, self-employment is growing as a lifestyle choice among older Canadians, especially in the strongest provincial economies. Given workers' demand for part-time work and self-employment, we should worry not about the rise of these kinds of jobs, but whether the economy is creating enough of them to ensure maximum labor participation for the students and older workers who would prefer to have them. Currently, it is not" (Cross 2015).

1.2.5 Precarious employment and socio-demographic factors

It is unlikely that engagement in precarious employment is spread evenly across society. Indeed, a substantial body of literature has shown that certain social groups such as women, immigrants, and members of racialized groups have a greater propensity of being engaged in precarious work in comparison to host populations (Cooke-Reynolds and Zukewich 2004; Cranford and Vosko 2006; Cranford et al., 2003a, 2003b; Fuller and Vosko 2008; Noak and Vosko 2011; PEPSO 2013, 2015; Spalter-Roth and Hartmann 1998; Standing 1989, 1999, 2011; Teelucksingh and Galabuzi, 2007; Vosko 2000, 2003; Vosko et al., 2003; Young 2010).

On gender, Cranford et al. (2003b) (using form measures of precarious work) finds that women were more likely to be employed in part-time and temporary employment than men between 1989 and 2001. Cranford et al. (2003b) findings clearly demonstrate the feminization of employment norms "characterized by both continuity and change in the social relations of gender" (Cranford et al., 2003b pg. 454). Cranford et al. (2003b) further insists that one of the facets of the feminization of employment norms (that increased in Canada in the 1990s) could be conceptualized by " the gendering of jobs to resemble more precarious so-called "women's work"—that is, work associated with women and other marginalized groups" (Cranford et al., 2003b, pg. 460). The aforementioned excerpt from Cranford et al. (2003b) raises a series of important questions on why work gendered as feminine is often precarious? The answer to this is

statistically explained by the high concentration of women in precarious service industry occupations that parallel their traditional gender roles (Benoit 2000; Moyser 2017).

With respect to the former, Moyser (2017) shows that in 2015, the three industries with the greatest share of women (relative to men) were health care and social assistance (82.4%), educational services (69.3%), and accommodation and food services (56.0%) (Moyser 2017). On the latter, Moyser (2017) further finds that in 2015, 59.2% of women were employed in 'traditionally female occupations' (often precarious) involving the "5 Cs" i.e. caring, clerical, catering, cashiering and cleaning compared to 17.1% of men were employed in these occupations. The concentration of women in precarious industries that parallel their traditional gender roles is further intensified by the overall growing wage inequality between men and women within occupations (Moyser 2017). Moyser (2017) specifically notes that in 2015 women earned $0.87 for every dollar earned by men ($26.11 per hour for women divided by $29.86 per hour for men) (see figure 1.2).

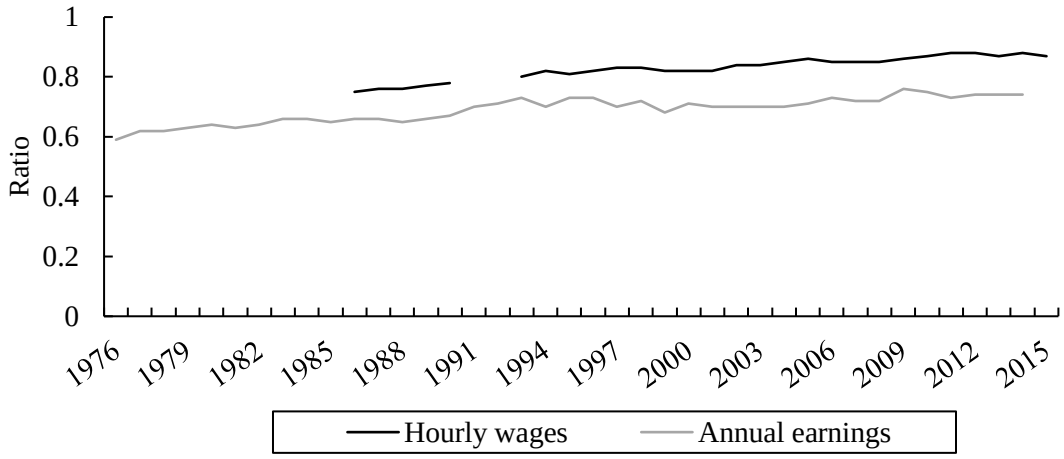

Figure 1. 2: Gender pay ratio of workers aged 25 to 54, Canada, 1976 to 2015

Source: Moyser (2017). Note: Blank gaps in the line graph indicate that data was not available for the specific reference period.

With respect to immigration, it has been widely established that immigrants in the Canadian labor force (in comparison to their Canadian-born counterparts) are more likely to be employed in precarious forms of wage work that is insecure, low paid and in some cases does not commensurate with their human capital (Cranford et al., 2003a: Cranford and Vosko 2006; Noack and Vosko 2011; Vosko et al., 2003). Additional studies have depicted the broader economic disadvantage faced by immigrants relative to the Canadian-born population (Aydemir 2003; Aydemir and Skuterud 2005; Baker and Benjamin 1994; Bauder 2003a; 2003b; Frenette and Morissette 2005 Reitz 2007; Picot and Sweetman 2005), with key findings including low returns to education value for immigrants (Ferrer and Riddell 2004; Reitz 2007); falling entry earnings across successive immigrant cohorts (Aydemir 2003; Aydemir and Skuterud 2005; Baker and Benjamin 1994; Frenette and Morissette 2005; Vosko et al., 2003); deskilling and

downward mobility in the labor market as a result of cultural segmentation (Bauder 2003a; 2003b; Creese and Wiebe 2009). Some studies further examining labor market inequalities along intersecting social locations of race and immigration status reveal that racialized immigrants encounter high levels of unemployment, underemployment and lower income levels than their non-racialized immigrant counterparts (Block et al., 2014; Cheung 2005; Cranford et al., 2003b; Pendukar and Pendukar 1998; Teelucksingh and Galabuzi 2007).

Other studies present the case that the devaluation of immigrant labor is associated with the workings or operations of cultural capital in society (Bauder 2001, 2003a: 2003b, 2005; Creese and Wiebe 2009). Creese and Wiebe (2009), for instance, show that the failure for immigrants to have their credentials recognized by employers as well as the presence of forms of embodied cultural capital (such as accents, cultural knowledge or work experience) contributes to the deskilling and downward mobility of immigrants in the Canadian labor market (Creese and Wiebe, 2009). Bauder (2003a) corroborates Creese and Wiebe's (2009) findings by suggesting that the devaluation of immigrant labor could also be correlated with one's habitus in society. This notion is studied by Bauder (2005) in his examination of "the barriers associated with workplace conventions and hiring practice" (confronted by immigrants in the labor market). Bauder (2005) makes the argument that immigrants may be unable to internalize the codes of conduct of the Canadian workplace. Moreover, they may be unfamiliar with the norms and

conventions of the hiring processes or unable to judge the employer's expectations (Bauder 2005).

1.2.6 Geography matters! The need for a spatial perspective

As outlined above, there have been substantial advances in how precarious employment is shaped by social locations or form of employment (Vosko 2006). Missing from the body of literature (within the Canadian context) is a comprehensive examination of whether geography matters! This gap creates a lack of understanding of how and why precarious work manifests and shapes itself across space. Although there is a dearth of literature examining the comprehensive spatial patterning of precarious forms of employment, there have been advancements in the examination of space in the study of precarious employment 'empirically' beyond the Canadian context. Jacquemond and Breau (2014), for instance, used detailed spatial data to find spatial clusters of low levels of precarious employment in the northern regions of France. They also find that precarious employment is predominantly a rural phenomenon in France except for temporary (interim) work which shows higher average levels in urban communes.

Within Canada, few studies have attempted to add a spatial element when examining the uneven geographies of precarious work (with limited geographic coverage). Noack and Vosko (2011), for example, look at how spatial context (within Quebec and Ontario) influences precarious work. In their analysis, they show that Ontario and Quebec have had a consistent share of workers in precarious work from 1999 to 2009. In the case of

Ontario, this consistency has occurred despite the erosion of collective bargaining and the greater dependence on weaker employment standard regulations since the early 1990s (Noack and Vosko 2011; Thomas 2009). A different story is depicted in Quebec which experienced a slower decline in unionization and improved employment standard regulations from 1984 to 2002 (Noack and Vosko 2011; Jackson 2004). As such Noack and Vosko (2011) suggest that labor regulations may not decrease the prevalence of precarious employment where workers lack control over the labor process through limited provisions of the mechanism of collective representation. However, these studies have been limited by their focus on Ontario and Quebec, while greater attention to a range of spatial scales, including all provinces and the metropolitan scale is needed to better understand the spatial patterning of precarious employment across Canada's landscape.

Other studies theorize the broad relationship between space and labour market outcomes by gender and immigration status (Hanson and Pratt 1988, 1995; Hanson et al., 1997: Isserman and Rephann 1993; Jones and Rosenfeld 1989; Lee and Schultz 1982; Massey 1994; McDonald 2009; Mcdowell and Massey 1984; McDowell et al., 2009; Peck and Theodore 2001; Sackmann and Haussermann 1994, Taylor et al., 2019). These studies have been useful in theorizing the complex implications of spatial arrangements on gendered labor market outcomes. Nonetheless, they pay little to no attention to precarious employment.

Hanson et al. (1997), for instance, theorizes the impacts of space on gendered labor market outcomes at a regional scale. They argue that in different regions, people have different attitudes as to what is considered "appropriate" work for women. In the USA, Powers et al. (2003) show that regional differences in "appropriate women's work" and "gender-role attitudes" were persistent in the 1990s, with Southerners having more traditional attitudes than whites in other parts of the USA. Similar generalizations are made by studies examining the German labor market where different regional cultures shape women's labor force participation (Sackmann and Haussermann 1994). Moreover, since work is gendered, women and men are disproportionally represented in various industries and occupations (across regional space), with women over-represented in low status-precarious jobs in the service industry (Hanson et al., 1997; Moyser 2017). Second, social network (e.g. place-based networks used in job seeking) across and within space can be a constraining or contributing factor to economic success for women and men (Gilbert 1998; Hanson and Pratt 1991, 1995; Hanson et al., 1997).

Third, Hanson et al. (1997) argue that the spatial constraints that women experience shape their employment expectations. Other studies build on Hanson's proclamation on gendered mobility patterns to conclude that the maintenance of precarious employment in poorer regions is associated with labor immobility and 'inadequate labor market adjustment' (MacDonald 2009). For example, in Canada, the inelasticity of women's labor supply, due to spatial mobility constraints, holds women captive in precarious jobs (MacDonald 2009). Alternatively, MacDonald (2009) presents the argument that spatial

labor mobility can be a factor maintaining precarious work, given the availability of labor willing to commute large distances to fill precarious jobs. Premji (2017) empirically fills the void in the literature on gender, immigration, and mobility patterns by demonstrating how immigrant women (precariously employed) in Toronto 's metropolitan area experience spatial entrapment, as indicated by their less-localized labor market and long (often 'unfamiliar, complex and unsafe') commuting times. The arguments above made by Hanson et al. (1997) and others are contributing factors as to why we might expect precarious employment to vary over space – as well as why gender /immigration patterns might vary over space.

1.3 Research objective and questions

The overarching objective of this dissertation is to examine how and why precarious forms of employment (PFE) are spatially patterned across Canada's landscape. To achieve this objective, four research questions are developed and addressed. They are as follows;

RQ1. How are precarious forms of employment (PFE) patterned across space?

RQ2. Are there gender differences/similarities in the spatial patterning of precarious forms of employment (PFE)?

RQ3. Are there differences/similarities in the spatial patterning of precarious forms of employment(PFE) by immigration status?

RQ4. What spatial characteristics influence the spatial patterns of temporary (precarious) employment across Canada's CMA/CA?

1.4 Outline of the dissertation

This dissertation comprises of chapters including the introduction (chapter 1) and conclusion (Chapter 6). Chapters 2 to 5 compromise four independent but interconnected manuscripts. Following this introductory chapter, chapter 2 broadly examined how PFEs are spatially patterned across Canada's landscape. This chapter specifically compares different PFEs (i.e. temporary employment, part-time employment, involuntary part-time employment and employment in multiple jobs) across a range of geographies (i.e. national, provincial, census metropolitan areas and urban/rural areas). Chapters 3 and 4 builds upon the findings of the previous chapter by examining how PFEs are spatially patterned across social locations of gender and immigration status respectively. Chapter 5 analyzes the labor supply and demand factors influencing the spatial patterns of precarious employment (temporary employment) across Canada's CMAs and /CAs. The concluding chapter (chapter 6) highlights the key findings from all four manuscripts and its contributions in the Economic Geography literature. The limitations of the dissertation as well as future avenues for research are also presented in this chapter.

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CHAPTER 2: Spatial dimensions of precarious employment in Canada

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2.1 Abstract

Using Statistics Canada's 2011-2016 Labor Force Surveys, this paper examines the spatial dimensions of precarious forms of employment (PFE) in Canada. We first compare different PFEs across a range of geographies including national, provincial, census metropolitan areas and urban/rural areas. The results show that different PFEs exhibited distinct spatial patterns across space and scale. Second, using logistic regression models, results show that patterns in PFEs were reinforced by factors such as immigration status, gender, age, education, and income. These models further confirm that spatial variations in PFEs were robust even when controlling for socio-demographic and socio-economic effects. Taken together, these marked spatial patterns advances our understanding of the spatial divisions of precariousness in Canada.

2.1 Résumé

Utilisant l'enquête sur la population active de Statistique Canada de 2011-2016, cet article examine les dimensions spatiales des formes précaires d'emploi (FPE) au Canada. Nous comparons d'abord différentes FPE à travers diverses échelles spatiales telles que l'échelle nationale, provinciale, les aires métropolitaines et les zones urbaines/rurales. Les résultats montrent que différentes FPE ont des répartitions spatiales distinctes selon les échelles. Utilisant des modèles de régression logistique, les résultats montrent que ces répartitions spatiales sont

renforcées par des facteurs tels que le statu d'immigration, le sexe, l'âge, l'éducation et le revenu. Ces modèles confirment que la répartition spatiale des FPE sont robustes quels que soient les effets socio-démographiques et socio-économiques. Ces résultats augmentent notre compréhension sur la répartition spatiale de la précarité au Canada.

2.2 Background

Work is at the core of people's lives, playing an important role in the stability of families and societies. Most formal work arrangements are characterized by stable employment patterns, better working conditions (with good fringe benefits) and higher wages. Yet in Canada, the likelihood of being employed informal work arrangements (i.e. full-time permanent employment) is declining. In 2015 for example, less than half of Canada's working population (49.8%) aged 25 to 54 worked in full-time, full-year jobs (Statistics Canada 2017). This finding is corroborated by Statistics Canada data from 2005-2015, showing a decline in the Standard Employment Relationship (SER), based on full-time secure work (Statistics Canada 2017).

Employment under the SER model is generally characterized as permanent and full-time, and often protected by collective bargaining arrangements. Workers under this model generally have one employer and access to benefits and entitlements that complete their social wage (Fudge and Owens 2006). Labor laws, legislation, and policies, as well as union practices, are normally based on this model (Fudge and Vosko 2001; Vosko 1997). The SER model, nonetheless, no longer reflects the reality of the Canadian labor market in the 21st century (Cranford et al., 2003a; 2003b; Vosko et al., 2003). Several studies

have revealed substantial evidence documenting the growth of non-standard employment relationships (non-SER) (Vosko 2006; 2010; Vosko et al., 2009). This is further reflected in figure 2.1. Figure 2.1a specifically shows that from 1997 to 2007, temporary employment grew at a faster pace than permanent employment (43.5% versus 23.2% respectively)(Statistics Canada 2009). More so, the share of all workers in temporary employment increased from 11.3% in 1997 to 12.9% in 2007 and from 12% in 2016/2017 to 13.6% in 2017/2018 (Hardy et al., 2018; Statistics Canada 2009). The index in Figure 2.1b, on the other hand, shows an increase (more than double) in the number of workers employed on a part-time basis in the last three decades (prior to 2005)(Statistics Canada 2009). In 1976 one in 8 workers were employed on a part-time basis compared to 1 in 5 in 2017(Patterson 2018; Statistics Canada 2009).

Fig 2.1a

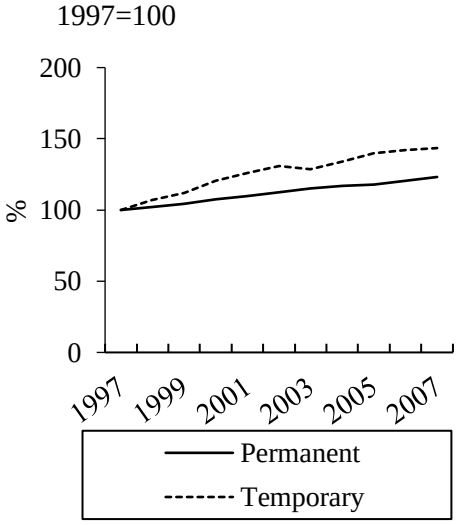


Fig 2.1b

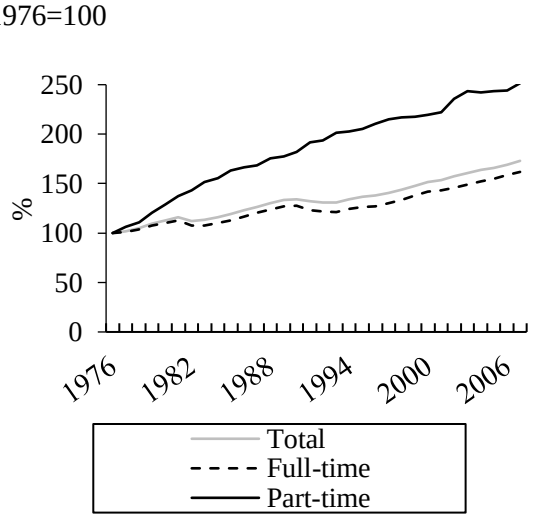


Figure 2. 1: Employment indexes, by job permanency (Fig 2.1a) and type of work (Fig 2.1b)

Source: Statistics Canada (2009). Reproduced and distributed on an "as is" basis with the permission of Statistics Canada.

The labor market shift from SER to non-SER is attributed to a combination of economic and social changes including labor market regulations, macroeconomic fluctuations, technological changes, and personal choices for flexible work arrangements (Statistics Canada 2017). Collectively, the aforementioned economic changes have resulted in the growth of precarious employment. Precarious employment is a term used to describe non-standard employment arrangements that are generally characterized by low income, lack of control over the labor process, high levels of uncertainty and a lack of regulatory protection (Cranford et al., 2003a; Fudge and Owens 2006; Rodgers 1989; Standing 2011).

Within the literature precarious employment has been measured in varied ways i.e. by either form of non-standard work i.e. precarious form of employment (PFE) (Cranford et al., 2003a, 2003b; Krahn 1991, 1995) or using detailed characteristics of employment security (Gallie et al., 2017; Lewchuk (2017). The distinction between the form (that captures non-standard work) and characteristics measures of precarious employment are as follows; form measures are widely available using census data and rely on a "binary classification" of employment form (e.g. temporary vs permanent employment) while characteristics measures explore the 'detailed' degree of insecurity of the forms (e.g. use of indexes to examine the effects of temporary, part-time, self-employment, etc. on social relations, etc.) (Lewchuk 2017). While characteristic measures tend to be a more nuanced measure of labor market insecurity, they were not feasible to measure in this study due to data limitations in census datasets, ultimately resulting in the use of form measures as

proposed by Krahn (1991, 1995). These form measure that deviate from the standard employment relationship (SER) of full-time permanent wage work include; temporary employment (employment that has a predetermined end date such as contract or casual jobs); part-time employment (employment that carries less than 30 hours per week); involuntary part-time employment (part-time employment that includes persons who could not find employment with 30 or more hours per week because of economic slack or for the reason that full-time employment could not be found); and multiple job holders (working persons who are employed in two or more jobs simultaneously, often in other nonstandard work arrangements such as temporary and involuntary part-time employment) (Statistics Canada 2015).

One disadvantage of relying on definitions of 'nonstandard work' is that it is an indirect measure of labor market insecurity (Cranford et al., 2003b). Another disadvantage is that there is growing heterogeneity within the form of employment captured in the definition of 'non-standard work'(e.g. self-employment and temporary employment- both of which are composed of sub-classifications of other non-standard employment e.g. temporary employment is comprised of fixed-term or contract, casual, agency and seasonal employment) (Cranford et al., 2003b). This, in turn, makes it difficult to asses the growth of labor market insecurity (Cranford et al., 2003b).

Although forms of precarious employment (that captures non-standard work) are a limited indicator of labor market security, Cranford et al. (2003b) and Fudge and Vosko

(2001) stress on their broader significance in understanding labor market insecurity. Cranford et al. (2003b pg. 9) for example writes " …still, an analysis of non-standard forms of employment is important because as long as the standard employment relationship is the basis for extending labor and social protections to workers… these employment forms (as well as work arrangements) will be linked to precarious employment. A more complete portrait of insecurity in the Canadian labor market must, therefore, consider the relationship between employment forms and dimensions of precarious employment."

In Canada, there has been extensive research focus on the variability and frequency of PFEs at the national level (Cranford et al., 2003a, 2003b; Krahn 1991, 1995; Vosko et al., 2003; Noak and Vosko 2011). These studies in some way employ the same measure of precarious work as this study i.e. from a form measure. On the other hand, there is a dearth of literature on the geographic variation of PFEs within Canada and at sub-national levels. McDonald (2009 pg. 211) affirmed the importance of examining the influence of space in suggesting that "precariousness is created not just by specific job characteristics but by the spatial contexts in which such work occurs. Precarious employment affects individuals in particular locations and is shaped by spatial dynamics." More so " the spatial dimension is part of the dynamic that creates and maintains precarious employment and determines its distribution." McDonald (2009 pg. 212). As such, much can be learned from a greater focus on how precarious forms of employment can vary by levels of geography.

In line with this, we examine how distinct PFEs - including temporary employment, part-time employment, involuntary part-time employment, and multiple jobholders vary across a spectrum of spatial scales including national provincial, Census Metropolitan Areas (CMAs) and urban/rural areas. With respect to scale, it is imperative to note that a suite of scales is chosen in congruence with complexity science/theory that stresses the importance of engaging in research across a range of scales. Specifically, this theory recognizes the significance of "processes at multiple and inter-locking geographic scales in "a system marked by constant change and emergence."(O'Sullivan et al., 2006: 614). Similarly, MacDonald (2009: 211) states that a focus on multi-scalar analysis "brings the importance of space to the forefront, as the socially produced scales of regulation, policy discourse, and individual action interact with geography". In this way, knowing what is occurring at one scale enables comparisons with other scales.

Several studies have taken a multi-dimensional approach when making meaningful connections between space and labor market outcomes (Hanson et al., 1997, Herod 2003; Jacquemond and Breau 2015; MacDonald 2009; McDowell et al., 2009; Peck and Theodore 2001). These studies nonetheless 1. Do not examine the heterogeneity among PFEs that fall outside the SER 2. Fail to examine the prevalence of PFEs from a multi-scalar approach across an array of geographies or 3. Are situated beyond the Canadian context. Peck and Theodore (2001) for example shows how at an intra-urban/metropolitan scale (in Chicago's inner cities), temporary agencies are actively engaged in the facilitation and exploitation of racialized populations into precarious settings. Somehow

similar findings are reported by McDowell et al. (2009) in the metropolitan scale in the U.K context. Jacquemond and Breau (2015) on the other find spatial clusters of low levels of precarious employment in the northern regions of France. They also find that precarious temporary (interim) work was higher in urban geographies. Modeling results in their study further suggest that the spatial distribution of precarious forms of employment is linked to factors such as the unemployment rate, the industrial composition of a region, gender and the structure of family households. Premji's (2017) study situated in Toronto's metropolitan area examines themes of "spatial access to employment" that precarious workers struggle with within urban areas.

Meaningful spatial divisions in precarious labor outcomes are also observed at the rural scale. In the United States, for example, Nelson et al. (2015) show how Latino and Latina immigrant are recruited into 'precarious labor regimes' in the service and construction sector within rural geographies (Georgia and Colorado) undergoing gentrification. In Canada, an inherent distinction between rural and urban areas is the high incidence of seasonal precarious jobs in rural labor markets (Stanford et al., 2004; Rothwell 2002). MacDonald (2009) for instance argues that the maintenance of precarious employment in poor rural regions is linked with spatial labor immobility and inadequate labor market adjustment (MacDonald 2009). With respect to the former, spatial labor mobility constraints may be an enabler to spatial entrapment in localized rural precarious labor markets (MacDonald 1999; Macdonald and Peters 1994; MacDonald 2009). Alternatively, MacDonald (2009) presents the argument that spatial

labor mobility can be a factor maintaining precarious work, given the availability of labor willing to commute large distances or migrate permanently or temporarily for low paying precarious jobs.

In summary, the literature points to the growth in PFEs in the Canadian labor market. Studies examining broader labor processes with a geographical lens have been useful in theorizing the complex implications of spatial arrangements on labor market outcomes. However, missing from the surveyed literature is specifically how PFEs manifests and shapes itself across space and scale. In line with this, the underlying aims of this paper are as follows: 1) to examine the spatial patterning of PFEs in Canada, focusing on a suite of geographic scales including the national, provincial, CMAs and urban/rural areas 2) to explore socio-demographic, socio-economic and Spatio-temporal correlates of PFEs, and assess whether spatial patterns of PFEs are robust when controlling for socio-demographic and socio-economic effects. Based on the theoretical underpinnings in the literature, we hypothesize that differences in PFE vary over multiple scales. Exploring each of these aims advances our understanding of precarious employment and its spatial contours. This advancement has implications for the formulation of place-based economic policies as spatial patterns of PFEs might help us identify population profiles and geographic areas of high precarious employment, where economic policies may be beneficial to improve economic growth.

2.3 Methods

2.3.1 Data and sample

The data in this study were drawn from the 2011-2016 Labor Force Surveys (LFS) administered by Statistics Canada. This survey provides monthly-nationwide estimates on the labor force status of Canada's population. Labor market estimates for each sample are broken down by socio-economic, socio-demographic and geographic population characteristics. The target population of the LFS includes household residents who are 15 years of age or older. Exemptions include populations in aboriginal reserves, remote areas, institutions, and Canadian Forces bases. The LFS collects data from all ten provinces (at a variety of spatial scales) and three territories. Statistics Canada, however, does not include estimates for the territories with the national total due to differences in methodology (in sample design and rotation pattern) from the 10 provinces. Estimates for the territories are calculated and reported separately as moving averages and are not included with the monthly provincial totals.

The LFS sample size typically includes 100,000 individuals representing 56,000 households. The LFS follows a rotating panel sample design, with data collected from the same subsample for six consecutive months, with each month consisting of six sub-samples. In any given month, the survey drops 1 sub-sample after completing its 6 months stay in the survey. A new sub-sample is then drawn to replace the dropped respondents. The use of a rotating panel sample design results in a month to month sample overlap occurring over five to six consecutive months. To ensure that the samples

in this study do not overlap, January and July samples were focused on, thus ensuring that the two months are within separate rotating panels and have unique household identifications. The study sample was then restricted to include Canada's population who are 25-64 years of age, employed and not full-time students.

2.3.2 Method of analysis

We conducted both descriptive and multivariate statistics using SAS 9.4. The first stage used descriptive statistics to characterize PFEs, including temporary employment, part-time employment, involuntary part-time employment and employment in multiple jobs. Frequencies for each PFE were calculated at the national, provincial, CMA and urban/rural geographic levels. While some of our focus is at the CMA scale (figure 2.2), we are also interested in variations in precarious employment across the urban-rural spectrum, with this spectrum differentiated by seven levels ranging from CMAs to non-CA rural areas. Statistics Canada's LFS dictionary defines each of the urban/rural geographies used in this paper.

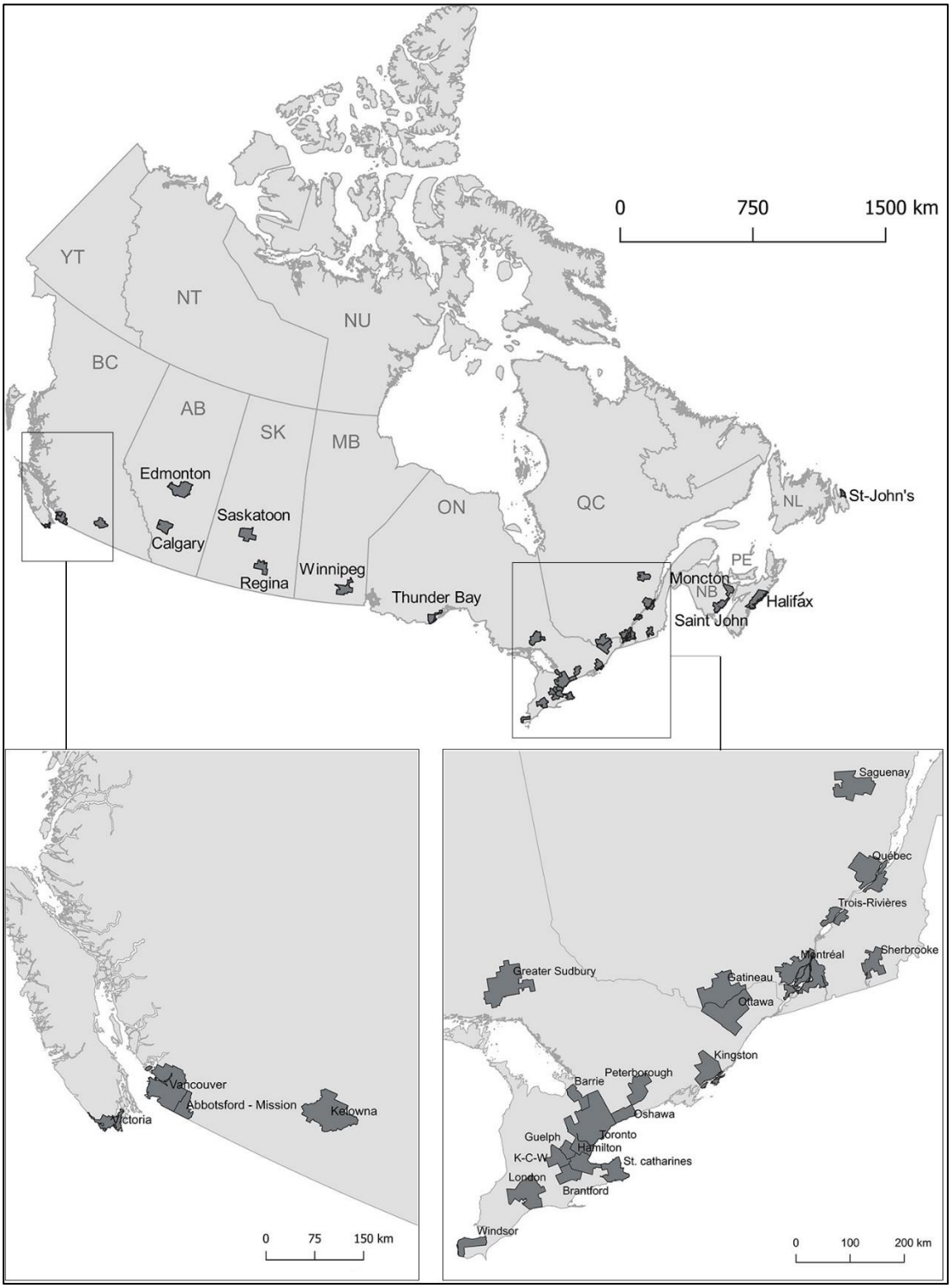


Figure 2. 2: Map of Canadas census metropolitan areas

The second stage used logistic regression analysis to examine the relationship between sociodemographic, socioeconomic, spatial and temporal variables for each of the four types of PFE. Logistic regression models were also used to asses whether geography is a significant determinant of precarious employment when controlling for socio-demographic, socio-economic and temporal effects. Socio-demographic and socio-economic variables used in this study are informed by both empirical and theoretical underpinnings in the body of literature e.g. immigration status (Bauder 2003), age (Vosko et al., 2003), marital status (Young 2010), education, income and occupation (Lewchuk 2017), union status (Cranford et al., 2003a) and space (Hanson and Pratt 1995). Finally, to ensure the stability of the variance estimates for key survey estimates we weighted each model in the logistic regression analysis using the normalized LFS final weight and the LFS bootstrap weights (1000 bootstrap replicate weights).

2.4 Main results

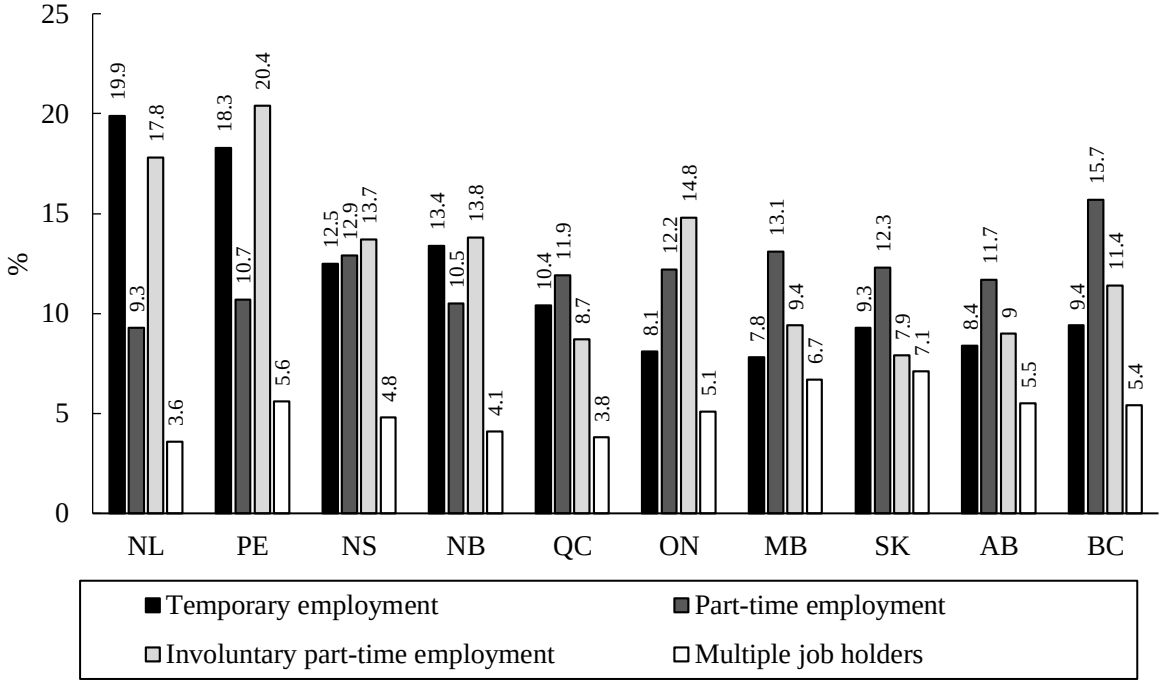
2.4.1 Descriptive results

Overall at the national scale, part-time employment was the most prevalent form of precarious employment (12.5%), while multiple job holding was the least common (5.0%). Involuntary part-time employment and temporary employment had 11.3% and 9.3% of population employed in these types of work respectively.

Keeping in mind national rates of precarious employment, we consider geographic variations at smaller, sub-national scales in figure 2.3. We find that temporary and

involuntary part-time work was more prevalent in Atlantic Canada and became gradually less prevalent moving westward (with very low prevalence in central Canada). Specifically, Newfoundland and Labrador and Prince Edward Island were the provinces where the greatest percentage of workers were engaged in temporary employment (19.9% and 18.3%, respectively). The provinces of Ontario and Manitoba comparatively had the lowest share of temporary employment (8.1% and 7.8%, respectively). In a similar fashion the highest rates of involuntary part time employment were reported in the Atlantic province of Prince Edward Island (20.4%), while the lowest in Saskatchewan (7.9%).

Findings for part time employment differed from those of temporary and involuntary part-time employment. Employment in part-time work was most common in western provinces and least common in the Atlantic provinces. Newfoundland and Labrador, Canada's easternmost province, reported the lowest part-time employment prevalence (9.3%), while British Columbia had the highest (15.7%). Like part-time work, employment in multiple jobs was more prevalent in western Canada and least common in Atlantic Canada. In the west, Manitoba and Saskatchewan had high rates of employment in multiple jobs (6.7% and 7.1% respectively). Moreover, Saskatchewan's share was higher in comparison to other provinces. Alternatively, employment in multiple jobs was least common in Newfoundland and Labrador and Québec, with 3.6 and 3.8% of the working population employed in multiple jobs, respectively.



Notes: SUC= Secondary Urban Core, UC= Urban Code, UF=Urban Fringe.

Figure 2. 3: Weighted percentages for Canada's population engaged in PFE, across provinces, 2011-2016

Echoing trends observed at the provincial level, the findings at the CMA scale in table 2.1 show that on average, temporary employment was higher within specific CMAs in Atlantic Canada (e.g. St. John's, NL -13.5%) and less common in central and western CMAs. The broad east-west pattern in temporary work were however partially distorted with slight variations across space, with Ontario CMAs reporting the lowest share in temporary work. Specifically, lower rates of temporary employment are observed in Oshawa, ON (5.7%) in comparison to CMAs in Ontario and other provinces.

Oscillating variations across space are observed at the CMA scale with respect to involuntary part-time employment with a high in eastern CMAs of Newfoundland and Labrador, Nova scotia and New Brunswick , followed by a low across Quebec CMAs and a high across Central Canadas CMAs (specifically Toronto and Windsor (17.1% and 19.2% respectively)) and a further gradual low across western Canadas CMAs. Results of descriptive analysis for part-time employment show contrasting spatial patterns as compared to temporary work. Employment in part-time work was more common in western Canada and least common in Atlantic Canada. Victoria, BC, the westernmost CMA, reported the highest participation in part-time employment (16.7%), while St. John's, NL had the lowest (7.7%). Larger CMAS in Ontario, such as Toronto, had the lowest share of workers employed in part-time time work relative to other CMAs in Ontario (10.8%). However, in general part-time employment exhibited greater spatial variations across CMAs. Similar to part-time employment, the share of Canada's population employed in multiple jobs tends to be greater on average in CMAs located in western Canada (e.g. CMAs in British Columbia, Alberta, Saskatchewan and Manitoba). Although a west to east spatial difference was evident, specific CMAs in central Canada were distinct with respect to having a high percentage of their population working multiple jobs. For example, Kingston, ON, reported the highest population percentage employed in multiple jobs (7.0%) relative to other CMAs.

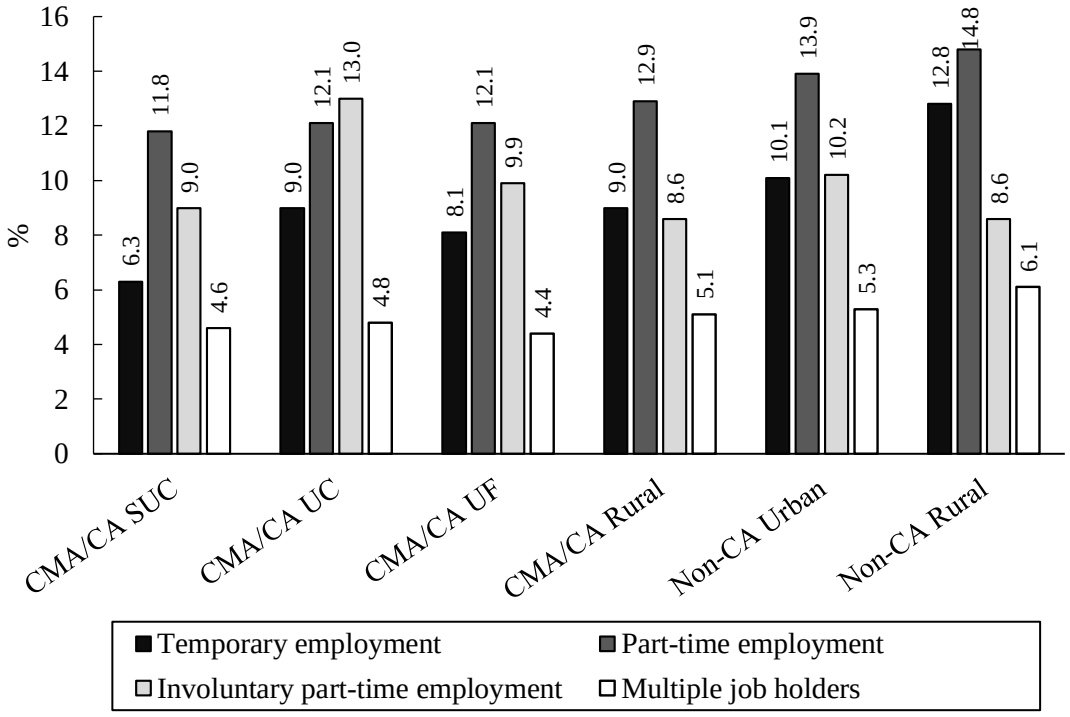
Table 2. 1: Weighted percentages for Canada's population engaged in PFE, across CMAs, 2011-2016

Geography	Temporary employment	Part-time employment	Involuntary part-time employment	Multiple job holders
St John's, NL	13.5	7.7	13.6	4.1
Halifax, NS	9.8	11.5	12.0	5.0
Moncton, NB	9.2	9.9	12.9	4.3
Saint John, NB	9.8	10.0	x	4.4
Saguenay, QC	11.6	13.4	8.2	3.0
Quebec, QC	11.5	10.3	8.1	3.9
Sherbrooke, QC	11.0	14.9	8.8	4.6
Trois-Rivieres, QC	9.9	14.0	9.2	3.8
Montréal, QC	9.8	11.7	9.3	3.8
Gatineau, QC	10.4	9.1	10.5	3.9
Ottawa, ON	9.1	11.2	14.0	5.3
Kingston, ON	9.9	14.5	14.7	7.0
Peterborough, ON	9.1	16.5	x	5.9
Oshawa, ON	5.7	12.2	15.8	4.2
Toronto, ON	8.3	10.8	17.1	4.7
Hamilton, ON	6.4	12.5	11.6	4.5
St. Catharines-Niagara, ON	8.2	15.7	14.4	5.8
Kitchener-Cambridge-Waterloo, ON	6.3	12.2	12.9	5.0
Brantford, ON	6.2	13.5	x	5.0
Guelph, ON	7.4	12.6	11.6	5.7
London, ON	8.7	13.8	16.5	5.4
Windsor, ON	6.3	13.8	19.2	5.2
Barrie, ON	7.9	12.4	x	5.0
Greater Sudbury, ON	9.5	11.6	13.6	3.8
Thunder Bay, ON	9.4	14.3	10.0	6.7
Winnipeg, MB	8.0	12.5	11.5	6.5
Regina, SK	8.7	9.2	9.6	6.2
Saskatoon, SK	9.1	12.1	10.4	6.5
Calgary, AB	8.1	10.9	10.6	5.2
Edmonton, AB	8.8	10.9	9.7	5.1
Kelowna, BC	10.4	16.1	x	5.4
Abbortsford-Mission, BC	7.9	15.3	9.4	5.7
Vancouver, BC	9.1	14.5	11.9	5.1
Victoria, BC	9.9	16.7	12.8	6.1

Notes: x-indicates that the sample is too small for disclosure.

Figure 2.4 provides a summary of PFE across the urban/rural spectrum. The results show that temporary employment (12.8%), part-time employment (14.8) and multiple job holders (6.1%) were more common in rural and small-town areas (non-CA Rural) and

gradually decreased across urban geographies. Involuntary part-time employment, on the other hand, was the only form of precarious work that was common in urban core areas (13%) and gradually decreased across rural geographies.



Notes: SUC= Secondary Urban Core, UC= Urban Code, UF=Urban Fringe. Geographies are ordered from urban to rural.

Figure 2. 4: Weighted percentages for Canada's population engaged in PFE, across urban/rural geographies, 2011-2016

2.4.2 Estimation results

Spatial effects. We now turn to the estimation results of logistic regression analysis of PFE in the appendix. Results of the logistic regression in table 2.2 support our finding that geography is significantly associated with precarious employment even when

controlling for socio-demographic and socio-economic effects. Moreover, geographic effects in the logistic regression models validate the general pattern observed in the descriptive statistics. For example, in comparison to Toronto, the likelihood of being employed in temporary and involuntary-part-time work is generally greater amongst CMAs located in Atlantic Canada and less in western CMAs. In contrast, the odds of being employed in part-time and multiple jobs are significantly reduced among CMAs located in Atlantic Canada and increased in western CMAs. Moving to urban/rural effects, the findings show that the chances of being employed in all PFEs generally increases as one progresses from an urban to a more rural geography (i.e. CMA-CA Secondary Urban Core to Non-CA Rural) in comparison to CMA/CA Urban Code (except for involuntary part-time employment, in both the base model).

Socio-demographic effects. Multivariate analysis reinforces earlier, descriptive results that women were significantly more likely to be employed in temporary and part-time work than their men counterparts ((OR=1.096, p=<.0001), (OR = 2.808, p=<.0001) respectively)). Gender differences in other PFE show contrasting findings. For example, women were 46.9% (OR = 0.531 p=<.0001) less likely to be employed in involuntary part-time work than men. Turning to immigration status, we find that immigrants were significantly more likely to be employed in temporary, involuntary part-time and multiple jobs ((OR = 1.160, p = <.0001), (OR= 1.658, p = <.0001), (OR =1.098, p=0.0002), respectively) than the Canadian born population, although they were 15% less likely to be engaged in part-time work (OR = 0.850, p=<.0001). Age effects illustrate a slight

negative linear relationship between increasing age and employment in multiple jobs and involuntary part time work .

Moving to marital status effects, respondents who are single were significantly more likely to be employed on a temporary basis in comparison to separated, divorced and widowed respondents (OR = 1.216, p = <.0001). However, single and married respondents were significantly less likely to be employed in multiple jobs than separated, divorced or widowed respondents (OR = 0.896, p = 0.002). With respect to education, the results illustrate a slight positive linear relationship between higher levels of education and employment in all forms of precarious employment.

Socio-economic effects. We find that as income increases, the likelihood of being employed in all forms of precarious work significantly decreases. Regarding occupation, the results show a significant association between all occupations and temporary precarious employment. However, effect measures (Odds ratios) were not pronounced in the temporary employment model in comparison to other PFEs, although contrasting findings are observed in other cases. E.g., occupations in trades, transport, and equipment operators (OR = 1.219, p = 0.0955) and manufacturing and utilities (OR = 1.344, p = 0.0867), were associated with a greater likelihood of involuntary part-time employment than natural resources, agriculture, and related production occupations. Furthermore, occupations in health (OR= 1.761, p = <.0001) and art, culture, recreation and sport (OR=1.626, p =<.0001) were associated with a significantly greater probability of part-

time employment than natural resources, agriculture, and related production occupations. Lastly, occupations in art, culture, recreation and sport (OR = 1.848, p = <.0001) and education, law and social, community and government services (OR = 1.569, p = <.0001) were associated with a greater likelihood of multiple job employment than the reference occupation.

Table 2. 2: Logistic regression estimates for PFEs -Canada's population, 2011-2016

	Temporary employment	Part-time employment	Involuntary part-time employment	Multiple job holders
Independent variables	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Socio-demographic				
Immigration status (reference: non-immigrants)				
Immigrants	1.160*** (1.116-1.206)	0.850*** (0.818-0.883)	1.658*** (1.521-1.808)	1.098*** (1.046-1.153)
Population age (reference: 55-64)				
25-34	1.106*** (1.064-1.151)	0.544*** (0.523-0.566)	3.038*** (2.696-3.423)	1.318*** (1.241-1.400)
35-44	0.851*** (0.815-0.888)	0.608*** (0.586-0.632)	2.581*** (2.308-2.887)	1.282*** (1.210-1.358)
45-54	0.800*** (0.769-0.832)	0.603*** (0.581-0.626)	2.555*** (2.282-2.861)	1.245*** (1.180-1.314)
Gender (reference: men)				
Women	1.096*** (1.063-1.131)	2.808*** (2.718-2.902)	0.531*** (0.486-0.580)	0.966 (0.927-1.008)
Marital status (reference: separated, divorced, widowed)				
Married, common law	0.909*** (0.868-0.951)	1.278*** (1.227-1.331)	0.547*** (0.490-0.609)	0.752*** (0.710-0.797)
Single	1.216*** (1.155-1.281)	1.217*** (1.160-1.278)	0.867** (0.763-0.986)	0.896*** (0.835-0.960)
Education (reference: without high school graduation)				
High school graduate	0.813*** (0.771-0.857)	0.991 (0.941-1.044)	1.212*** (1.052-1.397)	1.339*** (1.230-1.458)
Some post-secondary education	0.943 (0.878-1.013)	1.107*** (1.035-1.185)	1.423*** (1.186-1.707)	1.609*** (1.443-1.795)
Postsecondary certificate or diploma	0.914*** (0.870-0.960)	0.990 (0.942-1.041)	1.638*** (1.428-1.878)	1.668*** (1.539-1.809)
University degree	1.271***	1.087***	1.923***	1.941***

	(1.199-1.347)	(1.027-1.150)	(1.656-2.234)	(1.783-2.113)
Socio-economic				
Income (reference: Hourly Earnings (HE) greater than $30.00)				
HE< $12.00	4.109***	5.524***	2.931***	1.823***
	(3.886-4.346)	(5.247-5.814)	(2.510-3.423)	(1.690-1.966)
$12.00 ≤ HE ≤ $19.99	2.431***	2.427***	2.442***	1.772***
	(2.329-2.536)	(2.33-2.528)	(2.131-2.798)	(1.679-1.871)
$20.00 ≤ HE ≤ $29.99	1.575***	1.347***	1.710***	1.379***
	(1.513-1.639)	(1.294-1.402)	(1.487-1.967)	(1.306-1.456)
Occupation (reference: natural resources, agriculture and related production occupations)				
Management occupations	0.132***	0.200***	0.623**	0.833***
	(0.120-0.146)	(0.177-0.226)	(0.404-0.962)	(0.731-0.948)
Business, finance and administration occupations	0.241***	0.694***	0.751***	1.035
	(0.226-0.256)	(0.639-0.754)	(0.605-0.934)	(0.927-1.156)
Natural and applied sciences and related occupations	0.269***	0.314***	0.598***	0.670***
	(0.249-0.290)	(0.279-0.353)	(0.409-0.875)	(0.587-0.766)
Health occupations	0.318***	1.761***	0.777**	1.915***
	(0.296-0.341)	(1.618-1.916)	(0.627-0.964)	(1.708-2.147)
Occupations in education, law and social, community and government services	0.558***	1.224***	1.102	1.569***
	(0.524-0.594)	(1.126-1.331)	(0.896-1.356)	(1.406-1.750)
Occupations in art, culture, recreation and sport	0.607***	1.626***	1.074	1.848***
	(0.546-0.676)	(1.447-1.826)	(0.812-1.421)	(1.590-2.147)
Sales and service occupations	0.204***	1.160***	0.917	1.104*
	(0.191-0.217)	(1.071-1.257)	(0.751-1.121)	(0.993-1.227)
Trades, transport and equipment operators and related occupations	0.499***	0.520***	1.219*	0.646***
	(0.470-0.530)	(0.475-0.569)	(0.966-1.539)	(0.573-0.729)
Occupations in manufacturing and utilities	0.230***	0.194***	1.344*	0.590***
	(0.211-0.250)	(0.171-0.220)	(0.958-1.885)	(0.515-0.677)
Union status (reference: union member)				
Not a union member	0.870***	0.993	0.963	1.028
	(0.843-0.898)	(0.962-1.024)	(0.882-1.051)	(0.987-1.071)

Spatial				
CMA (reference: Toronto)				
St-John's	1.794***	0.584***	1.073	0.844***
	(1.632-1.973)	(0.521-0.654)	(0.828-1.389)	(0.745-0.956)
Halifax	1.117***	0.802***	0.834*	0.936
	(1.029-1.213)	(0.743-0.865)	(0.693-1.004)	(0.839-1.045)
Moncton	1.030	0.585***	1.034	0.795***
	(0.913-1.162)	(0.509-0.673)	(0.758-1.410)	(0.673-0.939)
Saint John	1.168**	0.621***	0.976	0.895
	(1.029-1.326)	(0.556-0.694)	(0.718-1.326)	(0.774-1.034)
Saguenay	1.405***	1.077	0.570***	0.601***
	(1.268-1.557)	(0.966-1.201)	(0.426-0.762)	(0.485-0.745)
Quebec	1.442***	0.852***	0.596***	0.735***
	(1.328-1.565)	(0.784-0.926)	(0.432-0.821)	(0.639-0.845)
Sherbrooke	1.279***	1.198***	0.697**	0.866
	(1.163-1.407)	(1.073-1.338)	(0.502-0.969)	(0.720-1.042)
Trois-Rivieres	1.144***	1.166***	0.694**	0.720***
	(1.036-1.263)	(1.058-1.286)	(0.516-0.933)	(0.615-0.844)
Montréal	1.134***	0.968	0.565***	0.755***
	(1.068-1.205)	(0.912-1.026)	(0.480-0.666)	(0.695-0.820)
Gatineau	1.335***	0.781***	0.738**	0.827***
	(1.231-1.449)	(0.705-0.864)	(0.547-0.997)	(0.723-0.945)
Ottawa	1.143***	0.996	0.918	1.123***
	(1.055-1.238)	(0.912-1.087)	(0.752-1.121)	(1.003-1.258)
Kingston	1.173***	1.131***	1.284**	1.385***
	(1.073-1.282)	(1.042-1.227)	(1.052-1.568)	(1.230-1.559)
Peterborough	1.074	1.292***	1.364*	1.232*
	(0.902-1.280)	(1.089-1.532)	(0.967-1.922)	(0.986-1.539)
Oshawa	0.725***	1.058	1.292**	0.960
	(0.645-0.816)	(0.962-1.164)	(1.035-1.614)	(0.839-1.099)
Hamilton	0.763***	1.066	0.879	0.934
	(0.685-0.848)	(0.975-1.166)	(0.690-1.119)	(0.805-1.083)
St. Catharines-Niagara	0.963	1.195***	1.212*	1.150**
	(0.864-1.075)	(1.099-1.301)	(0.999-1.470)	(1.019-1.298)

Kitchener-Cambridge-Waterloo	0.747***	1.138***	1.004	1.105
	(0.667-0.836)	(1.049-1.235)	(0.813-1.240)	(0.965-1.265)
Brantford	0.750***	1.151**	0.786	1.140*
	(0.661-0.851)	(1.017-1.302)	(0.559-1.104)	(0.987-1.317)
Guelph	0.850**	1.160**	0.821	1.263***
	(0.727-0.995)	(1.034-1.300)	(0.545-1.237)	(1.074-1.486)
London	1.042	1.146***	1.227**	1.114*
	(0.954-1.139)	(1.063-1.235)	(1.001-1.506)	(0.991-1.252)
Windsor	0.723***	1.231***	1.349***	1.068
	(0.632-0.826)	(1.141-1.328)	(1.088-1.674)	(0.916-1.246)
Barrie	0.982	1.025	1.388**	1.029
	(0.877-1.099)	(0.854-1.230)	(1.028-1.874)	(0.863-1.227)
Greater Sudbury	1.118**	0.913**	1.179	0.800***
	(1.006-1.243)	(0.835-0.998)	(0.921-1.509)	(0.692-0.926)
Thunder Bay	1.135**	1.185***	0.788*	1.493***
	(1.021-1.262)	(1.072-1.310)	(0.607-1.023)	(1.307-1.706)
Winnipeg	0.857***	1.025	0.764***	1.352***
	(0.808-0.909)	(0.973-1.080)	(0.662-0.881)	(1.259-1.452)
Regina	1.115**	0.832***	0.702**	1.401***
	(1.026-1.213)	(0.760-0.911)	(0.520-0.949)	(1.270-1.546)
Saskatoon	1.036	1.069*	0.779**	1.473***
	(0.957-1.122)	(0.988-1.158)	(0.621-0.977)	(1.331-1.631)
Calgary	0.997	1.098**	0.771**	1.231***
	(0.924-1.076)	(1.018-1.185)	(0.625-0.952)	(1.113-1.363)
Edmonton	1.092**	1.064	0.734***	1.213***
	(1.010-1.182)	(0.988-1.146)	(0.597-0.903)	(1.106-1.331)
Kelowna	1.323***	1.393***	1.016	1.026
	(1.132-1.548)	(1.201-1.616)	(0.697-1.483)	(0.784-1.342)
Abbortsford-Mission	0.820***	1.203***	0.706**	1.290***
	(0.727-0.925)	(1.094-1.323)	(0.523-0.952)	(1.126-1.478)
Vancouver	1.033	1.298***	0.804***	1.098**
	(0.968-1.102)	(1.227-1.372)	(0.694-0.931)	(1.012-1.191)
Victoria	1.238***	1.456***	1.012	1.261***
	(1.132-1.354)	(1.353-1.568)	(0.844-1.213)	(1.113-1.428)

Unban/rural (reference: CMA/CA Urban Code)				
CMA-CA Secondary Urban Core	0.776***	1.026	0.834	1.064
	(0.703-0.856)	(0.939-1.122)	(0.652-1.066)	(0.914-1.239)
CMA/CA Urban Fringe	0.998	1.031	0.933	1.009
	(0.914-1.090)	(0.954-1.113)	(0.753-1.156)	(0.883-1.152)
CMA/CA Rural	1.086***	1.030	0.902	1.101***
	(1.031-1.144)	(0.985-1.078)	(0.793-1.026)	(1.029-1.177)
Non-CA Urban	1.183***	1.118***	0.812***	1.178***
	(1.117-1.252)	(1.063-1.176)	(0.707-0.931)	(1.092-1.270)
Non-CA Rural	1.538***	1.169***	0.854***	1.378***
	(1.467-1.611)	(1.119-1.221)	(0.759-0.962)	(1.289-1.472)
Temporal				
Survey year (reference: 2016)				
2011	0.995	0.934***	1.167***	0.954
	(0.948-1.043)	(0.894-0.977)	(1.041-1.308)	(0.896-1.017)
2012	0.997	0.920***	1.029	0.945*
	(0.949-1.048)	(0.881-0.961)	(0.912-1.162)	(0.888-1.006)
2013	1.011	0.942***	1.025	0.937**
	(0.964-1.061)	(0.902-0.984)	(0.908-1.158)	(0.88-0.997)
2014	0.979	0.963***	1.052	1.000
	(0.934-1.027)	(0.922-1.005)	(0.934-1.186)	(0.938-1.066)
2015	0.997	0.941***	0.981	0.970
	(0.949-1.047)	(0.900-0.983)	(0.866-1.112)	(0.911-1.032)
Survey month (reference: July)				
January	0.849***	1.148***	1.100***	1.082***
	(0.826-0.873)	(1.119-1.178)	(1.027-1.179)	(1.041-1.124)
Summary statistics				
N (unweighted)	498,371	498,371	57,468	4983,71
Likelihood ratio/F statistic	261.72	718.99	54.64	76.18
Percent concordant	68	78	70	63

Note: OR = Odds Ratio. *Significant at the 90% level; **significant at the 95% level; and ***significant at the 99% level.

2.5 Discussion and conclusion

This paper has described the spatial variations associated with precarious forms of employment across Canada's landscape. The analysis yielded several key findings. At provincial and CMA levels, we observe different spatial patterns by type of PFE, thus supporting the study's hypothesis that states differences in PFE vary over multiple scales. For instance, temporary and involuntary part-time work were found to be more prevalent in the Atlantic provinces and CMAs, with lower rates of these types of work moving across central and western provinces and CMAs. In contrast, part-time employment and multiple job holding were more common in western provinces and CMAs and were less prevalent in central and Atlantic provinces and CMAs. Results of the multivariate analysis support our finding that geography is significantly associated with precarious employment as shown by the distinct spatial patterns even when controlling for socio-demographic and socio-economic effects.

Of all forms of PFE, temporary employment had the most visible east-west spatial pattern. De raaf et al. (2003) affirm the findings on the spatial concentrations of temporary work in Atlantic Canada by stating that temporary/seasonal work in this region remains well above the national average mainly because of its greater concentration of seasonal industries and greater incidence of seasonality within a given industry (i.e., fishing), with seasonality leading to the underutilization of both labor and capital resources (Guillemette et al., 2000). The differential impact of seasonality on

regions (e.g. Atlantic Canada) leads to substantial disparities in labor markets and earnings across the country (Guillemette et al., 2000).

Moving to urban/rural areas, the results demonstrate that precarious employment is more of a rural phenomenon. General urban-rural findings in this study are analogous to findings of several studies within the Canadian context, all showing a higher incidence of non-standard work in rural areas (Rothwell 2002; Curto and Rothwell 2003; Alasia and Rothwell 2003; Perusse 1997). Other studies examining urban/rural labor markets beyond the Canadian context indicate similar prevalence in precarious work in rural regions (Bryden and Bollman, 2000). Bryden and Bollman (2000), for example, examined changes in rural employment in Organisation for Economic Co-operation and Development (OECD) economies, and noted that the decline in agricultural employment is supplemented by the increase in service employment and changes in urban labor markets (feminization, shift to part-time and casual work, etc.) that have contributed to increases in part-time or temporary jobs (Bryden and Bollman 2000). It has been argued that the predominance of precarious work in rural areas has been exacerbated by a "spatial division of labor", with rural economies increasingly becoming the recipients of low-paid jobs (Barkley 1995; Phimister et al.,2006). Off all PFEs examined in this study, involuntary part-time was found to be more common in urban areas than in rural areas. Previous studies have shown fluctuations in income within urban neighborhoods owing to the growing prevalence of precarious employment (Hulchanski 2007). For example, Toronto's urban neighborhoods have experienced greater income fluctuations and

polarization from 1970 to 2005 as a result of changes in the nature of employment (more involuntary part-time work), income transfers and government taxes (Hulchanski 2007).

In conclusion, the findings of this paper clearly establish that PFEs have an inherent spatial dimension with provincial, CMA and rural/urban dimensions. The spatial patterns identified in this study are broadly shaped by the structures and dynamics of labor supply and demand that are regulated in distinct geographic ways (Peck 1996). The broad, regional, provincial, CMA and rural/urban spatial dimensions create, maintain or determine the spread of precarious employment (MacDonald 2009), while precarious employment is reinforced by factors such as immigration status, age, and education.

While this paper has offered insight into spatial patterns of PFEs, limitations remain, particularly with respect to small-scale patterns. Given that the spatial dimensions create, maintain or determine the spread of precarious employment (MacDonald 2009), there is a need to consider smaller spatial scales. However, such data is currently not available given resolution or reporting requirements by Statistics Canada. Furthermore, since the data in this study have clear spatial referents, spatial dependence tools e.g. spatial autocorrelations would have added further insights to the study. However, spatial autocorrelation analyses such as Moran I scatter plots were not feasible to conduct in this study as they fail to meet the disclosure requirements of Statistics Canada. Beyond these limitations, the findings of this study have implications for the formulation of place-based policies that could target geographies where precarious employment is prevalent.

Generally, place-based policies have been conventionally used in labor markets in North America such as the United States through State Empowerment Zones (EMPZs) and Enterprise Community (ENTC) programs to improve employment prospects in disadvantaged geographies (Ham et al., 2011). Studies have shown that these programs and policies have positive, statistically significant impacts on local labor markets in terms of the unemployment rate, the poverty rate, the fraction with wage and salary income, and employment (Ham et al., 2011).

Although these policies/programs have been successful, their self-sustainability has been questioned by some authors. Moretti (2012) for instance writes that "the real test is not whether [place-based policies] . . . create jobs during the push . . . Instead, we need to look at whether the publicly financed seed can eventually generate a privately supported cluster that is large enough to become self-sustaining" (Moretti 2012: 200–201). This limitation channels an area for future work to assess whether place-based policies, in the long run, are less or more efficient than the broader economic development policies that have been the norm in equalizing employment differences. Future research may also need to address two important questions on place-based policies that could address weak employment prospects within precarious geographies in Canada, namely for whom? And why? To achieve this, future work could focus on any of the geographies where precarious employment is high and qualitatively examine what social reproduction activities create and manifest these precarious labor inequalities within and across space. Answers to these questions could better inform policymakers in the formulation of

prudent place-based policies that address labor market inequalities in disadvantaged geographies.

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CHAPTER 3: Gender, precarious employment and space: Evidence from the Canadian Labor Force Survey.

3.1 Abstract

This paper examines the variegated geography of gendered precariousness in the Canadian labor market using Statistics Canada's 2011-2016 Labor Force Surveys. We first compare gender differences in distinct precarious forms of employment (PFEs) across a range of geographies including national, provincial, census metropolitan areas and urban/rural areas. We find that distinct spatial patterns in gendered precariousness were evident within and across geographic spaces. Using multivariate analyses, we confirm the spatial patterns in the descriptive analyses to be robust even when controlling for socio-demographic and socio-economic effects for both women and men. The gendered logit models further establish that PFEs are reinforced by immigration status, age, marital status, education, income, occupation, and union status. The spatial patterns observed in our findings advance our understanding of how space influences gender inequalities in precarious employment outcomes.

3.2 Introduction

In Canada, women's labor force participation (Moyser 2017), wages (Fortin and Huberman 2002) and employment outcomes (Vosko 2000, 2003) have historically lagged behind men. For instance, trends in the gender differences in labor force participation rates in Canada show that 82% of women and 90.9% of men aged 25-54

years participated in the labor market in 2015, compared to 21.6% and 97.1% (for women and men, respectively) in 1950 (Moyser 2017) (See figure 3.1). Furthermore, in the same study, it is insisted that the labor market participation gap between men and women declined over the years, from 75.5 percentage points in 1950 to 28.3 percentage points in 1983 and 8.9 percentage points in 2015. In spite of this narrowing gap, there happen to be considerable inequalities in the gendered experiences of paid work with women; performing fewer hours of paid work per week than men; likely to be relegated in industries that parallel their 'traditional gender roles'; employed in lower levels within 'female-dominated industries' (compared to men in 'male-dominated industries'); having careers that are interrupted more frequently than men; and experiencing greater wage penalties in comparison to men (Blau and Kahn 2000, 2007; Cranford et al., 2003a, 2003b; Moyser 2017; Webber and Williams 2008).

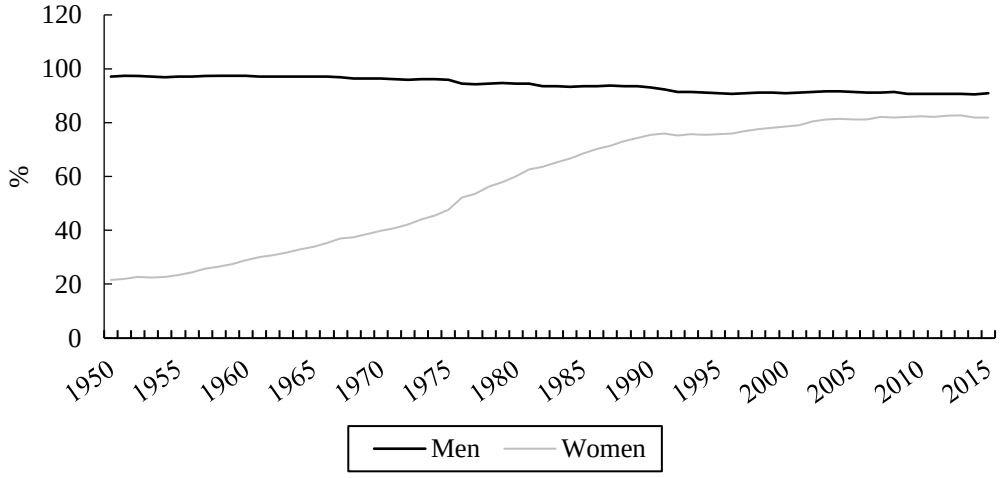

Figure 3. 1: Labor force participation rates of men and women aged 25 to 54, Canada, 1950 to 2015.

Source: Moyser (2017)

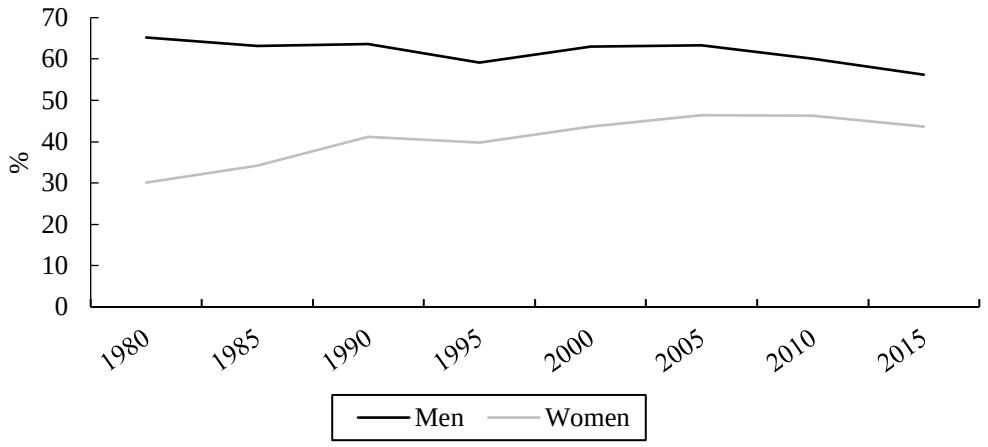

Figure 3. 2: Portion of men and women aged 25 to 54 working full year, full time, Canada, 1980 to 2015.

Source: Statistics Canada (2017).

Other indicators of labor market activity show that despite women's increased labor force participation, they are less likely to be employed in full-time- permanent employment (see figure 3.2) and more likely employed in precarious employment (in comparison to men) (Cranford et al., 2003a, 2003b; Fudge and Vosko 2001a, 2001b; Spalter-Roth and Hartmann 1998;Vosko 2000; Young 2017). By and large precarious employment is a term used to describe non-standard employment that is associated with low income, lack of control over the labor process, high levels of uncertainty and a lack of regulatory protection (Cranford et al., 2003a; Fudge and Owens 2006; Rodgers 1989; Standing 2011, 2015).

Studies have shown that the "continuum" of precarious employment in the Canadian labor market is gendered (Cranford et al., 2003b). This 'continuity' is corroborated by Young (2010) and Spalter-Roth and Hartmann (1998), in the U.S context as women are

documented to still hold a disproportionate share of precarious work despite their increased participation in the labor force. Spalter-Roth and Hartmann (1998 pg. 70) further state that 'the availability of women workers, who have traditionally earned less than men, and worked with jobs with fewer advancement opportunities has facilitated the growth of contingent [precarious] employment." Moreover, they stress that "if employers think of women as [precarious] workers, rather than as breadwinners, as workers who are more committed to their families than to their careers, then employers are likely to pay women less and to provide fewer opportunities for training and advancement (Spalter-Roth and Hartmann (1998 pg. 70).

Other studies situated within the Canadian context, have extensively examined how gender/race intersects with dimensions of precarious work-(Cranford et al., 2003a, 2003b; Krahn 1991, 1995; Vosko et al., 2003; Noak and Vosko 2011). However limited evidence (mostly indirect and anecdotal) on the relationship between space, gender, and precarious employment exists in the literature. Several studies have echoed that; space is a significant factor shaping labor market outcomes (Kain 1968; Peck 1996; Massey 1984; Massey and Allen 1984; Soja 1980) ; gendered and racialized differences in labor market opportunities are evident across spatial arrangements (Fernandez and Su 2004; Gilbert 1998; Hanson et al. 1997; Hanson and Pratt 1991, 1995; Massey 1994) ; and more specifically, precarious employment is shaped by spatial dynamics (Jacquemond and Breau 2015; McDonald 2009; Strauss 2018). As such, we argue that much can be learned from a greater focus on how precarious forms of employment (PFEs) can vary by

both levels of geography in addition to demographic variables that have been examined previously such as gender.

In line with this, we investigate the gender differences in distinct PFEs (including temporary employment, part-time employment, involuntary part-time employment, and multiple jobholders) across a spectrum of spatial scales (including national provincial, census metropolitan areas, and urban/rural areas). In the current paper, we identified PFEs as forms of employment that deviate from the standard employment relationship (SER) (characterized by permanent and full-time, and often protected by labor unions and collective bargaining arrangements). These PFEs include; temporary employment (employment that has a predetermined end date, such as contract or casual jobs); part-time employment (employment that carries less than 30 hours per week); involuntary part-time employment (part-time employment that includes persons who could not find employment with 30 or more hours per week because of economic slack or for the reason that full-time employment could not be found); and multiple job holders (working persons who are employed in two or more jobs simultaneously, often in other nonstandard work arrangements such as temporary and involuntary part-time employment)(Statistics Canada 2015).

We further refrain from grouping the range of PFEs unified by their deviation from the SER into a single category of "non-standard employment" on the basis of Cranford et al.'s (2003b pg. 455-456) assertion that "there are important differences both between and

within the forms of employment that fall outside the SER. For example, there are inequalities along lines of gender, "race" and ethnicity within both standard and non-standard forms of employment. The authors further add that if we are to understand the extent of precarious employment in the labor force, we need to move away from grouping together employment relationships that are united primarily by their deviation from the SER. This includes grouping temporary employment, part-time employment, involuntary-part time employment and employment in multiple jobs into a unified category of "non-standard' work. Form measures of precarious employment, as opposed to characteristic measures (that explore the ' detailed' degree of insecurity of employment forms e.g.; Lewchuk 2017), were used in this study due to data availability in census datasets.

Although forms of precarious employment are a limited indicator of labor market security, Cranford et al. (2003b) and Fudge and Vosko (2001b) stress on their broader significance in understanding labor market insecurity. Cranford et al. (2003b pg. 9) for example writes " …still, an analysis of non-standard forms of employment is important because as long as the standard employment relationship is the basis for extending labor and social protections to workers… these employment forms (as well as work arrangements) will be linked to precarious employment. A more complete portrait of insecurity in the Canadian labor market must, therefore, consider the relationship between employment forms and dimensions of precarious employment."

While we acknowledge that other factors such as migration and ethnicity exacerbate precariousness, we pay attention to gender in our conceptual approach based on the role of gender as an 'organizing feature of differentiation' in the Canadian labor market (Vosko 2003). Gender differentiation in the Canadian labor market has been apparent since the post–World War II period with the Standard Employment Relationship (SER) associated with a 'masculine' norm while Non-Standard Employment Relationship (NSER) with a "feminine" norm (Fudge and Owens 2006; Vosko 2000, 2003). The broader labor market inequalities between men and women are still evident in the Canadian labor market (Cranford et al, 2003b; Vosko 2003). These inequalities/ gender differentiation in the labor market were and are still shaped by policy mechanisms, legal instruments and social and institutional processes (Hanson et al., 1997; Hanson and Pratt 1991, 1995; Powers et al.2003; Sackmann and Haussermann 1994; Vosko 2003).

Using data drawn from Statistics Canada's 2011-2016 Labor Force Surveys , the objectives of this study are twofold 1) to examine gender differences in the spatial patterning of PFEs in Canada, focusing on a suite of geographic scales including the national, provincial, census metropolitan areas and urban/rural areas 2) to explore socio-demographic, socio-economic and Spatio-temporal correlates of PFEs, and assess whether spatial patterns of PFEs are robust when controlling for socio-demographic and socio-economic effects. Exploring each of these objectives advances our understanding of precarious employment and its spatial and gendered contours.

3.3 Survey of the literature

3.3.1 Gender disparities in the Canadian labor market

According to Vosko (2003), gender differentiations in the Canadian labor market can be traced to the standard/non-standard employment relationships (SER/NSER) evident in the post-Second World War period. During this period the SER characterized by stable permanent full-time work with a high level of social protraction and access to social benefits) was associated with a 'masculine' norm (Fudge and Owens 2006; Vosko 2000, 2003).

Vosko (2003. Pg. 31) explicitly writes" men dominated in auto manufacturing, raw resource, and construction industries as well as other sectors of industrial expansion, where they made considerable security and wage gains aided by Canada's full (male) employment objective and the birth of formal collective-bargaining and freedom of association rights." In contrast, the NSER that deviated from permanent full-time work, with limited access to collective bargaining rights and lower wages and lower levels social protection and benefits was associated with a "feminine" norm as women occupied precarious service occupations involving domestic nursing and clerical work(Vosko 2003). These 'gendered orders' that have been in place in the Canadian labor market in the post-Second World War period were enabled by legal instruments, supported by unions, endorsed by the state and advanced by employers, (Fudge and Vosko 2001a; Vosko 1997, 2003). Gottfried (2000) and Crompton and Harris (1998) similarly argue that Fordist institutions including the social security system, education system, and

welfare regimes had 'shaped ideas' of 'masculinity' and 'feminity' in the labor market as men held positions with stable employment while women were employed in "female occupations" that parallel their gender roles e.g. motherhood.

Recent studies using updated statistics have shown that gender disparities in the Canadian labor market still remains pervasive (Cooke-Reynolds and Zukewich 2004; Moyser 2017 and Benoite 2000). Moyser's (2017) study, for instance, finds that following the Second World War, women performed fewer hours of paid work per week on average (from 1976-2014) and were more likely to work part-time relative to men. Moyser (2017) further illustrates that in 2015, 59.2% of women were employed in traditionally 'female occupations' (often precarious) involving caring, clerical, catering, cashiering and cleaning compared to 17.1% of men were employed in these occupations (See Table 3.1). In a complementary fashion, Benoite's (2000) study (also situated within the Canadian context) further notes that "part of the disproportionality of high part-time employment status for [women] stems from the fact that they are still responsible for housework and childcare…men are far more likely to receive a wage for their hours of activity, while a substantial portion of women work hours are unpaid and invisible in the home" (Benoitte 2000, pg. 77). Figure 3.3 further illustrates how gendered labor market segmentation has been pervasive from the 1960s to present with the growth of the service industry fueled by the increased participation of women in the labor force (Moyser 2007).

Table 3. 1: Proportion of women and men, aged 25 to 54 employed in the top 20 occupations in Canada (1987 and 2015)

	Women		Men	
	1987 %	2015 %	1987 %	2015 %
Total	**59.2**	**56.1**	**15.7**	**17.1**
Secondary and elementary school teachers and educational counsellors	3.8	5.3	2.0	1.6
Paraprofessional occupations in legal, social, community and education services	2.8	4.7	0.4	0.6
Administrative and regulatory occupations	2.5	4.6	1.5	1.2
General office workers	7.1	4.2	1.0	0.4
Professional occupations in nursing	4.7	3.9	0.3	0.4
Assisting occupations in support of health services	1.5	3.4	0.2	0.5
Auditors, accountants and investment professionals	2.0	2.9	2.3	2.5
Financial, insurance and related administrative support workers	2.9	2.8	0.4	0.4
Cleaners	2.6	2.6	2.0	2.1
Home care providers and educational support occupations	3.7	2.4	0.4	0.2
Retail salespersons	4.0	2.3	1.8	1.5
Human resources and business service professionals	0.7	2.3	0.8	1.2
Customer and information services representatives	2.1	2.1	0.2	0.9
Finance, insurance and related business administrative occupations	2.4	2.1	0.4	0.6
Office administrative assistants - general, legal and medical	9.5	2.0	0.2	0.1
Social and community service professionals	0.8	1.8	0.7	0.6
Cashiers	2.3	1.8	0.2	0.3
Occupations in food and beverage service	1.8	1.7	0.4	0.6
Policy and program researchers, consultants and officers	0.4	1.7	0.4	1.0
Other technical occupations in health care	1.7	1.6	0.2	0.4

Source: Moyser (2017).

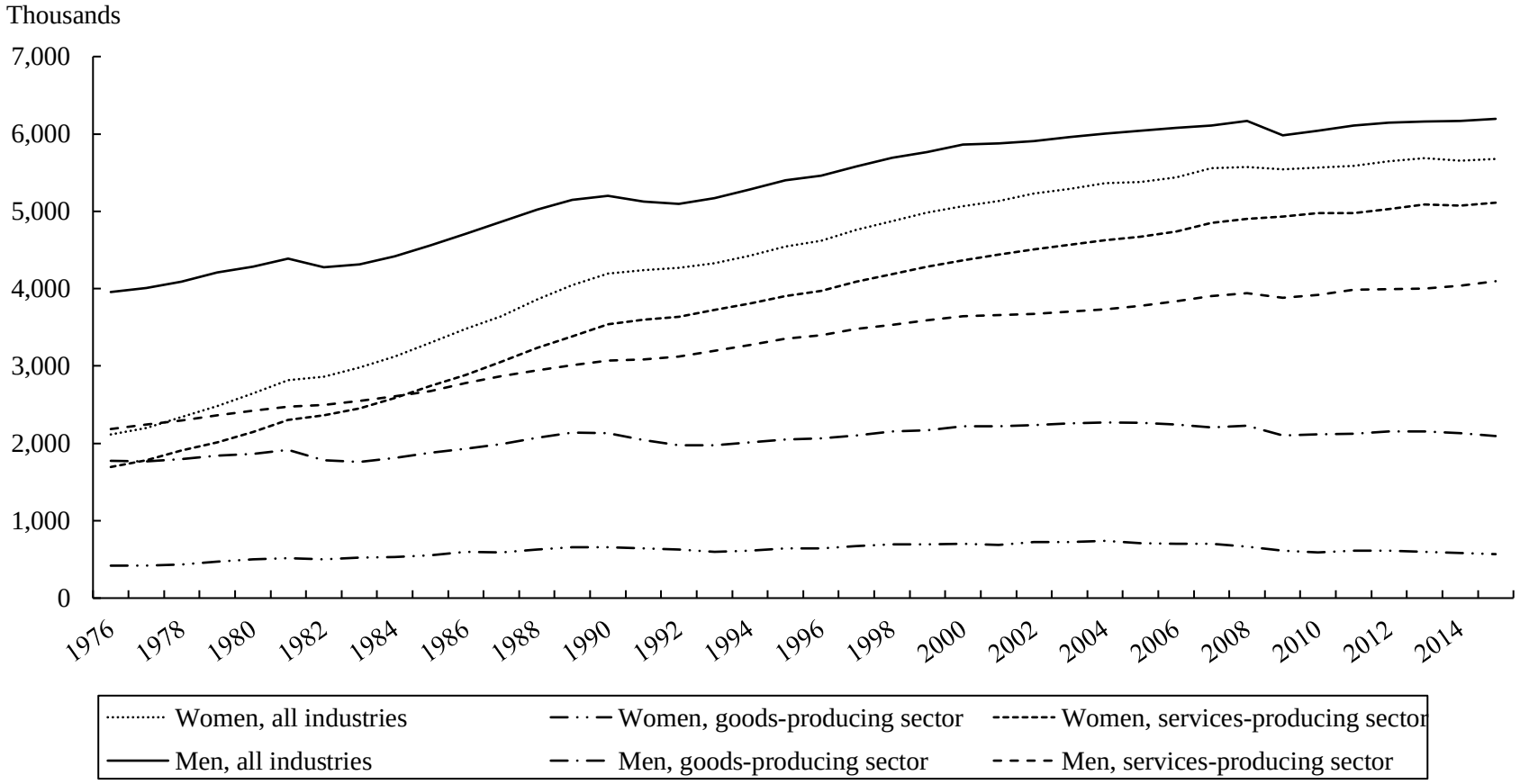

Figure 3. 3: Number of employed women and men , aged 25-54 by industrial sector(1976 to 2015)

Source: Moyser (2017).

Other studies have consistently shown that non-standard precarious employment continues to grow and is prevalent among women despite their invested human capital (Betti 2016; Cooke-Reynolds and Zukewich 2004; Cranford et al., 2003a, 2003b; Fuller and Vosko 2008; Spalter-Roth and Hartmann 1998; Standing 1989, 1999b;Vosko 2000, 2003, 2006, 2010; Vosko et al., 2003, 2009; Young 2010).

In a similar vein to the concept of gender differentiation, the disproportionate spread of women in precarious NSER is best conceptualized by the feminization thesis (Vosko 2003) i.e. "feminization of employment norms, rather than as genderless processes of casualization or erosion" (Cranford et al., 2003b, pg. 460). Vosko (2002, 2003) and Cranford et al. (2003b) specifically assert that the feminization of employment norms (that increased in Canada in the 1990s) could be conceptualized by the following four aspects: "(1) high levels of formal labor force participation among women; (2) continuing industrial and occupational segregation; (3) income and occupational polarization both between and among women and men; (4) the gendering of jobs to resemble more precarious so-called "women's work"—that is, work associated with women and other marginalized groups" (Cranford et al. 2003b pg. 460). The studies highlighted above nonetheless, overlook "spatial effects" that create and maintain precarious employment and determine its distribution including by gender (McDonald 2009).

3.3.2 Gender, work and space

Within the body of literature, several studies have taken a multi-dimensional approach when making meaningful connections between space, gender, and labor market outcomes (Fernandez and Su 2004; Hanson et al., 1997; Hanson and Pratt 1991, 1995; Herod 2003; Hiebert 1999; Logan et al. 2003; Massey 1994; McDonald 2009, McDowell et al., 2009; Peck and Theodore 2001; Taylor et al., 2019). These studies conceptualize space as an enabling (depending on power relations e.g gender and race) or constraining factor to labor market opportunities.

For instance, studies have shown how the labor market opportunities of women and men are constructed by the cultural perceptions of a given space, further resulting to the spatial constraints of women in specific occupations (Hanson et al., 1997; Powers et al.2003; Sackmann and Haussermann 1994). Hanson et al. (1997) argue that in different regions, people have different attitudes as to what is considered "appropriate" work for women. In the USA, Powers et al. (2003) show that regional differences in "appropriate women's work" and "gender-role attitudes" were persistent in the 1990s, with Southerners having more traditional attitudes than whites in other parts of the USA. Similar generalizations are made by studies examining the German labor market where different regional cultures shape women's labor force participation (Sackmann and Haussermann 1994).

Other studies including Gilbert (1998), Hanson et al. (1997), Hanson and Pratt (1991, 1995) and Premji (2017) look into the broader social processes that shape the economic

activities for women and men. Hanson and Pratt (1991 1995), through a case study in Worcester, Massachusetts metropolitan area show how occupational segregation and variations in women experience of paid work are grounded in space and within situated social networks. Specifically, they reveal that women employed in 'female-dominated occupations' are more likely than other women in 'male-dominated occupations' or 'gender-integrated occupations' to; 1 be spatially constrained; 2. prefer employment opportunities close to their places of residence and; 3. use other 'female contacts' within close proximity to their places of residence to find employment) (Hanson and Pratt 1991, 1995). They further note that 'geography' is at the centre of the differences in gendered job searches when they state that ' women's domestic responsibilities lead many to give priority to spatial proximity of paid employment ; women's greater residentials fixedness places them in local labor markets not necessarily of their choosing; women's channels of information tend to be more locally based."(Hanson and Pratt 1991 pg. 250).

Gilbert (1998) offers an extension of Hansen and Pratt (1991) study by examining the role of place-based personal networks in women's "survival strategies' across racial lines in Massachusetts metropolitan area. In their analysis, they found that both African American and White women develop 'networks in place' for employment and childcare decisions differently (Gilbert 1998). They show that place-based personal network was a contributing factor for White women economic success and constraining for African women (Gilbert 1998). Moreover, they find that due to residential racial segregation,

African American women were more spatially constraint when making employment and childcare decisions compared to white women and were more likely to use personal contacts to find jobs and childcare close to their place of residence (Gilbert 1998). Such findings are further compounded in situation where; 1. there is a mismatch between low income segregated households (occupied by members of racialized groups) and the spatial distribution of suitable jobs (Kain 1968); 2. residential segregation limits the abilities of members of racialized groups to integrate into the workforce (Leonard 1987) ; 3. there is a lack of jobs into which members of racialized groups are employed in-irrespective of spatial effects (Hellerstein et al., 2008) and; 4. stereotypical beliefs/perceptions of segregated low-income spaces are used as " discriminatory ' indicators for socio-economic status and employability by employers (Peck and Theodore 2001; Newman 1999; Neckerman and Kirschenman 1991; Waldinger 1997)

More recent studies have explored the gender differences in wages and employment outcomes in relation to patterns in geographic labor (im) mobility (Crane 2007; Dobbs 2007; Harris et al., 2007, Hardill and Watson 2004; McDowell et al., 2005; Kwan 2000; Premji 2017; Rapino and Cooke 2011; Watson, 2004; Wheatley 2013). Dobbs (2007) and Wheatley (2013) for instance notes that due to household responsibilities, women are less mobile than men and their employment opportunities are more localized than men, ultimately limiting their employment opportunities. Kwan (2000) further adds that women experience greater spatial 'fixity' constraints(due to household needs) than men

irrespective of whether they are employed in precarious part-time employment or fulltime employment.

Within the Canadian context, studies have shown that spatial labor immobility is an enabler in the maintenance of precarious employment for women in rural geographies(MacDonald 1999; Macdonald and Peters 1994; MacDonald 2009). Alternatively, MacDonald (2009) states that spatial labor mobility can be a factor fueling precarious employment outcomes as women (and men) may be willing to commute long distances for low paying precarious jobs.

MacDonald (2009) assertion on spatial labor mobility (fuelling the availability of labor willing to commute long distances for low wage work)is corroborated by other studies (Crane 2007; McLafferty and Preston 2019; Premji 2017; Preston and McLafferty 2016). McLafferty and Preston (2019) specifically find that Black and Latina women experience economic and spatial isolation as they are concentrated in low-wage labor with long-commutes. These spatial constraints were less evident for White men and White women (McLafferty and Preston 2019). Premji (2017) further shows that precariously employed women were limited in their commutes due to household responsibilities while night shifts were needed to access jobs. According to Peck (1996 pg. 88) " the social context in which [commuting] patterns are situated" is " intricately connected with processes such as the gendering of work, suburbanization, and the social reproduction of labor".

The surveyed literature provides an important foundation for understanding why space might affect gendered labor market outcomes. These studies are however limited to spatial disparities in gendered labor market outcomes within a single medium-sized metropolitan area. Moreover, missing from the surveyed literature is how PFEs manifests and shapes itself across space and gender lines. The broader significance of understanding the spatiality of precarious work has been echoed by MacDonald (2009) and Strauss (2018). We investigate the spatial dimensions of gendered precariousness across space. First, we map how gendered precariousness varies across multiple spatial scales and geographies. Second, we explore socio-demographic, socio-economic and Spatio-temporal correlates of PFEs by gender and assess whether spatial patterns of PFEs are robust when controlling for socio-demographic and socio-economic effects. In support of this research problem, we hypothesize that differences in PFE by gender vary over space at different scales and that less-educated men and women have a higher likelihood of being employed in PFEs in comparison to more educated men and women.

3.4 Data and methods

3.4.1 Data and sample

The empirical analysis in this study used data drawn from Statistics Canada's 2011-2016 Labor Force Surveys (LFS). This survey provides monthly-nationwide estimates on the labor market activities of Canada's population including; employment and unemployment, hours of work and work arrangements, industries, labor, occupations,

unionization and industrial relations, wages, salaries, and other earnings. These labor market estimates are provided across a suite of social locations including gender, immigration status as well as aboriginal status and geographies.

Data in the LFS is collected from a sample[3] of 54,000 households (approximately 100, 000 individuals) every month from all provinces, territories[4] and sub-provincial regions. Information is obtained nationwide from every member of a selected household who is non-institutionalized and 15 years of age or older irrespective of their employment status. Exemptions include; populations in aboriginal reserves, remote areas, institutions, and Canadian Forces bases. Together these populations (excluded from the surveys sample coverage) represent an exclusion of less than 2% of the total population 15 years old and above (Statistics Canada 2019). Non-response to the LFS average about 10% across all sampled households (Statistics Canada 2019). However, the LFS uses a weight adjustment (assigned to each survey respondent) to account for non-responding households and better represent the target population. In this study, the population unit of analysis is restricted to include Canada's working population who are 25-64 years of age, employed and not full-time students.

[3] According to Statistics Canada (2019), the sample size changes from time to time in order to meet budget and data quality requirements

[4] Labor market estimates for the territories are not included with the national totals (due to differences in sample design and rotation pattern, from the 10 provinces) and are calculated and reported separately as moving averages.

With respect to sampling, the LFS survey employs a cross-sectional design. Moreover, since the LFS uses a rotating panel sample design, this results in a five-sixths month-to-month sample overlap. To ensure that the sample for any given year does not overlap and consists of unique Household Identifications (HHID), two months of the year were selected, namely January and July.

3.4.2 Method of analysis

Cross tabulations were performed using SAS 9.4 to characterize precarious forms of employment (PFE), including temporary employment, part-time employment, involuntary part-time employment and employment in multiple jobs by gender at the national, provincial, CMA and urban/rural geographic levels (see appendix 3.1 for a spatial reference on the provincial and CMA geographies used in this study). In addition to the CMA scale, we also examined spatial variations in precarious employment across the urban-rural spectrum (see appendix 3.2).

We then used a set of sociodemographic, socioeconomic, spatial and temporal variables and assessed their relationship with PFEs (by gender) using logistic regression analyses. Logistic regression models were further used to asses whether spatial patterns of PFEs are robust even when controlling for socio-demographic and socio-economic effects. We weighted each model in the logistic regression analysis using the normalized LFS final weight and the LFS bootstrap weights (1000 bootstrap replicate weights). According to the methodology guideline provided by statistics Canada (2017b), the bootstrap variance

estimate for an estimate $\hat{\theta}$ is obtained by first computing the estimate with each set of bootstrap weights to obtain , $\hat{\theta}^{*(1)} \ldots \hat{\theta}^{*(1000)}$ and then applying equation 3.1 below;

$$\hat{V}_{BOOT}(\hat{\theta}) = \frac{1}{B}\sum_{b=1}^{B}(\hat{\theta}^{*(b)} - \hat{\theta}^{*(.)})^2 \text{ , where } \hat{\theta}^{*(.)} = \frac{1}{B}\sum_{b=1}^{B}\hat{\theta}^{*(b)} \qquad (3.1)$$

Sociodemographic variables selected in this study include immigration status, population age (25-34, 35-44, 45-54, 55-64), gender (women, men), marital status (separated, divorced, widowed, married, common law), education (without high school graduation, high school graduate, some post-secondary education, postsecondary certificate or diploma, university degree). Socio-economic variables include income (Hourly Earnings (HE) < \$12.00, \$12.00 ≤ HE ≤ \$19.99, \$20.00 ≤ HE ≤ \$29.99, HE > \$30.00), occupation (natural resources, agriculture and related production occupations, management occupations, business, finance and administration occupations, natural and applied sciences and related occupations, health occupations, occupations in education, law and social, community and government service, occupations in art, culture, recreation and sport, trades, transport and equipment operators and related occupations, occupations in manufacturing and utilities), union status (union member, not a union member). Spatial variables include CMAs (CMAs across Canada's provinces), urban/rural divides (CMA/CA urban code, CMA-CA secondary urban core, CMA/CA urban fringe, CMA/CA rural, Non-CA urban, Non-CA rural). Finally, temporal variables include (survey years of 2011-2016 and survey months of January and July). Each of these variables are dummy coded. The socio-demographic, socio-economic and spatial

variables chosen in the logit models are informed either empirically or theoretically in the literature e.g. immigration status (Bauder 2003; Goldring and Landolt 2012), age (Vosko et al., 2003), gender (Cranford et al., 2003b), marital status (Young 2010), education, income and occupation (Lewchuk 2017), union status (Cranford et al., 2003a) and space (Hanson and Pratt 1995).

3.5 Results of the empirical analysis

3.5.1 Descriptive results

National level. Table 3.2 shows a cross-tabulation of PFEs at the national level by gender from 2011-2016. We find that part-time employment was the most common form of precarious employment for women (19.7%), while multiple job holding was the least common (4.2%). In general, women tended to have higher rates of precarious forms of employment relative to men at the national level, except for involuntary part-time employment that was over-represented by men (17.2% versus 10.0% for men and women, respectively, p=<.0001).

Table 3. 2:Weighted percentages at the national level for Canada's population engaged in PFE by gender, 2011-2016

	Women	Men	Difference (Diff.)
PFE	%	%	p-value
Temporary employment	9.7	8.9	<.0001
Involuntary part-time employment	10.0	17.2	<.0001
Part-time employment	19.7	6.0	<.0001
Multiple job holders	5.8	4.2	<.0001

Notes: Two-tailed test are used to determine statistically significant differences (diff.) between women and men.

Provincial level. Table 3.3 and figure 3.4 present precarious employment rates at the provincial scale. Overall, temporary employment was common for both men and women in Atlantic Canada's provinces and less common in central Canada's province of Ontario and the prairie province of Manitoba. Gradual increases in temporary work were observed moving westward for both men and women. Specifically, Newfoundland and Labrador and Prince Edward Island were over-represented with both men and women employed in temporary employment. In both the provinces of Newfoundland and Labrador and Prince Edward Island men were represented in high shares and significantly more likely to be employed in this type of work than women (22.5% versus 17.2%, respectively, p=<.0001 for Newfoundland and Labrador and 19.1% versus 17.7% respectively, p=0.0380, for Prince Edward Island). The portion of men employed as temporary workers in Newfoundland and Labrador (22.5%) was higher than that of men employed in temporary employment in other provinces.

Men were further found to be significantly more likely to be employed in temporary employment than women in the Atlantic provinces of Nova Scotia (13.1% versus 12.0%, respectively, p=<0.007), New Brunswick (15.4% versus 11.5% respectively, p=<.0001) and Prince Edward Island (19.1% versus 17.7%, respectively, p=0.038). Although Prince Edward Island was represented by a high share of men relative to women in temporary work, the share of women employed on a temporary basis in this province was higher compared to women employed on a temporary basis in other provinces (17.7%). Women were further found to be significantly more likely than men to be employed on a

temporary basis in the prairies as well as in central and western Canada's provinces. The provinces of Ontario and Manitoba comparatively had the lowest share of temporary employment for both men and women (7.6% versus 8.6%, respectively, p=<.0001 for Ontario and 6.8% versus 8.9% respectively, p=<.0001, for Manitoba). Ontario had the lowest portion of women engaged in temporary work (8.6%) and Manitoba had the lowest proportion of men engaged in temporary work (6.8%) when compared with other Canadian provinces.

Similarly, we also find that involuntary part-time work was more common for both men and women in Atlantic Canada and became gradually less prevalent moving westward. However, this broad east-west pattern was distorted by the provinces of Quebec and Ontario. Ontario had somehow similar shares of men and women employed in an involuntary part-time basis to New Brunswick (20.3% versus 12.9%, respectively, p=<.0001 for Ontario and 19.0 % versus 12.3% respectively, p=<.0001, for New Brunswick), while Quebec was amongst one of the provinces that were under-represented by both men and women in this kind of employment (13.3% versus 6.9 %, respectively, p=<.0001).The province of Prince Edward Island, on the other hand, stood out with the highest share of both women and men employed on an involuntary part-time basis in comparison to other provinces (18.4% versus 26.0% respectively, p= 0.0017). Furthermore, men were over-represented more than women in involuntary part-time work in all provinces.

Spatial patterns observed in part-time employment markedly differed from those of temporary and involuntary part-time employment. For men, spatial patterns in part-time employment were not as pronounced as that observed for women as men were represented in high shares of part-time work in the westernmost province of British Colombia (7.6 %) and in the Atlantic province of Nova Scotia (6.5%). More so, the low prevalence for men employed in part-time work was reported in Newfoundland and Labrador (3.6%) while the central provinces had moderately high shares of men in part-time employment. For women, employment in part-time jobs was more common in western Canada's provinces than in central and Atlantic Canada. This pattern was slightly distorted by the Atlantic Canadas province of Nova Scotia, that had a high share of women employed on a part-time basis (19.2%) compared to women in other Atlantic provinces. Women were also represented in high shares in the central (Ontario-19.0%) and prairie provinces (Manitoba- 21.3%). Unlike involuntary-part-time employment, women were significantly more likely to be employed part-time than men in all provinces.

Variation in the prevalence of part-time employment for men corresponded with that of women across the provinces. For example, the share of both women and men employed on a part-time basis in Newfoundland and Labrador was the lowest amongst Canada's provinces (15.2%, versus 3.6%, respectively, p=<.0001, respectively). Conversely, the share of both women and men employed on a part-time basis in British Columbia (24.6%, versus 7.6 %, respectively, p =<.0001) was the highest amongst Canada's provinces.

Employment in multiple jobs, on the other hand, was more prevalent in the western and prairie provinces and CMAs of Canada for both women and men. Similar to part-time work, women were significantly more likely than men to be employed in multiple jobs in all provinces. In the west, Saskatchewan had the highest rates of both men and women employed in multiple jobs (6.1%, versus 8.2 %, respectively, p =<.0001).Manitoba was also over-represented by both men and women in multiple jobs (5.9%, versus 7.7 %, respectively, p =<.0001). Alternatively, employment in multiple jobs was least common in Newfoundland and Labrador (3.0%, versus 4.2 %, respectively, p =<.0001) and Québec (3.7%, versus 4.0 %, respectively, p =0.0029) for both men and women.

CMA level. Moving to the CMA scale (table 3.4), we find that temporary employment was common for men across CMAs in Atlantic and for women in the easternmost Atlantic CMAs (specifically. St John's, NL and Halifax, NS). The highest prevalence was reported in St. John's, NL with correspondingly high rates for women and men (12.7 % and 14.4 %, respectively, p=0.0262). CMAs in Quebec and eastern Ontario also reported high shares of both men and women employed on a temporary basis, while Ontario's south-central CMAs were underrepresented by men and women in temporary work. For men, low shares of temporary employment were also evident in the prairie CMAs. The lowest temporary employment rates for both women and men were observed in Oshawa (6.0 and 5.4%, respectively p= 0.265) in relation to other CMAs. In Atlantic Canada, further gender differences were noted across the CMAs. Specifically, men in Atlantic Canada's CMAs of St. John's, NL (14.4% for men versus 12.7% for women, p

=0.0262), Moncton, NB (9.5% for men versus 8.8%, for women, p=0.4806) and St. John, NB (11.6% for men versus 8.1%, for women , p = 0.0002), were more were likely to be employed in temporary employment than women. Similarly, in the central Canada's CMAs of Quebec and Ontario, more men than women were employed on a temporary basis in Trois-Rivieres- QC (9.9% versus 9.8% respectively, p = 0.9288), Gatineau-QC (10.7% versus 10.0%, respectively, p =0.2801), Kingston-ON (11.2% versus 8.7% respectively, p = 0.0007), Peterborough-ON (9.5% versus 8.8%, respectively, p= 0.6208), Windsor-ON (6.5% versus 6.1%, respectively, p=0.4837) and Thunder Bay-ON.(9.9% versus 9.0%, respectively, p= 0.2451). In non-CMA areas, men were further significantly represented in larger shares in temporary employment than women (11.1% versus 10.8%, respectively, p=0.0282).

In comparison to temporary employment, we find that involuntary part-time employment was significantly represented by more men than women in all CMAs where data was readily available. Moreover, we find that CMAs in Central Canada (specifically Ontario) had greater gender disparities and were represented with higher shares of both women and men employed on an involuntary basis in comparison to CMAs in other regions. Specific CMAs in Ontario, namely, Windsor stood pout with the highest prevalence of both women and men employed on an involuntary part-time work in comparison to CMAs in other regions (16.1% versus 28.7% respectively, p = 0.0002). Despite these trends, it was difficult to make spatial comparisons between genders and with other forms

of precarious employment due to an abundant amount of geographies having sample sizes that were too small for disclosure.

Alternatively, spatial patterns for part-time employment contrasts those observed in temporary and involuntary part-time work. Employment in part-time work was more common in western Canada and least common in Atlantic Canada for both women and men. For example, the share of both women and men employed on a part-time basis in St. John's, NL was the lowest amongst the CMAs (12.1%, versus 3.7%, respectively, p =<.0001, respectively). Conversely, the share of women in Abbortsford-Mission, BC (25.8%) and men in Victoria, BC (9.3%) were higher in comparison to other regions. CMAs in central Canada had the greatest variations in part-time work for both men and women. Generally, central Canadas eastern CMAs were represented by higher shares of men in part-time work, while western CMAs by lower shares. This pattern was not as evident for women as it was for men. Within specific regions in Central Canada e.g. Quebec's CMAs, we see a declining prevalence of women in part-time work moving westward. Similar patens were apparent for men across the prairie CMAs. Men were further found to be underrepresented in part-time work in this region. In general, part-time employment was more widespread for women than it was for men at the CMA scale. The inverse is the case for involuntary part-time work where men were over-represented in this type of paid employment.

Spatial patterns for men and women employed in multiple jobs were somehow similar to that of part-time employment. We find that employment in multiple jobs for both women and men tends to be greater on average in CMAs located in western and least common in the easternmost CMAs of Central Canada (e.g. Quebec's CMAs) followed by Atlantic Canada's CMAs. Quebec's CMAs stood out in terms of having the lowest share of both women and men employed in multiple jobs compared to CMAs in other regions. Specifically, Saguenay, QC, and Montréal, QC both were least represented in women and men employed in multiped jobs (3.6% versus 2.5%, respectively, p=0.0182 for Saguenay, QC and 3.8 % versus 3.8 % respectively, p=0.8760, for Montréal, QC). Although a west to east spatial difference was evident, specific CMAs in central Canada were distinct with respect to having a high percentage of their population working multiple jobs. For example, Kingston, ON, reported high portion of women and men employed in multiple jobs relative to other CMAs (8.0%, versus 6.1%, respectively, p =0.0013, respectively) Moreover, more women were employed in multiple jobs in Kingston, ON, and Thunder Bay, ON in relation to other CMAs in the province of Ontario and other provinces (8.0% and 8.1% respectively). Kingston, ON, on the other hand, had the highest portion of men (6.1%) employed in multiple jobs in relation to men in other CMAs. We also note that apart from Quebec, women were over-represented in multiple jobs in all geographies in comparison to men.

Urban/rural level. Across the urban/rural spectrum (table 3.5), we show that both men and women were over-represented in temporary employment, part-time employment and

multiple jobholders were more common in rural and small-town areas (non-CA Rural) in comparison to more urban areas (CMA-CA SUC). Men were found to be significantly more likely to be temporarily employed in rural areas (e.g. in non-CA-rural areas than women(13.6% versus 12.0%, respectively, p=<.0001). When we examined part-time employment and multiple jobs, we found that the inverse is true where women were significantly more likely to be employed in these forms of employment than men across all urban and rural geographies. Involuntary part-time employment, on the other hand, was the only form of precarious work that was common in urban core areas with men significantly more likely to be employed in core urban areas (CMA/CA UC) than women (18.4 % versus 11.1% respectively p=<0.0001). Men were also significantly more likely to be employed in involuntary part-time work in rural areas, relative to women.

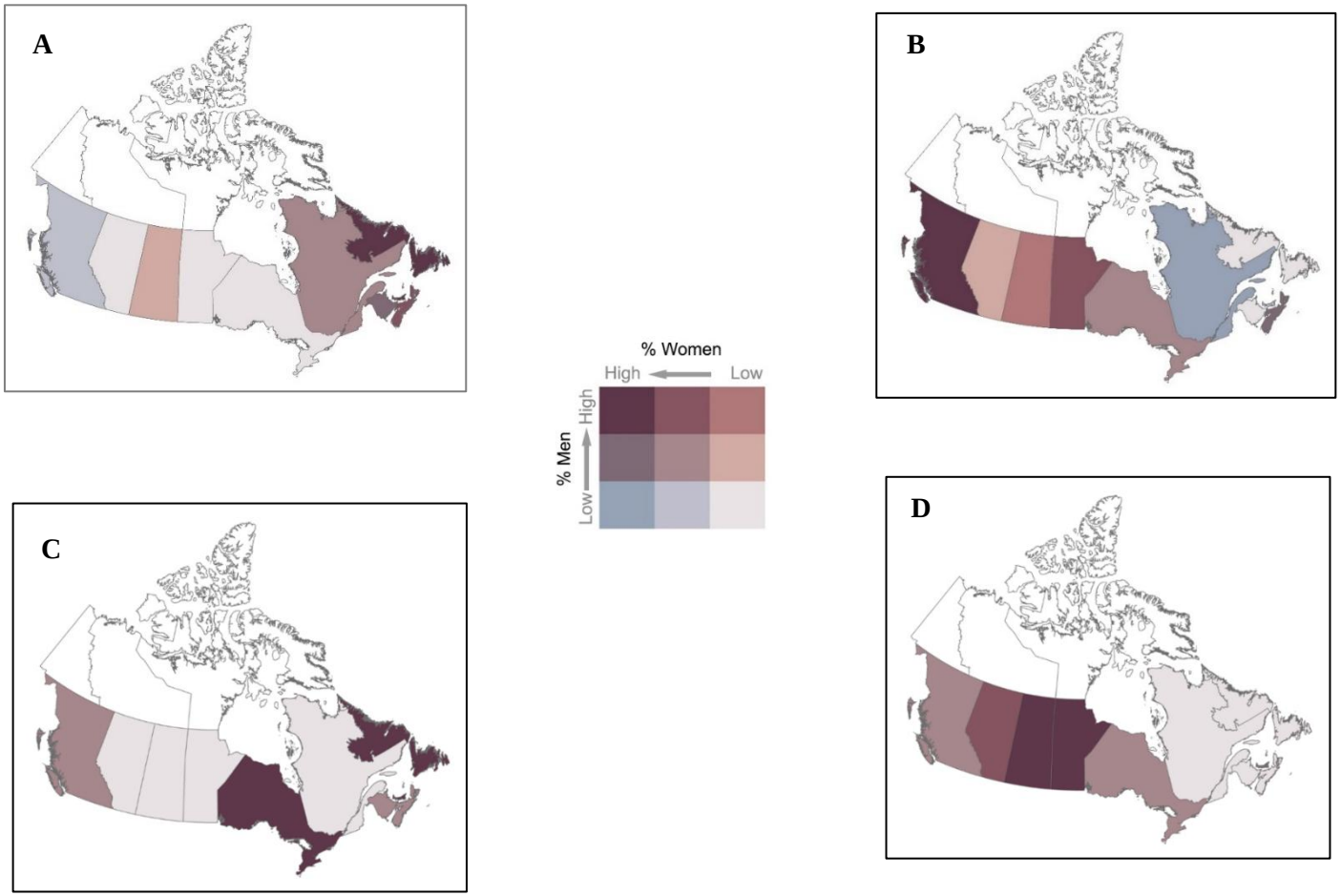

Figure 3. 4: Bivariate choropleth maps showing Canada's population engaged in PFE, across provinces by gender, 2011-2016.

A. Temporary employment B. Part-time employment C. Involuntary part-time employment D. Multiple job holders

Table 3. 3: Weighted percentages for Canada's population engaged in PFE, across provinces by gender, 2011-2016

	Temporary employment			Part-time employment			Involuntary part-time employment			Multiple job holders		
	Women	Men	Diff.	Women	Men	Diff.	Women	Men	Diff.	Women	Men	Diff.
Geography	%	%	p-value	%	%	p-value	%	%	p-value	%	%	p-value
Newfoundland and Labrador (NL)	17.2	22.5	<.0001	15.2	3.6	<.0001	16.8	21.7	0.0390	4.2	3.0	<.0001
Prince Edward Island (PE)	17.7	19.1	0.0380	15.9	5.5	<.0001	18.4	26.0	0.0017	6.1	5.1	0.0058
Nova Scotia (NS)	12.0	13.1	0.0070	19.2	6.5	<.0001	12.0	18.7	<.0001	5.7	4.0	<.0001
New Brunswick (NB)	11.5	15.4	<.0001	16.5	4.6	<.0001	12.3	19.0	<.0001	4.9	3.3	<.0001
Québec (QC)	10.5	10.2	0.1811	18.2	6.3	<.0001	6.9	13.3	<.0001	4.0	3.7	0.0029
Ontario (ON)	8.6	7.6	<.0001	19.0	6.0	<.0001	12.9	20.3	<.0001	5.9	4.3	<.0001
Manitoba (MB)	8.9	6.8	<.0001	21.3	5.9	<.0001	8.1	13.4	<.0001	7.7	5.9	<.0001
Saskatchewan (SK)	10.6	8.1	<.0001	20.8	5.2	<.0001	6.1	13.9	<.0001	8.2	6.1	<.0001
Alberta (AB)	9.2	7.7	<.0001	20.5	4.5	<.0001	7.1	15.7	<.0001	7.0	4.3	<.0001
British Columbia (BC)	10.3	8.5	<.0001	24.6	7.6	<.0001	9.4	17.3	<.0001	6.6	4.3	<.0001

Notes: Two-tailed test are used to determine statistically significant differences (diff.) between women and men.

Table 3. 4: Weighted percentages for Canada's population engaged in PFE by gender, across CMAs 2011-2016

	Temporary employment			Part-time employment			Involuntary part-time employment			Multiple job holders		
	Women	Men	Diff.	Women	Men	Diff.	Women	Men	Diff.	Women	Men	Diff.
Geography	%	%	p-value	%	%	p-value	%	%	p-value	%	%	p-value
St John's, NL	12.7	14.4	0.0262	12.1	3.7	<.0001	x	x	-	4.3	3.9	0.3690
Halifax, NS	10.4	9.1	0.0151	17.0	6.1	<.0001	10.3	16.7	0.0017	5.9	4.1	<.0001
Moncton, NB	8.9	9.5	0.4806	14.5	5.5	<.0001	x	x	-	5.0	3.5	0.0062
Saint John, NB	8.1	11.6	0.0002	16.0	4.1	<.0001	x	x	-	5.3	3.5	0.0026
Saguenay, QC	12.0	11.2	0.3988	22.4	5.6	<.0001	x	x	-	3.6	2.5	0.0182
Quebec, QC	11.9	11.1	0.2977	15.0	6.0	<.0001	x	x	-	3.9	3.9	0.9898
Sherbrooke, QC	11.1	10.9	0.8400	22.0	8.2	<.0001	x	x	-	5.0	4.3	0.1766
Trois-Rivieres, QC	9.8	9.9	0.9288	21.8	6.9	<.0001	x	x	-	3.9	3.8	0.8737
Montréal, QC	10.2	9.3	0.0299	17.2	6.6	<.0001	7.6	13.4	<.0001	3.8	3.8	0.8760
Gatineau, QC	10.0	10.7	0.2801	12.2	6.2	<.0001	x	x	-	3.9	3.8	0.8764
Ottawa, ON	10.7	7.5	<.0001	16.1	6.4	<.0001	11.9	19.2	0.0026	5.5	5.0	0.2930
Kingston, ON	8.7	11.2	0.0007	20.3	8.7	<.0001	12.1	20.9	0.0006	8.0	6.1	0.0013

Peterborough, ON	8.8	9.5	0.6208	23.0	10.1	<.0001	x	x	-	x	x	-
Oshawa, ON	6.0	5.4	0.2650	20.0	4.9	<.0001	x	x	-	5.4	3.2	<.0001
Toronto, ON	9.1	7.5	<.0001	16.5	5.7	<.0001	15.0	22.6	<.0001	5.3	4.1	<.0001
Hamilton, ON	6.9	5.9	0.0717	19.9	5.7	<.0001	x	x	-	5.4	3.7	0.0002
St. Catharines-Niagara, ON	8.3	8.1	0.7771	24.0	7.8	<.0001	x	x	-	7.3	4.3	<.0001
Kitchener-Cambridge-Waterloo, ON	6.5	6.1	0.5361	19.6	5.4	<.0001	x	x	-	5.9	4.1	<.0001
Brantford, ON	6.7	5.8	0.2010	22.0	5.8	<.0001	x	x	-	6.4	3.7	<.0001
Guelph, ON	7.9	6.9	0.2691	19.7	6.1	<.0001	x	x	-	7.0	4.5	0.0007
London, ON	8.9	8.5	0.4901	20.2	7.6	<.0001	14.0	22.8	0.0007	6.7	4.1	<.0001
Windsor, ON	6.1	6.5	0.4837	21.7	6.6	<.0001	16.1	28.7	0.0002	6.1	4.4	0.0028
Barrie, ON	8.5	7.4	0.3082	20.8	5.0	<.0001	x	x	-	6.3	3.9	0.0028
Greater Sudbury, ON	9.8	9.2	0.3980	18.1	5.5	<.0001	x	x	-	4.8	2.9	<.0001
Thunder Bay, ON	9.0	9.9	0.2451	21.5	7.2	<.0001	x	x	-	8.1	5.2	<.0001
Winnipeg, MB	9.1	6.8	<.0001	19.3	6.4	<.0001	10.0	15.4	<.0001	7.4	5.7	<.0001
Regina, SK	9.9	7.6	<.0001	14.5	4.7	<.0001	x	x	-	6.5	5.9	0.1498
Saskatoon, SK	10.8	7.6	<.0001	20.3	5.3	<.0001	x	x	-	8.0	5.3	<.0001
Calgary, AB	8.8	7.4	0.0015	18.3	4.9	<.0001	8.3	17.8	<.0001	6.3	4.3	<.0001
Edmonton, AB	9.3	8.3	0.0263	18.5	4.4	<.0001	7.6	17.2	<.0001	7.0	3.5	<.0001
Kelowna, BC	10.2	10.7	0.6831	24.8	8.5	<.0001	x	x	-	x	x	-

Abbortsford-Mission, BC	10.0	5.9	<.0001	25.8	6.0	<.0001	x	x	-	6.3	5.1	0.0285
Vancouver, BC	10.0	8.2	<.0001	22.4	7.4	<.0001	9.8	17.8	<.0001	6.2	4.1	<.0001
Victoria, BC	11.1	8.6	0.0002	24.2	9.3	<.0001	11.4	16.4	0.0130	7.0	5.2	0.0002
Non-CMA	10.8	11.1	0.0282	24.2	5.8	<.0001	8.1	14.7	<.0001	6.6	4.6	<.0001

Notes: Two-tailed test are used to determine statistically significant differences (diff.) between women and men. X= indicates that the sample is too small for disclosure.

Table 3. 5: Weighted percentages for Canada's population engaged in PFE, by gender, across urban/rural geographies, 2011-2016

	Temporary employment			Part-time employment			Involuntary part-time employment			Multiple job holders		
	Women	Men	Diff.	Women	Men	Diff.	Women	Men	Diff.	Women	Men	Diff.
Geography	%	%	p-value	%	%	p-value	%	%	p-value	%	%	p-value
CMA-CA SUC	7.0	5.7	0.0168	19.9	4.5	<.0001	7.8	13.5	0.0155	5.5	3.8	0.0002
CMA/CA UC	9.6	8.4	<.0001	18.6	6.2	<.0001	11.1	18.4	<.0001	5.6	4.1	<.0001
CMA/CA UF	9.3	7.0	<.0001	19.9	4.9	<.0001	8.3	16.0	<.0001	5.4	3.6	<.0001
CMA/CA Rural	8.9	9.2	0.2929	21.3	5.5	<.0001	7.3	13.3	<.0001	5.8	4.4	<.0001
Non-CA Urban	10.5	9.7	0.0070	23.2	5.4	<.0001	9.0	14.8	<.0001	6.6	4.0	<.0001
Non-CA Rural	12.0	13.6	<.0001	25.2	6.0	<.0001	x	x	-	6.8	5.4	<.0001

Notes: Two-tailed test are used to determine statistically significant differences (diff.) between women and men. X= indicates that the sample is too small for disclosure. SUC= Secondary Urban Core, UC= Urban Code, UF=Urban Fringe.

3.5.2 Estimation results

We now turn to the estimation results of logistic regression analysis of PFE in table 3.6

Table 3. 6: Logistic regression estimates for PFEs -Canada's population, 2011-2016

Independent variables	Temporary employment		Part-time employment	
	Model 1 Men	Model 2 Women	Model 3 Men	Model 4 Women
	β (SE)	β (SE)	β (SE)	β (SE)
Socio-demographic				
Immigration status (reference: non-immigrants)				
Immigrants	0.1325***	0.1605***	-0.0482	-0.1853***
	(0.0277)	(0.0258)	(0.0373)	(0.0217)
Population age (reference: 55-64)				
25-34	-0.0499*	0.2347***	-0.8229***	-0.5431***
	(0.0282)	(0.0294)	(0.0372)	(0.0226)
35-44	-0.2503***	-0.0811***	-0.8499***	-0.3935***
	(0.0300)	(0.0295)	(0.0401)	(0.0220)
45-54	-0.3079***	-0.1447***	-0.7798***	-0.4302***
	(0.0279)	(0.0291)	(0.0379)	(0.0209)
Marital status (reference: separated, divorced, widowed)				
Married, common law	-0.1294***	-0.0825***	-0.1719***	0.3346***
	(0.0373)	(0.0298)	(0.0495)	(0.0228)
Single	0.2272***	0.1451***	0.3639***	0.0260
	(0.0410)	(0.0359)	(0.0551)	(0.0285)
Education (reference: without high school graduation)				
High school graduate	-0.2587***	-0.0988**	-0.0243	-0.0199
	(0.0355)	(0.0419)	(0.0483)	(0.0308)
Some post-secondary education	-0.1183**	0.0598	0.1809***	0.0491
	(0.0488)	(0.0570)	(0.0664)	(0.0404)
Postsecondary certificate or diploma	-0.1467***	0.0175	-0.0114	-0.0135
	(0.0316)	(0.0387)	(0.0470)	(0.0303)

University degree	0.1474***	0.3854***	0.2380***	-0.00037
	(0.0395)	(0.0430)	(0.0524)	(0.0338)
Socio-economic				
Income (reference: hourly earnings greater than $30.00)				
Hourly earnings less than $12.00	1.4526***	1.4325***	2.3149***	1.4335***
	(0.0424)	(0.0389)	(0.0511)	(0.0295)
Hourly earnings between $12.00 and $19.99	0.8069***	0.9806***	1.2270***	0.7218***
	(0.0281)	(0.0313)	(0.0434)	(0.0239)
Hourly earnings between $20.00 and $29.99	0.3059***	0.6225***	0.4604***	0.2173***
	(0.0269)	(0.0294)	(0.0449)	(0.0234)
Occupation (reference: natural resources, agriculture and related production occupations)				
Management occupations	-2.0904***	-1.9253***	-1.2479***	-1.8107***
	(0.0666)	(0.0738)	(0.1144)	(0.079)
Business, finance and administration occupations	-1.4723***	-1.3654***	-0.2852***	-0.5199***
	(0.0488)	(0.0476)	(0.0828)	(0.0506)
Natural and applied sciences and related occupations	-1.3226***	-1.2831***	-0.7363***	-1.4945***
	(0.0485)	(0.0683)	(0.0913)	(0.0816)
Health occupations	-1.0394***	-1.0888***	0.8892***	0.3616***
	(0.0753)	(0.0468)	(0.0959)	(0.0504)
Occupations in education, law and social, community and government services	-0.6551***	-0.5089***	0.5671***	0.0208
	(0.0487)	(0.0455)	(0.0821)	(0.0507)
Occupations in art, culture, recreation and sport	-0.3809***	-0.5549***	0.7315***	0.3067***
	(0.0780)	(0.0727)	(0.1137)	(0.0679)
Sales and service occupations	-1.6533***	-1.4886***	0.2748***	0.0261
	(0.0451)	(0.0470)	(0.0716)	(0.0503)
Trades, transport and equipment operators and related occupations	-0.7357***	-0.6736***	-0.4893***	-0.3603***
	(0.0366)	(0.0698)	(0.0728)	(0.0742)
Occupations in manufacturing and utilities	-1.6094***	-1.2117***	-1.2984***	-1.8543***
	(0.0527)	(0.0691)	(0.1028)	(0.0836)
Union status (reference: union member)				

Not a union member	-0.1834***	-0.0934***	-0.00049	0.0128
	(0.0224)	(0.0230)	(0.0334)	(0.018)
Spatial				
Geography - Census Metropolitan Area's (CMA) (ref. =Toronto)				
St-John's	0.7250***	0.4531***	-0.3404***	-0.5866***
	(0.0649)	(0.0617)	(0.1117)	(0.0639)
Halifax	0.0641	0.1527***	-0.1631**	-0.2394***
	(0.0591)	(0.0543)	(0.0786)	(0.0423)
Moncton	0.1083	-0.0378	-0.3243***	-0.5892***
	(0.0809)	(0.082)	(0.1101)	(0.0846)
Saint John	0.3703***	-0.0751	-0.4611***	-0.4661***
	(0.0804)	(0.0875)	(0.1727)	(0.0668)
Saguenay	0.3380***	0.3410***	0.1457	0.0536
	(0.0686)	(0.0746)	(0.1092)	(0.0628)
Quebec	0.3771***	0.3586***	0.0904	-0.2436***
	(0.0619)	(0.0561)	(0.0955)	(0.0437)
Sherbrooke	0.2687***	0.2290***	0.3199***	0.1391**
	(0.0674)	(0.0622)	(0.0981)	(0.0623)
Trois-Rivieres	0.1619**	0.1062	0.2811***	0.1080*
	(0.0686)	(0.0749)	(0.0879)	(0.0559)
Montréal	0.1455***	0.1035**	0.1122**	-0.0894***
	(0.0423)	(0.0412)	(0.0568)	(0.0334)
Gatineau	0.3645***	0.218***	0.1643*	-0.4083***
	(0.0595)	(0.0590)	(0.0835)	(0.0589)
Ottawa	0.0219	0.2274***	0.1154	-0.0513
	(0.0657)	(0.0541)	(0.0935)	(0.0495)
Kingston	0.3300***	-0.0028	0.4485***	0.00319
	(0.0580)	(0.0644)	(0.0722)	(0.0539)
Peterborough	0.1566	0.00488	0.6514***	0.1099
	(0.1404)	(0.1430)	(0.1483)	(0.0905)
Oshawa	-0.2861***	-0.3500***	0.0558	0.0501
	(0.0803)	(0.0826)	(0.0975)	(0.0531)

Hamilton	-0.3035***	-0.2398***	0.1364	0.0344
	(0.0808)	(0.0723)	(0.0972)	(0.0458)
St.Catharines-Niagara	-0.0173	-0.0514	0.3274***	0.1335***
	(0.0786)	(0.0729)	(0.0838)	(0.0503)
Kitchener-Cambridge-Waterloo	-0.2304***	-0.3433***	0.2625***	0.0857*
	(0.0731)	(0.0786)	(0.0842)	(0.0505)
Brantford	-0.2995***	-0.2676***	0.1715	0.1292*
	(0.0949)	(0.0886)	(0.1357)	(0.0716)
Guelph	-0.1281	-0.1854*	0.2336*	0.1262*
	(0.1102)	(0.1000)	(0.1292)	(0.073)
London	0.0635	0.0228	0.4121***	0.0410
	(0.0690)	(0.0593)	(0.0848)	(0.0436)
Windsor	-0.2054**	-0.4371***	0.4088***	0.1406***
	(0.0971)	(0.0829)	(0.0870)	(0.0477)
Barrie	0.0341	-0.0527	-0.0417	0.0325
	(0.1019)	(0.0893)	(0.1363)	(0.1135)
Greater Sudbury	0.0803	0.1478**	0.0893	-0.1382***
	(0.0718)	(0.0729)	(0.1010)	(0.0522)
Thunder Bay	0.2031***	0.0455	0.2613**	0.1311**
	(0.0718)	(0.0718)	(0.1040)	(0.0518)
Winnipeg	-0.2591***	-0.0602	0.0899*	0.00155
	(0.0438)	(0.0399)	(0.0533)	(0.0291)
Regina	-0.00968	0.2222***	-0.0578	-0.2298***
	(0.0588)	(0.0614)	(0.0872)	(0.0527)
Saskatoon	-0.1516**	0.2067***	0.0548	0.0729
	(0.0612)	(0.0536)	(0.0804)	(0.0500)
Calgary	-0.0451	0.0430	0.0517	0.0991**
	(0.0584)	(0.0534)	(0.083)	(0.0431)
Edmonton	0.0919	0.0821	-0.00184	0.0739*
	(0.0581)	(0.0522)	(0.0809)	(0.0418)
Kelowna	0.3483***	0.2017	0.3073	0.3459***
	(0.1154)	(0.1323)	(0.1915)	(0.0851)
Abbortsford-Mission	-0.4202***	-0.0195	-0.00318	0.2241***
	(0.0906)	(0.0714)	(0.1101)	(0.0534)

Vancouver	-0.00196	0.0571	0.2405***	0.2652***
	(0.0462)	(0.0426)	(0.0600)	(0.0320)
Victoria	0.1033	0.2986***	0.4496***	0.3439***
	(0.0718)	(0.0636)	(0.0763)	(0.0413)
Urban/rural classifications (reference: CMA/CA Urban Code)				
CMA-CA Secondary Urban Core	-0.2652***	-0.2395***	-0.0918	0.0637
	(0.0733)	(0.0687)	(0.1028)	(0.0489)
CMA/CA Urban Fringe	-0.0805	0.0593	-0.0683	0.0581
	(0.0604)	(0.0643)	(0.0872)	(0.0461)
CMA/CA Rural	0.1160***	0.0428	-0.0795	0.0570**
	(0.0348)	(0.0360)	(0.0484)	(0.0269)
Non-CA Urban	0.1449***	0.1924***	0.0351	0.1418***
	(0.0414)	(0.0401)	(0.0523)	(0.0300)
Non-CA Rural	0.4783***	0.3801***	0.0969*	0.1676***
	(0.0323)	(0.0324)	(0.0493)	(0.0252)
Temporal				
Survey year (reference: 2016)				
2011	0.00417	-0.00865	-0.1064**	-0.0482*
	(0.0350)	(0.0331)	(0.0463)	(0.0253)
2012	-0.00133	0.000275	-0.0895**	-0.0726***
	(0.0359)	(0.0337)	(0.0445)	(0.026)
2013	0.0239	0.00188	-0.0757	-0.0508**
	(0.0350)	(0.0343)	(0.0461)	(0.0253)
2014	-0.0141	-0.0274	-0.0778*	-0.0217
	(0.0346)	(0.0335)	(0.0466)	(0.0249)
2015	0.0169	-0.0207	-0.0314	-0.0682***
	(0.0365)	(0.0346)	(0.0462)	(0.0259)
Survey month (reference: July)				
January	-0.3092***	-0.0282	0.1812***	0.1244***
	(0.0202)	(0.0193)	(0.0273)	(0.0142)
Summary statistics				
N (unweighted)	247428	250943	247428	250943

Likelihood ratio/F statistic	155.09	129.6	185.12	275.86
Percent concordant	70	66	77.9	69.6

Notes: β = parameter estimate. Standard error in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 3.6 (Continued)

	Involuntary part-time employment		**Multiple job holders**	
Independent variables	Model 5 Men	Model 6 Women	Model 7 Men	Model 8 Women
	β (SE)	β (SE)	β (SE)	β (SE)
Socio-demographic				
Immigration status (reference: non-immigrants)				
Immigrants	0.4360***	0.5102***	0.1767***	0.0223
	(0.0847)	(0.0542)	(0.0383)	(0.0319)
Population age (reference: 55-64)				
25-34	1.4136***	1.0045***	0.3393***	0.2517***
	(0.1067)	(0.0714)	(0.0454)	(0.0396)
35-44	1.2086***	0.8645***	0.3326***	0.1969***
	(0.1121)	(0.0692)	(0.0435)	(0.0388)
45-54	1.1584***	0.8672***	0.2318***	0.2227***
	(0.1059)	(0.0664)	(0.0431)	(0.0364)
Marital status (reference: separated, divorced, widowed)				
Married, common law	-0.1848	-0.7126***	-0.0932	-0.3841***
	(0.1277)	(0.0615)	(0.0573)	(0.0342)
Single	-0.1277	-0.0466	-0.1445**	-0.0331
	(0.1416)	(0.0759)	(0.0627)	(0.0429)
Education (reference: without high school graduation)				

High school graduate	0.1873	0.2223**	0.2674***	0.3139***
	(0.1215)	(0.0918)	(0.0658)	(0.0618)
Some post-secondary education	0.1947	0.4619***	0.4731***	0.4718***
	(0.1587)	(0.1168)	(0.0813)	(0.0771)
Postsecondary certificate or diploma	0.4033***	0.5496***	0.4668***	0.5388***
	(0.1153)	(0.0888)	(0.0590)	(0.0597)
University degree	0.6847***	0.6685***	0.5932***	0.6816***
	(0.1314)	(0.0961)	(0.0639)	(0.0615)
Socio-economic				
Income (reference: hourly earnings greater than $30.00)				
Hourly earnings less than $12.00	0.8813***	1.1604***	0.7176***	0.5047***
	(0.1407)	(0.0955)	(0.0607)	(0.0502)
Hourly earnings between $12.00 and $19.99	0.8856***	0.8829***	0.6629***	0.4944***
	(0.1264)	(0.0847)	(0.0433)	(0.0356)
Hourly earnings between $20.00 and $29.99	0.5305***	0.5224***	0.3811***	0.2722***
	(0.1293)	(0.0853)	(0.0401)	(0.0359)
Occupation (reference: natural resources, agriculture and related production occupations)				
Management occupations	-0.7521**	-0.2503	0.2266***	-0.6636***
	(0.3727)	(0.2698)	(0.0858)	(0.0966)
Business, finance and administration occupations	-0.2982	-0.1293	0.3163***	-0.3109***
	(0.1940)	(0.1514)	(0.0807)	(0.0792)
Natural and applied sciences and related occupations	-0.8353***	-0.2883	-0.0525	-0.8494***
	(0.2503)	(0.3504)	(0.0832)	(0.1127)
Health occupations	-0.4903**	-0.0665	1.1183***	0.2854***
	(0.2275)	(0.1448)	(0.0943)	(0.0787)
Occupations in education, law and social, community and government services	-0.2785	0.3169**	0.8380***	0.0706
	(0.1924)	(0.1426)	(0.0778)	(0.0777)

Occupations in art, culture, recreation and sport	-0.1948	0.3015	0.9266***	0.2672**
	(0.231)	(0.1915)	(0.1126)	(0.1042)
Sales and service occupations	-0.2517	0.0871	0.3629***	-0.2260***
	(0.1624)	(0.1430)	(0.0719)	(0.0783)
Trades, transport and equipment operators and related occupations	0.0270	0.3207	-0.1963***	-0.3172***
	(0.1700)	(0.2069)	(0.0746)	(0.1213)
Occupations in manufacturing and utilities	0.1112	0.4415	-0.2000**	-1.0089***
	(0.2254)	(0.2686)	(0.0856)	(0.1224)
Union status (reference: union member)				
Not a union member	0.0616	-0.0870*	-0.0945***	0.1352***
	(0.0880)	(0.0503)	(0.0319)	(0.0288)
Spatial				
Geography - Census Metropolitan Area's (CMA) (ref. =Toronto)				
St-John's	-0.1372	0.1252	0.0104	-0.3189***
	(0.2867)	(0.1478)	(0.1033)	(0.0827)
Halifax	-0.2533	-0.1584	-0.1653*	-0.00515
	(0.1880)	(0.1110)	(0.0867)	(0.0681)
Moncton	0.1150	-0.0152	-0.3594***	-0.1536
	(0.2878)	(0.1894)	(0.1382)	(0.1076)
Saint John	-0.1174	-0.0163	-0.1709	-0.0840
	(0.3263)	(0.1944)	(0.1345)	(0.0945)
Saguenay	-0.6488*	-0.5193***	-0.4775***	-0.5199***
	(0.3356)	(0.1802)	(0.1517)	(0.1324)
Quebec	-0.4614*	-0.5861***	-0.1566	-0.4412***
	(0.2577)	(0.2163)	(0.1057)	(0.0901)
Sherbrooke	-0.2333	-0.4461*	-0.0590	-0.2123*
	(0.2479)	(0.2378)	(0.1458)	(0.1130)

Trois-Rivieres	-0.4694	-0.3258*	-0.1128	-0.5259***
	(0.3021)	(0.1820)	(0.1215)	(0.1231)
Montréal	-0.5660***	-0.5776***	-0.1348**	-0.4098***
	(0.1555)	(0.0979)	(0.0600)	(0.0599)
Gatineau	-0.3953*	-0.2532	-0.0769	-0.2953***
	(0.2277)	(0.1925)	(0.0941)	(0.0967)
Ottawa	-0.2078	-0.0324	0.2132**	0.0362
	(0.2008)	(0.1311)	(0.0903)	(0.0754)
Kingston	0.3402*	0.1855	0.3090***	0.3288***
	(0.1896)	(0.1227)	(0.0868)	(0.0843)
Peterborough	-0.0846	0.4704**	0.5000***	-0.0467
	(0.3557)	(0.1940)	(0.1763)	(0.1349)
Oshawa	-0.1767	0.3736***	-0.1387	0.0089
	(0.2449)	(0.1192)	(0.1160)	(0.0812)
Hamilton	-0.2258	-0.0830	-0.0748	-0.0661
	(0.2495)	(0.1297)	(0.1023)	(0.0929)
St.Catharines-Niagara	0.0539	0.2447**	0.0119	0.2122***
	(0.1969)	(0.1117)	(0.1108)	(0.0793)
Kitchener-Cambridge-Waterloo	0.3504*	-0.1616	0.0878	0.1026
	(0.2017)	(0.1296)	(0.1048)	(0.0775)
Brantford	-0.2862	-0.2175	0.0526	0.1804*
	(0.3733)	(0.1946)	(0.1391)	(0.0936)
Guelph	-0.1577	-0.2392	0.1971*	0.2619**
	(0.3596)	(0.2617)	(0.1164)	(0.1189)
London	0.2221	0.2028*	-0.00426	0.1676**
	(0.2145)	(0.1121)	(0.1077)	(0.0758)
Windsor	0.3560*	0.2642**	0.0585	0.0714
	(0.2085)	(0.1310)	(0.1160)	(0.0916)
Barrie	0.1830	0.3717*	-0.0674	0.0791
	(0.3554)	(0.1982)	(0.1497)	(0.1138)

Greater Sudbury	0.0533	0.2034	-0.3467***	-0.1320
	(0.2366)	(0.1459)	(0.1332)	(0.0897)
Thunder Bay	0.0582	-0.3835**	0.3625***	0.4213***
	(0.2173)	(0.1825)	(0.0990)	(0.0764)
Winnipeg	-0.2971**	-0.2576***	0.3127***	0.2921***
	(0.1268)	(0.0848)	(0.0546)	(0.0444)
Regina	-0.2051	-0.4549**	0.4398***	0.2547***
	(0.2227)	(0.1921)	(0.0668)	(0.0689)
Saskatoon	-0.1794	-0.2974**	0.4093***	0.3757***
	(0.2141)	(0.1379)	(0.0717)	(0.0676)
Calgary	-0.0121	-0.3794***	0.2268***	0.1977***
	(0.1893)	(0.1363)	(0.0753)	(0.0631)
Edmonton	-0.0498	-0.4001***	0.00184	0.3178***
	(0.1894)	(0.1436)	(0.0777)	(0.0607)
Kelowna	0.0639	-0.0144	0.0787	-0.0173
	(0.4178)	(0.2335)	(0.2321)	(0.2662)
Abbortsford-Mission	0.3956	-0.655***	0.4217***	0.1099
	(0.2532)	(0.1962)	(0.0995)	(0.0868)
Vancouver	-0.0544	-0.2891***	0.0557	0.1236**
	(0.1360)	(0.0913)	(0.0605)	(0.0526)
Victoria	-0.2752	0.1516	0.2465***	0.2225***
	(0.1885)	(0.1056)	(0.0904)	(0.0748)
Urban/rural classifications (reference: CMA/CA Urban Code)				
CMA-CA Secondary Urban Core	-0.2228	-0.1670	0.0642	0.0582
	(0.2717)	(0.1680)	(0.1035)	(0.0863)
CMA/CA Urban Fringe	0.3025	-0.2055*	0.0324	-0.00974
	(0.2503)	(0.1215)	(0.1322)	(0.0703)
CMA/CA Rural	-0.0405	-0.1133	0.1549***	0.0678
	(0.1376)	(0.0764)	(0.0536)	(0.0449)
Non-CA Urban	-0.3109**	-0.1861**	0.1298**	0.192***

	(0.1447)	(0.0775)	(0.0595)	(0.0465)
Non-CA Rural	-0.0537	-0.1863***	0.4876***	0.2247***
	(0.1224)	(0.0697)	(0.0512)	(0.0391)
Temporal				
Survey year (reference: 2016)				
2011	0.4189***	0.0384	-0.0636	-0.0340
	(0.1133)	(0.0700)	(0.0501)	(0.0404)
2012	0.1360	-0.0133	-0.0714	-0.0457
	(0.1194)	(0.0719)	(0.0474)	(0.0414)
2013	0.0645	0.0109	-0.1284***	-0.0200
	(0.1160)	(0.0742)	(0.0492)	(0.0401)
2014	0.1844	-0.00242	0.00951	-0.00836
	(0.1224)	(0.0719)	(0.0497)	(0.0410)
2015	0.0639	-0.0563	-0.0713	-0.00198
	(0.1174)	(0.0755)	(0.0489)	(0.0406)
Survey month (reference: July)				
January	0.0914	0.1038***	0.0307	0.1152***
	(0.0665)	(0.0401)	(0.0283)	(0.0242)
Summary statistics				
N (unweighted)	11586	45882	247428	250943
Likelihood ratio/F statistic	13.58	34.55	37.89	40.35
Percent concordant	69.2	69.2	64.1	60.7

Notes: β = parameter estimate. Standard error in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Spatial effects. The multivariate analysis in table 3.6 confirms the robustness of the spatial patterns observed in the descriptive statistics even when controlling for socio-demographic and socio-economic effects. Furthermore, we observed different spatial patterns by type of PFE and gender, thus supporting the study's first hypothesis that states differences in PFE by gender vary over multiple scales. For instance, in comparison to Toronto, the likelihood of being employed in temporary work was greater for men and women across Atlantic Canadas CMAs. We further observed greater variations within Central Canadas CMAs. For instance, both men and women were more likely to be employed in temporary employment in Quebec's CMAs and least likely in Ontario's CMAs. The inverse relationship was the case for both men and women employed in an involuntary part-time basis. We further find that the likelihood of being employed in part-time and multiple jobs are significantly reduced among CMAs located in Atlantic Canada and increased in western CMAs for both men and women. Across the urban/rural spectrum, we found that generally both men and women were likely to be employed in PFEs (except for involuntary part-time work) in rural and small-town areas (Non-CA Rural) in comparison to CMA/CA Urban Code

Socio-demographic effects. Immigrant men and women were more likely to be employed in temporary (b=0.1325, p=<.0001 and b=0.1605, p=<.0001, respectively) involuntary part-time work(b=0.4360, p=<.0001 and b=0.5102, p=<.0001, respectively) and multiple jobs(b=0.1767, p=<.0001 and b=0.0223, p = 0.4846, respectively) than Canadian born men and women. Higher significant estimates were reported for immigrant women in

temporary and involuntary part-time work than for immigrant men employed in the same PFEs. Immigrant men and women were further found to be less likely to be employed on a part-time basis in comparison to Canadian born men and women (b=-0.0482, p= 0.1963 and b= -0.1853, p=<.0001, respectively). Age effects illustrate a slight negative linear relationship between increasing age and employment in temporary employment, involuntary part-time employment and multiple jobs for men and women. Mixed findings on the relationship between age and part-time employment were reported with women and men aged 45-54 generally having greater probabilities of employment in part-time work relative to younger age cohorts. Moreover, we find a significantly greater likelihood of younger women (aged 25-34) employed in temporary employment (b=0.2347, p=<.0001) and younger men (aged 25-34) employed in involuntary part-time (b=1.4136, p=<.0001) employment and multiple jobs (b=0.3393, p=<.0001).

Moving to marital status effects, single men and women were significantly more likely to be employed on a temporary basis in comparison to men and women who were separated, divorced and widowed respondents (b=0.2272, p = <.0001 and b=0.1451, p = <.0001). Mixed findings were reported in part-time work where higher estimates for married women (b=0.3346, p = <.0001) were observed relative to single women b=0.0260, p= 0.3627). However, single and married men and women were significantly less likely to be employed in involuntary-part-time employment and in multiple jobs than separated, divorced or widowed men and women. With respect to education, the results illustrate a slight positive linear relationship between higher levels of education and temporary

employment, involuntary part-time employment and multiple jobs gendered models. We further note that women and men with some post-secondary education had a greater likelihood of being employed on a part-time basis (b= 0.1809, p= 0.007 for men and b= 0.0491, p= 0.2243 for women) in comparison to men and women without high school graduation. These findings run counter to our second hypothesis that states that less-educated men and women have a higher likelihood of being employed in PFEs in comparison to more educated men and women.

Socio-economic effects. Estimates on income for men and women show that as income increases, the likelihood of being employed in all forms of precarious work significantly decreases. This finding is consistent in all PFE gendered models except for men in involuntary part-time work where estimates for men with an hourly earnings between $12.00 and $19.99 was higher (b= 0.8856, p = <.0001) than that of men with hourly earnings less than $12.00 (b=0.8813, p = <.0001) and between $20.00 and $29.99(b= 0.5305, p = <.0001). More so, higher estimates were reported for men with hourly earnings less than $12.00 in temporary, part-time and multiple jobs (in comparison to men with hourly earnings greater than $30.00) than for women with hourly earnings less than $12.00 employed in the same PFEs.

Regarding occupation, the results show a significant association between all occupations and temporary precarious employment. However, estimates were not pronounced in the temporary employment gendered models in comparison to other PFEs, although

contrasting findings are observed in other cases. E.g., health occupations were associated with a significantly greater likelihood of part-time employment (b= 0.8892, p = <.0001 for men and b= 0.3616, p = <.0001 for women) and multiple job holding b= 1.1183, p = <.0001 for men and b= 0.2854, p = <.0001 for women) than natural resources, agriculture, and related production occupations. Furthermore, occupations in manufacturing and utilities b= 0.1112, p = 0.6220 for men and b= 0.4415, p = 0.1005 for women) were associated with a higher probability of involuntary part-time employment than natural resources, agriculture, and related production occupations. Lastly, nonunionized women had a significantly higher probability of being employed in multiple jobs than unionized women (b= 0.1352, p = <.0001).

3.6 Discussion and conclusion

In this study, we investigated the spatial dimensions of precarious forms of employment (PFE) across gender lines. At the national level, we found that women were overrepresented in PFEs (except for involuntary work). This finding is consistent with findings from other researchers (i.e., Krahn 1995). We further observed distinct spatial patterns by type of PFE and gender at smaller, sub-national scales, thus supporting hypothesis one that states that differences in PFE by gender vary over multiple scales. For example, generally, temporary employment at the provincial and CMA scale was common for both men and women in Atlantic Canada's provinces and CMAs and less common in Ontario's south-central CMAs. Gradual increases in temporary work were

observed moving westward for both men and women at the provincial and CMA scale. Furthermore, women were significantly more likely than men to be employed on a temporary basis in western and central provinces and CMAs. Conversely, men were more likely to be employed in temporary positions in the Atlantic provinces and CMAs. Previous studies by Statistics Canada report comparable findings where (generally) more men than women are represented in temporary/seasonal employment in the Atlantic region (Statistics Canada, 2007).

Similarly, involuntary part-time work was found to be more common for both men and women in Atlantic Canada and became gradually less prevalent moving westward. Statistics Canada (2007), report similar findings. The generalized findings (without gender effects) in this report show that employment in involuntary part-time work is prevalent in the Atlantic region where unemployment rates are above the national average. Spatial patterns for part-time employment, on the other hand, showed contrasting spatial patterns in comparison to temporary and involuntary part-time work. Employment in part-time work was more common in western Canada and least common in Atlantic Canada for both women and men. Similar patterns for both women and men held for multiple job holdings. Furthermore, women were over-represented in both part-time employment and multiple jobs holding across all geographies. A similar trend is reported by men in involuntary part-time work.

Across the urban/rural spectrum, we found that generally both men and women were over-represented in PFEs in rural and small-town areas (non-CA Rural). Women were typically over-represented in part-time employment and multiple jobs in rural areas, while men are more likely to be engaged in temporary and involuntary part-time work in rural areas. These findings are corroborated by several studies situated in Canada, all showing that rural women are represented in shares in precarious work (MacDonald 2009; Rothwell 2002; Perusse 1997). MacDonald (2009) for instance argues that the maintenance of precarious employment for women in poor rural regions is linked with spatial labor immobility and inadequate labor market adjustment (MacDonald 2009). Women in rural geographies are less active in the labor market in comparison to 'rural men and 'urban women' (Curto and Rothwell, 2003). Moreover, rural women have lower employment rates, and if they were employed in the labor force, a smaller portion of rural women worked full time (Curto and Rothwell, 2003). Other studies show contrasting findings e.g., Curto and Rothwell (2003) examined the gendered nature of urban /rural labor markets (beyond the definitions used in these study) to show that men in large urban centers (LUC) and rural small towns (RST) had higher rates in part-time growth in comparison to women.

The aforementioned spatial patterns raise some significant questions as to what causal/contextual factors are at work in shaping these patterns. The outcomes of social and institutional processes as well as employer practices grounded and constituted in and across space could be underlying factors shaping the gender disparities in PFEs observed

in this study The inner workings of these processes are extensively examined in the literature (Gilbert 1998; Hanson et al. 1997; Hanson and Pratt 1991, 1995 MacDonald 2009; Newman 1999; Peck 1996; Peck and Theodore 2001; Powers et al.2003; Sackmann and Haussermann 1994; Vosko 2003).

Hanson and Pratt (1991) for example notes that women's social reproduction activities (domestic responsibilities) "lead many to give priority to spatial proximity of paid employment" and that "women's greater residentials fixedness places them in local labor markets not necessarily of their choosing" (Hanson and Pratt 1991 pg. 250), ultimately increasing their risk of being employed in precarious work. Furthermore, for women, their personal networks/ channels of information used in job-seeking tend to be more localized than men, ultimately constraining women spatially in their economic success (Hanson and Pratt 1991). Other studies such as MacDonald (2009) similarly argue that the maintenance of women in precarious settings is fueled by spatial labor (im)mobility due to "childcare, transportation, gendered immigration policy, tied migration, and other constraints" (MacDonald 2009 pg. 221). On the other hand, spatial labor mobility can be a factor fueling precarious employment outcomes for women willing commute long distances for low paying precarious jobs (Crane 2007; MacDonald 2009; McLafferty and Preston 2019; Preston and McLafferty 2016). Other studies looking at spatial labor (im)mobility through a housing lens find that due to 'residential racial segregation', African American women were more spatially constraint when making employment and childcare decisions in comparison to men (Gilbert 1998). This is further compounded by

discriminatory employer practices that perceive segregated low-income spaces as indicators for socio-economic status and, ultimately contributing to the exclusion of women in stable employment. (Peck and Theodore 2001; Newman 1999; Neckerman and Kirschenman 1991 Waldinger 1997).

In conclusion, we demonstrated that space shapes gendered precarious labor market outcomes in distinct geographical ways. Furthermore, we showed that precarious work is reinforced by a suite of sociodemographic and socioeconomic characteristics. For instance, with respect to immigration status, the results of this study show that immigrant women and men were significantly more likely to be employed in temporary, involuntary part-time and multiple jobs than Canadian born women and men. These findings echo those of Goldring and Landolt (2012) who state that in Canada's "new" economy, immigrants are likely to encounter labor market difficulties irrespective of their pre-migration work experience, education, and language skills. This assertion is corroborated by previous research (within the Canadian context) that documents the wage gap and economic disadvantage faced by immigrants in comparison to non-immigrant populations in the destination (see Aydemir and Skuterud 2005; Bauder 2003; Frenette and Morissette 2005). When taken together – those from groups that are overrepresented in precarious work (e.g. recent immigrant women) might be particularly disadvantaged in regions with high precarious employment. Noack and Vosko (2011) illustrate this. In their analysis, they interact gender and immigration status by arrival to find that recent immigrant women (landed less than 10 years ago) were represented in higher portions of precarious

work compared to recent immigrant men and nonimmigrant/establishing women and men (Noack and Vosko 2011). They further note that recent immigrant women were likely to be employed in a job with no pension(Noack and Vosko 2011). Consequently, a question for further analysis is how much immigrants are disadvantaged in the labor market (see Block et al 21014), and what related factors determine precarious employment amongst this group.

Results also reveal that younger workers are more likely to be engaged in precarious employment, with results echoing findings from the Canadian Labour Congress (2016). The report specifically highlights that 48% of young workers in Canada work part-time. Of them, 20% are engaged in involuntary part-time work. More so, over one-third are employed in temporary jobs and many gain employment as unpaid interns (Canadian Labour Congress 2016). Findings by Cranford et al. (2003b) further support our results as they show that younger women and men continue to be concentrated in precarious employment, particularly, temporary and part-time wage work.

Educational attainment for both men and women are also associated with precarious work, with the findings seemingly running counter to the expectation that low education is typified by low job security. Jackson (2004b) for example states that the risk of being engaged in precarious work is highly concentrated among persons with lower levels of education who normally earn lower than average wages when they are employed. The views that having an education guarantees a good job has long been expressed by young

Canadians since the 1980s, such that "if someone has worked hard in school, they are entitled to a good job," or "everyone has the right to the kind of job that their education and training has prepared them for" (Krahn and Lowe 1999, pg. 283). The results of this study, however, show a different reality, pointing to the growing mismatch between university graduates' skills and employment market needs. In part, labor insecurity amongst better-educated individuals may reflect the shift of the Canadian economy from a goods-producing economy to a service-based economy, with many of the jobs in the service sector including part-time, temporary, or contract positions (i.e., Vosko et al., 2003). Moreover, these results are consistent with other studies that find a large number of precarious jobs requiring a university degree (PEPSO 2013). Gebel's (2010) findings also corroborate our results as he finds that tertiary graduates have a high risk of entrapment in temporary employment cycles and risks of wage penalties at the beginning of their career (Gebel 2010). However, de Vries and Wolbers (2005) show that tertiary graduates can regain wage penalties and transition to more permanent employment within a shorter time frame compared to less-educated populations that suffer from persistent wage losses. Kahn (2016) further looks into the gain to promotion into permanent jobs by gender and confirms that the wage gap and transition from temporary to permanent employment are reduced for well-educated men with a substantial training component in their temporary jobs. On the contrary for highly educated women, the coefficients on these interactions were rather small and insignificant. Other studies examine the relationship between education, race, gender and precarious work to find that women with some form of tertiary education do not receive the same level of protection from

precarious work than men with the same level of education (Branch and Hanley 2017; Hiebert 1999).

On wages, we report that both men and women earning low wages are likely to be employed in PFEs. Lewchuk et al (2014) report contrasting findings. In their analysis (using an Employment Precarity Index) they find that a significant portion of low-income workers were not precariously employed. This raises a series of important question on the efficacy of form measures to capture the association between precarious employment and income. This echoed by Lewchuk et al (2014 pg. 70) when they state that " simply focusing on indirect measures of employment insecurity such as the form of the employment relationship may not fully reflect the underlying insecurity associated with uncertain earnings, loss of control over work schedules and relationship uncertainty."

The multivariate models further reveal that spatial patterns of precarious employment were robust even when controlling for socio-demographic and socio-economic effects. Those from social groups that are overrepresented in precarious work (e.g. women and immigrants) might be particularly disadvantaged in geographies with high levels of precarious work. Although the marked spatial patterns in precarious employment revealed in this study advance our knowledge on the spatial division of gendered precariousness in Canada, limitations persist. Primarily, this study was limited by the unavailability of data in small scale geographies e.g. involuntary part-time employment at the CMA scale for women and men. This limited any form of comparison with other

PFEs and with generalized findings from the broader literature. Beyond this limitation, this study provides avenues for future research to narrow down on a geography where PFEs are prevalent for both men and women and further explore social processes at work that are enablers in manifesting precarious labor inequalities for both women and men. More so, in this study, we have highlighted statistical differences in rates, but understanding these rates (i.e., differences by gender) are important for addressing policy directions and provide avenues for further research. With respect to broader impacts, future work could further explore how precarious work affects health outcomes across gender lines within disadvantaged Canadian geographies. This analysis could be longitudinal in design with time-varying mediators and further, be analyzed using mediation analyses namely parametric mediational g-Formula.

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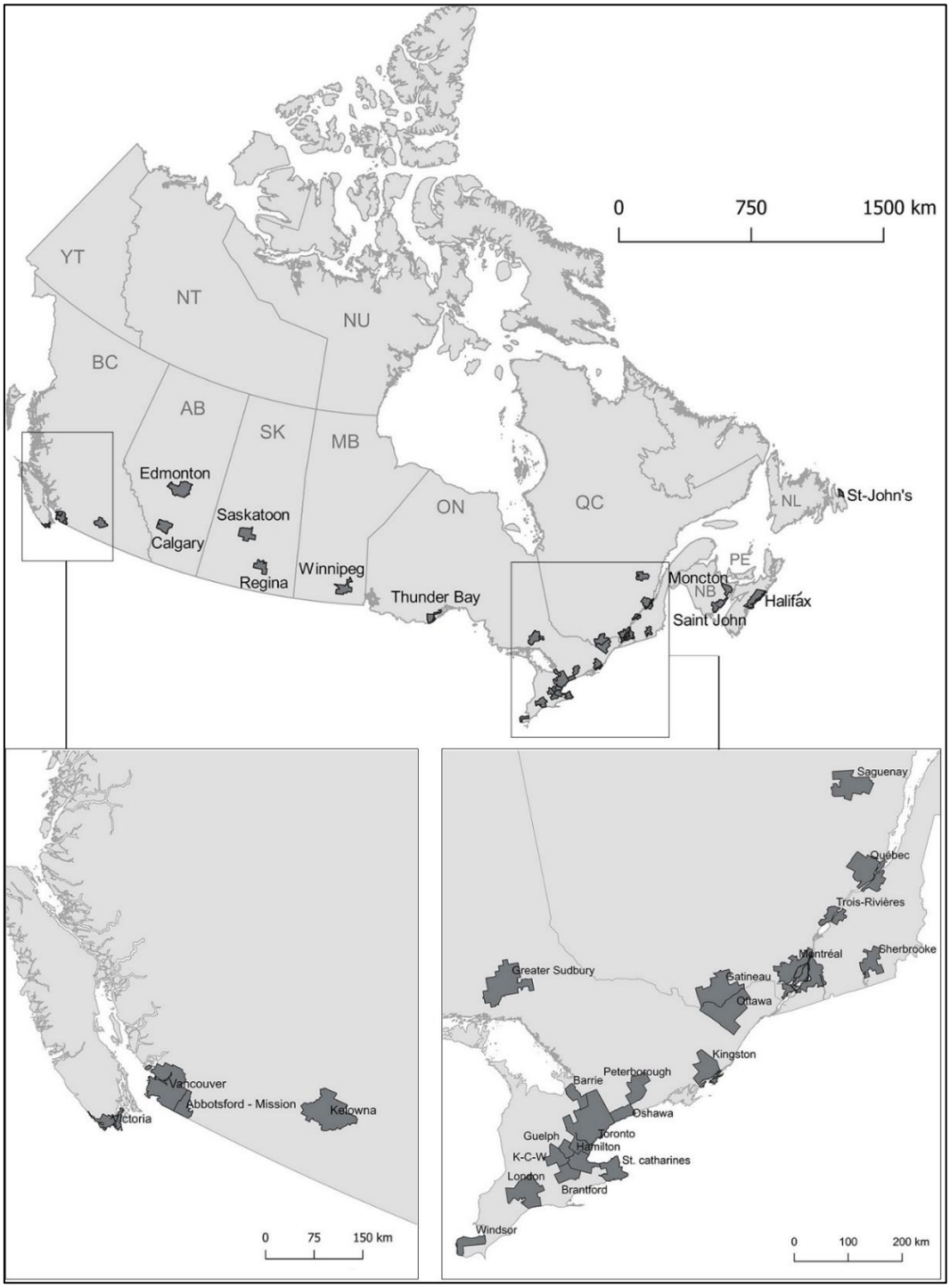
Appendix 3. 1: Provinces and CMAs in Canada



Notes: Cartographic boundary files used to create this map were retrieved from: http://www12.statcan.gc.ca/census-recensement/2011/geo/bound-limit/bound-limit-2016-eng.

Appendix 3. 2: LFS sub-geography definitions

Term	Definition
CMA/CA Urban Code/Core	A large urban area around which a CMA or a CA is delineated. The urban core must have a population (based on the previous census) of at least 50,000 persons in the case of a CMA, or at least 10,000 persons in the case of a CA.
CMA-CA Secondary Urban Core	The urban core of a CA that has been merged with an adjacent CMA or larger CA.
CMA/CA Urban Fringe	Includes all small urban areas within a CMA or CA that are not contiguous with the urban core of the CMA or CA.
CMA/CA Rural	All territory within a CMA or CA not classified as an urban core or an urban fringe.
Non-CA Urban	Small town population centres
Non-CA Rural	Include rural and small-town census rural areas outside population centres.

Source: Statistics Canada (2015). Web link: https://www150.statcan.gc.ca/n1/pub/21-006-x/2012001/data-eng.htm. Reproduced and distributed on an "as is" basis with the permission of Statistics Canada.

CHAPTER 4: Geographic variations in precarious employment outcomes between immigrant and Canadian-born populations

4.1 Abstract

The objective of this paper is to explore the spatial patterning of precarious forms of employment (PFE) by immigration status (i.e. differences between immigrant and Canadian-born populations). Using data drawn from Statistics Canada's 2011-2016 Labor Force Surveys, we first compare various PFEs across a range of geographies including national, provincial, census metropolitan areas and urban/rural areas. The results show that different PFEs exhibited distinct spatial patterns for both immigrant and Canadian-born populations, with the CMA scale showing the greatest spatial variation. This east-west pattern was partially distorted when we focused our analysis on the immigrant population. Results also indicate that PFEs are more of a rural phenomenon for both immigrant and Canadian-born populations with the exception of involuntary-part-time work and multiple job holding (specifically for immigrant populations).

Second, using logistic regression models, results show that PFEs among immigrants is reinforced by non-spatial factors such as gender, age, landing status, country of origin, education, occupation, and income. These models further confirm that spatial patterns of PFEs were robust even when controlling for socio-demographic and socio-economic effects. This was also the case for logit models with gender and immigration interactions. These findings makes two key contributions in the literature. First, the spatial patterns

identified advance our understanding of the spatial restructuring of immigrant labor in the face of growing migration into Canada. Second, we highlight the importance of further understanding the broader labor processes and work-place processes that shape precarious labor market outcomes for immigrants. A comprehensive understanding of these processes is imperative for formulating place-based anti-poverty policies.

4.2 Introduction

Immigration has had a significant impact on the population growth of Canada since confederation in 1867. As of 2016, Canada was home to 7.5 million foreign-born individuals, representing more than 1 in 5 people in Canada (Statistics Canada 2017a). Despite Canada's dependence on immigration for population growth and economic development, more recent immigrants experience economic incorporation slower than in the past (Noak and Vosko 2011). Most scholars affirm this by painting a pessimistic picture of the immigrant experience relative to the Canadian-born population (Aydemir 2003; Aydemir and Skuterud 2005; Baker and Benjamin 1994; Bauder 2003a; 2003b Frenette and Morissette 2005 and Reitz 2007), with key findings including low returns to education value for immigrants (Ferrer and Riddell 2004; Reitz 2007); falling entry earnings across successive immigrant cohorts (Aydemir 2003; Aydemir and Skuterud 2005; Baker and Benjamin 1994; Frenette and Morissette 2005; Vosko et al., 2003) and deskilling and downward mobility in the labor market as a result of cultural segmentation (Bauder 2001; 2003a; 2003b; Crease and Wiebe 2009).

The poor economic progress of immigrants may be reflected in participation in precarious employment, characterized by low income, lack of control over the labor process, high levels of uncertainty and lack of regulatory protection (Cranford et al., 2003a; Fudge and Owens 2006; Standing 2011). To date, studies situated within the Canadian context have shown that precarious work is oftentimes held by workers in certain social locations, especially immigrants, women and racialized people (Cranford and Vosko 2006; Noak and Vosko 2011). With respect to the former, Noack and Vosko (2011) notes that in 2008, recent immigrants to Canada were more likely to be employed in precarious jobs relative to established immigrants and the Canadian-born population (i.e. 40.7% and 31.4% respectively). Recent immigrants were also more likely to be found in temporary and part-time work relative to the host population, reflecting the challenges of entering the labor market in a new country, especially with foreign credentials and work experience (Noack and Vosko 2011).

A major under-researched area vital to enriching our understanding of labor market insecurity in Canada is how immigrants employed in precarious forms of employment (PFE) are geographically variegated. With a growing immigrant population in Canada, there is a pressing need to understand the nature of precarious work that immigrants are relegated to across space as labor markets are regulated in distinct geographical ways (Peck 1996). In a similar vein, several studies in the literature have demonstrated that space is a significant factor shaping labor market outcomes (Jacquemond and Breau 2015; Peck 1996; McDonald 2009; Massey 1984, 1994; Massey and Allen 1984; Soja

1980; Strauss 2018). As such, much can be learned from a greater focus on how PFEs can vary across multiple scales. This is corroborated by complexity science that recognizes the significance of "processes at multiple and inter-locking geographic scales in "a system marked by constant change and emergence" (O'Sullivan et al., 2006 pg. 614). Similarly, MacDonald (2009 pg. 211) states that a focus on multi-scalar analysis "brings the importance of space to the forefront, as the socially produced scales of regulation, policy discourse, and individual action interact with geography". In this way, knowing what is occurring at one scale enables comparisons with other scales.

In the current paper, we focus on disaggregate PFEs based on their deviation from the standard employment relationship (SER) (characterized by permanent and full-time, and often protected by labor unions and collective bargaining arrangements). These PFEs include temporary employment (employment that has a predetermined end date, such as contract or casual jobs); part-time employment (employment that carries less than 30 hours per week); involuntary part-time employment (part-time employment that includes persons who could not find employment with 30 or more hours per week because of economic slack or for the reason that full-time employment could not be found); and multiple job holders (working persons who are employed in two or more jobs simultaneously, often in other nonstandard work arrangements such as temporary and involuntary part-time employment) (Statistics Canada 2015).

As mentioned above, we conceptualise precarious employment by its individual form and refrain from grouping the range of PFEs unified by their deviation from the SER into a single category of "non-standard employment" on the basis of Cranford et al.'s (2003b pg. 455-456) assertion that "there are important differences both between and within the forms of employment that fall outside the SER. For example, there are inequalities along lines of gender, "race" and ethnicity within both standard and non-standard forms of employment". While we acknowledge that characteristic measures tend to be a more nuanced measure of labor market insecurity (see Gallie et al., 2017; Lewchuk 2017) data limitations was a factor that determined our focus on particular precarious forms of employment.

This paper therefore (1) examines the spatial patterning of PFEs (including temporary employment, part-time employment, involuntary part-time employment and employment in multiple jobs) by immigration status (i.e. differences between immigrant and Canadian-born populations), focusing on a suite of geographic scales including the national, provincial, census metropolitan areas and urban/rural areas; (2) explores the sociodemographic, socioeconomic and spatiotemporal correlates of PFEs, and (3) assesses whether spatial patterns of PFEs are robust when controlling for socio-demographic and socio-economic effects. Consequently, this research will advance our understanding of the spatial restructuring of immigrant labor in the face of neoliberal globalization.

4.3 Literature review

4.3.1 Vulnerable workers and precarious work: an overview

Precarious employment is a defining feature of the Canadian labor market that is not well understood, and yet its consequences are far-reaching (Vosko, 2006). In regard to its composition, this type of employment embraces forms of work involving limited benefits and statuary entitlements, low wages, job insecurity and high perils of ill health (Lewchuk (2017) Moreover, this type of employment is shaped by social locations (Cooke-Reynolds and Zukewich 2004; Cranford et al., 2003a, 2003b; Cranford and Vosko 2006; Noak and Vosko 2011; Vosko 2000; 2006) and geography (Hanson et al., 1997; Jacquemond and Breau 2014; MacDonald 2009; Strauss 2018).

Immigrants in the Canadian labor force (in comparison to their Canadian-born counterparts) are potentially more likely to be relegated to precarious employment that is insecure, low paid and in some cases is not commensurate with their human capital (Cranford and Vosko 2006; Noak and Vosko 2011). In addition, recent immigrants landed less than 10 years are more likely to cluster in temporary forms of employment in comparison to the Canadian-born population and established immigrants (landed more than 10 years) (Noack and Vosko 2011). Temporal trends in precarious work from 1999-2009, for example, show that the portion of workers in precarious employment is consistent for both Canadian-born women and men and established immigrant women and men, with the latter populations nonetheless showing evidence of higher rates (Noack and Vosko 2011)(see figure 4.1 and 4.2).

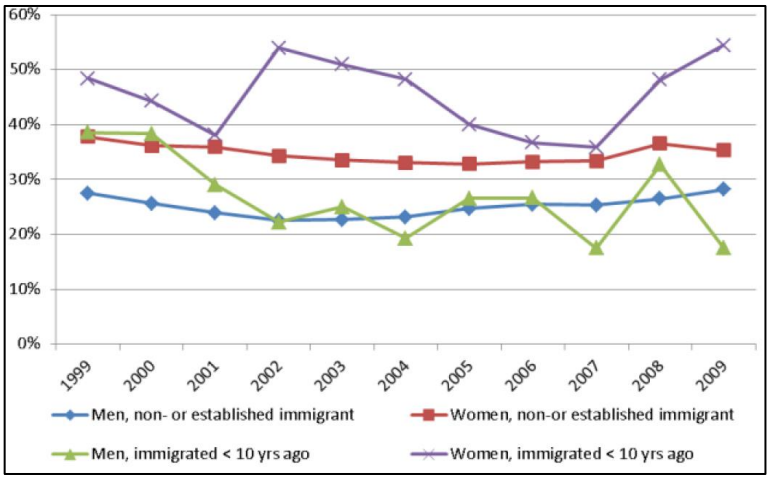


Figure 4. 1: Proportion of all workers in precarious jobs, by immigrant status & gender, 1999-2009.

Source: Noack and Vosko (2011)

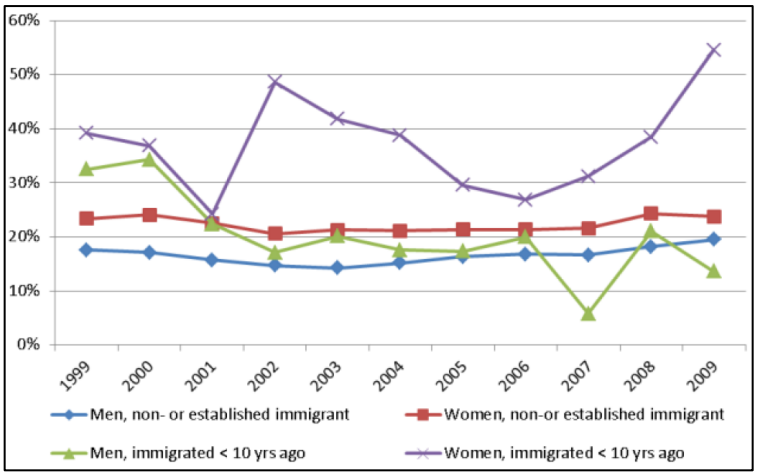


Figure 4. 2: Proportion of full-time permanent workers in precarious jobs, by immigrant status and gender, 1999-2009.

Source: Noack and Vosko (2011)

Noack and Vosko (2011 pg. 21) affirm that although "there is some reassurance in finding that established immigrants have job outcomes relatively similar to their Canadian-born counterparts, … it is difficult to estimate the effects of selection bias, that is, those immigrants who are not successful in entering into the labor market are more

likely to re-settle in another country or return to their countries of origin". In contrast to the aforementioned finding, Noack and Vosko (2011) show that there is a greater variation in recent immigrant women and men employed in precarious jobs from 1999-2009, further suggesting that recent immigrants are susceptible to labor market fluctuations relative to established immigrants and Canadian-born populations.

Concurrent with the literature on precarious employment, the wage gap faced by immigrants in Canada is also well documented (see Aydemir and Skuterud, 2005; Frenette and Morissette 2005; Li 2000, 2003). The body of literature highlights that immigrants often face income deterioration and lower probabilities of occupational mobility in the long run relative to native-born populations (Goldring, 2009). With respect to human capital (skills and education) Ley (1999; 2003) and Goldring (2009) both note that immigrants underperform in the Canadian labor market relative to their education and skills when compared to host populations. Other authors have established that this underperformance is structured along gender lines (Holtman and Theriault 2017; Noak and Vosko 2011) and country of origin/ethnicity (Aydemir and Skuterud 2005; Cranford et al., 2003b; Crease and Wiebe 2009; Reitz 2007) and associated with lack of credential recognition, deskilling or lack of experience in the Canadian labor market (Bauder 2003a; Creese and Wiebe 2009).

So far, we can clearly establish that immigrants (specifically recent immigrants) are more likely to face a greater degree of economic disadvantage relative to the host population.

The mechanisms behind the channeling of immigrants into precarious settings is best explained by the suite of studies examining Labor Market Segmentation (LMS) theory from both an economic and geographic context.

4.3.2 Segmentation of immigrant labor

In most industrialized, western economies, immigrants tend to be unevenly spread throughout the economic landscape and concentrated in certain precarious occupations, industries, and geographies. Piore (1979) argues that the demand for immigrant labor within the industrial structure in one way or another meets the requirement of the secondary sector of a dual labor market. This is the basis of segmentation theory that reflects the social and conflictual processes operating within the labor market, influenced in one way or another by space since "the labor market is in many ways intrinsically a geographic phenomenon" (Peck,1989. Pg. 50).

The broad literature on labor market segmentation (LMS) theory partly explains the economic disadvantage faced by immigrants in the labor market (Bauder 2001; Clairmont et al., 1983; Fevre 1992; Gordon et al., 1982; Peck 1996). This theory hypothesizes that jobs and workers are not smoothly matched by a universal market mechanism as is the case with neoclassical economic theory (Doeringer and Piore 1971; Gordon 1972; Gordon et al., 1982; Wilkinson 1981). Rather, the labor market is governed by conflictual institutions and social norms and is split into segments (i.e. primary, secondary and tertiary segments) with varying employment characteristics (Clairmont et al., 1983;

Gittleman and Howell 1995; Peck 1996; Rumberger and Carnoy 1980). The primary segment is characterized by stable employment patterns, higher wages, better working conditions with good fringe benefits, is highly unionized and has a high degree of autonomy (Peck 1996). Conversely, the secondary segment tends to have irregular/unstable employment patterns (precarious employment), lower wages, poor working conditions including health and safety issues, disorganized worker organization and rigid work rules (Peck 1996).

Within the labor market, workers are allocated into labor market segments based not only on their human capital (e.g. education) but also on their race, gender and immigration status (Bauder 2001; Boyd 1984). With respect to the latter, the literature establishes that immigrants are allocated into the secondary labor market segment, embodying precarious work, while stable jobs in the primary segment are largely reserved for native-born populations (Cranford et al., 2003b; Girad and Bauder 2007; Peck 1996). As stated by Piore (1979, pg. 35-36) "there is …a fundamental dichotomy between jobs of migrants and the jobs of natives, and the role of migrants in industrial economies can be traced to the factors that generate the distinction initially, to the role and function of the secondary sector in which migrants are found, and to the evolution of its labor requirements". These processes are best explained by the theory of economic duality (see Doeringer and Piore (1971) for further reading).

4.3.3 The Geography of labor market segmentation

There are different ways that researchers examining LMS theory have theorized how demand and supply-side processes of LMS theory operates in a spatial context to shape uneven landscapes of precarious work. To begin with, the segmentation of labor demand explains how pressures of flexibility cause firms to segment their workforce into a core element that is relatively secure and a peripheral element that is precarious (Peck 1996). The amount of labor afforded to peripheral workers always fluctuates to demand requirements (Peck 1996). Other demand-side causes of segmentation according to Peck (1996) include 'fractionized' industry structures and labor control strategies utilized by employers. Bauder (2001 pg. 39) conceptualizes the demand driver of LMS theory in a spatial context when he states that "demand-side approaches remain popular especially as explanation for spatial divisions in the labor market. For instance, the segmentation of inner-city minorities in the USA is often seen as an effect of industrial restructuring and decentralization of employment…This demand-side approach expresses spatial divisions in the labor market as an accessibility issue whereby segmented jobs are unevenly arranged in space and simply not available in some places like inner cities." These findings are corroborated by other studies in the Canadian context (see Access Alliance (2011) study situated in the Black Creek neighbourhood)

Processes underlying the spatial division of labor is illustrated by Kandel and Parrado (2005) who show how the rapid restructuring of the meatpacking industry in rural Midwest and Southeast, USA, has channeled the migration of Hispanic immigrants in

rural areas to fill labor shortages within the precarious secondary segments of the industry. Nelson et al. (2015) comparatively reveal that Latino and Latina immigrants are drawn to precarious work in rural spaces (Georgia and Colorado) in the face of rural gentrification.

On the segmentation of labor supply, Peck (1996) maintains that the supply of workers into the labor market is socially regulated in terms of household division of labor in shaping labor market participation, stigmatization of certain social groups as secondary workers (e.g. immigrants, women, and racialized workers), and the role of labor unions in restricting the labor supply to certain occupations. The stigmatization of certain social groups as secondary workers is evident in Hiebert (1999) study where he provides evidence of labor market segmentation in Canada's largest metropolitan areas (Toronto, Vancouver, and Montreal). Key findings in Hiebert (1999) study showed that racialized women and men were over-represented in secondary occupations; and racialized immigrant women were persistently trapped into low-paid, insecure jobs. Employment-related geographic mobility constraints are another factor shaping the spatial segmentation of labor supply. This is demonstrated by McCafferty and Preston (1992), Preston et al. (1998), and Premji (2017), all of whom find that immigrant women and racialized individuals in low-wage precarious work experience spatial entrapment, in the sense that they have poor spatial access to jobs, as indicated by their long commuting times and less-localized labor market.

The variability in the contextual factors contributing to the casual bases of labor market segmentation identified above (on labor demand and labor supply) are likely associated with spatial unevenness in labor markets (Peck 1996). Since labor markets are socially regulated in distinct geographical ways this may shape the spatial patterns of precarious employment across Canada's landscape.

In summary, the surveyed literature points to the general role of migration in the economic structure, oftentimes to fill labor shortages in secondary labor market segments. In this paper, we therefore further illustrate the economic disadvantage faced by immigrants relegated to secondary labor markets and the precarious nature of employment within those markets. Lastly, we build a case for further analysis to address the following gaps in the literature that adds considerably to our understanding of labor market insecurity in Canada by examining how immigration status is manifested first in precarious forms of employment across space, second by exploring how precarious forms of employment are mapped across multiple dimensions (e.g. socioeconomic and sociodemographic), and third by whether spatial patterns of PFEs are robust when controlling for socio-demographic and socio-economic effects. We address these gaps by using disaggregated spatial data provided by Statistics Canada. In support of these research questions, we hypothesize that differences in PFE by immigration status varies over space at different scales.

4.4 Methods

4.4.1 Data and sample

Data in this study were pooled from the 2011-21016 Labor Force Surveys (LFS) administered by Statistics Canada. The LFS is administered on a monthly basis and provides nationwide labor force estimates for Canada's population. A suite of socio-economic, socio-demographic, geographic and temporal population characteristics supplements each sample. With respect to the type of population sampled, the LFS targets individuals who are representative of the civilian, non-institutionalized population who are of 15 years of age or older. Populations excluded from the survey's sample coverage include populations in first nation reserve lands, institutions, Canadian Forces bases and populations residing in regions of extremely low population density. These populations are excluded from the survey target population due to specific operational challenges or for conceptual reasons (Statistics Canada 2017b).

For the purpose of this study, we mainly focus on labor force estimates for the immigrant population and compare them to that of the Canadian born population. We further restrict the study sample to include populations who are 25-64 years of age throughout the survey period, and who were employed and not full-time students (defined as an individual who spent 37.5 or more hours per week in class or training, excluding language training). This age restriction allows us to examine the labor market outcomes of the working-immigrant and Canadian born population who are fully engaged in the labor market. Since the LFS uses a rotating panel sample design (Statistics Canada 2017c), this results in a five-sixths

month-to-month sample overlap. To ensure that our sample for any given year does not overlap and consists of unique Household Identifications (HHID), two months of the year are selected in the analyses, namely January and July.

4.4.2 Method of analysis

The analysis in this study consists of two stages performed using SAS 9.4. The first stage focused on descriptive statistics (cross tabulation) of precarious forms of employment (PFE) by citizenship status and a suit of geographic levels including; the national level, provincial level, CMA level, and urban/rural level. With respect to the former, we consider the following PFEs; temporary employment, part-time employment, involuntary part-time employment, and multiple job holders.

The suit of geographic levels chosen in this study include; the national level, provincial level, CMA level, and urban/rural level. The urban-rural variable is further disaggregated into the following geographical levels that range in the following geographic order from urban to rural; CMA-CA secondary urban core, CMA/CA urban code, CMA/CA urban fringe, CMA/CA rural, non-CA urban and non-CA rural. It is imperative to note that a suite of scales are chosen in congruence with complexity science/theory that stresses the importance of engaging in research across a range of scales. Specifically, this theory recognizes the significance of "processes at multiple and inter-locking geographic scales in "a system marked by constant change and emergence."(O'Sullivan et al., 2006 pg. 614). Similarly, MacDonald (2009 pg. 211) states that a focus on multi-scalar analysis

"brings the importance of space to the forefront, as the socially produced scales of regulation, policy discourse, and individual action interact with geography". In this way, knowing what is occurring at one scale enables comparisons with other scales.

The second stage draws on regression analyses to assess the socio-demographic socioeconomic, spatial and temporal determinants of PFE and examine whether spatial patterns of PFEs are robust even when controlling for socio-demographic and socio-economic effects. The explanatory socioeconomic and sociodemographic variables are informed by underpinning in the body of literature and include age (Vosko et al., 2003), gender (Cranford et al., 2003a; 2003b), marital status (Young 2010), education, income and occupation (Reitz 2001, 2007), union status (Cranford et al., 2003a), space (Jacquemondand and Breau 2015), landing status (Reitz 2007) and country of origin (Aydemir and Skuterud 2005) Creese, and Wiebe 2009) . The logit regression model in this study is defined as;

$$\ln(p/(1-p)) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \ldots \beta_k X_k \qquad (1)$$

Where p is the expected probability of an event occurring. In the context of this study, $\hat{p}$ is the probability of being employed in each precarious form of employment. X_1 through X_k consists of the distinct independent variables; β_0 through β_k are the regression coefficients and $(p)/(1-p)$ is the odds ratio. Equation 1 can also be written as follows (solving for p);

$$p = (\exp(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \ldots \beta_k X_k)) / (1 + \exp(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \ldots \beta_k X_k), \quad 0<p<1 \qquad (2)$$

Lastly, the survey weights are normalized and a set of bootstrap weights (1000 weights) provided in the LFS survey are used to produce the variance estimate in the logistic regression models.

4.5 Main results

4.5.1 Descriptive results

National level. Table 4.1 compares the percentage of immigrant and Canadian-born employed in PFE from 2011-2016 at the national scale. Overall, involuntary part-time employment was the most prevalent form of precarious work for the immigrant population and was significantly different from the Canadian-born population (16.8% versus 10.2%, respectively, p=<.0001). Alternatively, the Canadian-born population was over-represented in part-time employment (12.6%) in comparison to other forms of precarious work and equally represented in this form of paid work in comparison to immigrants. Both immigrant and Canadian-born populations were equally represented in multiple jobs, which was also the least common PFE for both populations.

Table 4. 1: Weighted percentages at the national level for the immigrant and Canadian-born populations engaged in PFE, 2011-2016

	Immigrant	Canadian-born
PFE	*%*	*%*
Temporary employment	9.7***	8.9
Part-time employment	12.4	12.6
Involuntary part-time employment	16.8***	10.2
Multiple job holders	5.0	5.0

Notes: Two-tailed test are used to determine statistically significant differences between immigrant and Canadian-born populations . Significance is shown with respect to immigrants. ***$p < 0.01$

Provincial level. Turning to the provincial scale, table 4.2 presents precarious employment rates by immigration status. Generally, temporary employment for both immigrant and Canadian-born populations were more prevalent in Atlantic Canada and became gradually less prevalent moving westward. In relation to the Canadian-born, immigrants were over-represented in temporary work in all provinces except for New Brunswick (12.9% immigrants versus 13.4% Canadian-born, p= 0.6898). Provinces in Atlantic Canada, particularly, Newfoundland and Labrador and Prince Edward Island, had the greatest share of both immigrant and Canadian-born populations employed on a temporary basis (9.7% and 20.3%, respectively). Conversely, Manitoba had a low share of both populations employed on a temporary basis (8.9% for immigrants [second to Alberta at a low of 8.7%] versus 7.5% for Canadian-born [lowest], p=<.0001).

With respect to part-time employment, the findings reveal contrasting spatial patterns to temporary employment and involuntary part-time employment. In this case, employment in part-time work for the Canadian-born population was more common in western

provinces (highest in the province of British Columbia at 16.1%) and least common in the Atlantic provinces (lowest in the province of Newfoundland and Labrador at 9.3%). This east-west pattern was partially distorted when we direct our focus on the immigrant population. For example, immigrants were more common in part-time work in Atlantic Canada (highest in the province of Nova Scotia at 15%) followed by Western Canada (lowest in the province of Alberta at 11.5%) and least prevalent in Central Canada. Immigrants were also significantly more likely than Canadian-born populations to be employed on an involuntary- part-time basis in all provinces (where data was available).

Similar to part-time employment, multiple jobs were more widespread in western Canada and least common in Atlantic Canada for both immigrant and Canadian-born populations. Saskatchewan had greater shares of both immigrant and Canadian-born populations employed in multiple jobs relative to other provinces (9.1% versus 6.9 %, respectively, p =<.0001). Alternatively, employment in multiple jobs was not common for both populations in Québec (4.0% for immigrants [second to Newfoundland and Labrador at a low of 3.6%] versus 3.8% for Canadian-born [lowest], p=0.5116).

Table 4. 2: Weighted percentages for the immigrant and Canadian-born populations engaged in PFE, across provinces, 2011-2016

	Temporary employment		Part-time employment		Involuntary part-time employment		Multiple job holders	
	Immigrant	Canadian-born	Immigrant	Canadian-born	Immigrant	Canadian-born	Immigrant	Canadian-born
Geography	%	%	%	%	%	%	%	%
Newfoundland and Labrador-NL	x	19.8	x	9.3	x	17.7	x	3.6
Prince Edward Island-PE	20.3	18.2	14.5***	10.5	x	19.7	x	5.7
Nova Scotia-NS	14.0*	12.3	15.4***	12.7	x	13.3	5.3	4.8
New Brunswick-NB	12.9	13.4	13.3***	10.4	x	13.5	5.0	4.1
Québec-QC	12.2***	9.9	12.4*	11.8	14.9***	7.5	4.0	3.8
Ontario-ON	9.2***	7.4	11.7***	12.5	18.6***	3.0	4.5***	5.4
Manitoba-MB	8.9***	7.5	13.2	13.1	17.9***	7.0	7.8***	6.4
Saskatchewan-SK	10.1**	8.9	12.4	12.4	19.5***	6.3	9.1***	6.9
Alberta-AB	8.7***	7.6	11.5	12.0	15.2***	7.0	6.7***	5.2
British Columbia-BC	9.7**	8.9	15.0***	16.1	14.0***	10.3	5.4	5.4

Notes: Two-tailed test are used to determine statistically significant differences between immigrant and Canadian-born populations . Significance is shown with respect to immigrants. ***p < 0.01, **p < 0.05, *p < 0.1. x- indicates that the sample is too small for disclosure.

CMA level. Echoing trends observed at the provincial level, the findings from table 4.3 show that on average, temporary employment was higher within CMAs in Atlantic Canada and least common in western CMAs (for both immigrants and Canadian-born). Focusing on spatial variations within individual provinces, we found that CMAs, namely Sherbrooke, QC (17.5 %) had the highest portion of immigrants employed on a temporary basis. Spatial variations within the province of Ontario showed that Guelph, ON, recorded the highest share of immigrants employed in temporary work (11.3%), whilst Oshawa (5.6%) the lowest (amongst Canadas CMAs). Windsor, in contrast, had the lowest share of the Canadian-born population (5.2%) employed in temporary work.

Turning to part-time employment, the findings reveal differing spatial patterns compared to temporary work. The Canadian-born population employed on a part-time basis were common in western Canada and least common in Atlantic Canada. They were specifically underrepresented in the easternmost CMA of St John's, NL (7.7%) in relation to other Canadian CMAs. Canadian born populations in Abbortsford-Mission, BC, (one of the westernmost CMA), and Peterborough, ON were found to be over represented in part-time employment (16.4% and 16.6%, respectively) in comparison to other CMAs. The broad east-west pattern was partially distorted when we focused our analysis on the immigrant population. For example, immigrants were more likely to be engaged in part-time work in Atlantic and Western Canada and less likely in Central Canada. Spatial variation in part-time work within the province of Ontario shows that Toronto had the

lowest portion of immigrants employed on a part-time basis (10.8%), while Thunder Bay reported the highest prevalence (20.9%).

Comparable to part-time employment, employment in multiple jobs was greater on average in CMAs located in western Canada for both populations. Although a west to east spatial disparity was evident, specific CMAs in central Canada are distinct with respect to having a high or low percentage of either population working multiple jobs. For example, Kingston, ON, reported the highest share of Canadian-born population employed in multiple jobs (7.1%) while Saguenay, QC the lowest (3.0%). However, CMAs with the greatest share of immigrants as multiple job holders were located in the west (Regina, SK - 9.0%), while the lowest were in central Canada (Montréal, QC-4.0%).

Table 4. 3: Weighted percentages for the immigrant and Canadian-born populations engaged in PFE, across CMAs, 2011-2016

	Temporary employment		Part-time employment		Involuntary part-time employment		Multiple job holders	
	Immigrant	Canadian-born	Immigrant	Canadian-born	Immigrant	Canadian-born	Immigrant	Canadian-born
Geography	%	%	%	%	%	%	%	%
St John's-NL	x	13.2	x	7.7	x	12.5	x	4.0
Halifax-NS	13.1***	9.3	14.6***	11.2	x	11.1	x	5.0
Moncton-NB	x	8.8	x	9.8	x	x	x	4.2
Saint John-NB	x	9.7	x	9.7	x	x	x	4.4
Saguenay-QC	x	11.6	x	13.3	x	x	x	3.0
Quebec-QC	15.8**	11.2	x	10.2	x	x	x	3.9
Sherbrooke-QC	17.5***	10.5	12.1**	15.0	x	7.9	x	4.6
Trois-Rivieres-QC	x	9.6	x	14.1	x	9.0	x	3.7
Montréal-QC	11.7***	8.8	12.3**	11.4	14.8***	7.2	4.0	3.8
Gatineau-QC	15.9***	9.6	13.3***	8.5	x	x	xx	3.7
Ottawa-ON	12.4***	7.6	13.7***	10.3	16.8*	12.5	5.4	5.2
Kingston-ON	14.2***	9.3	16.8*	14.3	x	14.9	x	7.1
Peterborough-ON	x	9.2	x	16.6	x	x	x	5.9
Oshawa-ON	5.6	5.7	14.0**	11.7	x	16.0	x	4.4
Toronto-ON	9.1***	7.1	10.8	11.0	19.9***	13.8	4.3***	5.1
Hamilton-ON	7.8**	5.8	13.3	12.3	x	11.1	4.6	4.5

St. Catharines-Niagara-ON	8.2	8.1	18.5***	15.3	x	14.3	5.7	5.8
Kitchener-Cambridge -Waterloo-ON	7.4**	5.7	11.6	12.3	x	11.4	5.0	5.0
Brantford-ON	x	6.1	15.5	13.4	x	x	x	5.0
Guelph-ON	11.3***	6.2	13.8	12.4	x	x	x	5.8
London-ON	9.7	8.2	15.2*	13.5	x	15.0	5.3	5.5
Windsor-ON	9.5***	5.2	14.3	13.7	x	17.0	4.8	5.4
Barrie-ON	x	7.3	14.8	12.1	x	x	x	4.6
Greater Sudbury-ON	x	9.4	x	11.4	x	13.6	x	3.9
Thunder Bay-ON	x	9.2	20.9***	13.8	x	9.7	x	6.4
Winnipeg-MB	9.2***	7.4	13.4***	12.2	19.6***	8.1	8.1***	5.9
Regina-SK	10.0*	8.2	9.9	9.1	x	x	9.0***	5.7
Saskatoon-SK	11.1***	8.3	13.3	12.0	x	7.8	8.8***	6.0
Calgary-AB	8.2**	7.2	11.9**	10.7	14.9***	8.4	6.3***	4.7
Edmonton-AB	9.7***	7.7	11.3	11.0	18.0***	6.7	6.6***	4.7
Kelowna-BC	x	10.0	x	15.9	x	x	x	5.2
Abbortsford-Mission-BC	13.4***	5.9	12.7***	16.4	x	x	4.9	5.9
Vancouver-BC	9.3**	8.3	14.3	14.9	14.4***	10.1	5.1	5.3
Victoria-BC	11.0*	9.5	18.5**	16.3	x	12.5	6.7	6.0
Non-CMA	9.8***	10.9	16.6***	14.3	10.5	9.4	6.5***	5.5

Notes: Two-tailed test are used to determine statistically significant differences between immigrant and Canadian-born populations . Significance is shown with respect to immigrants. ***p < 0.01, **p < 0.05, *p < 0.1. x- indicates that the sample is too small for disclosure.

Urban/rural level. Table 4.4 provides a summary of PFE across the urban/rural spectrum. The results confirm that temporary employment (10.8% immigrants versus 12.8% Canadian-born, p = 0.0006), part-time employment (17.8% immigrants versus 14.7% Canadian-born, p=<.0001) and employment in multiple jobs (6.1% immigrants versus 6.1% Canadian-born, p=0.9502) were more common in rural and small-town areas (non-CA Rural), a finding that was pronounced with respect to both immigrant and Canadian-born populations. On the other hand, employment in involuntary-part-time work was more prevalent in urban areas (CMA/CA Urban) in comparison to rural areas for both populations' jobs (17.7% immigrants versus 10.9% Canadian-born, p=<.0001)

Table 4. 4: Weighted percentages for immigrant and Canadian-born population engaged in PFE, across urban/rural geographies, 2011-2016

	Temporary employment		Part-time employment		Involuntary part-time employment		Multiple job holders	
	Immigrant	Canadian-born	Immigrant	Canadian-born	Immigrant	Canadian-born	Immigrant	Canadian-born
Geography	%	%	%	%	%	%	%	%
CMA-CA SUC	6.4	6.2	11.9	11.9	x	7.8	x	4.9
CMA/CA UC	9.8***	8.3	12.2	12.1	17.7***	10.9	5.0**	4.8
CMA/CA UF	8.0	8.0	12.8	12.1	x	10.0	x	4.5
CMA/CA Rural	9.4	9.0	15.6***	12.7	x	8.9	5.5	5.1
Non-CA Urban	10.1	9.9	16.7***	13.8	12.0	10.0	7.1***	5.1
Non-CA Rural	10.8***	12.8	17.8***	14.7	8.3	8.6	6.1	6.1

Notes: Notes: Two-tailed test are used to determine statistically significant differences between immigrant and Canadian-born populations . Significance is shown with respect to immigrants. SUC= Secondary Urban Core, UC= Urban Code, UF=Urban Fringe. ***p < 0.01, **p < 0.05. x- indicates that the sample is too small for disclosure.

4.5.2 Estimation results

Spatial effects. Results of the logistic regression analyses in table 4.5 support our finding that geography was significantly associated with precarious employment for both immigrant and Canadian-born populations even when controlling for socio-demographic and socio-economic effects. In the logistic regression models, temporary and involuntary part-time employment for both immigrant and Canadian-born populations were more prevalent in Atlantic Canada and became gradually less prevalent moving westward. Employment in part-time work for the Canadian-born population was more common in western provinces and CMAs. This east-west pattern was partially distorted when we focused our analysis on the immigrant population in model 4 as immigrants were over-represented in part-time work in Atlantic Canada (relative to the Canadian-born population). These findings were consistent in all models further examining the intersection of gender and immigration (see appendix 4.1). Moving to urban/rural effects, the findings show that the likelihood of being employed in temporary employment, part-time employment and employment in multiple jobs for both immigrant and Canadian-born populations generally increased as one progresses from an urban to a more rural geography in comparison to CMA/CA Urban Code (urban geography).

Sociodemographic effects. The multivariate analysis reinforces the notion that the 'continuum of precarious work is highly gendered' (Cranford et al 2003b). Immigrant and Canadian-born women were significantly more likely to be employed in PFEs in

comparison to their men counterparts. Canadian-born women had a higher likelihood of being employed in all PFEs compared to women immigrants. Age effects in the immigrant and Canadian-born population models reveal that younger age groups (i.e., 25-34) were significantly more likely to be employed in precarious work in comparison to the 55-64-year age group. Exception to this is part-time work (OR =0.484, p=<.0001 for Canadian-born and OR=0.767, p=<.0001 for immigrants).

With respect to education, we find that immigrant and Canadian-born populations who earned a university degree or postsecondary diploma had a greater likelihood of employment in all PFEs compared to respondents without high school graduation. This finding was reinforced more for immigrants than Canadian-born. Moreover, immigrants with some postsecondary education were significantly more likely to be employed on a part-time basis in comparison to non-immigrants without a high school graduation (OR=2.024, p = 0.0026). Recent immigrants landed[5] within 10 years had a greater likelihood of being employed in all PFEs in comparison to established immigrants, landed more than 10 years. Focusing on the origin of immigrants, we find that immigrants from Latin America (OR =1.454 p=0.0541) Africa (OR = 1.714, p = 0.058) and Asia (OR= 1.371 p = 0.0666) were significantly more likely to be employed on an involuntary part-time basis compared to immigrants from North America and Oceania.

[5] According to Statistics Canadas LFS dictionary a landed immigrant " is a person who has been granted the right to live in Canada permanently by immigration authorities."

Socioeconomic effects. When we examine income differentiations across migration status, we find that as income increased, the likelihood of being employed in all forms of precarious work significantly decreased with the exclusion of immigrants in multiple jobs earning between $12.00 and $19.99/ hour (OR = 1.851, p=<.0001). This finding was also consistent in all PFE gendered models except for men and women immigrants employed in multiple jobs (see appendix 4.2). Moreover, immigrant women with hourly earnings less than $12.00 were significantly likely to be employed in both temporary and part-time employment.

Regarding occupation, the results show a greater association between health occupations and immigrants employed in part-time (OR= 1.709, p=<.0001), involuntary part-time (OR= 1.017, p=0.9588) and multiple jobs (OR= 3.316, p = 0.0666). These odds ratios were higher than that of the Canadian-born population employed in the same PFEs within healthcare occupations. Moreover, part-time employment in sales and service occupation were more likely occupied by immigrants (OR = 1.306, p= 0.0387) in comparison to the Canadian-born population.

Table 4. 5: Logistic regression estimates for PFE by immigration status, 2011-2016

	Temporary employment		Part-time employment	
	Model 1 Canadian-born	Model 2 Immigrant	Model 3 Canadian-born	Model 4 Immigrant
Independent variables	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Population age (ref. = 55-64)				
25-34	1.024 (0.981-1.069)	1.375*** (1.237-1.529)	0.484*** (0.464-0.505)	0.767*** (0.697-0.845)
35-44	0.779*** (0.743-0.816)	1.152*** (1.043-1.271)	0.551*** (0.530-0.573)	0.761*** (0.698-0.829)
45-54	0.745*** (0.714-0.778)	1.136** (1.028-1.255)	0.540*** (0.520-0.561)	0.762*** (0.700-0.829)
Gender (ref. = Men)				
Women	1.129*** (1.090-1.170)	1.125*** (1.052-1.203)	2.831*** (2.732-2.934)	2.471*** (2.305-2.650)
Marital status (ref. = separated, divorced, widowed)				
Married, common law	1.027 (0.977-1.080)	0.951 (0.853-1.060)	1.155*** (1.109-1.202)	1.226*** (1.111-1.352)
Single	1.435*** (1.356-1.519)	1.136* (0.995-1.296)	1.107*** (1.053-1.164)	1.139** (1.007-1.287)
Education (ref. = without high school graduation)				
High school graduate	0.927*** (0.876-0.982)	0.842** (0.723-0.981)	0.850*** (0.808-0.893)	0.973 (0.849-1.115)
Some post-secondary education	1.054 (0.977-1.137)	1.076 (0.879-1.316)	0.924** (0.864-0.989)	1.166* (0.973-1.397)
Postsecondary certificate or diploma	1.044* (0.993-1.098)	0.942 (0.816-1.089)	0.839*** (0.801-0.880)	0.999 (0.878-1.138)
University degree	1.509*** (1.421-1.602)	1.209** (1.043-1.403)	0.881*** (0.834-0.932)	1.104 (0.966-1.262)
Income (reference: Hourly Earnings (HE) greater than $30.00)				
HE< $12.00	4.088***	3.837***	5.542***	4.511***

	(3.847-4.344)	(3.375-4.362)	(5.244-5.856)	(3.990-5.099)
$12.00 ≤ HE ≤ $19.99	2.664***	1.997***	2.314***	2.214***
	(2.544-2.790)	(1.799-2.216)	(2.218-2.416)	(2.001-2.450)
$20.00 ≤ HE ≤ $29.99	1.675***	1.454***	1.276***	1.288***
	(1.605-1.749)	(1.310-1.615)	(1.224-1.330)	(1.161-1.428)
Occupation (ref. = natural resources, agriculture and related production occupations)				
Management occupations	0.157***	0.140***	0.130***	0.251***
	(0.142-0.174)	(0.108-0.183)	(0.116-0.146)	(0.179-0.351)
Business, finance and administration occupations	0.293***	0.226***	0.483***	0.718**
	(0.274-0.313)	(0.187-0.274)	(0.452-0.516)	(0.552-0.934)
Natural and applied sciences and related occupations	0.317***	0.274***	0.261***	0.168***
	(0.292-0.345)	(0.224-0.334)	(0.235-0.290)	(0.118-0.239)
Health occupations	0.363***	0.359***	1.237***	1.709***
	(0.337-0.392)	(0.295-0.437)	(1.158-1.321)	(1.314-2.224)
Occupations in education, law and social, community and government services	0.640***	0.641***	0.829***	1.397**
	(0.600-0.683)	(0.533-0.772)	(0.777-0.884)	(1.072-1.821)
Occupations in art, culture, recreation and sport	0.706***	0.684***	1.104*	1.845***
	(0.629-0.793)	(0.527-0.888)	(0.990-1.231)	(1.337-2.546)
Sales and service occupations	0.242***	0.214***	0.780***	1.306**
	(0.227-0.259)	(0.178-0.257)	(0.735-0.828)	(1.014-1.681)
Trades, transport and equipment operators and related occupations	0.643***	0.414***	0.339***	0.589***
	(0.606-0.684)	(0.343-0.499)	(0.316-0.363)	(0.451-0.770)
Occupations in manufacturing and utilities	0.264***	0.256***	0.129***	0.226***
	(0.242-0.288)	(0.209-0.312)	(0.113-0.147)	(0.165-0.307)
Union status (ref. = union member)				
Not a union member	0.857***	1.000	0.976	0.935*
	(0.829-0.886)	(0.921-1.087)	(0.946-1.008)	(0.868-1.006)
Geography - CMA (ref. =Toronto)				
St John's-NL	1.885***	1.460*	0.532***	0.690
	(1.710-2.079)	(0.996-2.140)	(0.474-0.597)	(0.355-1.342)
Halifax-NS	1.131***	1.283**	0.707***	1.342***
	(1.035-1.236)	(1.041-1.581)	(0.653-0.766)	(1.090-1.652)
Moncton-NB	1.054	1.150	0.525***	0.762

	(0.930-1.194)	(0.736-1.796)	(0.454-0.607)	(0.466-1.243)
Saint John-NB	1.221***	0.910	0.557***	0.948
	(1.073-1.390)	(0.520-1.591)	(0.493-0.630)	(0.561-1.604)
Saguenay-QC	1.444***	1.279	0.990	1.230
	(1.300-1.604)	(0.409-3.997)	(0.886-1.107)	(0.258-5.861)
Quebec-QC	1.469***	1.516***	0.766***	1.063
	(1.349-1.600)	(1.122-2.048)	(0.703-0.834)	(0.781-1.446)
Sherbrooke-QC	1.289***	1.533***	1.116*	0.931
	(1.155-1.437)	(1.151-2.043)	(0.994-1.254)	(0.647-1.339)
Trois-Rivieres-QC	1.177***	1.223	1.061	1.169
	(1.064-1.302)	(0.750-1.995)	(0.961-1.171)	(0.655-2.088)
Montréal-QC	1.167***	1.072	0.846***	1.119*
	(1.090-1.250)	(0.952-1.208)	(0.788-0.908)	(0.996-1.258)
Gatineau-QC	1.325***	1.616***	0.666***	1.131
	(1.216-1.443)	(1.296-2.015)	(0.602-0.738)	(0.847-1.508)
Ottawa-ON	1.056	1.480***	0.822***	1.331***
	(0.954-1.168)	(1.282-1.709)	(0.746-0.905)	(1.137-1.558)
Kingston-ON	1.162***	1.642***	1.014	1.453***
	(1.054-1.283)	(1.277-2.112)	(0.932-1.103)	(1.141-1.850)
Peterborough-ON	1.145	0.839	1.180*	1.324
	(0.951-1.378)	(0.386-1.823)	(0.987-1.411)	(0.699-2.506)
Oshawa-ON	0.777***	0.714**	0.941	1.263**
	(0.684-0.883)	(0.545-0.935)	(0.847-1.046)	(1.047-1.524)
Hamilton-ON	0.773***	0.878	0.954	1.194*
	(0.685-0.874)	(0.709-1.087)	(0.864-1.054)	(0.979-1.457)
St. Catharines-Niagara-ON	1.031	0.916	1.067	1.440***
	(0.921-1.153)	(0.708-1.185)	(0.972-1.172)	(1.169-1.773)
Kitchener-Cambridge- Waterloo-ON	0.755***	0.841*	1.025	1.220**
	(0.655-0.870)	(0.692-1.024)	(0.940-1.116)	(1.003-1.485)
Brantford-ON	0.795***	0.741	1.022	1.494**
	(0.701-0.903)	(0.508-1.083)	(0.906-1.154)	(1.073-2.080)
Guelph-ON	0.785**	1.314**	1.014	1.511***
	(0.650-0.947)	(1.036-1.666)	(0.895-1.149)	(1.165-1.959)
London-ON	1.083	1.139	1.016	1.39***

	(0.979-1.199)	(0.936-1.384)	(0.931-1.109)	(1.187-1.627)
Windsor-ON	0.669***	0.992	1.085*	1.471***
	(0.572-0.783)	(0.806-1.220)	(0.990-1.190)	(1.243-1.741)
Barrie-ON	0.979	1.372*	0.879	1.534**
	(0.855-1.122)	(0.943-1.998)	(0.721-1.071)	(1.062-2.217)
Greater Sudbury-ON	1.180***	1.032	0.822***	1.162
	(1.062-1.312)	(0.656-1.623)	(0.750-0.900)	(0.771-1.751)
Thunder Bay-ON	1.178***	1.303	1.053	1.634***
	(1.056-1.313)	(0.866-1.960)	(0.948-1.171)	(1.201-2.223)
Winnipeg-MB	0.910***	0.765***	0.938**	1.073
	(0.849-0.976)	(0.687-0.853)	(0.885-0.994)	(0.971-1.186)
Regina-SK	1.194***	0.875	0.750***	0.884
	(1.096-1.299)	(0.703-1.088)	(0.682-0.824)	(0.725-1.080)
Saskatoon-SK	1.065	0.983	0.943	1.22**
	(0.974-1.165)	(0.778-1.243)	(0.852-1.044)	(1.021-1.459)
Calgary-AB	1.071	0.898	0.977	1.192**
	(0.971-1.182)	(0.781-1.033)	(0.894-1.068)	(1.033-1.376)
Edmonton-AB	1.149***	1.024	0.995	1.024
	(1.043-1.266)	(0.876-1.197)	(0.920-1.076)	(0.867-1.209)
Kelowna-BC	1.344***	1.462*	1.237**	1.801***
	(1.130-1.597)	(0.965-2.213)	(1.045-1.464)	(1.276-2.543)
Abbortsford-Mission-BC	0.732***	1.076	1.270***	0.869
	(0.644-0.831)	(0.867-1.336)	(1.146-1.408)	(0.719-1.052)
Vancouver-BC	1.126***	0.995	1.351***	1.179***
	(1.033-1.226)	(0.896-1.105)	(1.258-1.450)	(1.075-1.293)
Victoria-BC	1.296***	1.236**	1.329***	1.499***
	(1.173-1.431)	(1.006-1.518)	(1.228-1.439)	(1.246-1.802)
Geography-Urban/rural classifications (ref. = CMA/CA Urban Code)				
CMA-CA Secondary Urban Core	0.811***	0.722**	0.989	1.081
	(0.719-0.915)	(0.544-0.958)	(0.902-1.085)	(0.849-1.376)
CMA/CA Urban Fringe	1.053	0.811	0.982	1.133
	(0.964-1.152)	(0.560-1.175)	(0.909-1.060)	(0.858-1.496)
CMA/CA Rural	1.136***	1.011	0.972	1.150
	(1.078-1.198)	(0.840-1.217)	(0.928-1.018)	(0.971-1.361)

Non-CA Urban	1.277***	0.964	0.976	1.484***
	(1.203-1.357)	(0.781-1.190)	(0.927-1.028)	(1.252-1.759)
Non-CA Rural	1.666***	1.111	1.011	1.709***
	(1.587-1.749)	(0.919-1.345)	(0.967-1.056)	(1.469-1.988)
Survey year (ref. = 2016)				
2011	1.103***	1.009	0.889***	0.860***
	(1.049-1.159)	(0.903-1.128)	(0.849-0.930)	(0.774-0.954)
2012	1.106***	0.992	0.869***	0.875***
	(1.048-1.168)	(0.891-1.105)	(0.830-0.910)	(0.791-0.967)
2013	1.114***	1.015	0.899***	0.865***
	(1.060-1.170)	(0.911-1.130)	(0.860-0.940)	(0.779-0.961)
2014	1.073***	0.985	0.893***	0.962
	(1.019-1.131)	(0.884-1.098)	(0.852-0.935)	(0.871-1.061)
2015	1.102***	0.962	0.879***	0.917*
	(1.045-1.161)	(0.863-1.072)	(0.839-0.921)	(0.828-1.015)
Survey month (ref. = July)				
January	0.850***	0.919**	1.132***	1.104***
	(0.825-0.875)	(0.862-0.980)	(1.101-1.163)	(1.042-1.170)
Landing status (ref. = long-term immigrant, landed more than 10 years)				
Recent immigrant, landed within 10 years		1.423***		1.023
		(1.310-1.545)		(0.946-1.106)
Country of origin (ref. = North America and Oceania)				
Immigrant from Latin America		0.907		0.714***
		(0.759-1.083)		(0.615-0.828)
Immigrant from Europe		0.923		0.832***
		(0.788-1.082)		(0.728-0.949)
Immigrant from Africa		1.272***		0.920
		(1.068-1.513)		(0.781-1.083)
Immigrant from Asia		0.961		0.753***
		(0.828-1.116)		(0.660-0.860)
Diagnostic statistics				
N-unweighted	498,371	79,850	498,371	79,850
Likelihood ratio/F statistic	212.24	40.68	577.94	102.38
% concordant	64.7	68.0	74.1	77.5

Table 4.5 (Continued)

	Involuntary part-time employment		Multiple job holders	
	Model 5 Canadian-born	Model 6 Immigrant	Model 7 Canadian-born	Model 8 Immigrant
Independent variables	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Population age (ref. = 55-64)				
25-34	2.985*** (2.642-3.373)	2.093*** (1.595-2.746)	1.263*** (1.187-1.344)	1.188** (1.025-1.378)
35-44	2.120*** (1.879-2.392)	2.520*** (1.983-3.203)	1.158*** (1.092-1.229)	1.337*** (1.174-1.522)
45-54	2.305*** (2.054-2.586)	2.234*** (1.766-2.825)	1.108*** (1.048-1.171)	1.345*** (1.189-1.521)
Gender (ref. = Men)				
Women	0.535*** (0.487-0.589)	0.479*** (0.403-0.568)	1.023 (0.977-1.072)	0.781*** (0.717-0.851)
Marital status (ref. = separated, divorced, widowed)				
Married, common law	0.442*** (0.398-0.490)	0.588*** (0.469-0.737)	0.661*** (0.627-0.697)	0.758*** (0.659-0.872)
Single	0.750*** (0.662-0.851)	0.821 (0.613-1.100)	0.813*** (0.758-0.873)	0.819** (0.689-0.974)
Education (ref. = without high school graduation)				
High school graduate	0.959 (0.842-1.093)	1.242 (0.869-1.774)	1.044 (0.968-1.126)	1.280** (1.024-1.599)
Some post-secondary education	0.997 (0.832-1.194)	2.024*** (1.279-3.203)	1.269*** (1.139-1.414)	1.438*** (1.098-1.883)
Postsecondary certificate or diploma	1.295*** (1.150-1.460)	1.661*** (1.178-2.342)	1.280*** (1.194-1.372)	1.681*** (1.373-2.059)

University degree	1.390***	1.820***	1.525***	1.671***
	(1.213-1.592)	(1.296-2.556)	(1.416-1.642)	(1.355-2.060)
Income (reference: Hourly Earnings (HE) greater than $30.00)				
HE< $12.00	2.413***	2.267***	1.794***	1.596***
	(2.064-2.821)	(1.657-3.103)	(1.652-1.948)	(1.361-1.872)
$12.00 ≤ HE ≤ $19.99	2.083***	1.873***	1.600***	1.851***
	(1.829-2.371)	(1.409-2.489)	(1.511-1.693)	(1.628-2.105)
$20.00 ≤ HE ≤ $29.99	1.444***	1.429**	1.256***	1.509***
	(1.258-1.658)	(1.053-1.939)	(1.188-1.329)	(1.330-1.713)
Occupation (ref. = natural resources, agriculture and related production occupations)				
Management occupations	0.357***	0.692	0.564***	1.040
	(0.223-0.570)	(0.230-2.080)	(0.506-0.630)	(0.700-1.546)
Business, finance and administration occupations	0.444***	0.810	0.702***	1.406*
	(0.373-0.528)	(0.417-1.570)	(0.645-0.764)	(0.999-1.978)
Natural and applied sciences and related occupations	0.308***	0.745	0.507***	0.705*
	(0.206-0.459)	(0.286-1.942)	(0.451-0.570)	(0.486-1.024)
Health occupations	0.360***	1.017	1.131**	3.316***
	(0.306-0.423)	(0.529-1.958)	(1.028-1.244)	(2.362-4.655)
Occupations in education, law and social, community and government services	0.586***	1.376	1.013	2.379***
	(0.499-0.689)	(0.728-2.602)	(0.931-1.101)	(1.687-3.357)
Occupations in art, culture, recreation and sport	0.621***	1.110	1.213***	2.745***
	(0.476-0.811)	(0.506-2.435)	(1.060-1.387)	(1.740-4.330)
Sales and service occupations	0.523***	0.954	0.705***	1.649***
	(0.447-0.611)	(0.501-1.816)	(0.651-0.764)	(1.190-2.286)
Trades, transport and equipment operators and related occupations	0.740***	0.887	0.444***	0.715*
	(0.611-0.896)	(0.441-1.783)	(0.405-0.487)	(0.498-1.027)
Occupations in manufacturing and utilities	0.633***	1.505	0.354***	0.895

	(0.454-0.883)	(0.694-3.264)	(0.309-0.404)	(0.626-1.280)
Union status (ref. = union member)				
Not a union member	0.935	0.886	1.040*	0.893**
	(0.854-1.023)	(0.734-1.069)	(0.996-1.086)	(0.814-0.980)
Geography - CMA (ref. =Toronto)				
St John's-NL	0.938	2.568	0.783***	0.904
	(0.713-1.234)	(0.716-9.204)	(0.688-0.891)	(0.484-1.689)
Halifax-NS	0.751***	1.109	0.880**	0.923
	(0.606-0.930)	(0.632-1.947)	(0.786-0.984)	(0.641-1.328)
Moncton-NB	1.017	0.726	0.727***	1.126
	(0.736-1.405)	(0.013-40.422)	(0.608-0.868)	(0.525-2.417)
Saint John-NB	0.837	2.875**	0.831**	1.107
	(0.586-1.195)	(1.094-7.554)	(0.715-0.966)	(0.588-2.086)
Saguenay-QC	0.521***	0.389	0.569***	0.373
	(0.389-0.699)	(0, ∞)	(0.459-0.706)	(0, ∞)
Quebec-QC	0.564***	0.396	0.699***	0.606
	(0.404-0.787)	(0.104-1.507)	(0.605-0.807)	(0.309-1.186)
Sherbrooke-QC	0.626***	0.767	0.817**	0.818
	(0.451-0.869)	(0.285-2.063)	(0.673-0.992)	(0.475-1.407)
Trois-Rivieres-QC	0.654***	0.258	0.661***	1.096
	(0.487-0.878)	(0, ∞)	(0.562-0.778)	(0.503-2.388)
Montréal-QC	0.498***	0.551***	0.718***	0.718***
	(0.401-0.618)	(0.417-0.726)	(0.651-0.793)	(0.604-0.854)
Gatineau-QC	0.533***	1.092	0.747***	0.931
	(0.368-0.771)	(0.584-2.043)	(0.648-0.862)	(0.633-1.370)
Ottawa-ON	0.879	0.852	1.010	1.252**
	(0.653-1.182)	(0.607-1.194)	(0.880-1.160)	(1.004-1.561)
Kingston-ON	1.264**	0.963	1.328***	1.176
	(1.010-1.581)	(0.514-1.802)	(1.168-1.509)	(0.82-1.686)

Peterborough-ON	1.310	1.191	1.125	1.562
	(0.927-1.852)	(0, ∞)	(0.901-1.406)	(0.700-3.486)
Oshawa-ON	1.306**	0.928	0.907	0.874
	(1.017-1.676)	(0.599-1.440)	(0.776-1.061)	(0.652-1.173)
Hamilton-ON	0.879	0.790	0.847*	1.033
	(0.657-1.176)	(0.489-1.277)	(0.716-1.003)	(0.788-1.356)
St. Catharines-Niagara-ON	1.228*	0.999	1.097	1.079
	(0.999-1.510)	(0.598-1.668)	(0.962-1.251)	(0.779-1.495)
Kitchener-Cambridge-Waterloo-ON	0.914	1.197	1.004	1.199
	(0.698-1.196)	(0.790-1.815)	(0.868-1.163)	(0.927-1.551)
Brantford-ON	0.787	0.557	1.077	1.037
	(0.537-1.153)	(0.008-38.012)	(0.917-1.264)	(0.673-1.597)
Guelph-ON	0.636*	1.370	1.165*	1.313
	(0.378-1.068)	(0.646-2.907)	(0.988-1.375)	(0.888-1.940)
London-ON	1.133	1.339	1.022	1.185
	(0.889-1.445)	(0.919-1.951)	(0.897-1.164)	(0.922-1.524)
Windsor-ON	1.292*	1.387*	1.047	0.951
	(0.979-1.706)	(0.974-1.976)	(0.886-1.239)	(0.708-1.277)
Barrie-ON	1.292	1.496	0.846	1.760
	(0.900-1.856)	(0.841-2.660)	(0.682-1.050)	(0.854-3.627)
Greater Sudbury-ON	1.106	0.584	0.745***	0.503
	(0.849-1.440)	(0.022-15.190)	(0.641-0.867)	(0.209-1.208)
Thunder Bay-ON	0.783*	0.395	1.354***	2.147***
	(0.597-1.027)	(0.011-13.962)	(1.178-1.556)	(1.418-3.252)
Winnipeg-MB	0.599***	0.860	1.151***	1.570***
	(0.500-0.717)	(0.687-1.076)	(1.057-1.255)	(1.394-1.768)
Regina-SK	0.611***	0.734	1.188***	1.872***
	(0.421-0.887)	(0.473-1.141)	(1.062-1.329)	(1.523-2.300)
Saskatoon-SK	0.640***	0.956	1.236***	1.985***

	(0.491-0.835)	(0.632-1.447)	(1.103-1.384)	(1.565-2.518)
Calgary-AB	0.674***	0.772	1.007	1.504***
	(0.507-0.898)	(0.559-1.067)	(0.888-1.142)	(1.276-1.772)
Edmonton-AB	0.567***	0.874	1.019	1.448***
	(0.433-0.743)	(0.621-1.230)	(0.909-1.142)	(1.226-1.709)
Kelowna-BC	1.046	0.672	0.982	0.893
	(0.684-1.601)	(0.107-4.205)	(0.727-1.326)	(0.419-1.905)
Abbortsford-Mission-BC	0.546***	1.038	1.242**	1.231
	(0.388-0.768)	(0.621-1.735)	(1.048-1.474)	(0.948-1.599)
Vancouver-BC	0.778**	0.754**	1.059	1.080
	(0.637-0.950)	(0.608-0.936)	(0.948-1.183)	(0.945-1.235)
Victoria-BC	0.969	1.027	1.151**	1.320**
	(0.768-1.223)	(0.686-1.537)	(1.005-1.319)	(1.018-1.712)
Geography-Urban/rural classifications (ref. = CMA/CA Urban Code)				
CMA-CA Secondary Urban Core	0.827	0.859	1.101	0.854
	(0.591-1.157)	(0.547-1.350)	(0.932-1.302)	(0.537-1.358)
CMA/CA Urban Fringe	0.977	0.699	1.024	0.851
	(0.779-1.225)	(0.293-1.667)	(0.894-1.174)	(0.557-1.300)
CMA/CA Rural	0.949	0.447***	1.087**	0.931
	(0.828-1.087)	(0.288-0.691)	(1.012-1.168)	(0.709-1.221)
Non-CA Urban	0.784***	0.628**	1.060	1.511***
	(0.678-0.906)	(0.408-0.967)	(0.983-1.143)	(1.180-1.934)
Non-CA Rural	0.818***	0.632**	1.256***	1.501***
	(0.724-0.923)	(0.400-0.998)	(1.173-1.345)	(1.187-1.898)
Survey year (ref. = 2016)				
2011	0.945	1.528***	0.896***	0.935
	(0.839-1.063)	(1.195-1.952)	(0.840-0.956)	(0.808-1.082)
2012	0.843***	1.288**	0.874***	0.970
	(0.746-0.953)	(1.003-1.654)	(0.817-0.935)	(0.848-1.110)

2013	0.896	1.078	0.872***	0.937
	(0.783-1.025)	(0.839-1.386)	(0.818-0.928)	(0.815-1.077)
2014	0.884*	1.205	0.934**	0.979
	(0.777-1.005)	(0.940-1.544)	(0.875-0.996)	(0.852-1.125)
2015	0.927	0.836	0.880***	1.007
	(0.810-1.060)	(0.642-1.087)	(0.825-0.938)	(0.880-1.153)
Survey month (ref. = July)				
January	1.044	1.104	1.061***	1.059
	(0.967-1.128)	(0.958-1.272)	(1.018-1.105)	(0.975-1.150)
Landing status (ref. = long-term immigrant, landed more than 10 years)				
Recent immigrant, landed within 10 years		1.350***		1.138***
		(1.142-1.597)		(1.034-1.252)
Country of origin (ref. = North America and Oceania)				
Immigrant from Latin America		1.454*		0.993
		(0.993-2.128)		(0.815-1.211)
Immigrant from Europe		0.984		0.828**
		(0.691-1.403)		(0.69-0.994)
Immigrant from Africa		1.714***		0.852
		(1.169-2.511)		(0.682-1.063)
Immigrant from Asia		1.371*		0.914
		(0.979-1.92)		(0.766-1.092)
Diagnostic statistics				
N-unweighted	57,468	9,561	498,371	79,850
Likelihood ratio/F statistic	43.41	3.23	51.26	14.06
% concordant	66.5	69.1	58.8	66.5

Notes: ***p < 0.01, **p < 0.05, *p < 0.1. OR = Odds ratio

4.6 Discussion and conclusion

In this study, we presented an analysis of the spatial dimensions of PFEs across Canada's landscape with respect to geography and immigration status. Several key findings. First, at the national level, a higher share of immigrants was employed on a temporary and involuntary part-time basis in comparison to their Canadian-born counterparts. This finding is consistent with that of Gilmore (2009) and supports hypothesis 1 that aggregate trends in PFE vary by immigration status.

Second, across provincial and CMA scales, we clearly establish that precarious forms of employment for both immigrant and Canadian-born populations have an inherent spatial dimension with provincial, CMA and rural /urban dimensions. These east-west and urban-rural spatial patterns were broadly homogenous for both immigrant and Canadian-born populations with the exception in part-time employment for immigrants. For example, immigrants were employed in part-time work in high shares across Atlantic Canada's geographies in comparison to western and central Canada. Census data have consistently shown that unemployment rates in Atlantic Canada are among the highest nationwide, despite the demands for immigrants as a means to address issues of aging populations, declining populations and economic development (Holtman and Theriault 2017). As Workman (2005) affirms, high unemployment rates in Atlantic Canada are among several reasons associated with a global transformation of work that has driven down wages and contributed to the growth of precarious employment in the Atlantic

region. Within specific provinces in Atlantic Canada, namely New Brunswick, research has confirmed that precarious employment as experienced by immigrant women is a structural and social problem in the province (Holtman and Theriault 2017). The Atlantic region is an exemplar of the segmentation of immigrant and native-born labor as a process of economic expansion or recruitment (Holtman and Theriault 2017).

The results also demonstrate that precarious employment is more of a rural phenomenon for both immigrant and Canadian-born populations. General urban-rural findings in this study are corroborated by several studies within the Canadian context, all showing a higher incidence of non-standard work in rural areas (Perusse 1997; Vera-Toscano 2004). Vera-Toscano (2004) specifically demonstrates how labor-force transition, principally underemployment, significantly varies between rural and urban workers. He finds that rural workers are significantly more likely to enter underemployment, but once they are underemployed, they have a higher chance of re-entering "adequate employment"- stable employment. He further notes that there is weak evidence purporting that the education level of workers has a lower impact on the probability of moving out of underemployment in rural areas than in urban area. It is however yet to be known whether these labor force transitions hold for immigrant populations. Other studies examining urban/rural labor markets beyond the Canadian context have revealed how immigrant based precarious-labor regimes are instantiated into U.S. rural geographies undergoing gentrification (Nelson et al., 2015).

Moving to the modeling results, we demonstrated that the prevalence of precarious employment specifically is reinforced by gender. We illustrated that women irrespective of immigration status were generally significantly more likely to be employed in all PFEs in comparison to their men counterparts. Disaggregating the women variable by immigration status, however, reveals that Canadian-born women had a higher likelihood of being employed in all PFEs compared to women immigrants. This finding contradicts the findings from the literature (e.g. Noack and Vosko 2011). As such, more research is needed to further understand why this disparity exists in the first place.

The totality of these findings clearly reflects the feminization of precarious employment norms that is characterized by both 'continuity and change in the social relations of gender" (Cranford et al., 2003a pg. 454). The logistic regression models further reveal that spatial patterns of precarious employment were robust for both populations even when controlling for socio-demographic and socio-economic effects. The spatial patterns identified in this study could be shaped by labor market segmentation taking up different forms across space (Hiebert 1999).

Taken together, these marked spatial patterns in precarious employment advance our knowledge on the spatial restructuring of immigrant labor in Canada. While this paper has offered insight into spatial patterns of PFEs by immigration status, limitations remain, particularly with respect to the inability to explore spatial variations of PFEs by race and immigration due to the LFS exclusion of questions on race. The inclusion of race would

have allowed for the examination of assimilation effects across a suite of racial groups. Beyond this limitation, the findings of this study have implications for the formulation of place-based policies that could target specific geographies where precarious employment is prevalent for immigrants struggling in the labor market or entering the labor market for the first time. Fundamental to these place-based policies is support for local community organizations and social institutions that mediate immigrant's settlement processes with respect to not only economic assimilation but also broader social inclusion. In terms of future work, studies could focus on any one geography where precarious employment is high, specifically for immigrants and further examine changes the broader labor processes and workplace processes underlying the spatial and statistical patterns identified in this study. Another area for future work is how theory on labor market segmentation can be reconceptualized with recent developments in migration to ethnic enclaves. Specifically, more research is needed to understand the economic and social characteristics of this 'third labor market" across varying Canadian geographies.

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Appendix 4. 1: Logistic regression estimates for immigrants employed in PFEs- with interaction terms

Independent variables	**Temporary employment**	**Part-time employment**	**Involuntary part-time employment**	**Multiple job holders**
	β (SE)	β (SE)	β (SE)	β (SE)
Population age (ref. = 55-64)				
25-34	0.3212*** (0.1494)	-0.2632*** (0.0487)	0.8778*** (0.1507)	0.1718** (0.0753)
35-44	0.1419*** (0.1494)	-0.2753*** (0.0441)	0.8875*** (0.1243)	0.2841*** (0.0661)
45-54	0.1282** (0.0509)	-0.2727*** (0.0432)	0.7883*** (0.1201)	0.293*** (0.0625)
Gender (ref. = men)				
women	0.1678*** (0.0384)	0.9746*** (0.0409)	-0.7300*** (0.0871)	-0.1994*** (0.0487)
Marital status (ref. = separated, divorced, widowed)				
Married, common law	-0.0473 (0.0555)	0.2072*** (0.0499)	-0.5314*** (0.1151)	-0.2749*** (0.0717)
Single	0.1256* (0.0674)	0.1266** (0.0624)	-0.2287 (0.1489)	-0.1969** (0.0884)
Education (ref. = without high school graduation)				
High school graduate	-0.1710** (0.0779)	-0.0216 (0.0697)	0.2206 (0.1818)	0.2465** (0.1136)
Some post-secondary education	0.0781 (0.1031)	0.1642* (0.0925)	0.7124*** (0.2360)	0.3661*** (0.1375)
Postsecondary certificate or diploma	-0.0550 (0.0740)	0.0103 (0.0667)	0.5165*** (0.1756)	0.5207*** (0.1032)
University degree	0.1919** (0.0759)	0.1062 (0.0687)	0.6109*** (0.1743)	0.5160*** (0.1068)

Landing status (ref. = long-term immigrants, landed more than 10 years)				
Recent immigrants, landed within 10 years	0.3950***	0.1129**	0.5418***	0.4185***
	(0.0458)	(0.0459)	(0.1262)	(0.0971)
Country of origin (ref. = North America and Oceania)				
Immigrant from Latin America	-0.0937	-0.3321***	0.3726*	-0.0038
	(0.0905)	(0.0763)	(0.1943)	(0.1009)
Immigrant from Europe	-0.0780	-0.1822***	-0.0163	-0.1867**
	(0.0810)	(0.0679)	(0.1802)	(0.0928)
Immigrant from Africa	0.2420***	-0.0814	0.5244***	-0.1641
	(0.0889)	(0.0836)	(0.1958)	(0.1131)
Immigrant from Asia	-0.0368	-0.2801***	0.3108*	-0.0883
	(0.0760)	(0.0680)	(0.1721)	(0.0901)
Income (ref. = hourly earnings greater than $30.00)				
Hourly earnings less than $12.00	1.5498***	1.7929***	0.8164***	0.4710***
	(0.0894)	(0.0875)	(0.1599)	(0.0812)
Hourly earnings between $12.00 and $19.99	0.6778***	0.777***	0.6193***	0.6119***
	(0.0535)	(0.0516)	(0.1453)	(0.0654)
Hourly earnings between $20.00 and $29.99	0.3691***	0.2461***	0.356**	0.4088***
	(0.0532)	(0.0528)	(0.1561)	(0.0644)
Occupation (ref. = natural resources, agriculture and related production occupations)				
Management occupations	-1.9687***	-1.3904***	-0.3585	0.0334
	(0.1346)	(0.1716)	(0.5629)	(0.2021)
Business, finance and administration occupations	-1.4960***	-0.3457**	-0.1984	0.3360*
	(0.0969)	(0.1340)	(0.3407)	(0.1744)
Natural and applied sciences and related occupations	-1.2942***	-1.7857***	-0.3031	-0.3503*
	(0.1010)	(0.1789)	(0.4911)	(0.1903)
Health occupations	-1.0394***	0.5151***	0.0101	1.1951***
	(0.1001)	(0.1342)	(0.3369)	(0.1731)

Occupations in education, law and social, community and government services	-0.4492***	0.3260**	0.3176	0.8726***
	(0.0948)	(0.1348)	(0.3280)	(0.1759)
Occupations in art, culture, recreation and sport	-0.3864***	0.6019***	0.1023	1.0074***
	(0.1328)	(0.1643)	(0.4058)	(0.2323)
Sales and service occupations	-1.5426***	0.2613**	0.0427	0.4982***
	(0.0941)	(0.1290)	(0.3379)	(0.1666)
Trades, transport and equipment operators and related occupations	-0.8765***	-0.5201***	-0.1017	-0.3352*
	(0.0952)	(0.1362)	(0.3593)	(0.1845)
Occupations in manufacturing and utilities	-1.3610***	-1.4878***	0.4100	-0.1182
	(0.1024)	(0.1581)	(0.3960)	(0.1827)
Union Status (ref. = union member)				
Not a union member	0.0011	-0.0680*	-0.1288	-0.0448
	(0.0423)	(0.0375)	(0.0956)	(0.0538)
Geography - Census Metropolitan Area's (CMA) (ref. =Toronto)				
St-John's	0.3745*	-0.3789	0.8976	-0.1085
	(0.1950)	(0.3373)	(0.6631)	(0.3199)
Halifax	0.2468**	0.2894***	0.0868	-0.0795
	(0.1063)	(0.1063)	(0.2838)	(0.1859)
Moncton	0.1346	-0.2750	-0.3154	0.1252
	(0.2279)	(0.2483)	(2.0576)	(0.3895)
Saint John	-0.0951	-0.0469	1.0785**	0.1120
	(0.2839)	(0.2662)	(0.5011)	(0.3227)
Saguenay	0.2582	0.2305	-0.9103	-0.9949
	(0.5787)	(0.7879)	(6.5038)	(4.9863)
Quebec	0.4130***	0.0563	-0.9179	-0.5112
	(0.1532)	(0.1574)	(0.6847)	(0.3390)
Sherbrooke	0.4248***	-0.0693	-0.2527	-0.2104
	(0.1470)	(0.1855)	(0.5087)	(0.2762)
Trois-Rivieres	0.1901	0.1415	-1.3329	0.0806
	(0.2501)	(0.2951)	(4.2176)	(0.3966)

Montréal	0.0676	0.1090*	-0.5915***	-0.3317***
	(0.0605)	(0.0595)	(0.1415)	(0.0881)
Gatineau	0.4760***	0.1141	0.0703	-0.0707
	(0.1127)	(0.1472)	(0.3199)	(0.1967)
Ottawa	0.3887***	0.2819***	-0.1621	0.2270**
	(0.0732)	(0.0799)	(0.1743)	(0.1124)
Kingston	0.4974***	0.3751***	-0.0512	0.1613
	(0.1284)	(0.1235)	(0.3173)	(0.1836)
Peterborough	-0.1775	0.2856	0.1593	0.4502
	(0.3939)	(0.3224)	(4.0764)	(0.4096)
Oshawa	-0.3369**	0.2337**	-0.0871	-0.1282
	(0.1384)	(0.0956)	(0.2252)	(0.1497)
Hamilton	-0.1302	0.1773*	-0.2455	0.0333
	(0.1088)	(0.1018)	(0.2443)	(0.1382)
St.Catharines-Niagara	-0.0898	0.3617***	-0.0181	0.0769
	(0.1314)	(0.1063)	(0.2625)	(0.1658)
Kitchener-Cambridge-Waterloo	-0.1695*	0.2040**	0.1745	0.1819
	(0.0997)	(0.1014)	(0.2121)	(0.1308)
Brantford	-0.2925	0.4034**	-0.5990	0.0411
	(0.1925)	(0.1691)	(2.1405)	(0.2203)
Guelph	0.2728**	0.4080***	0.2997	0.2710
	(0.1212)	(0.1341)	(0.3785)	(0.1991)
London	0.1333	0.3330***	0.2891	0.1714
	(0.0998)	(0.0804)	(0.1917)	(0.1280)
Windsor	-0.0082	0.3851***	0.3161*	-0.0493
	(0.1054)	(0.0856)	(0.1805)	(0.1503)
Barrie	0.3163*	0.4267**	0.3971	0.5692
	(0.1912)	(0.1874)	(0.2969)	(0.3703)
Greater Sudbury	0.0326	0.1480	-0.5507	-0.6914
	(0.2304)	(0.2101)	(1.6681)	(0.4478)
Thunder Bay	0.2653	0.4934***	-0.9038	0.7661***
	(0.2082)	(0.1577)	(1.8160)	(0.2115)
Winnipeg	-0.2630***	0.0792	-0.1327	0.4469***
	(0.0551)	(0.0509)	(0.1141)	(0.0607)

Regina	-0.1367	-0.1270	-0.2840	0.6107***
	(0.1108)	(0.1017)	(0.2237)	(0.1054)
Saskatoon	-0.0142	0.2047**	-0.0098	0.6796***
	(0.1186)	(0.0904)	(0.2103)	(0.1215)
Calgary	-0.1086	0.1727**	-0.2455	0.4097***
	(0.0712)	(0.0731)	(0.1647)	(0.0837)
Edmonton	0.0249	0.0245	-0.1252	0.3708***
	(0.0797)	(0.0840)	(0.1751)	(0.0845)
Kelowna	0.3779*	0.5805***	-0.4194	-0.1068
	(0.2119)	(0.1768)	(0.9374)	(0.3869)
Abbortsford-Mission	0.0806	-0.1317	0.0575	0.2074
	(0.1093)	(0.0970)	(0.2633)	(0.1335)
Vancouver	-0.0040	0.1657***	-0.2773**	0.0798
	(0.0533)	(0.0471)	(0.1098)	(0.0680)
Victoria	0.2112**	0.4057***	0.0355	0.2815**
	(0.1049)	(0.0941)	(0.2051)	(0.1324)
Geography - Urban/Rural classifications (ref. = CMA/CA Urban Code)				
CMA-CA Secondary Urban Core	-0.3217**	0.0821	-0.1617	-0.1582
	(0.1440)	(0.1221)	(0.2282)	(0.2365)
CMA/CA Urban Fringe	-0.2031	0.1341	-0.3470	-0.1570
	(0.1899)	(0.1411)	(0.4404)	(0.2157)
CMA/CA Rural	0.0138	0.1423*	-0.7974***	-0.0704
	(0.0944)	(0.0863)	(0.2247)	(0.1385)
Non-CA Urban	-0.0404	0.3858***	-0.4579**	0.4097***
	(0.1074)	(0.0866)	(0.2222)	(0.1264)
Non-CA Rural	0.1096	0.5368***	-0.4553*	0.4099***
	(0.0971)	(0.0773)	(0.2322)	(0.1194)
Survey year (ref. = 2016)				
2011	0.0121	-0.1457***	0.4229***	-0.0653
	(0.0566)	(0.0533)	(0.1259)	(0.0743)
2012	-0.0051	-0.1296**	0.2585**	-0.0310

	(0.0549)	(0.0512)	(0.1285)	(0.0687)
2013	0.0163	-0.1416***	0.0771	-0.0653
	(0.0549)	(0.0534)	(0.1280)	(0.0712)
2014	-0.0138	-0.0358	0.1898	-0.0221
	(0.0553)	(0.0502)	(0.1261)	(0.0710)
2015	-0.0384	-0.0865*	-0.1753	0.0069
	(0.0551)	(0.0518)	(0.1346)	(0.0689)
Survey month (ref. = July)				
January	-0.0844**	0.0993***	0.0978	0.0577
	(0.0329)	(0.0293)	(0.0720)	(0.0421)
Two-way interactions				
women * hourly earnings less than $12.00	-0.2352***	-0.2765***		
	(0.0889)	(0.0800)		
recent immigrants, landed within 10 years * hourly earnings less than $12.00	-0.1814**	-0.3086***		
	(0.0854)	(0.0808)		
recent immigrants, landed within 10 years * age(25-34)			-0.3787**	
			(0.1699)	
recent immigrants, landed within 10 years * sales and service occupations			-0.2689*	
			(0.1566)	
recent immigrants, landed within 10 years * women				-0.1660*
				(0.0881)
recent immigrants, landed within 10 years * not a union member				-0.2746***
				(0.0970)
Diagnostic statistics				
N (unweighted)	79850	79850	9561	79850
Likelihood ratio/F statistic	39.9	100.09	3.29	13.93
Percent concordant	68.1	77.5	69.2	66.6

Notes: β = parameter estimate. Standard error in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Appendix 4. 2: Logistic regression estimates for immigrant men and women employed in PFEs, 2011-2016

Independent variables	Temporary employment		Part-time employment	
	Model 1	Model 2	Model 3	Model 4
	Immigrant men	Immigrant women	Immigrant men	Immigrant women
	β (SE)	β (SE)	β (SE)	β (SE)
Population age (ref. = 55-64)				
25-34	0.1614** (0.0812)	0.4451*** (0.0729)	-0.4371*** (0.0953)	-0.2213*** (0.0566)
35-44	0.0276 (0.0745)	0.2314*** (0.0694)	-0.6017*** (0.0906)	-0.1724*** (0.0509)
45-54	0.0197 (0.0716)	0.2215*** (0.0695)	-0.4721*** (0.0799)	-0.2108*** (0.0495)
Marital status (ref. = separated, divorced, widowed)				
Married, common law	0.0059 (0.1062)	-0.0828 (0.0636)	-0.2333** (0.1165)	0.3053*** (0.055)
Single	0.3013** (0.121)	-0.0065 (0.0823)	0.1204 (0.1353)	0.0411 (0.0719)
Education (ref. = without high school graduation)				
High school graduate	-0.2095* (0.1075)	-0.1215 (0.1014)	0.0961 (0.1377)	-0.0936 (0.0826)
Some post-secondary education	0.1357 (0.1387)	0.0262 (0.1431)	0.2441 (0.1754)	0.1083 (0.109)
Postsecondary certificate or diploma	-0.1462	0.0428	0.1083	-0.0521

	(0.0996)	(0.0988)	(0.1338)	(0.0797)
University degree	0.1314	0.2572**	0.3952***	-0.0332
	(0.1064)	(0.0999)	(0.1317)	(0.0813)
Landing status (ref. = long-term immigrants, landed more than 10 years)				
Recent immigrants, landed within 10 years	0.3846***	0.3399***	0.0537	0.0343
	(0.0613)	(0.0543)	(0.075)	(0.0453)
Country of origin (ref. = North America and Oceania)				
Immigrant from Latin America	0.006	-0.1485	-0.5807***	-0.2254***
	(0.1386)	(0.111)	(0.1477)	(0.0857)
Immigrant from Europe	0.0307	-0.1627	-0.463***	-0.0837
	(0.1249)	(0.1001)	(0.1306)	(0.0763)
Immigrant from Africa	0.3111**	0.1965*	-0.3052**	-0.0107
	(0.1338)	(0.1125)	(0.1543)	(0.0952)
Immigrant from Asia	0.0143	-0.0674	-0.4649***	-0.208***
	(0.1203)	(0.0951)	(0.1284)	(0.0754)
Income (reference: Hourly Earnings (HE) greater than $30.00)				
HE< $12.00	1.4701***	1.2915***	1.9551***	1.2974***
	(0.0968)	(0.0877)	(0.1246)	(0.0709)
$12.00 ≤ HE ≤ $19.99	0.6547***	0.7521***	1.1231***	0.6518***
	(0.0749)	(0.0734)	(0.106)	(0.0594)
$20.00 ≤ HE ≤ $29.99	0.2395***	0.5389***	0.3273***	0.221***
	(0.0739)	(0.0717)	(0.1123)	(0.0616)
Occupation (ref. = natural resources, agriculture and related production occupations)				

Management occupations	-2.08***	-1.8674***	-1.0768***	-1.5785***
	(0.2025)	(0.1866)	(0.2909)	(0.2167)
Business, finance and administration occupations	-1.4248***	-1.6065***	-0.1812	-0.445***
	(0.1578)	(0.1279)	(0.2281)	(0.1608)
Natural and applied sciences and related occupations	-1.179***	-1.5423***	-1.5105***	-2.0473***
	(0.1505)	(0.1616)	(0.2674)	(0.2368)
Health occupations	-0.9094***	-1.1443***	0.797***	0.408**
	(0.1807)	(0.1248)	(0.237)	(0.1614)
Occupations in education, law and social, community and government services	-0.2418	-0.5915***	0.526**	0.2381
	(0.1531)	(0.1268)	(0.2336)	(0.1634)
Occupations in art, culture, recreation and sport	-0.3602*	-0.4437**	0.5966**	0.5619***
	(0.2078)	(0.1785)	(0.2958)	(0.1975)
Sales and service occupations	-1.5887***	-1.5764***	0.2149	0.2249
	(0.1483)	(0.1226)	(0.211)	(0.1575)
Trades, transport and equipment operators and related occupations	-0.8194***	-0.999***	-0.4489**	-0.3198
	(0.1396)	(0.1861)	(0.2143)	(0.1999)
Occupations in manufacturing and utilities	-1.4398***	-1.2835***	-1.4046***	-1.5557***
	(0.1531)	(0.1405)	(0.2591)	(0.1909)
Union status (ref. = union member)				
Not a union member	-0.0258	0.0442	-0.1505**	-0.0291
	(0.0624)	(0.0565)	(0.0752)	(0.0429)
Geography - Census Metropolitan Area's (CMA) (ref. =Toronto)				
St-John's	0.2889	0.4493*	-0.4766	-0.3252
	(0.2867)	(0.2659)	(1.0991)	(0.3502)
Halifax	0.193	0.2875*	0.2377	0.3003**
	(0.1616)	(0.1507)	(0.2065)	(0.1406)

Moncton	-0.3416	0.4218	0.1225	-0.4098
	(0.3807)	(0.3158)	(1.5313)	(0.2622)
Saint John	-0.5304	0.215	0.0632	-0.1315
	(0.6807)	(0.516)	(1.0458)	(0.3352)
Saguenay	-0.093	0.5518	0.4979	0.0763
	(3.6333)	(1.1148)	(3.7941)	(1.2223)
Quebec	0.5055**	0.2939	0.4948**	-0.1571
	(0.2087)	(0.2181)	(0.2359)	(0.2233)
Sherbrooke	0.2743	0.5601***	0.3433	-0.2929
	(0.2126)	(0.206)	(0.2971)	(0.2462)
Trois-Rivieres	-0.2685	0.5726	0.0903	0.1687
	(0.4913)	(0.3583)	(0.9226)	(0.4076)
Montréal	0.0626	0.0633	0.3343***	0.0101
	(0.0848)	(0.0762)	(0.1036)	(0.0676)
Gatineau	0.3694**	0.5717***	0.4007*	-0.0129
	(0.1772)	(0.1522)	(0.2106)	(0.1772)
Ottawa	0.3186***	0.4423***	0.372**	0.2482***
	(0.1187)	(0.0981)	(0.1556)	(0.0951)
Kingston	0.7311***	0.2168	0.4468*	0.3443**
	(0.1707)	(0.1808)	(0.2288)	(0.1557)
Peterborough	0.1125	-0.687	0.6708	0.0849
	(0.9157)	(2.617)	(0.9563)	(0.4551)
Oshawa	-0.2948	-0.3585*	0.0151	0.2885**
	(0.1901)	(0.2068)	(0.2641)	(0.1207)
Hamilton	-0.1633	-0.1109	0.1941	0.1602
	(0.152)	(0.1542)	(0.1677)	(0.1219)
St.Catharines-Niagara	-0.2235	0.0096	0.6496***	0.2578**
	(0.2135)	(0.1785)	(0.1843)	(0.1268)

Kitchener-Cambridge-Waterloo	-0.2032	-0.1646	0.2389	0.1728
	(0.1375)	(0.142)	(0.1936)	(0.1147)
Brantford	-0.2666	-0.3163	0.2235	0.4668**
	(0.3071)	(0.3337)	(0.3353)	(0.182)
Guelph	0.1542	0.3621*	0.8456***	0.2489
	(0.2081)	(0.1948)	(0.256)	(0.1605)
London	-0.0687	0.2865**	0.3947**	0.3025***
	(0.141)	(0.1336)	(0.1998)	(0.0911)
Windsor	0.1567	-0.1821	0.454**	0.3612***
	(0.1528)	(0.1401)	(0.2032)	(0.0998)
Barrie	0.5799*	0.0407	0.6639	0.3384
	(0.2966)	(0.3135)	(0.6838)	(0.2331)
Greater Sudbury	-0.2724	0.2442	-0.1364	0.2041
	(0.3622)	(0.2935)	(1.0076)	(0.235)
Thunder Bay	0.5338*	-0.0773	0.2019	0.571***
	(0.2728)	(0.3159)	(0.3479)	(0.1925)
Winnipeg	-0.3736***	-0.175**	0.0038	0.0939
	(0.0806)	(0.0679)	(0.0992)	(0.0581)
Regina	-0.4571***	0.1729	0.0087	-0.1941
	(0.1576)	(0.1478)	(0.1788)	(0.1233)
Saskatoon	-0.1473	0.1137	0.1009	0.2323**
	(0.1491)	(0.1607)	(0.1911)	(0.1037)
Calgary	-0.3031***	0.0527	0.1421	0.1869**
	(0.1156)	(0.0888)	(0.1451)	(0.0793)
Edmonton	0.1027	-0.0608	0.0973	-0.0035
	(0.1145)	(0.1014)	(0.1492)	(0.0965)
Kelowna	0.031	0.6391**	0.1228	0.7542***
	(0.4104)	(0.2813)	(0.6183)	(0.2477)

Abbortsford-Mission	-0.2032	0.235*	-0.021	-0.2027*
	(0.1704)	(0.1249)	(0.2197)	(0.113)
Vancouver	-0.1308	0.0847	0.1688*	0.1615***
	(0.081)	(0.066)	(0.1006)	(0.0532)
Victoria	0.1261	0.2751**	0.5017***	0.3668***
	(0.1604)	(0.1401)	(0.1842)	(0.0993)
Geography - Urban/Rural classifications (ref. = CMA/CA Urban Code)				
CMA-CA Secondary Urban Core	-0.3347	-0.2981**	-0.127	0.1356
	(0.2441)	(0.1435)	(0.2431)	(0.1696)
CMA/CA Urban Fringe	-0.5188**	-0.0178	-0.1664	0.1999
	(0.2185)	(0.2992)	(0.3316)	(0.1645)
CMA/CA Rural	-0.1342	0.1208	0.0704	0.1587
	(0.1478)	(0.1313)	(0.1797)	(0.098)
Non-CA Urban	-0.3308**	0.1994	0.3281*	0.4381***
	(0.1647)	(0.1334)	(0.1748)	(0.1025)
Non-CA Rural	-0.0898	0.2744**	0.2899*	0.6137***
	(0.1447)	(0.1222)	(0.1712)	(0.0879)
Survey year (ref. = 2016)				
2011	0.0408	-0.0186	-0.1107	-0.1581***
	(0.085)	(0.0731)	(0.1013)	(0.0612)
2012	0.0107	-0.0217	-0.1994**	-0.1026*
	(0.0844)	(0.0725)	(0.0995)	(0.0601)
2013	0.0379	-0.0009	-0.1723	-0.1364**
	(0.0871)	(0.0714)	(0.1051)	(0.0601)
2014	-0.0777	0.0362	-0.1228	-0.0041
	(0.0823)	(0.0724)	(0.1007)	(0.0576)

2015	0.0076	-0.0765	-0.1696*	-0.0595
	(0.0852)	(0.076)	(0.0991)	(0.0612)
Survey month (ref. = July)				
January	-0.235***	0.0348	0.0645	0.1101***
	(0.0493)	(0.0425)	(0.0623)	(0.034)
Diagnostic statistics				
N (unweighted)	39966	39884	39966	39884
Likelihood ratio/F statistic	15.85	16.99	15.86	40.08
Percent concordant	68.8	67.7	77.9	69.8

Notes: β = parameter estimate. Standard error in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Appendix 4.2 (continued)

Independent variables	Involuntary part-time employment		Multiple job holders	
	Model 5	Model 6	Model 7	Model 8
	Immigrant men	Immigrant women	Immigrant men	Immigrant women
	β (SE)	β (SE)	β (SE)	β (SE)
Population age (ref. = 55-64)				
25-34	0.9645*** (0.0664)	0.7324*** (0.1436)	0.3986*** (0.1165)	0.0248 (0.0968)
35-44	1.1103*** (0.0681)	0.8932*** (0.129)	0.4539*** (0.1002)	0.172* (0.0915)
45-54	0.8563*** (0.0647)	0.7981*** (0.1215)	0.4043*** (0.0928)	0.2223*** (0.0846)
Marital status (ref. = separated, divorced, widowed)				
Married, common law	0.0985 (0.0706)	-0.6895*** (0.1032)	-0.2094 (0.139)	-0.3133*** (0.0828)
Single	0.0787 (0.08)	-0.176 (0.1457)	-0.396** (0.1654)	-0.0411 (0.1019)
Education (ref. = without high school graduation)				
High school graduate	0.0438 (0.0963)	0.3388* (0.1848)	0.2636 (0.1685)	0.2181 (0.153)
Some post-secondary education	0.5081*** (0.1154)	0.799*** (0.2362)	0.3384* (0.2033)	0.3836* (0.201)
Postsecondary certificate or diploma	0.3622*** (0.0901)	0.5797*** (0.1805)	0.5194*** (0.1575)	0.5043*** (0.1431)

University degree	0.7078***	0.5876***	0.4842***	0.5151***
	(0.095)	(0.1792)	(0.1636)	(0.1449)
Landing status (ref. = long-term immigrants, landed more than 10 years)				
Recent immigrants, landed within 10 years	0.3948***	0.2304***	0.1272*	0.111*
	(0.0427)	(0.0881)	(0.0746)	(0.0658)
Country of origin (ref. = North America and Oceania)				
Immigrant from Latin America	0.49***	0.2838	-0.0515	0.0201
	(0.1137)	(0.1961)	(0.16)	(0.1335)
Immigrant from Europe	0.0456	-0.0584	-0.2424*	-0.1457
	(0.0987)	(0.1807)	(0.1434)	(0.1232)
Immigrant from Africa	0.4297***	0.5463***	-0.0798	-0.2655*
	(0.1097)	(0.1986)	(0.1646)	(0.1538)
Immigrant from Asia	0.304***	0.2985*	-0.1222	-0.0598
	(0.0981)	(0.1766)	(0.1354)	(0.1213)
Income (reference: Hourly Earnings (HE) greater than $30.00)				
HE< $12.00	0.8934***	0.8021***	0.6151***	0.343***
	(0.0914)	(0.159)	(0.1254)	(0.1136)
$12.00 ≤ HE ≤ $19.99	0.7501***	0.555***	0.753***	0.4921***
	(0.0782)	(0.1452)	(0.0961)	(0.09)
$20.00 ≤ HE ≤ $29.99	0.5889***	0.2512*	0.5297***	0.2945***
	(0.0843)	(0.1483)	(0.0928)	(0.088)
Occupation (ref. = natural resources, agriculture and related production occupations)				
Management occupations	-1.2013***	0.4888	0.6078**	-0.5425*

	(0.2565)	(0.6321)	(0.2414)	(0.3095)
Business, finance and administration occupations	-0.5171***	0.223	0.816***	-0.083
	(0.1628)	(0.4097)	(0.2213)	(0.2436)
Natural and applied sciences and related occupations	-0.7948***	-0.1318	0.1846	-0.972***
	(0.2357)	(0.6919)	(0.2278)	(0.3457)
Health occupations	-0.6011***	0.4936	1.6105***	0.8081***
	(0.1711)	(0.4051)	(0.2274)	(0.2478)
Occupations in education, law and social, community and government services	-0.3889**	0.8545**	1.291***	0.485*
	(0.1659)	(0.397)	(0.2274)	(0.2494)
Occupations in art, culture, recreation and sport	-0.4783**	0.6707	1.6036***	0.4806
	(0.219)	(0.4647)	(0.304)	(0.3131)
Sales and service occupations	-0.451***	0.4394	0.8824***	0.1458
	(0.157)	(0.4047)	(0.2048)	(0.2439)
Trades, transport and equipment operators and related occupations	-0.3843**	-0.3485	0.0619	-0.3933
	(0.1613)	(0.5403)	(0.2137)	(0.3775)
Occupations in manufacturing and utilities	0.3066*	0.6572	0.4062*	-0.7238**
	(0.1612)	(0.5033)	(0.2146)	(0.2926)
Union status (ref. = union member)				
Not a union member	0.0302	-0.2103**	-0.1703**	-0.0629
	(0.0526)	(0.0902)	(0.0703)	(0.0668)
Geography - Census Metropolitan Area's (CMA) (ref. =Toronto)				
St-John's	1.1007***	0.8398	0.2301	-0.687
	(0.3432)	(0.6602)	(0.5918)	(1.7114)
Halifax	0.4506***	-0.1102	-0.1087	-0.0362

	(0.1511)	(0.3203)	(0.2782)	(0.269)
Moncton	-0.8219	-0.1428	-0.3442	0.3919
	(0.7668)	(0.8073)	(2.514)	(0.5603)
Saint John	-0.039	1.4419**	0.0581	0.1217
	(0.3458)	(0.6553)	(1.3845)	(0.591)
Saguenay	0.4503	-12.28***	-0.2036	-9.0168
	(1.145)	(3.2372)	(5.8409)	(6.2985)
Quebec	-1.5851***	-0.479	-0.1268	-1.4615
	(0.138)	(0.531)	(0.341)	(4.5789)
Sherbrooke	-0.3926***	-0.1093	-0.4489	0.0152
	(0.1432)	(0.6537)	(0.3872)	(0.4056)
Trois-Rivieres	-0.4431	-12.755***	0.3206	-0.3293
	(0.3648)	(3.0783)	(1.0053)	(2.6712)
Montréal	-0.7609***	-0.5118***	-0.2846**	-0.3754***
	(0.0657)	(0.135)	(0.1279)	(0.1198)
Gatineau	-0.0488	0.199	-0.23	0.0949
	(0.1187)	(0.2993)	(0.2585)	(0.2511)
Ottawa	-0.3166***	-0.0188	0.3136*	0.1667
	(0.1035)	(0.1677)	(0.1609)	(0.1378)
Kingston	0.5091***	-0.2666	-0.3709	0.4822**
	(0.1418)	(0.3904)	(0.5748)	(0.2176)
Peterborough	0.8697***	-11.564***	0.1904	0.6724
	(0.2398)	(3.0502)	(2.5524)	(1.4049)
Oshawa	-0.3174**	0.0231	-0.1209	-0.1336
	(0.1467)	(0.2115)	(0.2751)	(0.1958)
Hamilton	-0.1974	-0.2462	-0.1639	0.1681
	(0.1544)	(0.2058)	(0.247)	(0.1689)
St.Catharines-Niagara	-0.481***	0.2688	-0.0713	0.1792

	(0.1168)	(0.2449)	(0.3206)	(0.1965)
Kitchener-Cambridge-Waterloo	0.5917***	0.0564	-0.0142	0.344**
	(0.1118)	(0.2126)	(0.2097)	(0.1552)
Brantford	0.036	-0.8005	0.0881	0.0302
	(0.2462)	(0.7019)	(0.3983)	(0.3579)
Guelph	0.0792	0.3879	0.1983	0.3533
	(0.1868)	(0.4283)	(0.25)	(0.261)
London	0.4486***	0.2353	0.1121	0.2266
	(0.0958)	(0.2005)	(0.1994)	(0.1856)
Windsor	0.487***	0.2398	-0.4127	0.164
	(0.1091)	(0.1838)	(0.283)	(0.1844)
Barrie	-0.0702	0.5975**	0.6606	0.4629
	(0.1618)	(0.2733)	(0.5027)	(0.6612)
Greater Sudbury	-0.7723	-0.4452	-1.083	-0.4711
	(0.9963)	(1.1921)	(4.1174)	(0.8936)
Thunder Bay	-12.431***	-0.5186	0.4504	0.9494***
	(1.6862)	(0.4671)	(0.3699)	(0.2572)
Winnipeg	-0.2044***	-0.1444	0.3836***	0.5074***
	(0.0602)	(0.1116)	(0.0906)	(0.0748)
Regina	-0.2109**	-0.4118	0.6757***	0.5873***
	(0.0913)	(0.3104)	(0.1328)	(0.1515)
Saskatoon	0.4162***	-0.3035	0.8525***	0.4963***
	(0.0985)	(0.2309)	(0.1369)	(0.1763)
Calgary	0.1552**	-0.4727***	0.4774***	0.3471***
	(0.0788)	(0.1721)	(0.1245)	(0.1043)
Edmonton	0.0638	-0.2106	0.2839**	0.4421***
	(0.0777)	(0.2005)	(0.1291)	(0.1139)
Kelowna	-1.3646**	-0.2391	0.3944	-0.856

	(0.5865)	(0.5701)	(0.7672)	(1.9076)
Abbortsford-Mission	0.549***	-0.2072	0.338*	0.0839
	(0.1321)	(0.2883)	(0.1906)	(0.1887)
Vancouver	-0.2198***	-0.3076***	0.0251	0.1157
	(0.0481)	(0.1076)	(0.0996)	(0.0854)
Victoria	-0.3041**	0.16	0.3728*	0.2104
	(0.1255)	(0.1902)	(0.201)	(0.1667)
Geography - Urban/Rural classifications (ref. = CMA/CA Urban Code)				
CMA-CA Secondary Urban Core	-0.1875	-0.1752	-0.2481	-0.0858
	(0.2087)	(0.2312)	(0.4387)	(0.2199)
CMA/CA Urban Fringe	1.2925***	-1.1681***	-0.7091	0.1662
	(0.2161)	(0.4098)	(0.6114)	(0.226)
CMA/CA Rural	-1.0736***	-0.6961***	-0.3541	0.081
	(0.1202)	(0.2131)	(0.2184)	(0.1838)
Non-CA Urban	-0.6255***	-0.3985**	0.3951*	0.4379***
	(0.1252)	(0.1947)	(0.2039)	(0.1336)
Non-CA Rural	-0.6867***	-0.4045*	0.6051***	0.2685*
	(0.1177)	(0.2127)	(0.1737)	(0.1487)
Survey year (ref. = 2016)				
2011	0.6601***	0.3011**	-0.1	-0.0474
	(0.0553)	(0.1261)	(0.1032)	(0.0997)
2012	0.2754***	0.23*	-0.1484	0.062
	(0.0592)	(0.124)	(0.1009)	(0.0922)
2013	-0.0967	0.1631	-0.2282**	0.0584
	(0.0635)	(0.1234)	(0.1057)	(0.0906)
2014	0.3122***	0.1265	-0.1094	0.0465

	(0.0621)	(0.1238)	(0.101)	(0.0969)
2015	-0.2154***	-0.2027	-0.1125	0.1057
	(0.0625)	(0.1352)	(0.0962)	(0.0904)
Survey month (ref. = July)				
January	0.1659***	0.0792	0.0001	0.1023*
	(0.0374)	(0.0675)	(0.0598)	(0.0559)
Diagnostic statistics				
N (unweighted)	2168	7393	39966	39884
Likelihood ratio/F statistic	12.32	1.92	4.09	0.81
Percent concordant	70.9	67.7	68.5	64.7

Notes: β = parameter estimate. Standard error in parentheses. *** p<0.01, ** p<0.05, * p<0.1

CHAPTER 5: An analysis of spatial characteristics influencing the spatial patterns of temporary employment in Canada

5.1 Abstract

Temporary employment is a distinctive feature of the Canadian labor market that is unprotected, poorly paid, and often insecure. However, the factors that shape the spatial patterning of temporary employment in Canada are unknown. Using data from Statistics Canada's 2016 Labor Force Survey and the 2016 census, this paper examines the spatial characteristics influencing the spatial patterns of temporary employment across Canada's CMAs and CAs. Key findings reveal that CMA/CAs characterized by large shares of manufacturing, utility, and management occupations were significantly negatively associated with temporary employment. Conversely, CMA/CAs with high shares of sales and service occupations were positively associated with temporary employment. Generally, population characteristics (measured by metropolitan areas characterized by a high share of Asian immigrants) and labor market characteristics (measured by low-income earners and employment insurance beneficiaries) contributed more to explaining positive temporary employment estimates than industry characteristics. This study adds valuable insights into the spatial characteristics that create and maintain the spatial patterning of temporary employment across Canada's landscape.

5.2 Introduction

Temporary forms of employment, including seasonal, contract, casual, and other forms of nonpermanent employment that have a predetermined termination date are growing and becoming widespread within the Canadian labor market (Cooke-Reynold and Zukewich 2005; Cranford et al., 2003a, 2006; Galarneau 2005; Kapsalis and Tourigny 2004; Vosko et al., 2003). For example, the growth of temporary employment outpaced permanent positions between 1998 and 2018 and accounted for 20% of the employment increases from 2016/2017 to 2017/2018 (Hardy et al., 2018). Over this period, the share of workers in temporary employment grew from 12.0% to 13.6% (Hardy et al., 2018), with the largest gains found in public administration, health care and social assistance, and wholesale and retail trade (Fields et al., 2018).

According to Fuller and Vosko (2008, pg. 32) the growth of temporary employment in Canada "prompts concern about worker wellbeing due to its association with "casualization", or dimensions of labor market insecurity characterizing precarious employment", an assertion that is supported by others studies (Cranford et al., 2003a; Galarneau 2005; Hatton 2011; Vosko et al., 2003) which equate temporary employment with less employment security, lower wages, fewer benefits (including employment insurance benefits), and lower chances of upward mobility (in comparison to permanent full-time positions). Furthermore, employment in temporary wage work can also make it difficult to build up a retirement fund given the typically lower wages and reduced pension plan coverage (Galarneau 2010). While some studies have shown that temporary employment acts as a 'stepping stone' to permanent work (Booth et al., 2002; Fang and

Macphail 2008; Gebel 2010; Ichino et al., 2008; Lane et al., 2003), others have shown no evidence of such an effect. Instead, temporary employment may lead to wage penalties and a precarious career path (AHN 2018; Autor and Houseman 2010; Kvasnicka 2008; Hveem 2013).

A substantial body of literature has shown that the rising number of temporary jobs has been fueled by a growing temporary industry that has become a key feature of this flexible form of employment (Hatton 2011; Kalleberg 2000; McDowell et al., 2009; Peck and Theodore 2001, 2007; Vosko 2000; Theodore and Peck 2002). In Canada, reliable data on temporary help industries have been limited, as researchers have used different indicators to depict the growth of this industry. Bartkiw (2012) for instance used revenue as a proxy for the market value of labor supplied by agency workers, demonstrating that temporary help industries grew from $1.4 billion in 1993 to $5.6 billion in 2005.

By and large, the shift to a temporary economy (where low wage temporary employment is the new norm) has played a large role in changing employers' perception of labor (Hatton 2011). Within the broad body of literature, this is evident in Hatton's (2011) analyses as he illustrates a progressive transition from the "human relations" asset model (i.e. the management philosophy widespread in the post-World War II era where employees were valued as key generators of profit because of their company-specific expertise) to the normative "liability" model, where employees are viewed as liabilities and employers are aggressively pressed to increase labor flexibility and search for

lower-cost labor options. Hatton's findings are corroborated by Weil (2014) who finds that employers are increasingly restructuring their organizations to become leaner by relying on contingent temporary workers, especially as wages and employment conditions are increasingly subject to 'competitive market-based considerations'. Weil (2014) specifically drew on industry examples and case studies to illustrate a common trajectory of progressive "fissuring" (i.e. organizational restructuring) in U.S workplaces. He finds that fissuring was a successful business strategy that allowed companies to become more streamlined by driving down costs using subcontractors, third-party managers, and franchisees, leading to increased precarious work, declining wages, eroding benefits and ever-widening income inequality.

In line with fissuring, private and public capital market pressures have also been enablers to the shedding of workers into contingent 'temporary' employment settings (Njoya 2015). As accentuated by Njoya (2015 pg. 122) "the growing influence of capital markets has significant implications for workers; through the increasing financialization of corporate law and governance, capital markets now wield a disproportionate influence on decision-making in the large corporations that function as the lead employer for [the majority of fissured workplaces]". Further, the growing demand placed on companies by private and public capital market pressures is intertwined with the increased need to maximize bottom line profits to shareholders who are 'residual claimants' (Weil 2014). This often involves the restructuring of internal workforces into a lean production model by subjecting workers into temporary wage work in order to adjust to fluctuations in labor

demand within competitive market environments (Capelli 1999; Fuller and Vosko 2008; Galarneau 2010). As such, this has enabled employers to be flexible by cutting down on labor costs during “slack times” when demand for labor decreases (Gramm and Schnell 2004; Kalleberg et al., 2000). According to Fuller and Vosko (2008 pg. 31-32), this happens in "institutional contexts with strong employment protection legislation where the avoidance of employment protections and benefits is a central motivating factor"

Previous studies examining the patterns, trends, and consequences of the temporary employment relationship in Canada have focused on how the increasing prominence of this employment relationship has worsened labor market inequalities along intersecting social axes of race, gender and immigration status (Cranford and Vosko 2006; Fuller and Vosko 2008; Noack and Vosko 2011; Vosko 2000). However, from a geographical lens, there is a dearth in the literature on the broad nexus between space and temporary wage work. McDonald (2009 pg. 211) broadly insists on the significance of examining the influence of space in suggesting that “precariousness is created not just by specific job characteristics but by the spatial contexts in which such work occurs. Precarious employment affects individuals in particular locations and is shaped by spatial dynamics.” More so “ the spatial dimension is part of the dynamic that creates and maintains precarious employment and determines its distribution.” McDonald (2009 pg. 212). As such, much can be learned from a greater focus on understanding the factors that shape the spatial patterning of temporary employment. The purpose of this paper is therefore to examines the spatial characteristics influencing the spatial patterns of temporary

employment across Canada's CMAs and CAs. These spatial characteristics include; industry, population, labor market and human capital characteristics.

5.3 Literature review

5.3.1 Growth of the Temporary Employment Relationship (TER)

The standard employment relationship model of employment that emerged in the post-World War II era has and still plays a central role for labor legislation, wage policy and social policy (Vosko 2000). Nonetheless, this model increasingly does not reflect the reality of the Canadian labor market (Cranford et al., 2003a, 2003b; Vosko et al., 2003), with labor market restructuring leading to the displacement of workers from the standard employment relationship model into the temporary employment relationship model of employment (Fudge and Vosko 2001). As a result, temporary employment has increased in the Canadian labor market since the 1990s and has been greater amongst women, racialized workers, and immigrants (Cranford et al., 2003a, 2003b; Fudge and Vosko 2001; Galarneau 2005; Spalter-Roth and Hartmann 1998; Vosko 2000; Fuller and Vosko 2008).

Numerous empirical studies have contributed insightful connections when examining "how" temporary employment varies across space (Ali et al., 2019; Ali and Newbold 2019a, 2019b) and intersecting social locations of race (Cranford et al., 2003; Fuller and Vosko 2008), gender (Cranford et al., 2003a: Fuller and Vosko 2008) and immigration

status (Fuller and Vosko 2008; Noack and Vosko 2011). However, from a geographical lens, there is a dearth in the literature in understanding "why" temporary employment is "created by the spatial contexts in which such work occurs" (MacDonald 2009, pg. 222).

5.3.2 Spatial perspectives of temporary employment outcomes

A substantial body of research assesses the broad relationship between labor and space in unraveling the complex implications of spatial arrangements on labor market outcomes (i.e., Hanson and Pratt 1992 and Hanson et al., 1997 in the U.S; Jacquemond and Breau 2015 in France; Massey 1995 in the U.K). In the Canadian context, spatial variations are also observed. For instance, regions with high unemployment rates are likely to have high levels of non-standard work (i.e. all forms of self-employment, part-time jobs- less than 30 hours weekly, and temporary jobs), lower rates of unionization and lower average wages (Kapsalis and Tourigny 2004; MacDonald 2009; Perusse 1997). These spatial variations in low income and temporary employment are also evident at the neighborhood scale (Bolton and Breau 2012; Breau et al., 2018; Chen et al., 2012; Sampson 2019; Walks 2015).

Ali et al. (2019) further examine the spatial variations associated with precarious forms of employment across Canada's landscape. In their analysis, they find that of all forms of precarious employment, including part-time employment, involuntary part-time employment, and employment in multiple jobs, temporary employment had the most visible east-west spatial pattern. Specifically, temporary employment was more prevalent

in the Atlantic provinces and CMAs, with lower rates in the central and western provinces and CMAs. Their analyses further showed that temporary employment was more common in rural and small-town areas, and less common in larger urban areas. The higher prevalence of temporary employment in Atlantic Canada was also observed by De raaf et al. (2003) given its greater concentration of seasonal industries (Guillemette et al., 2000). Ali and Newbold (2019a, 2019b) also explore the spatial dimensions of precarious employment across intersections of gender and immigration status. On gender, Ali and Newbold (2019a) unveil partial distortions in east-west and urban-rural spatial patterns in comparison to earlier aggregate findings (Ali et al., 2019). For example, women were significantly more likely than men to be employed on a temporary basis in western and central provinces and CMAs. Conversely, men were more likely to be employed in temporary positions in the Atlantic provinces and CMAs.

With respect to immigration status, Ali and Newbold (2019b) observe that immigrants were over-represented in temporary work in all provinces except for New Brunswick. Provinces in Atlantic Canada, and particularly Newfoundland and Labrador and Prince Edward Island, had the greatest share of both immigrant and Canadian-born populations employed on a temporary basis. Conversely, Manitoba had a low share of both populations employed on a temporary basis. This paper builds on this work by exploring the spatial characteristics influencing the spatial patterns of temporary employment across Canada's CMA/CA.

5.3.3 Determinants of temporary employment

Several studies have explored the determinants of temporary employment across varying industrial economies (AHN 2016; Devicienti et al., 2018; Gebel 2010; Kahn 2016; Noack and Vosko 2011; Fuller and Vosko 2008; Ojala et al., 2018; Vosko 2000). These studies focus on either the supply or demand determinants of temporary employment. For example, Vosko (2000) and Noack and Vosko (2011) center their studies specifically on supply determinants to show that immigrants, and especially recent immigrants, are likely to be trapped in precarious employment as a result of difficulties integrating into the Canadian labor force, especially with foreign credentials and lack of "Canadian" work experience. Conversely, Fuller and Vosko (2008) find that recent immigrants were less likely to be employed in all forms of temporary employment (including seasonal, contract, casual and agency) than their Canadian born counterparts or established immigrants who immigrated before 1987.

Other studies investigate the effects of human capital on temporary employment, finding that tertiary graduates (i.e. 'post-secondary education, including both public and private universities, colleges, technical training institutes, and vocational schools'- World Bank definition) have a high risk of entrapment in 'temporary employment cycles' and risks of wage penalties at the beginning of their career (Gebel 2010). However, de Vries and Wolbers (2005) and Gebel (2010) show that tertiary graduates can compensate for wage penalties and transition to more permanent employment within a shorter time frame compared to less-educated populations that suffer from persistent wage losses. Gebel (2010 pg. 644), for instance, writes;

> "some high-skilled jobs are temporary in their nature and, thus, induce cycles of temporary jobs without being of low job quality. In contrast, temporary jobs for the less educated are concentrated in the secondary segment to adjust to short-term demand fluctuations without providing upward mobility chances. Therefore, higher initial disadvantages and cycles of uncertainty should be observed but there should also exist a catching-up process for tertiary graduates with temporary contracts compared to less educated entrants."

Kahn (2016) looks into the gain associated with promotion into permanent jobs by gender and confirms that the wage gap and transition from temporary to permanent employment is reduced for well-educated men with a substantial training component in their temporary jobs. Similar effects were not observed for women.

Other supply determinants of temporary employment, including geographic labor mobility and immobility, have been examined within the Canadian and U.K. labor markets (Bailey and Livingston 2008; Coulter et al., 2016; MacDonald 2009; Preece 2018; Turok 1999). In Canada, MacDonald (2009) and Walsh et al. (2014) present the argument that the maintenance of precarious employment (including temporary employment) is linked with labor immobility of workers i.e. spatial labor mobility constraints may be an enabler to spatial entrapment in localized rural precarious labor markets (MacDonald 1999; Macdonald and Peters 1994; MacDonald 2009). MacDonald

(2009) further adds that the immobility of workers may be related to residential patterns (in an urban context) or to household gender dynamics. Other studies have sought to explain why people may remain in weaker labor market geographies rather than moving to places that could offer greater employment opportunities (Preece 2018). Drawing on qualitative, biographical interviews, Preece (2018) demonstrates how geographic immobility experienced by workers created a range of dense local support networks that were essential for workers to offset their experiences in precarious work. Additionally, participants in their study were found to have adapted to labor market changes. Geographic labor mobility could also be a factor fueling the labor supply of temporary workers as a result of policies related to international migration, the housing market, social policies, unemployment insurance, and transportation (Walsh et al., 2014). Immigrants, for example, while settling in locations with strong job prospects and higher wages are often found in precarious, low status, low paying jobs (Boese 2013; Coe 2013; King and Newbold 2007; McDowell 2018; Piore 1979; Walsh et al., 2014).

The demand-side determinants of temporary employment have been studied to a lesser degree. Fuller and Vosko (2008), for example, explore industry /occupation effects to show that secondary industries, namely construction and trade industries, are associated with a high prevalence in a seasonal and casual temporary form of employment, respectively. In the same study, tertiary industries, namely educational services were likely to have workers employed in temporary "contract" employment. Jacquemond and Breau (2015) found that geographies with a high percentage of populations employed in

primary sector jobs were significantly more likely to have workers employed in temporary work. Further analysis confirmed that high unemployment rates were associated with a greater likelihood of temporary wage work (Jacquemond and Breau 2015). Similar findings are noted in the Dutch and British labor markets where unemployment at the beginning of one's career is associated with weaker labor market attachment (Burgess et al., 2003; Steijn et al., 2006).

The impacts of workplace unionization on temporary employment have been examined by several studies with mixed findings (Abraham and Taylor 1996; Devicienti et al., 2018; Francesconi and Garcia-Serrano 2004; Gramm and Schnell 2001; Houseman 2001; Saint-Paul 1996; Salvatori 2009, 2012). Devicienti et al. (2018), for instance, show that the impacts of unions on the use of temporary workers are heterogeneous across varying temporary employment contracts. In particular, they show that the presence of unions increases the demand for 'non-training' temporary contracts (i.e., temporary employment without a training component). Devicienti et al. (2018) assert that 'non-training' temporary contracts are used by unions as a 'buffer stock' for permanent workers. In their results, these effects were not pronounced for 'training' temporary contracts.

They affirm their findings by citing Abraham and Taylor (1996), Bentolila at al., (1994), Bentolila and Saint-Paul (1994), Booth (1995) and Saint-Paul (1996) and state that "one of the insights from the insider-outsider literature is that the unions may encourage firms to increase their use of temporary workers if they regard temporary employment as a

buffer to isolate permanent workers from negative effects of demand uncertainty and technological shocks. The presence of a union might also influence a firm's use of temporary workers indirectly, for example, by inducing firms to increase their share of temporary contracts to reduce a union-driven rise in labor costs (Devicienti et al., 2018 pg. 177). A counter-argument to Devicienti et al. (2018) findings is that the presence of unions likely pushes up wages and makes it harder to fire workers thus employers become more likely to use temporary contracts of non-union workers.

Salvatori (2009) reports similar findings to Devicienti et al. (2018), with unions playing a role in fashioning a dual labor market. Conversely, Francesconi, and Garcia-Serrano (2004), Gramm and Schnell (2001) and Houseman (2001) find no evidence of a negative correlation between union coverage and the use of temporary wage workers.

Despite the number of studies that have considered the relationship between temporary employment and space, the studies have failed to consider the interplay between supply and demand determinants and the spatial patterning of temporary employment. Further, existing studies have tended to group a range of precarious forms of employment into a single category of "non-standard employment" when examining spatial effects. Most have explored either supply or demand determinants of temporary employment at the aggregate national scale with no spatial effects. Consequently, the overall aim of this study is to examine the spatial characteristics (supply and demand factors) influencing the spatial patterns of temporary employment in Canada at the CMA/CA level.

5.4 Methods

5.4.1 Data and sample

Data are drawn from the 2016 Labor Force Survey (LFS) and 2016 census of Population conducted by Statistics Canada. The LFS provides monthly-nationwide estimates on the labor force status of Canada's population. A suite of socio-economic, socio-demographic and geographic population characteristics supplements each sample. The target population of the LFS includes household residents who are 15 years of age or older. Exemptions include populations in aboriginal reserves, remote areas, institutions, and Canadian Forces bases. The LFS sample size typically includes 100,000 individuals representing 56,000 households and follows a rotating panel sample design, with data collected from the same subsample for six consecutive months, with each month consisting of six sub-samples. In any given month, the survey drops 1 sub-sample after completing its 6 months in the survey. A new sub-sample is then drawn to replace the dropped respondents. To ensure that the samples in the 2016 LFS do not overlap, January and July samples were focused on, thus ensuring that the two months are within separate rotating panels and have unique household identifications.

The census provides a detailed statistical portrait of Canada's population including demographic, social and economic characteristics. Populations in institutional collective dwellings, Canadian Forces bases and Canadian citizens temporality living abroad are

excluded from the analysis. We use the LFS to determine the percentage of employed populations in temporary employment and the census to derive sociodemographic and socioeconomic measures for the CMAs/CAs. The study sample used in this study was then restricted to include Canada's population who are 25-64 years of age in both the 2016 LFS and Census surveys.

5.4.2 Method of analysis

Ordinary Least Square (OLS) regression was used to provide insights into the effects of spatial characteristics on the spatial patterning of temporary employment at the CMA and CA level. According to Statistics Canada's 2016 LFS guide, a temporary job has a predetermined end date or ends as soon as a specified project is completed. The LFS sub-classifies temporary jobs into four groups, including seasonal; temporary, term or contract; casual job; and other temporary work. In this study, we aggregate all sub-classification of temporary jobs into a single unified category. The percentage of the total employed populations engaged in temporary employment is calculated for each of Canada's 83 CMA and CAs. In total, three models are estimated in this study, with the first model assessing the relationship between industry characteristics on temporary employment. Models 2 and 3 are sequentially built by adding a suite of other spatial characteristics including population, labor market, and human capital characteristics. All variables are continuous and calculated as percentages for each of the CMA/CAs. Table 5.1 defines and lists the variable in each category. Table 5.2 further presents the descriptive statistics for each of the explanatory variables. It is important to note that in

this study we did consider population size, however, preliminary results showed that the addition of this variable was consistently insignificant and further decreased the robustness of the OLS model. More so, we were unable to find any empirical and theoretical studies that considered population size. Thus, for simplicity purposes, this variable was dropped from the OLS model.

Table 5. 1: Variable definitions

Variable	Definition
Dependent variable	
Temporary employment	Captures the percentage of working population with "an employment contract that has a predetermined end date or will end as soon as a specified project is completed", inclusive of seasonal; temporary, term or contract, including work done through a temporary help agency; casual job; and other temporary work". In this study, we aggregate all sub-classification of temporary jobs into a single unified category of temporary employment.
Independent variables-spatial characteristics	
Industry characteristics	% CMA/CA health occupations: Occupations providing health care services directly to patients and providing support to health care delivery. % CMA/CA management occupations: Occupations engaged in management by planning, organizing, co-ordinating, directing, controlling, staffing, and formulating, implementing or enforcing policy, either directly or through other levels of management. % CMA/CA occupations in manufacturing and utilities-: Occupations concerned with supervisory and production work in manufacturing, processing and utilities.

	% CMA/CA sales and service occupations: Occupations involved with selling goods and services and providing personal, protective, household, tourism and hospitality services.
Population characteristics	% CMA/CA immigrant population- refers to the percentage of populations who are, or have ever been, a landed immigrant or permanent resident in Canada. % CMA/CA recent immigrant population- the percentage of landed immigrants who have been in Canada within 10 years. Immigrant origin[6]- refers to the geographic location where an immigrant was born. In this study we classify immigrant origin as follows; % CMA/CA immigrant population from Africa - Includes the aggregate percentage of immigrants from Western Africa, Eastern Africa, Northern Africa, Central Africa, Southern Africa, Africa (not specified)

[6] We grouped the geographic locations where immigrants were born into broader categories in order to prevent multicollinearity between the independent variables. We acknowledge that there are significant employment differences between immigrant populations within respective categories.

	% CMA/CA immigrant population from Asia - Includes the aggregate percentage of immigrants from West central Asia and middle east, Eastern Asia, South-east Asia, Southern Asia, Asia (not specified) % CMA/CA immigrant population from Latin America - Includes the aggregate percentage of immigrants from Central America, Caribbean and Bermuda, South America.
Labor market characteristics	Employment insurance beneficiaries (represented by the variable % CMA/CA population with employment insurance benefits) include the percentage of populations receiving regular benefits for unemployed populations under the federal Employment Insurance (E.I) program. % CMA/CA prevalence in low income- the "prevalence of low income is the percentage of persons in low income. Low-income status for person can be measured using five different low-income concepts (Low-income cut-offs, after-tax (LICO-AT), Low-income cut-offs, before-tax (LICO-BT), Low-income measure, after-tax (LIM-AT), Low-income measure, before-tax (LIM-BT), 'Market Basket Measure (MBM))." In this study we use Low-income cut-offs, after-tax (LICO-AT)' as a measure of low-income which refers to "an income threshold, defined using 1992 expenditure data, below which economic families or persons not in economic families would likely have devoted a larger share of their after-tax income than average to the necessities of food, shelter and clothing. More specifically, the thresholds represented income levels at which these families or persons were expected to spend 20 percentage points or more of their after-tax income than

	average on food, shelter and clothing. These thresholds have been adjusted to current dollars using the all-items Consumer Price Index (CPI)." CMA/CA unemployment rate - refers to the percentage of "unemployed persons expressed as a percentage of the labour force. Unemployed persons include those who during the reference period; 1. were without work but had looked for work in the past four weeks ending with the reference period and were available for work; 2. Were on temporary layoff due to business conditions and were available for work; or 3. were without work, had a job to start within four weeks of the reference period and were available for work." % CMA/CA non-unionized population - the percentage of populations that are not union members and not covered by a collective agreement.
Human capital characteristics	% CMA/CA population with a bachelor's or better- refers to the percentage of populations with a level of education at the bachelor's level or higher that has successfully been completed.

Note: Definitions are reproduced with the permission of Statistics Canada. Source: Statistics Canada. (2019). *Definitions, Data Sources and Methods*. Last updated April 3, 2019. http://www.statcan.ca/english/concepts/index.htm (accessed April 14, 2019).

Table 5. 2: Descriptive statistics of the explanatory variables

Spatial characteristics	Mean	Median	Skewness	Kurtosis	Data source
Industry characteristics					
CMA/CA health occupations (%)	8.8	8.70	0.79	0.79	LFS
CMA/CA management occupations (%)	8.5	8.61	-0.42	0.11	LFS
CMA/CA occupations in manufacturing and utilities (%)	5.2	4.70	0.90	0.18	LFS
CMA/CA sales and service occupations (%)	21.2	21.16	0.51	0.10	LFS
Immigrant population characteristics					
CMA/CA immigrant population (%)	13.1	9.95	1.65	3.64	LFS
CMA/CA recent immigrant population (%)	36.6	34.53	0.45	-0.46	LFS
CMA/CA immigrant population from Africa (%)	13.2	8.99	1.57	1.77	LFS
CMA/CA immigrant population from Asia (%)	38.5	36.32	0.09	-1.08	LFS
CMA/CA immigrant population from Latin America (%)	12.8	9.55	1.68	3.33	LFS
Labor market characteristics					
CMA/CA population with employment insurance benefits (%)	1.2	0.46	4.51	21.51	CENSUS
CMA/CA prevalence in low income (%)	12.3	12.30	-0.15	0.59	CENSUS
CMA/CA unemployment rate (%)	6.8	6.20	1.78	4.25	LFS
CMA/CA non-unionized population (%)	65.1	66.31	-0.41	-0.15	LFS
Human capital characteristics					
CMA/CA population with a bachelor's or better (%)	24.6	21.9	0.69	0.09	LFS

5.5 Results

5.5.1 Spatial patterns of temporary employment across Canadas landscape

The spatial patterns observed at the CMA scale in figure 5.1 show a U-shaped pattern, with higher rates on the coasts (highest Atlantic Canada) and lower in Central Canada. Specific CMAs in Atlantic Canada, namely St. John's, NL, was represented with the highest share of populations employed on a temporary basis. The broad east-west pattern in temporary work was however partially distorted with slight variations across space, with Ontario CMAs reporting the lowest share in temporary work. Specifically, lower rates of temporary employment are observed in Oshawa, ON in comparison to CMAs in Ontario and other provinces. Overall, geographic patterns in temporary employment at the CMA scale were difficult to identify.

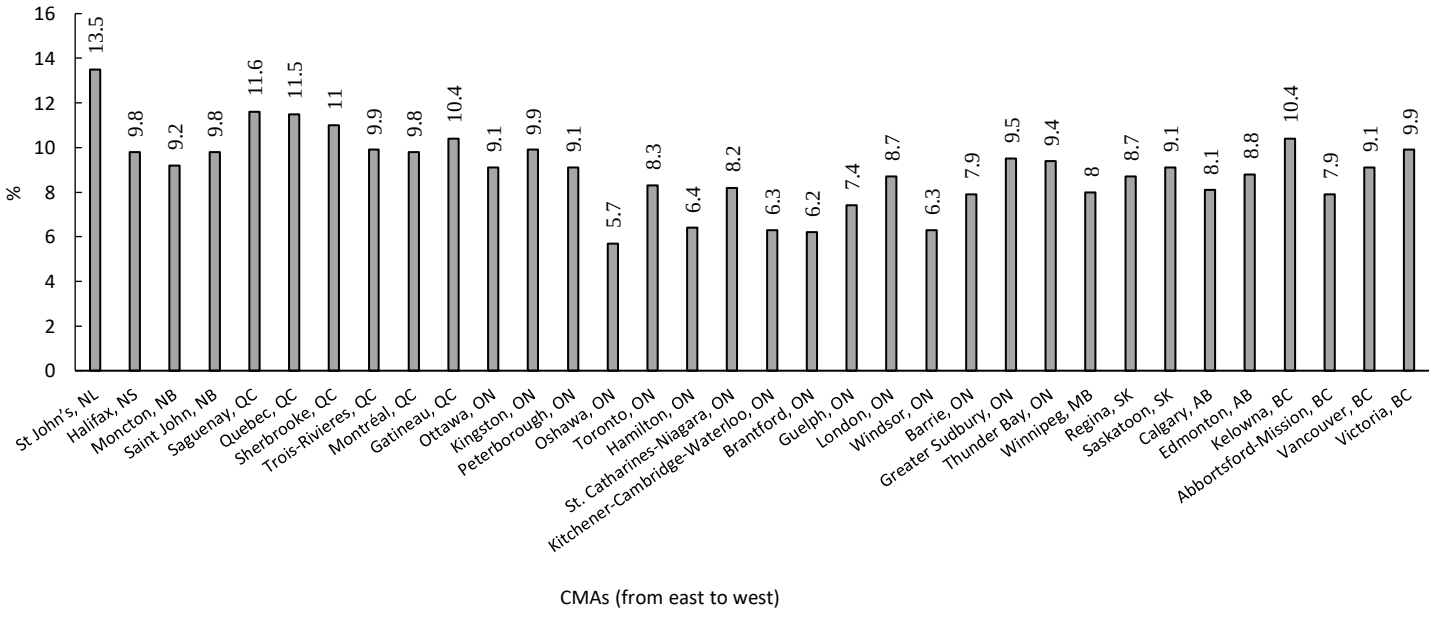

Figure 5. 1: Prevalence of temporary employment across census metropolitan areas, 2011-2016

5.5.2 OLS estimation results

A critical question is how spatial characteristics help shape the pattern of temporary employment, with these relationships explored through OLS. Overall, the fit of all four models in table 3 was statistically significant ($p<0.01$)), with the coefficient of determination (r^2) gradually increasing from 0.49 (Model 1) to 0.61 (Model 3).

Model 1 (Table 5.3) estimates the relationship between industry characteristics and temporary employment. Broadly, we find that industry characteristics of census metropolitan areas and agglomerations were significant determinants of temporary employment, although the sign, magnitude, and significance of these relationships differed by industry type. Specifically, temporary employment was associated with a higher percentage share of individuals employed in occupations including health and sales and services (B = 0.3116, SE = 0.1366 and B = 0.2384, SE = 0.1010, respectively). On the other hand, urban areas with a high proportion of their labor force in management occupations were associated with significantly lower levels of temporary employment (B= -0.7007, SE = 0.1867). This finding also held for secondary sector occupations like manufacturing and utilities that were also significantly associated with lower levels of temporary work (B= -0.3944, SE = 0.0932).

Model 2 assessed the impacts of labor market effects on temporary employment with the addition of population and labor market effects. Although urban areas with large immigrant populations have lower rates of temporary employment, temporary

employment was not impacted by either the proportion of recent immigrants or reflective of immigrant origin with the exception of Asian origins, which modestly increased temporary employment rates. This may be attributed to immigrants being drawn more to other forms of precarious work e.g. part-time (12.4%) or involuntary part-time employment(16.8%) other than temporary employment (9.7%) (Ali and Newbold 2019b). On labor market effects, the results illustrate that census metropolitan areas and agglomerations identified by a large share of employment insurance beneficiaries and low-income earners had significantly higher rates of temporary employment (B= 0.2598, SE = 0.1352; B= 0.2850, SE = 0.1332, respectively). Perhaps not surprisingly, unionization levels were not significantly associated with temporary employment. On the contrary, census metropolitan areas characterized by high unemployment rates had significantly lower rates of temporary employment (B= -0.5681, SE = 0.2296). This finding is rather at odds with previous findings on EI beneficiaries (MacDonald 2009). Interestingly, the inclusion of demographic and labor market effects resulted in the impact of the sales and service occupations becoming insignificant.

Finally, model 3 represents the fully adjusted OLS model. Interestingly, the educational mix of a metropolitan area did appear to impact rates of temporary employment (as indicated by the insignificance of the coefficient estimate)[7]. The inclusion of educational

[7] Human capital effects were examined separately and not included in terms of population effects due to differences in population units of analysis i.e. population effects, focuses on immigrant populations while human capital effects on the entire population, irrespective of immigration status.

attainment also changed other relationships. For example, census metropolitan areas and agglomerations with a higher percentage share of individuals engaged in health occupations were characterized by a low share of temporary employment (B=-0.0337, SE = 0.1872). On the contrary, we find that census metropolitan areas and agglomerations with a high share of sales and services occupations were positively (but insignificantly) associated with a high portion of temporary workers (B=0.0468, SE = 0.1449). We also note that census metropolitan areas and agglomerations with high shares of immigrants from Asia were positively and significantly associated with temporary employment (B= 0.0627, SE =0.0363).

Table 5. 3: OLS exploring the effects of spatial characteristics on temporary employment across CMA and CA's, 2016

	Dependent variable: temporary employment			
	Model 1	Model 2	Model 3	Model 3
Explanatory variables: Spatial characteristics	B (SE)	B (SE)	B (SE)	VIF
Intercept	9.4183*** (3.5050)	12.8374** (5.1466)	10.8534** (5.1946)	
Industry characteristics				
CMA/CA health occupations (%)	0.3116** (0.1366)	0.0321 (0.1863)	-0.0337 (0.1872)	2.5763
CMA/CA management occupations (%)	-0.7007*** (0.1867)	-0.6248*** (0.2165)	-0.6560*** (0.2130)	1.5589
CMA/CA occupations in manufacturing and utilities (%)	-0.3944*** (0.0932)	-0.4665*** (0.1086)	-0.3694*** (0.1227)	2.2763
CMA/CA sales and service occupations (%)	0.2384** (0.1010)	-0.0146 (0.1426)	0.0468 (0.1449)	2.2640
Immigrant population characteristics				
CMA/CA immigrant population (%)		-0.1161* (0.0621)	-0.1457** (0.0637)	9.4473
CMA/CA recent immigrant population (%)		-0.0123 (0.0263)	-0.0225 (0.0265)	3.3817
CMA/CA immigrant population from Africa (%)		0.0593 (0.0377)	0.0578 (0.0369)	2.7391
CMA/CA immigrant population from Asia (%)		0.0564 (0.0368)	0.0627* (0.0363)	7.3033
CMA/CA immigrant population from Latin America (%)		0.0136 (0.0449)	0.0333 (0.0457)	2.2121

Labor market characteristics				
CMA/CA population with employment insurance benefits (%)		0.2598* (0.1352)	0.2286* (0.1339)	3.2321
CMA/CA prevalence in low income (%)		0.2850** (0.1332)	0.2393* (0.1336)	2.7086
CMA/CA unemployment rate (%)		-0.5681** (0.2296)	-0.4581* (0.2354)	1.9575
CMA/CA non-unionized population (%)		0.0421 (0.0473)	0.0323 (0.0468)	2.2153
Human capital characteristics				
CMA/CA population with a bachelor's or better (%)			0.0753 (0.0475)	2.9207
R-squared	0.49	0.59	0.61	
Pr > F	<0.0001	0.0006	0.0005	

Note: *** p<0.01, ** p<0.05, * p<0.1

Abbreviations: B= Coefficient, SE = Standard Error, VIF= Variance Inflation Factor

5.6 Discussion and Conclusion

This study has explored the spatial characteristics influencing the spatial patterns of temporary employment in Canada at the CMA/CA level. Key findings showed that CMA/CAs characterized by large shares of manufacturing, utility, and management occupations were significantly and negatively associated with temporary employment. With respect to the latter, our results are in line with Vosko et al. (2003). Conversely, CMA/CAs with high shares of sales and service occupations were positively associated with temporary employment, reflecting findings by Noack and Vosko (2011).

Generally, we find that specific population and labor market characteristics (measured by metropolitan areas characterized by a high share of Asian immigrants, low-income earners, and employment insurance beneficiaries) contributed more to explaining positive temporary employment estimates than industry characteristics. Rather surprisingly, urban areas with a high share of immigrants were associated with lower rates of temporary employment. Moreover, temporary employment was not found to be impacted by the recency of arrival or immigrant origin. Exemption to this is census metropolitan areas represented by high shares of Asian immigrants that were positively and significantly associated with temporary employment. In the literature, several studies from a generalist lens all point to the growing racialization of poverty, as racialized individuals and immigrants continue to encounter high levels of unemployment, underemployment than their non-racialized immigrant counterparts (Cheung 2005;

Cranford et al., 2003b; Pendukar and Pendukar 1998; Teelucksingh and Galabuzi 2007). Temporal data dating back from 1996-2001 also show that racialized and immigrant populations continue to sustain a double-digit income gap and experience higher unemployment rates despite contributing to a much higher rate of new entrants to the Canadian labor force (Teelucksingh and Galabuzi 2007). Most of these studies however examined labor market inequalities at the individual level. More so, there is a dearth in the literature on the spatial effects of temporary employment (within the Canadian context), thus making any form of comparative analysis difficult.

Our results also confirm that CMA/CAs characterized by a high percentage share of low-income populations were significantly and positively associated with high levels of temporary work. This finding is in line with Breau et al.'s (2018) study that looked into the spatial dynamics in income changes across Canada's eight largest CMAs. In their analysis, they find that specific CMAs (Edmonton, Winnipeg, and Quebec City) in addition to several lower-income CMAs had patterns of spatial polarization (that were slightly pronounced) and were characterized by higher levels of precarious employment. Other studies insist that the maintenance of precarious employment in low-income geographies is associated with the labor immobility of workers that provides a captive labor force for precarious employment (MacDonald 2009; Walsh et al., 2014). Our findings that CMA/CA with high unemployment rates were associated with significantly lower levels of temporary employed. This runs counter to the consensus in the literature that maintain geographies characterized by high unemployment rates are likely to have a

high concentration of precarious jobs, an absolute shortage of jobs, lower rates of unionization and lower average wages (Kapsalis and Tourigny 2004; MacDonald 2009; Perusse 1997).

In terms of immigration, we showed that the share of immigrants did not impact temporary employment, a finding that contrasts with Fuller and Vosko's (2008) whereby recent immigrants were less likely to be employed in all forms of temporary employment (i.e., seasonal, contract, casual and agency) than their Canadian born counterparts or established immigrants who immigrated before 1987. Fuller and Vosko (2008) demonstrate that recent immigrants in Canada make up a small share of the labor force in each form of temporary employment in comparison to permanent employment. Lastly, on human capital effects, we noted that CMAs and CAs with a high share of better-educated populations were positively associated with temporary wage work, a finding consistent with Gebel (2010) and Kahn (2016). However, Gebel (2010) study shows that both German and British tertiary graduates who have a high risk of being employed at the start of their career on a temporary basis are able to recoup wage penalties and transition to more permanent employment in less time compared to less-educated populations.

In conclusion, we have illustrated that the temporary labor market is shaped by a series of spatial characteristics that vary across space and result in spatial variations in temporary employment. Population and labor market characteristics (measured by metropolitan areas characterized by a high share of Asian immigrants, low-income earners, and

employment insurance beneficiaries) contributed more to explaining positive temporary employment estimates. As such, the findings in this paper calls for greater attention to the aforementioned spatial characteristics in future empirical or conceptual research examining precarious employment from a spatial dimension. Taken together, this study adds valuable insights into the spatial characteristics that create and maintain the patterning of temporary employment across Canada's landscape.

One of the main limitations encountered in this study was that the analysis (and data) did not enable consideration of smaller spatial scales within CMAs. We were also limited by the incapacity to include economic factors, e.g. GDP or other factors affecting the supply of workers including factors that serve as a proxy for discrimination(in the labor force e.g. workers past criminal convictions). Such data was not readily available for all the geographies we were interested in, and we were consequently unable to examine their effects. Another limitation encountered in this study was that we aggregated the sub-classification of temporary (i.e. seasonal; temporary, term or contract and casual jobs) into a unified homogeneous form of temporary employment. Fuller and Vosko (2008) write that there are variations within the specific types of temporary employment that shape labor force inequalities. These variations have different effects on gender race and immigration status. Lastly, missing data may have been a limiting factor in producing biased estimates or leading to a loss in statistical power.

These limitations channel several areas for future work. With respect to improvements in methods, future studies could consider several statistical techniques for dealing with missing data; including the use of Multiple Imputation (MI) (Little and Rubin 2002; Rubin 1987), Full Information Maximum-Likelihood (FIML) (Enders 2001; Enders and Bandalos 2001) and/or Expectation-Maximization (EM) algorithm (Dempster et al., 1977).

Other avenues for future work could include further examination of the dynamics of labor supply and demand and the spatial patterning of the various heterogeneous forms of temporary employment as outlined by Fuller and Vosko (2008). Moreover, since this study relied on cross-sectional data, future studies could consider longitudinal data when drawing conclusions between space and precarious labor market outcomes. There could also be an attempt to explore how supply and demand factors explain the spatial patterning of other forms of precarious employment apart from temporary employment e.g. part-time employment and multiple-job holders. Earlier studies by Ali et al. (2019) and Ali and Newbold (2019a and 2019b) have shown that spatial variations in the expression of precarious labor are evident in these forms. Taken together, the findings of this paper enable our understanding of the spatial factors that contribute to temporary employment and why it varies across the Canadian landscape. Consequently, understanding these effects could enable policymakers to consider how to address variations and inequities in the labor market.

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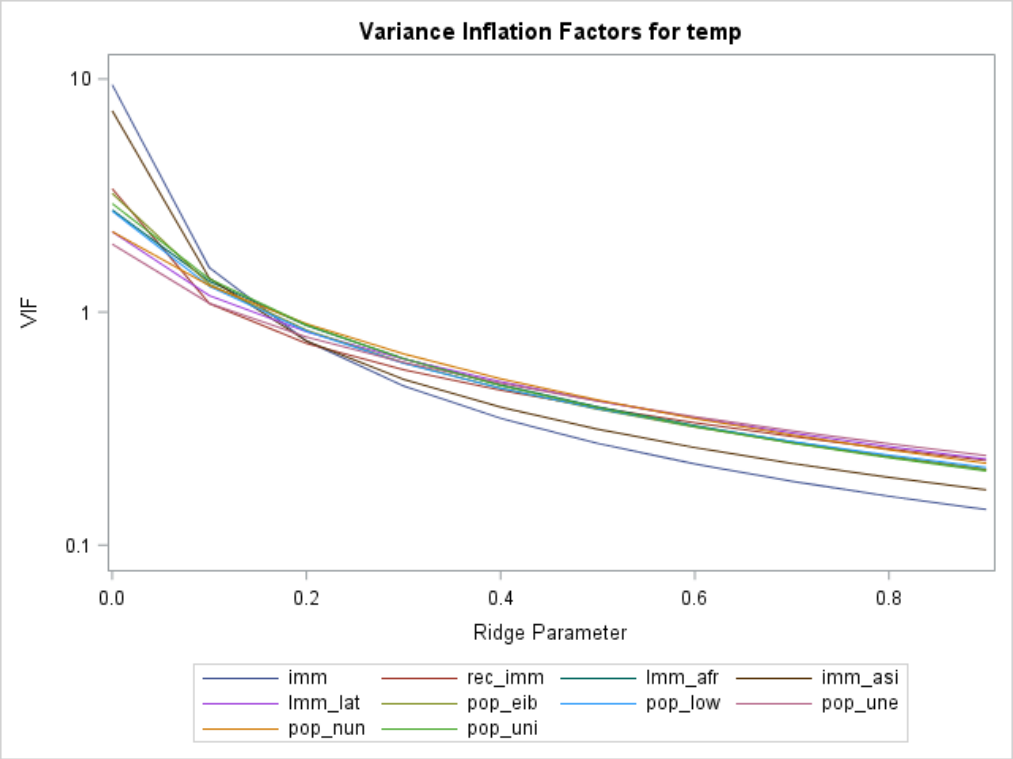
Appendix 5. 1: Pearson correlation matrix for explanatory variables

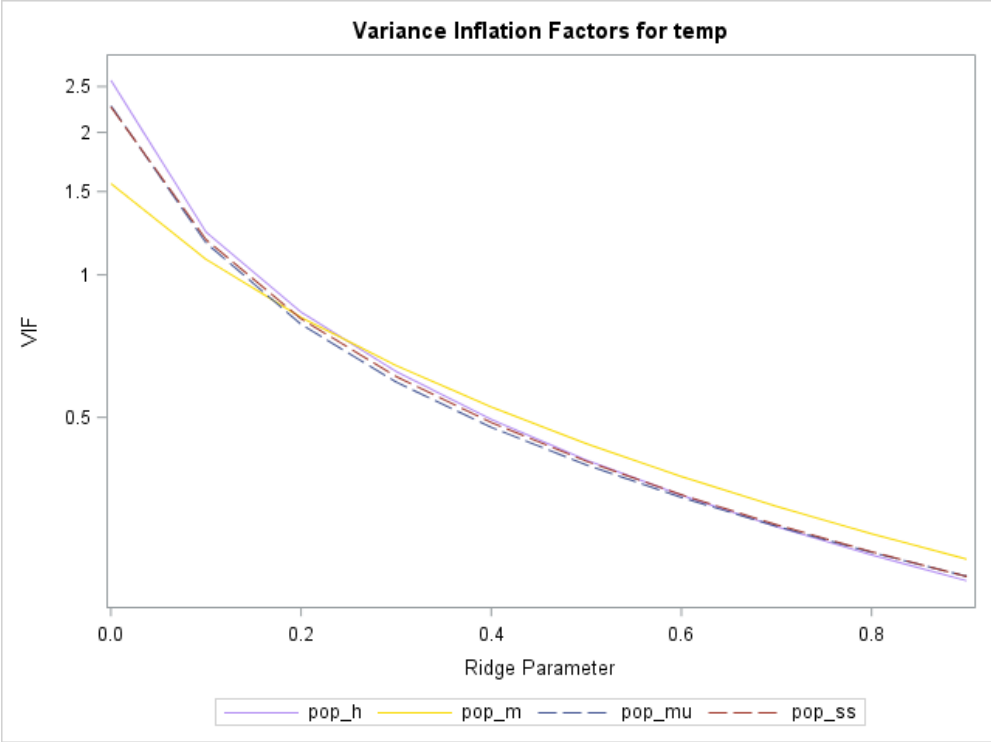
Prob > |r| under H0: Rho=0

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
IMM (1)	1													
REC_IMM (2)	-0.1172 0.3524	1												
IMM_AFR (3)	-0.3354 0.0141	0.3596 0.0082	1											
IMM_ASI (4)	0.4056 0.0008	0.3399 0.0064	-0.4048 0.0032	1										
IMM_LAT (5)	-0.1371 0.309	-0.1992 0.1411	0.3201 0.0235	-0.6284 <.0001	1									
POP_EIB (6)	0.6684 <.0001	-0.0471 0.7096	-0.0142 0.9195	0.1528 0.2242	0.0526 0.6976	1								
POP_LOW (7)	-0.2141 0.0819	-0.1043 0.412	-0.1033 0.4662	-0.1236 0.3268	-0.0016 0.9905	-0.0169 0.8805	1							
POP_UNE (8)	-0.3463 0.0041	-0.0298 0.815	-0.0013 0.9925	0.1128 0.371	-0.1218 0.3667	-0.0583 0.6027	0.113 0.3121	1						
POP_NUN (9)	0.4312 0.0002	-0.22 0.0783	-0.4278 0.0014	0.2103 0.0928	-0.0242 0.8583	0.2651 0.0289	-0.1872 0.1293	-0.1445 0.2434	1					
POP_UNI (10)	0.5895 <.0001	0.1221 0.3324	-0.1496 0.2851	0.2974 0.0161	-0.3192 0.0155	0.4829 <.0001	-0.0976 0.4322	-0.2801 0.0217	0.1366 0.2669	1				
POP_H (11)	-0.34	-0.0859	-0.1583	-0.1058	0.0258	-0.1889	0.3938	0.3707	-0.3924	-0.0757	1			

	0.0046	0.496	0.2577	0.4015	0.8488	0.1229	0.001	0.002	0.0009	0.5396				
POP_M														
(12)	0.3629	-0.0587	-0.25	0.0509	-0.0916	0.2264	-0.1633	-0.3864	0.2502	0.4422	-0.2636	1		
	0.0024	0.6421	0.071	0.6869	0.4982	0.0634	0.1868	0.0012	0.0396	0.0002	0.0299			
POP_MU														
(13)	0.0309	-0.1809	0.0694	-0.2019	0.373	-0.0838	0.1605	-0.1915	0.1875	-0.3922	-0.0926	-0.2747	1	
	0.8028	0.1493	0.6215	0.1068	0.0043	0.4969	0.1945	0.1206	0.1258	0.0009	0.4525	0.0234		
POP_SS														
(14)	-0.2874	-0.0191	-0.1563	0.0614	-0.1182	-0.0577	0.4179	0.4251	-0.1072	-0.191	0.2384	-0.3135	-0.1159	1
	0.0175	0.8798	0.2637	0.6271	0.3813	0.64	0.0004	0.0003	0.3843	0.1186	0.0502	0.0092	0.3468	

Appendix 5. 2: Variance inflation Factors trace plots





Appendix 5. 3: Population and dwelling counts, for Canada, census metropolitan areas and census agglomerations

Geographic name	Geographic type,	Province / territory	Population, 2016
St. John's	Census metropolitan area (CMA)	Newfoundland and Labrador	205955
Bay Roberts	Census agglomeration (CA)	Newfoundland and Labrador	11083
Grand Falls-Windsor	Census agglomeration (CA)	Newfoundland and Labrador	14171
Gander	Census agglomeration (CA)	Newfoundland and Labrador	13234
Corner Brook	Census agglomeration (CA)	Newfoundland and Labrador	31917
Charlottetown	Census agglomeration (CA)	Prince Edward Island	69325
Summerside	Census agglomeration (CA)	Prince Edward Island	16587
Halifax	Census metropolitan area (CMA)	Nova Scotia	403390
Kentville	Census agglomeration (CA)	Nova Scotia	26222
Truro	Census agglomeration (CA)	Nova Scotia	45753
New Glasgow	Census agglomeration (CA)	Nova Scotia	34487
Cape Breton	Census agglomeration (CA)	Nova Scotia	98722
Moncton	Census metropolitan area (CMA)	New Brunswick	144810
Saint John	Census metropolitan area (CMA)	New Brunswick	126202
Fredericton	Census agglomeration (CA)	New Brunswick	101760
Bathurst	Census agglomeration (CA)	New Brunswick	31110
Miramichi	Census agglomeration (CA)	New Brunswick	27523
Campbellton	Census agglomeration (CA)	New Brunswick/Quebec	15746
Campbellton (New Brunswick part)	Census agglomeration (CA) – provincial part	New Brunswick	13114
Campbellton (Quebec part)	Census agglomeration (CA) – provincial part	Quebec	2632
Edmundston	Census agglomeration (CA)	New Brunswick	23524
Matane	Census agglomeration (CA)	Quebec	17926
Rimouski	Census agglomeration (CA)	Quebec	55349
Rivière-du-Loup	Census agglomeration (CA)	Quebec	28902
Baie-Comeau	Census agglomeration (CA)	Quebec	27692
Saguenay	Census metropolitan area (CMA)	Quebec	160980
Alma	Census agglomeration (CA)	Quebec	32849
Dolbeau-Mistassini	Census agglomeration (CA)	Quebec	15673
Sept-Îles	Census agglomeration (CA)	Quebec	28534
Québec	Census metropolitan area (CMA)	Quebec	800296
Sainte-Marie	Census agglomeration (CA)	Quebec	13565
Saint-Georges	Census agglomeration (CA)	Quebec	32513
Thetford Mines	Census agglomeration (CA)	Quebec	28448
Sherbrooke	Census metropolitan area (CMA)	Quebec	212105
Cowansville	Census agglomeration (CA)	Quebec	13656
Victoriaville	Census agglomeration (CA)	Quebec	49151

Trois-Rivières	Census metropolitan area (CMA)	Quebec	156042
Shawinigan	Census agglomeration (CA)	Quebec	54181
Drummondville	Census agglomeration (CA)	Quebec	96118
Granby	Census agglomeration (CA)	Quebec	85056
Saint-Hyacinthe	Census agglomeration (CA)	Quebec	59614
Sorel-Tracy	Census agglomeration (CA)	Quebec	41629
Joliette	Census agglomeration (CA)	Quebec	49439
Montréal	Census metropolitan area (CMA)	Quebec	4098927
Salaberry-de-Valleyfield	Census agglomeration (CA)	Quebec	40745
Lachute	Census agglomeration (CA)	Quebec	12862
Val-d'Or	Census agglomeration (CA)	Quebec	33871
Rouyn-Noranda	Census agglomeration (CA)	Quebec	42334
Cornwall	Census agglomeration (CA)	Ontario	59699
Hawkesbury	Census agglomeration (CA)	Ontario/Quebec	11974
Hawkesbury (Quebec part)	Census agglomeration (CA) – provincial part	Quebec	1711
Hawkesbury (Ontario part)	Census agglomeration (CA) – provincial part	Ontario	10263
Ottawa - Gatineau	Census metropolitan area (CMA)	Ontario/Quebec	1323783
Ottawa - Gatineau (Quebec part)	Census metropolitan area (CMA) – provincial part	Quebec	332057
Ottawa - Gatineau (Ontario part)	Census metropolitan area (CMA) – provincial part	Ontario	991726
Arnprior	Census agglomeration (CA)	Ontario	15973
Carleton Place	Census agglomeration (CA)	Ontario	31451
Brockville	Census agglomeration (CA)	Ontario	38553
Pembroke	Census agglomeration (CA)	Ontario	23269
Petawawa	Census agglomeration (CA)	Ontario	17187
Kingston	Census metropolitan area (CMA)	Ontario	161175
Belleville	Census metropolitan area (CMA)	Ontario	103472
Cobourg	Census agglomeration (CA)	Ontario	19440
Port Hope	Census agglomeration (CA)	Ontario	16753
Peterborough	Census metropolitan area (CMA)	Ontario	121721
Kawartha Lakes	Census agglomeration (CA)	Ontario	75423
Centre Wellington	Census agglomeration (CA)	Ontario	28191
Oshawa	Census metropolitan area (CMA)	Ontario	379848
Ingersoll	Census agglomeration (CA)	Ontario	12757
Toronto	Census metropolitan area (CMA)	Ontario	5928040
Hamilton	Census metropolitan area (CMA)	Ontario	747545
St. Catharines - Niagara	Census metropolitan area (CMA)	Ontario	406074

Kitchener - Cambridge - Waterloo	Census metropolitan area (CMA)	Ontario	523894
Brantford	Census metropolitan area (CMA)	Ontario	134203
Woodstock	Census agglomeration (CA)	Ontario	40902
Tillsonburg	Census agglomeration (CA)	Ontario	15872
Norfolk	Census agglomeration (CA)	Ontario	64044
Guelph	Census metropolitan area (CMA)	Ontario	151984
Stratford	Census agglomeration (CA)	Ontario	31465
London	Census metropolitan area (CMA)	Ontario	494069
Chatham-Kent	Census agglomeration (CA)	Ontario	102042
Leamington	Census agglomeration (CA)	Ontario	49147
Windsor	Census metropolitan area (CMA)	Ontario	329144
Sarnia	Census agglomeration (CA)	Ontario	96151
Wasaga Beach	Census agglomeration (CA)	Ontario	20675
Owen Sound	Census agglomeration (CA)	Ontario	31820
Collingwood	Census agglomeration (CA)	Ontario	21793
Barrie	Census metropolitan area (CMA)	Ontario	197059
Orillia	Census agglomeration (CA)	Ontario	31166
Midland	Census agglomeration (CA)	Ontario	35859
North Bay	Census agglomeration (CA)	Ontario	70378
Greater Sudbury	Census metropolitan area (CMA)	Ontario	164689
Elliot Lake	Census agglomeration (CA)	Ontario	10741
Timmins	Census agglomeration (CA)	Ontario	41788
Sault Ste. Marie	Census agglomeration (CA)	Ontario	78159
Thunder Bay	Census metropolitan area (CMA)	Ontario	121621
Kenora	Census agglomeration (CA)	Ontario	15096
Winnipeg	Census metropolitan area (CMA)	Manitoba	778489
Winkler	Census agglomeration (CA)	Manitoba	30297
Steinbach	Census agglomeration (CA)	Manitoba	15829
Portage la Prairie	Census agglomeration (CA)	Manitoba	13304
Brandon	Census agglomeration (CA)	Manitoba	58003
Thompson	Census agglomeration (CA)	Manitoba	13678
Regina	Census metropolitan area (CMA)	Saskatchewan	236481
Yorkton	Census agglomeration (CA)	Saskatchewan	18905
Moose Jaw	Census agglomeration (CA)	Saskatchewan	35053
Swift Current	Census agglomeration (CA)	Saskatchewan	18536
Saskatoon	Census metropolitan area (CMA)	Saskatchewan	295095
North Battleford	Census agglomeration (CA)	Saskatchewan	19623
Prince Albert	Census agglomeration (CA)	Saskatchewan	44160
Estevan	Census agglomeration (CA)	Saskatchewan	13615

Weyburn	Census agglomeration (CA)	Saskatchewan	10870
Medicine Hat	Census agglomeration (CA)	Alberta	76522
Brooks	Census agglomeration (CA)	Alberta	24662
Lethbridge	Census metropolitan area (CMA)	Alberta	117394
Okotoks	Census agglomeration (CA)	Alberta	28881
High River	Census agglomeration (CA)	Alberta	13584
Calgary	Census metropolitan area (CMA)	Alberta	1392609
Strathmore	Census agglomeration (CA)	Alberta	13756
Canmore	Census agglomeration (CA)	Alberta	13992
Red Deer	Census agglomeration (CA)	Alberta	100418
Sylvan Lake	Census agglomeration (CA)	Alberta	15302
Lacombe	Census agglomeration (CA)	Alberta	13057
Camrose	Census agglomeration (CA)	Alberta	18742
Edmonton	Census metropolitan area (CMA)	Alberta	1321426
Lloydminster	Census agglomeration (CA)	Alberta/Saskatchewan	34583
Lloydminster (Saskatchewan part)	Census agglomeration (CA) – provincial part	Saskatchewan	14938
Lloydminster (Alberta part)	Census agglomeration (CA) – provincial part	Alberta	19645
Cold Lake	Census agglomeration (CA)	Alberta	14961
Grande Prairie	Census agglomeration (CA)	Alberta	63166
Wood Buffalo	Census agglomeration (CA)	Alberta	73320
Wetaskiwin	Census agglomeration (CA)	Alberta	12655
Cranbrook	Census agglomeration (CA)	British Columbia	26083
Nelson	Census agglomeration (CA)	British Columbia	18307
Penticton	Census agglomeration (CA)	British Columbia	43432
Kelowna	Census metropolitan area (CMA)	British Columbia	194882
Vernon	Census agglomeration (CA)	British Columbia	61334
Salmon Arm	Census agglomeration (CA)	British Columbia	17904
Kamloops	Census agglomeration (CA)	British Columbia	103811
Chilliwack	Census agglomeration (CA)	British Columbia	101512
Abbotsford - Mission	Census metropolitan area (CMA)	British Columbia	180518
Vancouver	Census metropolitan area (CMA)	British Columbia	2463431
Squamish	Census agglomeration (CA)	British Columbia	19893
Victoria	Census metropolitan area (CMA)	British Columbia	367770
Duncan	Census agglomeration (CA)	British Columbia	44451
Nanaimo	Census agglomeration (CA)	British Columbia	104936
Parksville	Census agglomeration (CA)	British Columbia	28922
Port Alberni	Census agglomeration (CA)	British Columbia	25112
Courtenay	Census agglomeration (CA)	British Columbia	54157
Campbell River	Census agglomeration (CA)	British Columbia	37861

Powell River	Census agglomeration (CA)	British Columbia	16783
Williams Lake	Census agglomeration (CA)	British Columbia	18277
Quesnel	Census agglomeration (CA)	British Columbia	23146
Prince Rupert	Census agglomeration (CA)	British Columbia	12687
Terrace	Census agglomeration (CA)	British Columbia	15723
Prince George	Census agglomeration (CA)	British Columbia	86622
Dawson Creek	Census agglomeration (CA)	British Columbia	12178
Fort St. John	Census agglomeration (CA)	British Columbia	28396
Whitehorse	Census agglomeration (CA)	Yukon	28225
Yellowknife	Census agglomeration (CA)	Northwest Territories	19569

Source: Statistics Canada Census 2016

Appendix 5. 4: OLS exploring the effects spatial characteristics on temporary employment : seasonal employment, 2016

	Dependent variable: temporary employment: seasonal employment			
	Model 1	Model 2	Model 3	Model 4
Explanatory variables: spatial characteristics	B (SE)	B (SE)	B (SE)	B (SE)
Intercept	1.4224	-1.7045	12.8374**	10.8534**
	(1.3663)	(1.1326)	(5.1466)	(5.1946)
Industry characteristics				
CMA/CA health occupations (%)	0.0902*	0.0653	0.0321	-0.0337
	(0.0528)	(0.0460)	(0.1863)	(0.1872)
CMA/CA management occupations (%)	-0.2929***	-0.1313*	-0.6248***	-0.6560***
	(0.0734)	(0.0663)	(0.2165)	(0.2130)
CMA/CA occupations in manufacturing and utilities (%)	-0.0160	-0.0027***	-0.4665***	-0.3694***
	(0.0376)	(0.0302)	(0.1086)	(0.1227)
CMA/CA sales and service occupations (%)	0.1098***	0.1550	-0.0146	0.0468
	(0.0395)	(0.0355)	(0.1426)	(0.1449)
Immigrant population characteristics				
CMA/CA immigrant population (%)		-0.0279	-0.1161*	-0.1457**
		(0.0123)	(0.0621)	(0.0637)
CMA/CA recent immigrant population (%)		-0.0055	-0.0123	-0.0225
		(0.0076)	(0.0263)	(0.0265)
CMA/CA immigrant population from Africa (%)		0.0300	0.0593	0.0578
		(0.0113)	(0.0377)	(0.0369)
CMA/CA immigrant population from Asia (%)		0.0167	0.0564	0.0627*
		(0.0094)	(0.0368)	(0.0363)
CMA/CA immigrant population from Latin America (%)		0.0366	0.0136	0.0333
		(0.0137)	(0.0449)	(0.0457)

CMA/CA population with employment insurance benefits (%)			0.2598*	0.2286*
			(0.1352)	(0.1339)
CMA/CA prevalence in low income (%)			0.2850**	0.2393*
			(0.1332)	(0.1336)
CMA/CA unemployment rate (%)			-0.5681**	-0.4581*
			(0.2296)	(0.2354)
CMA/CA non-unionized population (%)			0.0421	0.0323
			(0.0473)	(0.0468)
Human capital characteristics				
CMA/CA population with a bachelor's or better (%)				0.0753
				(0.0475)
R-squared	0.45	0.66	0.74	0.75
Pr > F	<0.0001	<.0001	<.0001	<.0001

Note: *** p<0.01, ** p<0.05, * p<0.1

Abbreviations: B= Coefficient, SE = Standard Error

Appendix 5. 5: OLS exploring the effects of spatial characteristics on temporary employment : temporary, term or contract employment, 2016

	Dependent variable: temporary employment: temporary, term or contract employment			
	Model 1	Model 2	Model 3	Model 4
Explanatory variables: spatial characteristics	B (SE)	B (SE)	B (SE)	B (SE)
Intercept	1.4224	-1.7045	12.8374**	10.8534**
	(1.3663)	(1.1326)	(5.1466)	(5.1946)
Industry characteristics				
CMA/CA health occupations (%)	0.0902*	0.0653	0.0321	-0.0337
	(0.0528)	(0.0460)	(0.1863)	(0.1872)
CMA/CA management occupations (%)	-0.2929***	-0.1313*	-0.6248***	-0.6560***
	(0.0734)	(0.0663)	(0.2165)	(0.2130)
CMA/CA occupations in manufacturing and utilities (%)	-0.0160	-0.0027***	-0.4665***	-0.3694***
	(0.0376)	(0.0302)	(0.1086)	(0.1227)
CMA/CA sales and service occupations (%)	0.1098***	0.1550	-0.0146	0.0468
	(0.0395)	(0.0355)	(0.1426)	(0.1449)
Immigrant population characteristics				
CMA/CA immigrant population (%)		-0.0279	-0.1161*	-0.1457**
		(0.0123)	(0.0621)	(0.0637)
CMA/CA recent immigrant population (%)		-0.0055	-0.0123	-0.0225
		(0.0076)	(0.0263)	(0.0265)
CMA/CA immigrant population from Africa (%)		0.0300	0.0593	0.0578
		(0.0113)	(0.0377)	(0.0369)
CMA/CA immigrant population from Asia (%)		0.0167	0.0564	0.0627*
		(0.0094)	(0.0368)	(0.0363)
CMA/CA immigrant population from Latin America (%)		0.0366	0.0136	0.0333
		(0.0137)	(0.0449)	(0.0457)

CMA/CA population with employment insurance benefits (%)			0.2598*	0.2286*
			(0.1352)	(0.1339)
CMA/CA prevalence in low income (%)			0.2850**	0.2393*
			(0.1332)	(0.1336)
CMA/CA unemployment rate (%)			-0.5681**	-0.4581*
			(0.2296)	(0.2354)
CMA/CA non-unionized population (%)			0.0421	0.0323
			(0.0473)	(0.0468)
Human capital characteristics				
CMA/CA population with a bachelor's or better (%)				0.0753
				(0.0475)
R-squared	0.22	0.34	0.51	0.60
Pr > F	0.0030	0.0324	0.0056	0.0010

Note: *** p<0.01, ** p<0.05, * p<0.1

Abbreviations: B= Coefficient, SE = Standard Error

Appendix 5. 6: OLS exploring the effects of spatial characteristics on temporary employment : casual employment, 2016

	Dependent variable: temporary employment: casual employment			
	Model 1	Model 2	Model 3	Model 4
Explanatory variables: spatial characteristics	B (SE)	B (SE)	B (SE)	B (SE)
Intercept	1.4224	-1.7045	12.8374**	10.8534**
	(1.3663)	(1.1326)	(5.1466)	(5.1946)
Industry characteristics				
CMA/CA health occupations (%)	0.0902*	0.0653	0.0321	-0.0337
	(0.0528)	(0.0460)	(0.1863)	(0.1872)
CMA/CA management occupations (%)	-0.2929***	-0.1313*	-0.6248***	-0.6560***
	(0.0734)	(0.0663)	(0.2165)	(0.2130)
CMA/CA occupations in manufacturing and utilities (%)	-0.0160	-0.0027***	-0.4665***	-0.3694***
	(0.0376)	(0.0302)	(0.1086)	(0.1227)
CMA/CA sales and service occupations (%)	0.1098***	0.1550	-0.0146	0.0468
	(0.0395)	(0.0355)	(0.1426)	(0.1449)
Immigrant population characteristics				
CMA/CA immigrant population (%)		-0.0279	-0.1161*	-0.1457**
		(0.0123)	(0.0621)	(0.0637)
CMA/CA recent immigrant population (%)		-0.0055	-0.0123	-0.0225
		(0.0076)	(0.0263)	(0.0265)
CMA/CA immigrant population from Africa (%)		0.0300	0.0593	0.0578
		(0.0113)	(0.0377)	(0.0369)
CMA/CA immigrant population from Asia (%)		0.0167	0.0564	0.0627*
		(0.0094)	(0.0368)	(0.0363)
CMA/CA immigrant population from Latin America (%)		0.0366	0.0136	0.0333
		(0.0137)	(0.0449)	(0.0457)
CMA/CA population with employment insurance benefits (%)			0.2598*	0.2286*

			(0.1352)	(0.1339)
CMA/CA prevalence in low income (%)			0.2850**	0.2393*
			(0.1332)	(0.1336)
CMA/CA unemployment rate (%)			-0.5681**	-0.4581*
			(0.2296)	(0.2354)
CMA/CA non-unionized population (%)			0.0421	0.0323
			(0.0473)	(0.0468)
Human capital characteristics				
CMA/CA population with a bachelor's or better (%)				0.0753
				(0.0475)
R-squared	0.34	0.23	0.50	0.50
Pr > F	<.0001	0.2376	0.0083	0.0146

Note: *** p<0.01, ** p<0.05, * p<0.1

Abbreviations: B= Coefficient, SE = Standard Error

CHAPTER 6: Conclusion

6.1 Background

It is widely established that Canada's labor market has undergone substantial shifts with the manifestation of precarious employment across industries (Vosko et al., 2009). In Canada, there has been an extensive focus on research examining the spread, variability and effects (e.g. social relations) of precarious employment across social locations of gender, race and immigration status (Cranford et al., 2003a, 2003b; Holtmann and Theriault 2017; Krahn 1991, 1995; Noak and Vosko 2011; PEPSO 2013, 2015; Teelucksingh and Galabuzi 2007; Vosko 2000, 2003; 2010; Vosko et al., 2003). These studies have been imperative in encouraging policy discourse on key challenges affecting precarious workers.

Nonetheless, the available prior work has been limited in the understanding of how space shapes precarious employment outcomes. Theoretically, it is maintained that labor markets operate in different ways in different places (Hanson and Pratt 1992, 1995; Harvey 1989; Peck 1996). Hanson and Pratt (1992 pg. 404) insist on this when they write " Local labor markets are…heterogenous because of gender, race and class-based segmentation…but they are also spatially segmented through the fine-scaled processes defining labor supply and demand… individuals knowledge of the universe of jobs available to them, their expectations about wages and benefits, and the gendering and racialization of jobs all are shaped [in distinct geographical ways- emphasis added]…job

opportunities are …to a considerable extent socially constructed through the interactions embodying everyday life."

This quote echoes the notion that labor markets are not 'containers of universal labor processes'(Peck 1996 pg. 86). Rather, the constructs of labor markets are unique and vary geographically (Peck 1996). The latter serves to justify why space is considered in this dissertation. From an empirical standpoint, there is limited knowledge in Canada on whether precarious employment varies across space, and why this might be the case. MacDonald (2009) noted the importance of examining the influence of space in suggesting "precariousness is created not just by specific job characteristics but by the spatial contexts in which such work occurs. Precarious employment affects individuals in particular locations and is shaped by spatial dynamics. More so " the spatial dimension is part of the dynamic that creates and maintains precarious employment and determines its distribution" (McDonald 2009 pg. 212). As such, much can be learned from a greater focus on how precarious forms of employment can vary by both levels of geography in addition to demographic variables that have been examined previously such as gender, race and immigration status.

In response to the dearth of research in this area, this dissertation sought to explore how and why precarious forms of employment (PFE) are spatially patterned across Canada's landscape. To achieve this objective, four research questions (RQ) were developed and addressed. They are as follows:

RQ1. How are precarious forms of employment (PFE) patterned across space?

RQ2. Are there gender differences/similarities in the spatial patterning of precarious forms of employment (PFE)?

RQ3. Are there differences/similarities in the spatial patterning of precarious forms of employment(PFE) by immigration status?

RQ4. What spatial characteristics influence the spatial patterns of temporary (precarious) employment across Canada's CMA/CA?

The sections that follow revisit key findings from the research questions. Lastly, the limitations of the dissertation are reviewed and future avenues for research are highlighted.

6.2 Revisiting the research questions and key findings

This dissertation embarked with a broad inquiry into how precarious forms of employment (PFE) vary across Canada's landscape. Using Statistics Canada's 2011-2016 Labor Force Surveys, research question one explored how different PFEs (temporary employment, part-time employment, involuntary part-time employment and employment in multiple jobs) spatially vary across a range of geographies and scales (including national, provincial, census metropolitan areas and urban/rural areas) in aggregate and across social locations of gender and immigration status. The findings illustrated that different PFEs exhibited spatial patterns across space and scale. For example, temporary and involuntary part-time work was more prevalent in Atlantic Canada and was typically

less prevalent moving westward. In contrast, part-time employment and employment in multiple jobs were more common in western Canada than in central and Atlantic Canada. The findings also suggested that all PFEs (except for involuntary-part-time work) were more common in rural and small-town areas, and less common in large urban areas.

These east-west and urban-rural patterns were partially distorted when the analyses were disaggregated by gender (RQ2) and immigration status(RQ3). For example, women were significantly more likely than men to be employed on a temporary basis in the Prairies as well as in Central and Western Canada. Disaggregation by immigration status further revealed greater variations at the CMA scale, specifically southern Ontario's CMAs that were represented by a low share of both immigrant and Canadian born populations employed on a temporary basis relative to other urban areas. However, immigrants were still more likely to be engaged in temporary employment than the Canadian born.

With respect to involuntary part-time employment, the findings suggested that CMAs in Central Canada (particularly Ontario) had greater gender variations and were represented with higher shares of both women and men employed on an involuntary basis in comparison to CMAs in other provinces. More so, men were over-represented in involuntary part-time work in all geographies in comparison to women. In spite of these broad trends in involuntary part-time work, it was difficult to make comparisons between genders and with other forms of precarious employment due to sample size issues that

limited further examination. Spatial analyses by immigration status showed that involuntary part-time employment was over-represented among immigrants in the central and prairie provinces/CMA (except for Quebec). Immigrants were underrepresented in involuntary part-time work in Western Canada. Canadian born populations, on the other hand, were more likely to be engaged in involuntary part-time work in Atlantic Canada. However, unlike immigrants, Canadian born populations had a low prevalence in involuntary part-time work in the Prairie CMAs. Moreover, at the CMA scale, greater spatial variations were discerned in Southern Ontario's CMAs with the Canadian born over-represented in this form of paid work.

As observed in RQ1, employment in part-time jobs was more common in western Canada than in central and Atlantic Canada. However, disaggregation of the analysis by gender further showed this finding held more for women than for men who were also represented in high shares in the central and prairie provinces/CMAs. Mixed findings were observed in the spatial patterning of part-time employment across immigration status as immigrants were represented in high shares in this form of paid work in Atlantic Canada than in central Canada. With respect to employment in multiple jobs, the findings suggest that Canadian born populations were significantly more likely to be employed in this form of employment in comparison to immigrants in Central Canada. The findings further revealed that both immigrant and Canadian born populations were over-represented in this type of paid work in the prairie provinces/CMAs. Lower prevalences in multiple job holding were evident towards the east coast of Canada for both

populations. Moreover, like part-time employment, greater variations in multiple job holding were observed within southern Ontario's CMAs, especially for Canadian born populations.

Similar to the findings in research question 1, all forms of PFEs (except for involuntary-part-time work) were more common in rural and small-town areas, and less common in large urban areas for both men and women. However, disaggregation of the analyses by gender and immigration status revealed variations in PFEs across urban/rural geographies. For example, men and Canadian born populations were significantly more likely to be temporarily employed in rural areas (as compared to women and immigrants, respectively).On the other hand, all urban/rural geographies were over-represented by women and immigrants employed in part-time and multiple jobs (than men and Canadian born populations, respectively). Involuntary part-time employment was the only form of precarious work that was common in urban core areas with men and immigrants significantly more likely to be employed in this form of paid work in core urban areas (CMA/CA) than women and Canadian born populations, respectively.

Second, using logistic regression models results from RQ1, RQ2 and RQ3 suggest that the prevalence of PFEs was reinforced by factors such as immigration status, age, marital status, education, income, landing status, country of origin, occupation, and union status. These models further confirmed that spatial patterns of PFEs were robust in finer scales

i.e. CMA and urban/rural geographies even when controlling for socio-demographic and socio-economic effects.

Using Statistics Canada's 2016 Labor Force Survey and the 2016 census, research question four (RQ4) seeks to explore the spatial characteristics influencing the spatial patterns of temporary employment across Canada's CMAs and CAs. Key findings reveal that CMA/CAs characterized by large shares of manufacturing, utility, and management occupations were significantly negatively associated with temporary employment. Conversely, CMA/CAs with high shares of sales and service occupations were positively associated with temporary employment. Generally, population characteristics (measured by metropolitan areas characterized by a high share of Asian immigrants) and labor market characteristics measured by (low-income earners and employment insurance beneficiaries) contributed more to explaining positive temporary employment estimates than industry characteristics. This study adds valuable insights into the spatial characteristics that create and maintain the spatial patterning of temporary employment across Canada's landscape.

6.3 Contributions to the literature

Taken together, these findings contribute to the literature in precarious employment by drawing in the 'complexity-oriented spatial science' element, i.e. 'processes at multiple and inter-locking geographic scales' (O'Sullivan 2006, pg. 614). The findings in this thesis have implications for further understanding how processes/elements that channel

precarious employment outcomes in multiple scales interact to explain the 'behavior of the whole system' (O'Sullivan 2004, 2006). This is the underlying basis of the spatiality of complexity science (Hanson 2004; Manson 2001; Soja 1989; Thrift 1999; O'Sullivan 2004, 2006). The findings from research question two further our understanding of how spatial relations influences gender inequalities in precarious employment outcomes. This contribution has implications for understanding the intersecting social 'processes at work within labor markets' (Harvey 1989) across and within space that channel either men or women in disproportionate shares of precarious work. This could further involve the different ways in which social reproduction activities create and manifest precarious labor inequalities for both women and men across space.

The findings drawn from research question three add insight into how the segmentation of immigrant labor into precarious employment settings is associated with the spatial dimensions of labor markets. This contribution has implications for further understanding the broader labor processes and workplace processes underlying high employment precarity for immigrants and Canadian born populations within disadvantaged geographies in the process of formulating place-based anti-poverty policies. Lastly, the findings observed in research question four add insights into how labor supply and demand dynamics create and maintain the spatial patterning of temporary employment across Canada's landscape.

6.4 Limitations

While this dissertation has offered insight into the spatial dimensions of precarious employment, limitations remain, particularly with respect to sample sizes that limited analysis at finer levels of disaggregation (space, gender, immigration status), or by finer levels of temporary employment. Furthermore, lack of reliable data in some instances precluded fine-grained, small scale analyses and the use of other statistical techniques.

In chapter 4 the analysis was limited by the inability to explore spatial variations of PFEs by racialized status due to the LFS exclusion of questions on members of racialized groups or Latin Americans. The inclusion of a racialized group indicator would have allowed for the examination of differences with respect to racialized status. In chapter 5, the inability to include economic factors such as GDP or other factors affecting the supply of workers including factors that serve as a proxy for discrimination also limited the analysis. Such data was not readily available for all the geographies we were interested in, and we were consequently unable to examine their effects. Moreover, there are other variations in precarious labor that cannot be considered (such as self-employment or variations within specific types of precarious employment e.g. fixed term or contract/ temporary employment, casual /temporary employment, agency/ temporary employment and seasonal/ temporary employment). Spatial analyses of these forms of paid work were hampered by data limitations at the CMA level). Fuller and Vosko (2008) insist on the significance of examining 'heterogeneity' within forms of precarious employment when they write that there are variations within the specific types

of temporary employment, for example, that shape labor force inequalities. These variations have different effects on gender race and immigration status. In general, it was challenging to compare the findings of each manuscript situated within this dissertation with the broader literature due to the dearth in research on the interplay of space and employment precarity, particularly within the Canadian context.

6.5 Future directions

This dissertation has explored how and why precarious forms of employment are patterned across space. It has also raised a series of important questions that are imperative for a fuller understanding of the complex spatial processes that shape and maintain precarious employment outcomes. Looking forward, attention should be focused on the various intersecting social and institutional processes (Peck 1996) across space that fashion precarious employment outcomes. Moreover, more studies within the Canadian context should investigate the various types of spatial relations that channel precarious employment outcomes across intersecting social locations of gender, race and immigration status. Prior work has been attempted in the U.S context on the broader normative and industrial measures of space predicting differing levels of gender segregation (Taylor et al., 2019). However, this research overlooked the effects of spatial relations on precarious employment.

Future research should also investigate the formulation of place-based policies that target geographies where precarious employment is prevalent across gender lines and immigration status. Neumark and Simpson (2015) insist that there is a plausibility that

broader economic policies may fail to achieve some of the 'distributional goals' of place-based policies. This is corroborated by several studies that have shown empirical evidence on the positive impacts of place-based policies in enhancing economic performance (Busso et al., 2013; Freedman 2012; Givord et al., 2013; Ham et al., 2011; Hanson 2009; Kolko and Neumark 2010; Reynolds and Rohlin 2014).

Generally, place-based policies have been conventionally used in labor markets in North America such as State Empowerment Zones (EMPZs) and Enterprise Community (ENTC) programs to improve employment prospects in disadvantaged geographies in the United States (Ham et al., 2011). Studies have shown that these programs and policies have positive, statistically significant impacts on local labor markets in terms of the unemployment rate, the poverty rate, the fraction with wage and salary income, and employment (Ham et al.,2011). Although these policies/programs have been successful, their self-sustainability has been questioned by some authors. Moretti (2012) for instance writes that "the real test is not whether [place-based policies] . . . create jobs during the push . . . Instead, we need to look at whether the publicly financed seed can eventually generate a privately supported cluster that is large enough to become self-sustaining" (Moretti 2012, pg. 200–201). As such, future work could assess whether place-based policies, in the long run, are less or more efficient than the broader economic development policies that have been the norm in equalizing employment differences.

Future research may also need to address two important questions on place-based policies that could address weak employment prospects within precarious geographies in Canada, namely for whom? And why? To achieve this, future work could focus on any of the geographies where precarious employment is high and qualitatively examine what social reproduction activities create and manifest these precarious labor inequalities for both women and men. Answers to these questions could better inform policymakers in the formulation of prudent place-based policies that address labor market inequalities in disadvantaged geographies. Another area for future work is to use more refined measures of precarious work (e.g Employment Precarity Index. See PEPSO 2013, 2015) and asses how labor market insecurity as measured by this index varies across Canadas geographies.

In chapters 2 to 4, the findings in the logit models suggest that university graduates were likely to be employed in precarious forms of employment. Future research may need to further investigate why this is the case in Canada and whether or how long precariously employed university graduates' transition to standard permanent full- time employment (See Gebel 2010). These analyses could be conducted across gender lines and immigration status as well as across specific occupations.

Lastly, more research is needed to examine the dynamics of labor supply and demand and the spatial patterning of the various heterogeneous forms of temporary employment as outlined by Fuller and Vosko (2008). In a similar vein, there is a need to explore how

supply and demand factors explain the spatial patterning on other forms of precarious employment apart from temporary employment e.g. part-time employment and multiple-job holders. Chapters 2 to 4 have shown that spatial variations in the expression of precarious labor are evident in these forms. On another note, since the basis of this dissertation (specifically in chapter 5) was on cross-sectional data, future studies could consider multigenerational or longitudinal data when drawing conclusions between space and precarious labor market outcomes.

6.6 Concluding remarks: Geography matters!

Throughout the course of four manuscripts, this dissertation has consistently shown that 'geography matters' in shaping and maintaining precarious employment outcomes. The notion that 'geography matters' has been an underlying theme for Massey and Allen (1984) and Massey (1984, 1994) who presents a new look at how society is constructed spatially. This dissertation was motivated by such conceptualizations. As such, I hope that this dissertation can spark further interests in understanding why geography matters more than ever in the study of labor market inequalities.

6.7 References

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