

Three Empirical Essays on  
Economic Well-being in Canada

Three Empirical Essays on Economic Well-being in Canada

Moyosore Sogaolu, Ph.D. Candidate  
Department of Economics, McMaster University

A Thesis Submitted to the School of Graduate Studies  
in Partial Fulfilment of the Requirements for  
the Degree of Doctor of Philosophy

McMaster University DOCTOR OF PHILOSOPHY (2024) Hamilton, Ontario  
(Economics)

TITLE: Three Empirical Essays on Economic Well-being in Canada

AUTHOR: Moyosore Sogaolu  
B.Sc. Economics (Bowen University)  
M.A. Business Economics (Wilfrid Laurier University)

SUPERVISORS: Professor Arthur Sweetman

SUPERVISORY COMMITTEE MEMBERS: Professor Michael Veall  
Professor Adam Lavecchia  
Professor Siha Lee

NUMBER OF PAGES: xiv, 132

## **Lay Abstract**

---

This thesis examines issues related to population aging in Canada, focusing on the role of policies in shaping the economic well-being of individuals during significant life events, such as childbirth and retirement.

I examine the impact of maternity and parental leave policies on earnings. Receiving more generous maternity and parental leave benefits affect the earnings losses of mothers. Particularly, the earnings trajectory increases, starting around four years after the birth of their first child.

Next, I investigate immigrants' retirement patterns and access to public pensions. I observe that immigrants who arrived in Canada before age 40, particularly in the economic immigration class, have higher employment rates at older ages than native-born Canadians.

Finally, I document disparities in low-income rates between immigrants and non-immigrants at older ages, highlighting the role of immigration, race, and gender. Improved access to public pensions, higher employment, and increased private investment have contributed to declining low-income rates over time.

## **Abstract**

---

This thesis studies issues related to population aging. In Canada, various policies address this issue. Such policies include encouraging labour force participation to address challenges about the variations in the size of different birth cohorts through immigration or encouraging fertility while ensuring attachment to the labour market. In this thesis, I explore the influence policies have on the economic well-being of individuals at two significant events in a person's lifetime, namely childbirth and retirement.

In Chapter 1, I examine the impact of children on the earnings of mothers through the lens of Québec's Parental Insurance Plan. Particularly, I explore how the maternity and parental leave benefits available at first birth affect a woman's earnings loss. The results show that mothers who received a more generous benefit experience, on average, a larger decline in earnings immediately after the birth of their first child. However, under Québec's plan, there is a substantial recovery in earnings starting four years after their first child's birth.

In Chapter 2, I study immigrants' retirement and public pension take-up patterns and examine the residency requirements associated with public pension eligibility and entitlement that primarily impact immigrants. Additionally, I examine how reaching the eligibility age for OAS affects the employment and earnings of Canadian seniors differently depending on their immigration status. The analysis reveals that immigrants who arrive in Canada before age 40, especially those in the economic immigration class, have higher employment rates at older ages compared to native-born Canadians. Conversely,

immigrants who arrive later in life and face stricter public pension restrictions tend to have lower employment rates. Furthermore, the impact of the age at immigration appears to outweigh the incentives related to public pension eligibility.

In Chapter 3, I document disparities in low-income rates between immigrants and non-immigrants at older ages, focusing on the intersectionality of immigration status, racial identity, and gender, while observing the changes over two decades. I find a large decline in low-income rates between 2000 and 2020 and a reduction in the gaps between demographic groups. I show that the differences in low-income levels are associated with variations in prime-age employment, earnings, and access to pension benefits, particularly the Canada Pension Plan.

## **Acknowledgments**

---

There is an African proverb that says, “It takes a village to raise a child.” This statement cannot be more accurate as I reflect on the completion of this project. This thesis would not have been possible without the guidance and encouragement of many individuals who, in one way or another, contributed throughout my academic journey.

First, I would like to express my sincere gratitude to my supervisor, Arthur Sweetman, for his continuous support, patience and dedication to my development and growth as a researcher. His invaluable supervision and insightful feedback have been instrumental in shaping this thesis and my research agenda. I would also like to thank my committee members, Mike Veall, Adam Lavecchia and Siha Lee, whose expertise, encouragement, and constructive advice have enriched my work and enhanced my experience at McMaster. I can recall several occasions where conversations with each of them have left me inspired.

I am also grateful to the staff and faculty members in the Economics department, especially Stephen Jones, Irene Botosaru, Jonathan Zhang and Angela Zheng, for their guidance and contributions to the development of my thesis. In addition, I would like to thank Tammy Schirle at Wilfrid Laurier University for her mentorship over the years and for being an invaluable sounding board for my personal and career aspirations.

I want to express my gratitude to the analysts at McMaster’s Research Data Centre (RDC), Peter Kitchen, Li Wang and Anna Kata, for their dedication to helping researchers succeed. Their behind-the-scenes efforts were essential to this research. I am thankful for their support.

I am also thankful to my friends, particularly Deborah Ilesanmi, Esther Odeyale, Julius Owusu, Akwugo Balogun, Amandeep Singh and Nmasinachi Agada, who have been such a great support system throughout this journey. Their companionship, support and sometimes necessary distraction have been helpful. I am truly blessed to have them in my life.

I am deeply grateful to my family for their endless love and support. To my siblings, Ayodeji Sogaolu, Olaseni Sogaolu, Adeola Sogaolu and Omolara Kareem, thank you for your patience and understanding during this long journey. Words cannot fully express my gratitude to my parents, Gbolahan and Folasade Sogaolu, for their sacrifices and unwavering support throughout this journey.

Finally, I am grateful to God for the grace, strength, and resilience to complete this project. I dedicate this thesis to my niece, Amelia Sogaolu, and the next generation of Sogaolus.



## **Declaration of Academic Achievement**

All three chapters are original work. Chapter 2 is co-authored with Arthur Sweetman and James Stutely, and Chapter 3 is co-authored with Arthur Sweetman. I conducted all the empirical analysis and wrote the manuscript jointly with my coauthors from 2022 to 2024.

## **Table of Contents**

---

|   |      |
|---|------|
| <b>Lay Abstract</b> .....   | iii  |
| <b>Abstract</b> .....   | iv   |
| <b>Acknowledgments</b> .....  | iv   |
| <b>Declaration of Academic Achievement</b> .....                          | viii |
| <b>Table of Contents</b> .....  | ix   |
| <b>List of Tables</b> .....   | xii  |
| <b>List of Figures</b> .....  | xiii |
| <b>Introduction</b> .....   | 1    |
| <b>Chapter 1</b> .....  | 9    |
| <b>1.1 Introduction</b> .....   | 10   |
| <b>1.2. Motherhood and Parental Leaves</b> .....                          | 14   |
| <b>1.3. Maternity and Parental Policies in Canada</b> .....               | 18   |
| <b>1.4. Data</b> .....  | 23   |
| <b>1.4.1 Data Source</b> .....  | 23   |
| <b>1.4.2 Outcomes of Interest and Variables Definition</b> .....          | 24   |
| <b>1.4.3 Sample Selection</b> .....                                       | 24   |
| <b>1.5. Empirical Approach and Identification</b> .....                   | 27   |
| <b>1.5.1 Impact of Children on Mothers’ Earnings</b> .....                | 27   |
| <b>1.5.2 Impact of Québec’s Parental Insurance Plan on Outcomes</b> ..... | 28   |
| <b>1.6. Results</b> .....   | 32   |
| <b>1.6.1. Effects of Children</b> .....                                   | 32   |
| <b>1.6.2. Responses to Québec Parental Insurance Plan</b> .....           | 33   |
| <b>1.6.3. Mechanisms</b> .....  | 35   |
| <b>1.6.4. Sensitivity Analysis</b> .....                                  | 37   |
| <b>1.7. Conclusion</b> .....  | 37   |
| <b>1.8 References</b> .....   | 40   |
| <b>1.9 Tables and Figures</b> .....                                       | 44   |

|   |            |
|---|------------|
| Appendix .....  | 52         |
| <b>Chapter 2.....</b>   | <b>56</b>  |
| <b>2.1. Introduction .....</b>  | <b>57</b>  |
| <b>2.2. Policy Environment.....</b>   | <b>59</b>  |
| <b>2.2.1 Incentives and the Research Literature .....</b>                           | <b>61</b>  |
| <b>2.2.2 Labour Supply Incentives as a Function of Years Since Landing.....</b>     | <b>64</b>  |
| <b>2.3. Data and Descriptive Statistics .....</b>                                   | <b>65</b>  |
| <b>2.3.1 Data Source and Sample Selection .....</b>                                 | <b>65</b>  |
| <b>2.3.2 Age Profiles of Employment and Public Pension Take-Up and Income .....</b> | <b>67</b>  |
| <b>2.4. Empirical Analysis .....</b>  | <b>69</b>  |
| <b>2.4.1 Effects of Residency Requirements on Outcomes .....</b>                    | <b>69</b>  |
| <b>2.4.2 Regression Discontinuity Design .....</b>                                  | <b>73</b>  |
| <b>2.5. Conclusion .....</b>  | <b>75</b>  |
| <b>2.6 References .....</b>   | <b>77</b>  |
| <b>2.7 Tables and Figures .....</b>   | <b>80</b>  |
| <b>Chapter 3.....</b>   | <b>80</b>  |
| <b>3.1. Introduction .....</b>  | <b>81</b>  |
| <b>3.2. Context .....</b>   | <b>84</b>  |
| <b>3.2.1 Low Income .....</b>   | <b>84</b>  |
| <b>3.2.2 Senior Poverty in Canada .....</b>   | <b>85</b>  |
| <b>3.2.3 Income Sources of Canadian Seniors .....</b>                               | <b>88</b>  |
| <b>3.3. Data and Descriptive Analysis .....</b>                                     | <b>91</b>  |
| <b>3.3.1 Data Source and Sample Selection .....</b>                                 | <b>91</b>  |
| <b>3.3.2 Socioeconomic Characteristics of Canadian Seniors .....</b>                | <b>93</b>  |
| <b>3.4. Low-income Profiles .....</b>   | <b>96</b>  |
| <b>3.4.1 Low-income Profile by Immigration, Minority Status and Gender.....</b>     | <b>96</b>  |
| <b>3.4.2 Income Sources .....</b>   | <b>99</b>  |
| <b>3.4.3 Income Sources for Low-Income Individuals.....</b>                         | <b>102</b> |
| <b>3.5. Low-Income Gaps over Time .....</b>   | <b>105</b> |

|   |     |
|---|-----|
| <b>3.6. Discussion and Conclusion</b> ..... | 110 |
| <b>3.7 References</b> .....                 | 113 |
| <b>3.8 Tables and Figures</b> .....         | 118 |
| <b>Conclusion</b> .....                     | 131 |

## List of Tables

---

|   |     |
|---|-----|
| Table 1.1: Parental Leave Programs in Canada in 2006 .....  | 50  |
| Table 1.2: Sociodemographic characteristics before and after QPIP.....                                  | 51  |
| Table 2.1: Characteristics of Seniors in our Sample by Immigration Status and Class .....               | 78  |
| Table 2.2: Regression Discontinuity Design Estimates of the Effect of the Ten-Rule on<br>Outcomes ..... | 79  |
| Table 3.1: Sociodemographic Characteristics of population groups (Men) .....                            | 118 |
| Table 3.2: Sociodemographic Characteristics of population groups (Women).....                           | 119 |
| Table 3.3: Low Income Differentials by Immigrant, Racial identity, Gender and Year .....                | 120 |

## List of Figures

---

|   |     |
|---|-----|
| Figure 1.1: Benefit Schedules.....  | 44  |
| Figure 1.2: Impact of children on the earnings of mothers .....   | 45  |
| Figure 1.3: Difference-in-differences estimates – Employment Earnings .....   | 46  |
| Figure 1.4: Difference-in-differences estimates – Market Participation .....  | 47  |
| Figure 1.5: Difference-in-differences estimates – Labour Market Participation.....  | 48  |
| Figure 1.6: Mechanisms - Difference-in-differences raw estimates .....  | 49  |
| Figure 2.1: Age Profile of Employment Probabilities by Landing Age and Immigrant Status                                       | 80  |
| Figure 2.2: Age Profile of OAS Take-Up Probabilities by Landing Age and Immigrant Status                                      | 81  |
| Figure 2.3: Age Profile of GIS/Allowance Take-Up Probabilities by Landing Age and<br>Immigration Status.....                  | 82  |
| Figure 2.6: Event Study Estimates of Immigrants’ GIS Take-Up Probability by Years Since<br>Landing .....                      | 85  |
| Figure 3.1: Age Profile of Low-income Probabilities.....  | 121 |
| Figure 3.2: Employment Rate by Immigration status, Racial identity, Gender and Year ....                                      | 122 |
| Figure 3.3: CPP Receipt by Immigration status, Racial identity, Gender and Year .....   | 123 |
| Figure 3.4: OAS/GIS Receipt by Immigration status, Racial identity, Gender and Year .....                                     | 124 |
| Figure 3.5: Private Investment Income by Immigration status, Racial identity, Gender and<br>Year .....                        | 125 |
| Figure 3.6: Other Government Transfers by Immigration status, Racial identity, Gender and<br>Year .....                       | 126 |
| Figure 3.7: Average Income from sources by Immigration status, Racial identity, Gender and<br>Year (45-59years) .....         | 127 |
| Figure 3.8: Average Income from sources by Immigration status, Racial identity, Gender and<br>Year (60-66 years) .....        | 128 |
| Figure 3.9: Average Income from sources by Immigration status, Racial identity, Gender and<br>Year (67 years and above) ..... | 129 |
| Figure 3.10: Low-Income gaps by Immigration status, Racial identity, Gender and Year ..                                       | 130 |

## List of Appendix Figures

---

|   |    |
|---|----|
| Figure A1. 1: Difference-in-differences raw estimates - Employment Earnings .....         | 52 |
| Figure A1. 2: Difference-in-differences raw estimates - Market Participation.....         | 53 |
| Figure A1. 3: Sensitivity Difference-in-differences estimates – Employment Earnings.....  | 54 |
| Figure A1. 4 Sensitivity Difference-in-differences estimates – Market Participation ..... | 55 |

## **Introduction**

---

Population aging has been an issue of concern for many high-income countries. This is primarily as a result of the increase in life expectancy due to improvements in health care, and fertility rates that are lower than replacement rates (Maestas & Zissimopoulos, 2010; OECD, 2021). These trends have led to an increase in the old-age dependency ratio – the number of individuals aged 65 and over per 100 working-age individuals (20-64 years). In Canada, the old-age dependency ratio has been steadily increasing. For example, the old-age dependency ratio was about 19% in 1972 and has since risen to approximately 32% in 2022 and is expected to increase to 46% by 2052 (OECD, 2023). As in most economically developed countries, in Canada, population aging has sparked many debates over the potential labour shortage and the expected costs and sustainability of the public pension system.

Policymakers have introduced policies to address the challenges of declining birth cohort size. Such policies include efforts to increase fertility rates through family-friendly programs. However, this is a long-term solution, as it takes years for children to contribute to society. A more immediate approach is supporting women's labour market participation through family-friendly policies, like Québec's Parental Insurance Plan (QPIP), which helps families grow while keeping women in the workforce, contributing to economic growth (Laplante, 2024; Thévenon & Gauthier, 2011). Yet, these policies alone may not fully counteract population aging. As a result, immigration becomes an essential complement to these policies. Immigration plays a vital role in addressing the labour shortages caused by



an aging population by bringing in younger workers who can immediately contribute to the workforce and support the economy.

This dissertation studies these two channels and their implications for the economic well-being of individuals. Specifically, I study the impact of government policies on individuals' labour market outcomes. First, I look at the effects of a more generous maternity and parental leave policy on mothers' earnings in the long run. Second, I examine how the residency requirement differentially affects the retirement behaviour of immigrants and non-immigrants. Lastly, I explore the changes in the low-income rates of seniors over the last two decades, accounting for the role of immigration status, racial identity and gender.

In Chapter 1, I study the impact of children on mothers' earnings through the lens of Québec's parental insurance program. The literature often examines the differential impact of children on the earnings of mothers and fathers (Kleven et al., 2019; Rosenbaum, 2021). Much is attributed to the household responsibilities of women, especially childcare (an overview is Olivetti & Petrongolo, 2017). The consensus in the literature is that the labour market trajectories of men and women are similar in the periods before the arrival of a child but diverge sharply after, with little to no recovery for mothers (Cortés & Pan, 2023). This is referred to as the motherhood penalty. However, does the maternity and parental leave option available at first birth affect this motherhood penalty? I draw from the literature recognizing the existence of a motherhood penalty and analyze how different policy options available at birth influence the extent of the penalty that mothers experience. I address this question by utilizing Canadian administrative tax data from 2002 to 2019 to exploit the

introduction of Québec's Parental Insurance Plan in 2006, which offered a more generous maternity and parental leave benefit.

Using an event-study difference-in-differences approach (Miller, 2023; Sun & Abraham, 2021), I focus on mothers below the 75th percentile of the earnings distribution because the reform mainly affected these mothers. I find that immediately after birth, mothers with a more generous benefit experience a larger decline in earnings. However, there is a more substantial recovery in earnings which ranges from 4-10%, starting from four years after the birth of their first child. Lastly, using the Labour Force Survey (2003-2019), I explore the mechanism behind this result and find that the differences in motherhood penalty are largely driven by greater attachment to the labour market.

In the second chapter, I explore the historical increases in immigration and its implication on the share of immigrants entering retirement and taking up public pensions. As a traditional immigrant country, the share of immigrants among the senior population is increasing. Yet little is known about immigrants' retirement patterns, especially given incentives associated with public pension eligibility criteria for those who arrive later in life. For example, in Canada, immigrants must arrive younger than 26 to obtain full public pension benefits at age 65. Immigrants and non-immigrants may experience differential employment and public pension patterns because of preparedness for retirement (Sevak and Schmidt, 2014), differences in work disincentives due to access to public pension programs (Borjas, 2011), and health reasons (Milligan & Schirle, 2018).

In this chapter, I examine the employment and public pension take-up patterns of immigrants (based on immigration class and age at immigration) and examine the differences with non-immigrants. Specifically, I explore the relationship between the residency requirement for public pension and employment and take-up decisions and consider the differences between men and women. Using the LAD, I begin by estimating the age profiles for employment and public pension take-up. Then, I utilize an event study model to explore how reaching the residency requirement affects employment and take-up decisions. Lastly, I use a regression discontinuity design to compare the outcomes of observationally equivalent immigrants who are just above and below the threshold.

The results show that age at immigration matters a lot for the difference between immigrants and non-immigrants. Specifically, immigrants who arrive in Canada younger than age 40, especially those from the economic immigration class, have higher employment rates later in life than Canadians at birth. Immigrants who arrive later in life and have more severe pension restrictions have lower employment rates. The influence of age at immigration seems to dominate the incentives from public pensions eligibility. Further, a 10-year minimum residency for any public pension receipt is an important threshold affecting the behaviour of immigrants who arrive late in life.

I find evidence that crossing the ten-year residency requirement threshold reduces immigrant seniors' relative employment probabilities. Accompanying this, the probability of public pension receipt dramatically increases after crossing the threshold. Focusing on comparing observationally equivalent immigrants shows that crossing the residency requirement threshold does not statistically affect the employment probability or mean.

However, there is evidence of a 3.1 percentage drop for women. In contrast, crossing the threshold increases the probability of receiving public pension benefits for both genders.

Typically overlooked is the demographic shift resulting from changes in the primary source countries of immigration. In the third chapter, I drill down on the implication of the demographic change of the senior population and what it means for the economic well-being of seniors. A body of research focuses on the poverty rates of Canadian seniors over time (see Curtis & McMullin, 2019; Milligan, 2008); however, little attention is paid to the disparities across various demographic groups of seniors. Research on prime-age workers has shown differences in labour market outcomes between immigrants and non-immigrants (Edo et al., 2020). As a result, there is reason to believe that the income disparities in prime age are likely to perpetuate into old age, leading to large gaps in the low-income rates of seniors of various demographic groups. Particularly, this chapter documents the disparities in low-income rates between immigrants and non-immigrants at older ages, focusing on the intersectionality of immigration status, racial identity, and gender.

Using data from the 2001 and 2021 Canadian Censuses, I document the age-low-income profiles and undertake a multivariate analysis to understand the low-income patterns of seniors over time. I characterize differences in low income across eight population subgroups while examining the differences over the last two decades. In addition, I unravel the mechanism behind the changes using a complete set of tax-relevant income sources to understand how each underlying income stream is associated with the observed differences in low income.

I observe that low-income rates of seniors are larger than prime-age individuals, and there are larger variations across groups. Specifically, groups with lower employment rates and investment income are more likely to live in a low-income household later in life. In addition, seniors' low-income rates increase with each of immigrant, racialized and female status – and the effects are cumulative. However, the low-income rates have decreased over time. Low-income differences are linked to variations in prime-age employment and earnings, and access to pension benefits for immigrants. The decrease in low income over time is due to increased access to public pension benefits, particularly the Canada Pension Plan, increased employment earnings and private investment.

## References

- Borjas, G. J. (2011). Social Security Eligibility and the Labor Supply of Older Immigrants. *Industrial and Labor Relations Review*, 64(3), 485–501.
- Cortés, P., and Pan, J. (2023). Children and the Remaining Gender Gaps in the Labor Market. *Journal of Economic Literature*, 61(4), 1359–1409. <https://doi.org/10.1257/jel.20221549>
- Curtis, J., and McMullin, J. (2019). Dynamics of Retirement Income Inequality in Canada, 1991-2011. *Journal of Population Ageing*, 12(1), 51–68. <https://doi.org/10.1007/s12062-018-9219-5>
- Edo, A., Ragot, L., Rapoport, H., Sardoschau, S., Steinmayr, A., & Sweetman, A. (2020). An introduction to the economics of immigration in OECD countries. *Canadian Journal of Economics*, 53(4), 1365–1403. <https://doi.org/10.1111/caje.12482>
- Kleven, H., Landais, C., & Søgaaard, J. E. (2019). Children and Gender Inequality: Evidence from Denmark. *American Economic Journal: Applied Economics*, 11(4), 181–209. <https://doi.org/10.1257/app.20180010>
- Laplante, B. (2024). Policy and Fertility, a Case Study of the Quebec Parental Insurance Plan. *Population Research and Policy Review*, 43(3), 39. <https://doi.org/10.1007/s11113-024-09859-6>
- Maestas, N., & Zissimopoulos, J. (2010). How Longer Work Lives Ease the Crunch of Population Aging. *Journal of Economic Perspectives*, 24(1), 139–160. <https://doi.org/10.1257/jep.24.1.139>
- Milligan, K. (2008). The Evolution of Elderly Poverty in Canada. *Canadian Public Policy*, 34(Supplement 1), S79–S94. <https://doi.org/10.3138/cpp.34.Supplement.S79>
- Milligan, K., & Schirle, T. (2018). The Labor Force Participation of Older Men in Canada. *NBER Chapters*, 51–65.
- OECD. (2021). *Pensions at a Glance 2021: OECD and G20 Indicators*. Organisation for Economic Co-operation and Development. [https://www.oecd-ilibrary.org/finance-and-investment/pensions-at-a-glance-2021\\_ca401ebd-en](https://www.oecd-ilibrary.org/finance-and-investment/pensions-at-a-glance-2021_ca401ebd-en)
- OECD. (2023). *Pensions at a Glance 2023: OECD and G20 Indicators*. OECD Publishing, Paris. <https://doi.org/10.1787/678055dd-en>

- Olivetti, C., & Petrongolo, B. (2017). The Economic Consequences of Family Policies: Lessons from a Century of Legislation in High-Income Countries. *Journal of Economic Perspectives*, 31(1), 205–230. <https://doi.org/10.1257/jep.31.1.205>
- Rosenbaum, P. (2021). Pregnancy or motherhood cost? A comparison of the child penalty for adopting and biological parents. *Applied Economics*, 53(29), 3408–3422. <https://doi.org/10.1080/00036846.2021.1881431>
- Sevak, P., & Schmidt, L. (2014). Immigrants and Retirement Resources. *Social Security Bulletin*, 74(1).
- Thévenon, O., & Gauthier, A. H. (2011). Family policies in developed countries: A ‘fertility-booster’ with side-effects. *Community, Work & Family*, 14(2), 197–216. <https://doi.org/10.1080/13668803.2011.571400>

## **Chapter 1**

---

### **A Tale of Two Programs: The Experience of Canadian Mothers**

#### Abstract

Motherhood affects the earnings of women. Studies have estimated that women face a persistent earnings penalty of about 30% when compared to men. Much is attributed to women being the primary caretakers in the home. But does the maternity and parental leave option available at the time of first birth affect this motherhood penalty? This paper addresses this question by exploring Canadian annual tax data for the years 2002-2019 and exploiting the 2006 introduction of Québec's Parental Insurance Plan, which offered a more generous maternity and parental leave benefit. Using an event-study difference-in-differences approach, this paper focuses on mothers below the 75<sup>th</sup> percentile of the earnings distribution and finds that in the short run, the type of parental leave policy has no significant effect on the initial earnings loss faced by mothers. However, under the plan, there is a more substantial recovery in earnings, starting from four years after the birth of their first child. This appears to be largely driven by greater attachment to the labour market.



## 1.1 Introduction

Over the last three decades, most high-income countries have introduced maternity leave policies to encourage women's labour force participation and gender equity or to address declining fertility rates. These policies have mostly generated increased labour force participation (Olivetti & Petrongolo, 2017). However, while there have been gains in women's employment over time, there is still an unequal impact of children on the earnings of men and women (Kleven et al., 2019a; Rosenbaum, 2021). This is referred to as the child penalty (or sometimes the motherhood penalty when comparing earnings of women with and without children). Previous studies have attributed much of this gap to women being the primary caretakers in the home and to women being more likely to choose jobs with more flexibility, which can sometimes translate to lower wages. As argued by Becker (1965), the opportunity cost of work outside the home increases for a household after having children and for mothers who typically have the comparative advantage in childrearing; this affects market work.

The child penalty may place women on a 'mommy track,' where mothers' earnings decline after the birth of their first child and never recover. The literature often compares mothers' earnings to that of fathers and observes significant differences, but very little research focuses on how parental leave policies affect the motherhood penalty (an overview is Olivetti & Petrongolo, 2017; Cortés & Pan, 2023). Evaluating the financial consequences of motherhood without considering the broader landscape of parental leave policies may lead to incomplete or skewed insights. This paper, therefore, bridges this gap by painting a holistic picture of the interplay between leave policies and income losses of mothers after

the birth of their first child. Specifically, this paper revisits the child penalty literature by examining how the maternity and parental leave benefits package available at the time of birth affects the motherhood penalty. Particular attention is paid to how changes to maternity and parental leave policies affect mothers in the bottom 75% of the earnings distribution, a group primarily affected by the policy change.

This study examines the long-term impact of leave policies on the motherhood penalty through the lens of the Canadian province of Québec's Parental Insurance Plan (QPIP), which was introduced in 2006. This policy relaxed the eligibility criteria and extended benefits to individuals who initially would not have previously qualified for benefits. Specifically, it extended benefits to very low-income mothers and mothers in non-standard work and increased the level of benefits available for other low-income mothers. This allows me to examine how the motherhood penalty for mothers at the bottom of the earnings distribution evolved when there was a more generous maternity and parental leave plan.

The introduction of QPIP and the associated relaxation of the eligibility requirement meant that benefits were accessible to more mothers. For some mothers, QPIP provided income replacement after the birth of their child (extensive margin). For others, it increased the income replacement from 55% up to 75% (intensive margin), and for some others, it increased the total benefit period available to the household. Regardless of how much income an individual earned, the introduction of QPIP ensured that all mothers were at least as well-off in terms of cash benefits received under the new plan. A priori, it is difficult to determine how the policy would affect behaviour and outcomes. On the one hand, a more generous benefit would effectively lower the cost of the leave and encourage more mothers

to take more time off to care for their children. The longer time off could make returning to employment more difficult resulting in lower incomes. But there may be other effects. For example, the increased income from the benefit package and longer leave duration (and potentially other features in the program that will be discussed) could ease some of the strain on mothers, which could lead to better re-entry into employment and hence a better outcome.

In this paper, I rely on a panel of Canadian administrative tax data and implement an event study difference-in-differences estimation. I compare women who had their first child and received benefits under the earlier EI maternity and parental leave program to those who had their first child after the creation of QPIP. I follow mothers from 5 years before, up to 13 years after, the birth of their first child under these different parental leave plans. I implement a dynamic analysis since the impact of QPIP might not be immediate and because I do not expect the impact of the policy to be constant throughout the working history of a woman. The results show that women who received QPIP experience larger earnings penalties in the year of birth but have markedly higher earnings in the long run. The results also show that mothers in the treated group are more likely to remain attached to the labour market. Taken together, the results suggest that the policy improved labour market attachment of mothers which translates to better employment income prospects in starting from four years after the birth of the first child.

The contribution of this paper is three-fold. First, I exploit changes to maternity and parental leave policy to examine the motherhood penalty for mothers below the 75th earnings percentile before giving birth. Until 2006, a large proportion of these mothers were

ineligible for the program while others were only eligible for comparatively low benefits. In addition, mothers below the 75th earnings percentile fall under the maximum insurable earnings of EI, therefore excluding high-earnings jobs where mothers have employer-provided maternity benefits. Second, the Canadian context presents an avenue to compare two groups of mothers receiving different benefits simultaneously. That is, two concurrent parental leave benefits programs were in operation: QPIP was exclusive to Québec residents and the federal program operated in the rest of Canada. I compare mothers in Québec to mothers in the Rest of Canada (ROC) who had their first child around the same time but were eligible for different programs based on their province of residence (and birth of child). Last, this paper focuses on the long-term impact of the benefits on the outcomes of mothers. Since I can observe the income history of women from the data, I can trace out the income losses or motherhood penalty for mothers up to 13 years after the birth of their first child.

The rest of this paper is structured as follows. I first begin by describing some of the relevant literature in section 2. Next, I summarize the institutional framework in section 3. In the subsequent section, I describe the data used for the analysis. In section 5, I present the main results and explanations for the mechanism behind the motherhood penalty. Section 6 provides a sensitivity analysis, while section 7 concludes.

## 1.2. Motherhood and Parental Leaves

This paper is related to two branches of literature. The first focuses on the impact of maternity leave policies on labour market outcomes, and the second looks at the child/motherhood penalty.

The literature that relates maternity leave policies to labour market outcomes has mixed results. This is likely because different studies consider different reforms, and each result depends on the institutional/contextual setting of the relevant reform(s). Typically, these reforms vary in the length of leave, job protection, income replacement, and which parent can receive the benefit. Those who study policies that change the benefit amount available to mothers find significant increase in the uptake of leaves and a short-term decline in employment (Baum & Ruhm, 2016; Bergemann & Riphahn, 2010). For example, Bergemann and Riphahn (2010) examined a 2007 policy change in Germany that offered a higher replacement rate for a shorter period. They found that the policy shortened the time spent away from work, which, in turn, increased mothers' labour market outcomes. Similarly, Baum and Ruhm (2016) examined the effects of a paid leave policy change in California, which essentially increased the replacement rate from 0% to 55% for all parents in the private sector and some parents in the public sector. They found that the reform increased leave-taking and led to an eventual increase in the employment rate of mothers.

Others study the change in benefit durations (Baker & Milligan, 2008; Dahl et al., 2016; Frodermann et al., 2023; Lalive & Zweimüller, 2009; Schönberg & Ludsteck, 2007; Baertsch and Sandner, 2024). On the one hand, studies examining policies that extend the

benefit periods find that women take longer periods away from work. For example, Baker & Milligan (2008) examined the impact of a policy in Canada that extended job-protected leave. They found that a policy that introduced leave entitlements for 17-18 weeks did not change the amount of time mothers spent away from work. However, longer leaves significantly increased the time spent at home. Similarly, Lalive and Zweimüller (2009) examined a 1990 Austrian policy reform that changed the duration of paid, job-protected leave from one year to two years on mothers' post-birth outcomes. They found that the policy encouraged delayed return to the labour market, which affected women's income while on leave but had no long-term impact on mothers' earnings. On the other hand, a handful of studies have looked at the impact of reducing the weeks of paid benefits. For example, Frodermann et al. (2023) explored a German policy that along with a paternity leave provision and the replacement of a means-tested benefit with an earnings-related benefit, reduced the duration of maternity benefits from 24 to 12 months. They found a heterogeneous impact; high- and medium-income mothers tended to increase their leave-taking, but still experienced an increase in earnings in the long run. For low-income mothers, they found an increase in employment in the second year after giving birth, but no positive effect on their long-run earnings.

Another area of study explores reforms that allocate time specifically for the other parent, often fathers. Choi et al. (2019) found that such reforms had small negative effects on fathers' earnings but positive effects on the earnings of their spouses, leading to an increase in household earnings in the long term. Kluge and Tamm (2009) found that the paternity leave provision in Germany successfully encouraged fathers to take advantage of

the parental leave benefits. Similarly, Patnaik's (2019) Canadian study found that Québec's parental leave program, which introduced up to 5 weeks of benefits for the other parent, helped bolster fathers' involvement in the household and promote a more equal division of household labour. Albrecht et al. (2024) also studied a Swedish policy which provided an additional month of leave for the other parent and found that the policy increased the leave take-up for men.

Overall, proponents of these policies argue that they help women by providing a channel that allows them to balance work and childcare obligations. In contrast, opponents argue that these policies could have long-term impacts that could harm women's careers due to the time off from work. One key finding from this literature is that the design of the policy matters.

The second branch of literature focuses on the child penalty. Up until the birth of their first child, the labour market outcomes of men and women follow very similar trajectories (Kleven et al., 2019a). However, women have a comparative advantage in childrearing due to a blend of biological, social, and cultural factors and, as such, tend to spend more time away from work to care for the children, which comes at a cost. The idea is that for some, having a child increases the likelihood of women being placed on a 'mommy track' - where these women earn less than not just men ('child penalty') but also other women ('the motherhood penalty'). Some studies have attributed these penalties to the reduction of human capital that occurs when women take time off from work to have and care for their children (Bertrand et al., 2010; Kleven et al., 2019a). As seen in the parental leave literature,

the length of these work interruptions is typically driven by the type of benefits available post-birth. That is, the type of leave available after birth, the length of leave, and job protection laws shape the penalty mothers experience. This literature also attributes some of the gap to the fact that mothers self-select into jobs that offer more flexibility or have family-friendly policies, which sometimes translates to lower wages (Bayard et al., 2003; Goldin, 2014). Others have attributed it to the productivity difference stemming from the differences in perceived labour market commitment and gender norms (Bertrand et al., 2015). A consensus in this literature is that regardless of the mechanism, there exists a large penalty that has not fallen over time. Women are penalized for having children through lower earnings, lack of promotions and/or lower likelihood of attaining managerial roles (Olivetti & Petrongolo, 2017; Waldfogel, 1997).

The closest study to this paper is by Mari and Cutuli (2021). They focused on the difference in the motherhood penalty while observing two reforms in Germany at different times. They found that reforms that triggered longer time spent on leave led to better job tenure accumulation but with significant wage loss, whereas policies which encouraged shorter leaves led to an increase in hours and had no motherhood penalty. This paper differs from Mari and Cutuli (2021) because of the unique nature of the policy change, where I consider two programs operating at the same time and the focus on mothers.

The intersectionality between motherhood and income status is important to explore. In Canada, before the 2020 pandemic, 30% of all Canadian mothers outside of Québec did not receive maternity and parental benefits, a startling ratio that rises to 60% for



low-income mothers (Mathieu et al., 2020). Little is known about the impact of motherhood on the outcomes of mothers on the lower end of the distribution. Wilde et al. (2010) examined the difference in the motherhood penalty by skill level and find high-skilled mothers face a higher penalty than their low-skilled counterparts. To the extent that low-skilled mothers are in low-wage jobs, we can infer that the motherhood penalty for low-income mothers is smaller than other groups of mothers. In this paper, I am less interested in testing the already established literature on the impact of children on the employment outcomes of mothers but instead, focus on how changes to leave policies affect the motherhood penalty and the income trajectory of mothers.

### **1.3. Maternity and Parental Policies in Canada**

Canada's Employment Insurance (EI – named Unemployment Insurance prior to 1997) Maternity and Parental benefit plan was introduced as a special benefit in 1971 with the aim of subsidizing childbirth and child-rearing costs by providing income transfers to eligible parents. The maternity and parental benefits plan offers temporary financial assistance to parents who cannot work due to childbirth or the care of a newly adopted baby. Maternity benefits were initially set at 15 weeks. Several changes have occurred since its inception; for example, in 1990, 10 weeks of paid parental benefits were introduced, which could be taken by either parent. This increased the total benefit available to the family to 25 weeks. The initial replacement rate was 66% of the pre-birth weekly earnings (up to a maximum), but this rate has been 55% since 1994. In 2000, individuals from low-income families eligible for a Family Supplement provision faced an increase in their benefit rate

from 55% up to 80%. Another significant change to the parental leave plan occurred in 2001; the parental leave portion was increased by 25 weeks so that a total of 50 weeks is available to a family.

Before January 2006, individuals in all provinces in Canada accessed this maternity and parental benefit under a unified EI plan administered by the federal government. However, this changed when Québec started its Parental Insurance Plan (QPIP). While QPIP was implemented in January 2006, talks about a Québec parental insurance plan began in 2001. In March 2005, the Québec and Canadian governments reached an agreement allowing the province to create its parental plan, but the legislation authorizing it was not passed until June 2005. The primary objective of the QPIP is to allow workers to reconcile market work with their family responsibility by offering a better and more flexible benefit for new parents (Government of Québec, 2022).

The EI Maternity and Parental Benefit (hereafter referred to as the Parental Benefit Plan or PBP) differs from the QPIP along multiple dimensions. First, the PBP determines eligibility based on hours worked in the 52 weeks before claim, while the QPIP focuses on employment income in the year before the claim. Specifically, the PBP requires claimants to have at least 600 hours of insurable earnings in the year before birth. In contrast, QPIP only requires claimants to have insurable earnings of at least \$2000 in the year before claiming benefits, which at minimum wage is equivalent to requiring 258 hours. Besides lowering the effective requirement for regular employees, this change also extended coverage to self-employed parents and those in non-standard work, such as contract

workers, part-time employees and students who would not have been eligible under the PBP.

Second, QPIP increased the regular replacement rate available to parents from 55% to 75%. There was also a supplement to raise the rate to 80% for low-income parents. In addition to the higher replacement rate, the maximum insurable earnings increased from \$39,000 to \$57,000. QPIP was also offered a flexible approach to benefits by creating two options under which claimants can receive their benefits. These options differ in the duration of the leave, and the proportion of income replaced, but the total benefits received under the two streams are similar if the maximum number of weeks is utilized. The first plan (basic) enables claimants to receive their benefits for a maximum of 50 weeks with a replacement rate of 70% for the first 25 weeks of benefits (18 weeks of maternity and seven weeks of parental benefits) and 55% for the remaining period. The second plan (special) offers a higher replacement rate (75%) for a shorter period – 40 weeks. Regardless of the option mothers chose, under QPIP, mothers received a higher average replacement rate than PBP and had maximum insurable earnings of \$57,000. To give an example, a mother who previously earned \$45,000 would have received 55% of her insurable earnings up to \$39,000 (i.e. about \$412 per week) with PBP, whereas with QPIP using the special option, she could receive up to 75% of her entire earnings (i.e. about \$650 per week).

While all eligible mothers receive an increased replacement rate and, therefore, a reduction in the cost of having a child, mothers with incomes between the maximum insurable earnings cut-offs under the PBP and QPIP (those between \$39,000 and \$57,000) experienced a proportionally more significant increase in their compensation; see Figure

1.1. Mothers earning below \$39,000 on the other hand consist of four groups with differing impacts. The first group who earned less than \$2000 do not qualify for either PBP or QPIP and hence there is no impact. For a second group, mainly self-employed mothers and those in non-standard work arrangements, who did not reach the eligibility threshold for PBP eligibility but do reach the lower QPIP threshold, there is a discrete change in eligibility, which can be thought of as the replacement rate increasing from 0% to 75%. For a third group, above the EI family supplement threshold, the replacement rate increases from 55% to 75%. Finally, for a fourth group whose income and household income are low enough to have been eligible for the PBP family supplement threshold, they are also eligible for the equivalent QPIP supplement and hence have no change in the replacement rate of 80%; however, this group face an increase in the total of weeks of paid benefits available to their household.

Another feature of the QPIP was the introduction of the ‘daddy only quota’ from its outset in 2006; it comprised five weeks of paternity leave that were not transferable to their partner. In contrast, at the time PBP offered no time earmarked for the other parent. In 2018, however, the PBP also introduced five weeks of nontransferable paternity benefits. At the same time, the PBP introduced two streams. First, the regular/basic stream that offers mothers benefits for 50 weeks at a 55% replacement rate, and second an extended option that spreads the benefits across 76 weeks at a 33% replacement rate. These features of PBP add caution to PBP/QPIP comparisons after 2018.

While I focus on benefits, it should be noted that maternity job protection is granted by provincial and federal employment standards legislation. As a consequence, mothers in this study typically have the opportunity to return to the jobs they held before giving birth.

In summary, the introduction of QPIP created a scenario with two parallel maternity and parental programs, one for Québec and one for the rest of Canada. The Québec program provided parents with higher replacement rates for a maximum of 52 weeks while also offering flexibility in the sharing of the leave. This study compares the outcomes of mothers under the two programs and hence examine the impact of a more generous maternity and parental benefit plan on mothers' long-term outcomes. Table 1 presents a summary of the differences between the two programs for the study period.

With the introduction of QPIP, studies have focused on the impact of the policy on the outcomes of fathers. These studies agree that the policy change increased fathers' involvement in the household (Wray, 2020), increased the take-up of parental leaves by fathers (Marshall, 2008; Mayer & Le Bourdais, 2019) and had no long-term implication on the labour outcomes of fathers (Patnaik, 2019). Less attention has been placed on the impact on mothers. Studies that consider the impact of QPIP on mothers find that there exists some heterogeneity in the impacts. For example, Haeck et al., (2019) considered the impact of the overall policy change on post-birth employment income and found that while there are significant increases for both groups associated with the introduction of QPIP, mothers with post-secondary education had larger percentage increases in employment income than did less-educated mothers. Choi et al. (2019) examined the impact of the introduction of the "daddy quota" on the outcome of mothers and fathers. They found no net effect on family

income: they estimated a negative effect on fathers, but a positive effect on mothers. To contrast, the contribution of this paper is to study the impact of the introduction of the QPIP on the motherhood penalty.

## **1.4. Data**

### **1.4.1 Data Source**

I utilize Statistics Canada's Longitudinal Administrative Database (LAD) for the years 1997-2019 as the main data source for this analysis. The LAD is an administrative dataset derived from tax returns comprising a 20% sample of all Canadian tax filers and their families and containing information about their income dynamics. The LAD has the following advantages. First, the dataset allows for a combination of individual-level tax data and data aggregated over an individual's family containing information about spouses and children. Second, the longitudinal nature of the LAD allows me to observe new births and divide the sample into treated and control groups. I also follow mothers to observe the program's long-term impact on their income trajectories and other outcomes. The LAD spans several years before and after the policy, allowing for a credible assessment of the parallel trend assumption. Lastly, since I am focusing on a specific group of mothers, the LAD provides a large enough sample for the analysis.

### 1.4.2 Outcomes of Interest and Variables Definition

The main dependent variables of interest in this study are:

1. **Earnings:** This variable captures all T4 earnings which includes wages, salaries and any taxable benefits an employee earned. I index earnings to 2021 consumer prices. I avoid using the log of earnings to guarantee the inclusion of mothers with zero earnings. Since I am particularly interested in seeing how the policy reform affects earnings dynamics, I follow this variable from 5 years before the birth of each mother's first child up to 13 years after, which implies that the most recent birth in my dataset is in 2010 since the current version of the LAD extends to 2019.
2. **Employment:** I include two definitions of employment. First, I define employment as having nonzero earnings in a given year. Then, I take a more conservative approach and define employment as mothers with an income above \$10,000 a year in 2021 dollars. I chose this threshold because this amount is above the \$2000 required for eligibility under QPIP. This threshold is equivalent to working 19 hours per week at a wage of \$7.75 (minimum wage in Québec in 2006).

### 1.4.3 Sample Selection

For the analysis, I focus on first-time mothers aged 21-35 years who had their first child between 2002 and 2010 and follow them for up to 5 years before and up to 13 years after the birth of their first child. Since I cannot identify students in the sample, I restrict the sample by the mother's age at birth. During the sample period, job-protected parental leave remained unchanged across provinces, making it possible to isolate the effect of increased

cash benefits. I exclude mothers who do not report earnings in the year before birth because I need to establish a baseline to understand the income trajectory. Also, including women with pre-birth income is helpful to ascertain strong labour market attachment. I exclude mothers observed for less than 10 years because I am primarily interested in the long-term impacts on the outcomes. This results in a minuscule loss of the sample.

I am interested in women at the bottom of the earnings distribution; therefore, the sample consists of mothers whose income before first birth is in the bottom 75 percentiles of the earnings distribution of women in the year before birth. I use this measure rather than other poverty-based measures, such as the Low-income Cut-offs (LICOs) or Market Basket Measure (MBM) thresholds, because I am interested in women affected mainly by the introduction of QPIP. Recall that eligibility for QPIP depends upon individual and not household income in the pre-birth year.

The time and province of birth define treatment. The treated group consists of mothers who had their first birth in Québec after the introduction of QPIP, mainly post-2005 Québec mothers. The control group consists of mothers in the rest of Canada who had their first child after the reform and all mothers in Canada who had their first birth pre-reform. Including older cohorts of mothers serves as a control for other policy differences between Québec and the ROC.

To investigate the mechanisms behind the results, I also utilize the confidential files of the Canadian Labour Force Survey (LFS) for the years 2003-2019. The LFS, a monthly survey assessing the current state of Canada's labour market, provides detailed information



on employment status, hours worked, and wages, which can help explain variations in annual earnings. The confidential files offer the added benefit of including detailed age information. My sample begins in 2003 to avoid the effects of the 2001 parental leave policy change. The focus is on a sample of mothers aged 20-50 with children under 12 years. Due to data limitations (the inability to identify first births and sample size considerations), I expanded the selection of mothers to include those up to age 50. Additionally, the sample is restricted to mothers whose hourly wages are below the median in their respective locations. Mothers in the treated group consist of mothers of young children in Québec regardless of their birth year, and the control group are mothers in the rest of Canada.

Table 1.2 presents a summary of the sociodemographic characteristics of mothers who had their first child before and after the introduction of QPIP in Québec and the rest of Canada for the LAD sample. It helps to shed light on the composition of mothers based on their location and time of birth. To adhere to Statistics Canada's confidentiality requirements and prevent disclosure concerns, I present results for a random 30% subsample of my analytical sample. The table shows that mothers in the two groups are very similar, however, there are some noticeable differences between these groups and across time. For example, mothers who had their first birth after 2006 are younger on average and Québec mothers tend to have children at a younger age. Mothers in Québec are less likely to be in a union (either in a common-law or married). Regardless of province, post-2006 mothers are less likely to be legally married. The immigrant proportion increased in both Québec (from 15-28%) and the rest of Canada (from 31-45%).

## 1.5. Empirical Approach and Identification

### 1.5.1 Impact of Children on Mothers' Earnings

The analysis begins by estimating the impact of children on the earnings (the motherhood penalty) of mothers in each province/group (Québec and the ROC) for mothers who had their first birth before QPIP using an event study approach. Following the standard in the literature, I center time on the birth of the first child (the event in the 0<sup>th</sup> year) and comparisons are made relative to the year before birth (see Kleven et al., 2019b). I estimate this equation separately for the two groups of mothers based on first birth in Québec or the ROC:

$$y_{itk}^g = \alpha + \tau_t + \sum_{k=-5, k \neq -1}^{13} \beta^k (\mathbf{1}[tsb_{itk} = k]) + X\delta + \epsilon_{itk} \quad (1)$$

where  $y_{itk}^g$  is the earnings of a mother  $i$  in group  $g$ , in year  $t$  at  $k$  years from birth (event time  $k$ ).  $\mathbf{1}[tsb_{itk} = k]$  is a vector of years from birth or event dummies. The period before birth is omitted, meaning that the event time coefficients measure the impact of children on mothers' earnings relative to the period before the birth of the child. This specification forces all provinces in the ROC to have a common intercept.  $X$  includes controls for age using age dummies to account for life-cycle profiles and  $\tau_t$  is a vector of calendar year dummies. This method offers the benefit of mapping the complete dynamic path of the effect of children on mothers' earnings. Following the convention in the literature, I divide the estimated coefficients of interest by the predicted outcome absent the birth of the child. Put differently, I convert the estimated coefficients to percentages by applying this

equation:  $P_k = \frac{\widehat{\beta}^k}{E_k[\widehat{y}_{itk}]}$ , where the denominator is the predicted outcome absent the time-since-birth time coefficients.

### 1.5.2 Impact of Québec's Parental Insurance Plan on Outcomes

To examine the impact of a more generous maternity and parental benefits program on mothers, I use the Event Study Difference-in-Differences design<sup>1</sup> (Miller, 2023; Sun & Abraham, 2021). Since I anticipate that the impact of the policy might vary throughout the working history of a woman, I consider the long-term impacts of the program by exploiting the longitudinal nature of the data. The research design exploits the quasi-random shifts between parental benefits schemes induced by the date and province of birth of their first child. Identification of the causal impact hinges on the parallel trend assumption, which requires that the outcome of the treated units would have evolved in the same manner as the control units without the introduction of the policy. This assumption is typically not testable, but in the event study literature, researchers suggest focusing on pre-trends as a diagnostic tool (See Miller, 2023). Therefore, the absence of pre-trends provides suggestive evidence that parallel trend assumption holds.

With this method, I compare the outcomes of women who had their first child in Québec post 2005, and hence were eligible for QPIP, with mothers who were not eligible for

---

<sup>1</sup> This method is also known as a difference-in-differences event study or a dynamic difference-in-differences.

benefits under the new policy.<sup>2</sup> Since I am interested in examining the dynamic change in earnings around QPIP; I present the estimating equation as follows:

$$y_{iptk} = \alpha + \omega_p + \tau_t + \sum_{k=-5, k \neq -1}^{13} \beta_k^{ROC} \mathbf{1}[tsb_{iptk} = k] + \sum_{k=-5, k \neq -1}^{13} \beta_k^{QPIP} (QPIP_{iptk} * \mathbf{1}[tsb_{iptk} = k]) + X\delta + \epsilon_{iptk} \quad (2)$$

where  $y_{iptk}$  is the outcome for individual  $i$  in province  $p$  in year  $t$  and at event time  $k$ . After the intercept, the first three terms are province, calendar year, and the event time fixed effects, respectively. The province fixed effects account for every province-specific time-invariant characteristic e.g., cultural differences in the Canadian provinces. The year fixed effect captures every time-varying factor that affects the whole country in each period. QPIP is an indicator variable that takes the value 1 if the mother had her first child in Québec after the policy came into effect. Lastly, the indicator function captures the relative time to event indicators, which are set to 1 if the time  $t$  is  $k$  years away/from birth and is zero otherwise. That is, each event time has a corresponding dummy. In this specification,  $k$  is the relative time to the event (years before/since birth) and ranges from -5 to 13, and the omitted (base) period is -1, the year before the birth of each mother's first child. I include control variables such as marital status and dummies for age to nonparametrically control for lifecycle effects.

With this specification, the goal is to obtain the average earnings loss or gain of a mother (below the 75<sup>th</sup> percentile of earnings prior to birth) in each year post birth as compared to her pre-birth earnings and further contrast it with the same difference for a mother in the control group. In other words, the objective is to measure the difference in the

---

<sup>2</sup> This includes mothers who had a first child in Quebec pre-2005 and mothers in the ROC.

overall motherhood penalty following the first birth between the treated and control groups. The coefficients of the interest  $\beta_k^{QPIP}$  capture the average change between  $k$  years from the birth of a first child and the year before the birth of that first child among mothers in Québec (exposed to QPIP) relative to the same change over time among mothers in the control group not exposed to the policy. The product of the event time dummies and the treatment assignment yield the difference in the motherhood penalty between the treated and control groups – the average effect of changes to the parental leave policy on the treated. Note that in this case, the estimate represents an intention to treat (ITT) since we do not know whether an individual received benefits.

For earnings, if qualifying for benefits under the QPIP encourages labour market attachment and induces earnings growth, then we expect that the coefficients of interest will increase with time. Put differently, we expect that the difference in the motherhood penalty between the treated and control group should be positive. For this analysis, the standard errors are clustered at the province and birth year level since the policy happens at the provincial level. These standard errors allow for serial correlation and heterogeneity in the outcomes. Similar to equation (1), I express the estimates in percentages by rescaling them by the predicted outcomes. That is, I divide the estimates by the average counterfactual earnings. For the calculations of the standard errors, I treated the denominator as non-random.

One dimension that could be a threat to this analysis is Québec's low-fee childcare program implemented in 1997. That is, the childcare policy in Québec, even though time

invariant, could have a time-varying impact on the earnings of new mothers. The childcare subsidy available to parents only in Québec in the first few years of a child's life could potentially affect mothers' labour market decisions and outcomes. The literature on childcare in Québec shows that it increased the number of mothers at work (see Fortin et al., 2012; Lefebvre et al., 2009; Karademir et al., forthcoming). This means that any estimated effect observed immediately after the introduction of the QPIP could be a combination of the childcare subsidy and QPIP. Therefore, comparing Québec mothers to mothers in the ROC post-2005 without accounting for older cohorts of mothers might provide a biased result. Put differently, post-2005, mothers in Québec might be faring better because of other policies (e.g., Québec's childcare subsidy) instead of as a result of the introduction of QPIP. Karademir et al. (forthcoming) observed significant variation in the impact of children on mother's labour supply within Canada, depending on the availability of formal childcare. To account for this, rather than focusing on only mothers who had their first birth in 2006 in Québec and the rest of Canada for the analysis, I included mothers with first births from four years before the policy change (older cohorts) because, without them, we are unable to control for the effects of other family policies in Québec.

Another dimension that could serve as a threat to the identification is if women self-select into treatment: i.e. if mothers in Québec delayed conception to be eligible for benefit. As stated above, QPIP was officially announced in June 2005, less than nine months before the program started. This implies that for women in Québec to select into the usage of QPIP, they had to be aware of the policy change at least nine months in advance to delay conception and also ensure they were residents of Québec before the end of the preceding

calendar year. We rule this case out as Patnaik (2019) provides supporting evidence that strategic manipulation of conception and birth dates did not occur.

## **1.6. Results**

I start by presenting a descriptive account of the earnings trajectories of mothers in Québec and the rest of Canada by providing the estimates of the motherhood penalty. Then I present evidence on the impact of a more generous maternity and parental benefits on social assistance usage. Lastly, I present some results to explain the mechanism behind the results.

### **1.6.1. Effects of Children**

Figure 1.2 presents the estimated effects of children on the earnings of mothers in Québec and the ROC for a sample of mothers who had their first child before QPIP from equation (1). The results show that the earnings trajectories of mothers in Québec and the rest of Canada are similar in the years before the birth of their first child. We observe an increasing trend, more so for mothers in Québec, signifying the evolution of earnings and reflecting their location in the age-earning profile. At birth, both groups experience a significant decline in earnings. For mothers in Québec, we observe a 40% decline in earnings, while mothers in the ROC experience a 35% decline. In the subsequent years after birth, differences between the two groups vanish and in the long run, there are no significant differences in the income recovery of mothers. Put differently, compared to their earnings in the period before birth, mothers in Québec and the rest of Canada have similar variations in

earnings. This provides evidence on the similarities of the motherhood penalties between mothers in Québec and the ROC before the introduction of QPIP.

### **1.6.2. Responses to Québec Parental Insurance Plan**

I continue by examining the effects of QPIP on the penalty based on estimates of equation (2). The results, reported in Figure 1.3, should be interpreted as the difference in the motherhood penalty between the treated and the control groups as a result of QPIP. A positive value implies that the motherhood penalty was less for the treated group when compared to the control group, indicating that mothers in Québec who had their first child after QPIP was introduced have higher earnings, and the reverse is the case for negative values. The pattern of the motherhood penalty is as expected. First, the results show no evidence of differential pre-trends, pointing to similarities in the income trajectories of mothers in the treated and control groups before birth. This does not imply that the earnings of mothers in the treatment group and control groups are the same, but when compared to their income in the year before the birth of their first child, the earnings differences are similar. Mothers in the treated group experience a significantly larger drop immediately after the birth of their first child (about a 10% drop when compared to the control group) presumably because of increased benefit eligibility and entitlement. However, earnings bounce back in the year after birth ( $k=1$ ), which coincides with the end of parental leave benefits, and surpass the control group by year 4.

The result shows that the introduction of QPIP statistically and economically significantly reduced the motherhood penalty for women. In Figure 1.3, the income losses



of the treated group are statistically significantly different starting from 4 years after birth compared to mothers in the control group. This points to a smaller motherhood penalty for the treated group. Women in the treated group experience a positive difference in the motherhood penalty that ranges from about 4-7% in the long run when compared to the control group.

Overall, the differences in the motherhood penalty suggest that the type of leave opportunities available at the time of birth does have an impact on the earnings trajectory of mothers. This result is consistent with findings from Connolly et al. (2023) who find that the 2001 PBP parental leave reform in Canada led to an increase in the earning losses of mothers in the year immediately after birth for the treated mothers, however in the long term, they are better off. With the introduction of QPIP, more mothers in Québec become eligible for benefits and can take time off work immediately after birth, hence the larger drop in their employment earnings in the year of birth. After the leave, there is a significant increase in earnings in the long run for those who return. These positive effects could result from increased labour market attachment to qualify for future benefits and/or because of the correlation between continuous attachment and income growth. This result provides evidence of the benefits of QPIP on employment earnings. Baker and Milligan (2005) suggest that while there might be a short-term decrease in hours the availability of parental leave policies (accompanied by job protection policies) increase the probability of mothers returning to work after leave. For mothers who were not eligible for benefits, this could mean more attachment.

### 1.6.3. Mechanisms

To better understand the mechanism(s) behind how the parental leave policy affects the motherhood penalty, I focus on the LAD sample and use the conventional definition of employment (i.e. having non-zero earnings).

Figure 1.4 shows that compared to the period before the birth of their first child, mothers in the treated group are more likely to remain attached to the labour market both in the short and long run, except for the year of birth. At birth, mothers in both the treated and control groups experience a decline in the probability of being employed; however, mothers in the treated group are more likely to be away from the from market work in the year of birth. In subsequent years starting from one year after birth, mothers in the treated group are 4% more likely to be attached to the labour market than mothers in the control group. This implies that QPIP increases the probability of being employed after the leave. This higher labour market attachment ranges from 4% to 8% over the 13 years after the birth. The results are robust to the alternative definition of labour market attachment where I define it as earning at least \$10,000 per year (see Figure 1.5).

I turn to the LFS to investigate whether changes in the probability of being employed, hours worked, changes in weekly earnings, or changes to job tenure explain some of these effects. Specifically, I trace out if the introduction of QPIP affected the employment status, hours worked, weekly earnings and job tenure of mothers in Quebec. Given the limitations of the data, mothers in the treated group consist of mothers of young children in Québec regardless of their year of birth, and the control group are mothers in the rest of Canada.

Recall from my earlier description of the LFS sample that I also restrict the sample to mothers who had wages below the median. I estimate a version of the main model for these variables.

Since the LFS is treated as a pooled cross-section, we estimate the equation omitting the year fixed effect. The event time ( $tsb$ ) in this case is the difference between the calendar year and the year the policy came into effect. QPIP is dummy variable for mothers in Québec:

$$y_{ipk} = \alpha + \omega_p + \sum_{k=-3, k \neq -1}^{12} \beta_{ROC}^K \mathbf{1}[tsb_{ipk} = k] + \sum_{k=-3, k \neq -1}^{12} \beta_{QPIP}^K (QPIP_{ipk} * \mathbf{1}[tsb_{ip} = k]) + X\delta + \epsilon_{ipk} \quad (3)$$

The top left-hand side of Figure 1.6 shows the changes in the probability of being employed. The results show that after QPIP was introduced, the treated mothers are more likely to be employed. This is consistent with the finding that maternity leave policies accompanied by job protection preserve existing matches in the labour market (see Baker and Milligan, 2008). However, it may also be that treated mothers are more likely to return to work, perhaps for a different employer, in order to be eligible for future benefits if they plan on potentially having a second child. We observe an increase in this probability that ranges from about 4 – 10%. We start to see a difference in the employment status for the treated and control groups from the period immediately after birth, and this gap is persistent.

The top right side of Figure 1.6 focuses on the difference in actual weekly hours worked between the treated and control groups before and after the policy change. The result shows no significant difference in weekly work hours between mothers in Québec and mothers in the rest of Canada. Similarly, for the weekly earnings we do not find any

significant difference between the treated and the control group. In each year since the introduction of QPIP, mothers in the treated and control groups have similar wages on average. The last outcome considered is job tenure. If we assume that long-term increase in earnings is as a result mothers switching to higher paying jobs, then the tenure of mothers in the treated group will be lower than the control group. The results show that in the long term, mothers in the treated group have short tenure at a specific job and this ranges from 3 to 6 months. This could mean that mothers in the treated group are more likely to switch jobs in search of higher wages. The combination of higher probability of being employed and changes in job tenure could potentially account for the long-term effect we see in employment earnings and the financial wellbeing of mothers.

#### **1.6.4. Sensitivity Analysis**

To explore the sensitivity of the results, I rerun the analysis using a different sample selection. Specifically, I restrict the sample to first-time mothers who had their first child between 20 and 45 years. The results are reported in the appendix. This additional analysis reinforces the main findings, which show that the motherhood penalty for the treated group was less than that for the control group in the long run. This implies that the introduction of QPIP reduced the motherhood penalty for mothers at the bottom of the earnings distribution.

#### **1.7. Conclusion**

An aging population means that the share of the population relying on the public pension systems is rising and there is a need to increase tax revenue. One way to do this is

to raise the share of women working through family incentives. Over the years, policymakers have introduced family policies such as maternity and parental leaves to help encourage women's labour force participation after giving birth. However, the impact of these policies on the child penalty faced by mothers, especially those in the lower earnings brackets, remains under-explored.

Canada's distinct political landscape creates an avenue where we can directly compare the impact of more generous benefits on the outcomes of mothers. Prior to 2006, all Canadian mothers were covered under a unified Parental Benefits Plan (PBP). In January 2006, Québec introduced its own Québec Parental Insurance Plan (QPIP), which offered broader access and equality across income levels. With reduced eligibility criteria, more mothers in Québec qualified for maternity and parental leave benefits. This paper examines the impact of these changes on the motherhood penalty for first-time mothers below the 75th percentile in earnings distribution.

The child or motherhood penalty might take a different form for mothers at the bottom of the earnings distribution, potentially causing them to exit the labor market post-birth due to insufficient support or prevent them from finding higher wage jobs. The results show that QPIP effectively reduced children's impact on mothers' earnings in the short and long run. This result is consistent with Connolly et al. (2023) and Karademir et al. (forthcoming), who show that family-friendly policies can have long-term effects on the earnings of mothers.

One factor contributing to better income recovery for mothers is increased employment following birth among treated mothers. QPIP's introduction of a daddy quota, which encouraged fathers to take parental leave, facilitated shared childcare responsibilities, possibly enabling mothers to return to work. Choi et al. (2019) report a substantial increase in the use of parental leave by fathers in Québec, which they conclude positively affects their partner's earnings.

Another factor is the incentive for mothers to return to work to qualify for future maternity benefits, ensuring continued eligibility if planning additional children. However, this may also increase human capital accumulation, increasing earnings. The findings also show that treated mothers tend to have shorter job tenure, indicating a higher likelihood of job switching, which could drive long-term earnings growth. These results highlight the potential of parental leave policies, particularly QPIP, to enhance mothers' financial well-being through greater labor market participation and mobility. From a policy perspective, the study demonstrates that maternity and parental leave benefits not only support mothers but also promote sustained labour market attachment, contributing to their economic well-being and income growth over time.

## 1.8 References

- Albrecht, J., Edin, P.-A., Fernández, R., Lee, J., Thoursie, P., & Vroman, S. (2024). Parental Leave: Economic Incentives and Cultural Change (Working Paper 32839). *National Bureau of Economic Research*. <https://doi.org/10.3386/w32839>
- Avdic, D., & Karimi, A. (2018). Modern Family? Paternity Leave and Marital Stability. *American Economic Journal: Applied Economics*, 10(4), 283–307. <https://doi.org/10.1257/app.20160426>
- Baertsch, L., & Sandner, M. (2024). Reducing the Child Penalty by Incentivizing Maternal Part-Time Work? IZA Discussion Papers, No. 17109. <https://doi.org/10.2139/ssrn.4883868>
- Baker, M., & Milligan, K. (2005). How Does Job-Protected Maternity Leave Affect Mothers' Employment and Infant Health? (Working Paper 11135). National Bureau of Economic Research. <https://doi.org/10.3386/w11135>
- Baker, M., & Milligan, K. (2008). How Does Job-Protected Maternity Leave Affect Mothers' Employment? *Journal of Labor Economics*, 26(4), 655–691. <https://doi.org/10.1086/591955>
- Baum, C. L., & Ruhm, C. J. (2016). The Effects of Paid Family Leave in California on Labor Market Outcomes. *Journal of Policy Analysis and Management*, 35(2), 333–356.
- Bayard, K., Hellerstein, J., Neumark, D., & Troske, K. (2003). New Evidence on Sex Segregation and Sex Differences in Wages from Matched Employee-Employer Data. *Journal of Labor Economics*, 21(4), 887–922. <https://doi.org/10.1086/377026>
- Becker, G. S. (1965). A Theory of the Allocation of Time. *The Economic Journal*, 75(299), 493–517. <https://doi.org/10.2307/2228949>
- Bergemann, A., & Riphahn, R. T. (2010). Female labour supply and parental leave benefits – the causal effect of paying higher transfers for a shorter period of time. *Applied Economics Letters*, 18(1), 17–20. <https://doi.org/10.1080/13504850903425173>
- Bertrand, M., Goldin, C., & Katz, L. F. (2010). Dynamics of the Gender Gap for Young Professionals in the Financial and Corporate Sectors. *American Economic Journal: Applied Economics*, 2(3), 228–255. <https://doi.org/10.1257/app.2.3.228>
- Bertrand, M., Kamenica, E., & Pan, J. (2015). Gender Identity and Relative Income within Households. *The Quarterly Journal of Economics*, 130(2), 571–614. <https://doi.org/10.1093/qje/qjv001>
- Budig, M. J., & Hodges, M. J. (2010). Differences in Disadvantage: Variation in the Motherhood Penalty across White Women's Earnings Distribution. *American Sociological Review*, 75(5), 705–728. <https://doi.org/10.1177/0003122410381593>

- Choi, Y., Holm, A., & Margolis, R. (2019). The Effects of Paternity Leave on Parents' Earnings Trajectories and Earnings Inequality. SocArXiv, Article tx2vh. <https://ideas.repec.org/p/osf/socarx/tx2vh.html>
- Connolly, M., Fontaine, M. M., & Haeck, C. (2023). Child Penalties in Canada. *Canadian Public Policy*, e2023015. <https://doi.org/10.3138/cpp.2023-015>
- Cortés, P., & Pan, J. (2023). Children and the Remaining Gender Gaps in the Labor Market. *Journal of Economic Literature*, 61(4), 1359–1409. <https://doi.org/10.1257/jel.20221549>
- Dahl, G. B., Løken, K. V., Mogstad, M., & Salvanes, K. V. (2016). What Is the Case for Paid Maternity Leave? *The Review of Economics and Statistics*, 98(4), 655–670.
- Fortin, P., Godbout, L., & St-Cerny, S. (2012). Impact of Québec's universal low fee childcare program on female labour force participation, domestic income, and government budgets | Research Connections. [https://cftp.recherche.usherbrooke.ca/wp-content/uploads/2018/12/cr\\_2012-02\\_impact\\_of\\_Québecs\\_universal\\_low\\_fee.pdf](https://cftp.recherche.usherbrooke.ca/wp-content/uploads/2018/12/cr_2012-02_impact_of_Québecs_universal_low_fee.pdf)
- Frodermann, C., Wrohlich, K., & Zucco, A. (2023). Parental Leave Policy and Long-run Earnings of Mothers. *Labour Economics*, 80, 102296. <https://doi.org/10.1016/j.labeco.2022.102296>
- Goldin, C. (2014). A Grand Gender Convergence: Its Last Chapter. *American Economic Review*, 104(4), 1091–1119. <https://doi.org/10.1257/aer.104.4.1091>
- Government of Canada. (2015). Monitoring Assessment Report 2014/2015. <https://www.canada.ca/en/employment-social-development/programs/ei/ei-list/reports/monitoring2015/chapter2-benefits.html>
- Government of Québec. (2022). Publications | Québec Parental Insurance Plan. <https://www.rqap.gouv.qc.ca/en/about-the-plan/publications>
- Haeck, C., Paré, S., Lefebvre, P., & Merrigan, P. (2019). Paid Parental Leave: Leaner Might Be Better. *Canadian Public Policy / Analyse de Politiques*, 45(2), 212–238.
- Karademir, S., Laliberté, J.W. P., & Staubli, S. (forthcoming). The Multigenerational Impact of Children and Childcare Policies. *Journal of Labour Economics*. <https://www.journals.uchicago.edu/doi/abs/10.1086/732358?journalCode=jole>
- Kleven, H., Landais, C., & Sjøgaard, J. E. (2019a). Children and Gender Inequality: Evidence from Denmark. *American Economic Journal: Applied Economics*, 11(4), 181–209. <https://doi.org/10.1257/app.20180010>
- Kleven, H., Landais, C., Posch, J., Steinhauer, A., & Zweimüller, J. (2019b). Child Penalties across Countries: Evidence and Explanations. *AEA Papers and Proceedings*, 109, 122–126. <https://doi.org/10.1257/pandp.20191078>

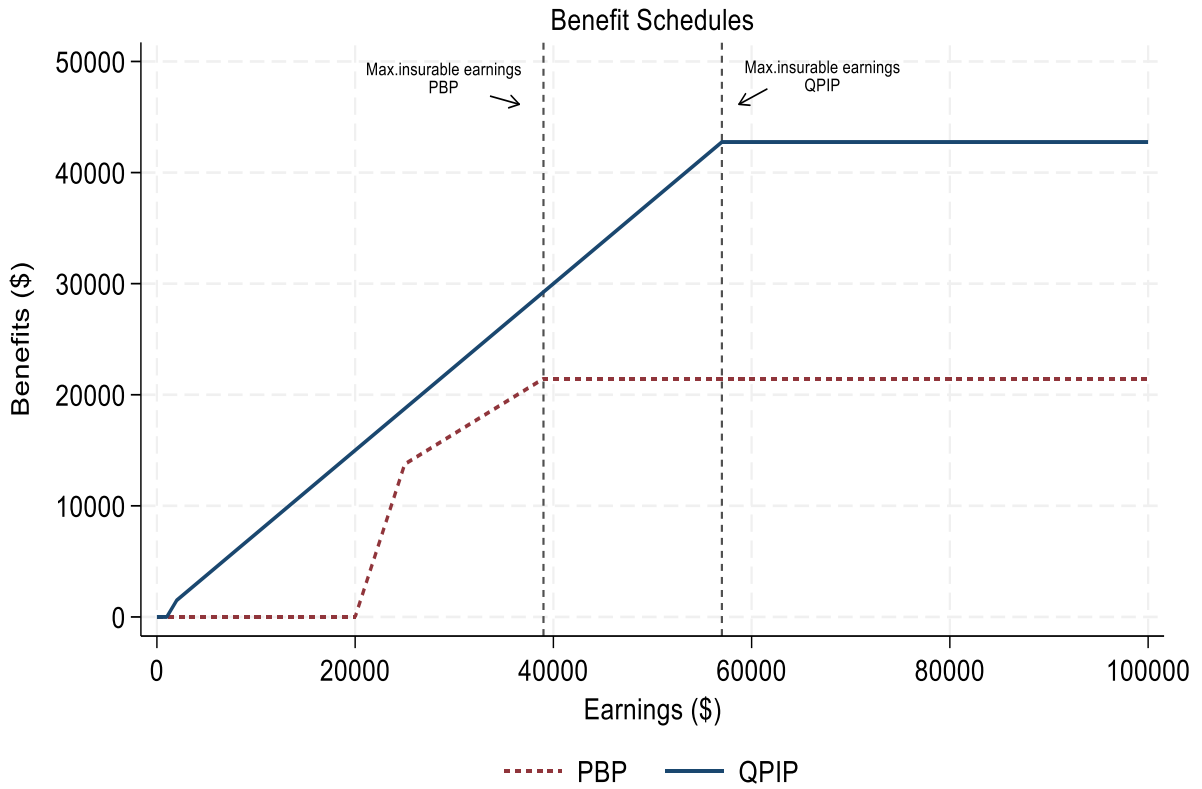


- Kluve, J., & Tamm, M. (2009). Now Daddy's Changing Diapers and Mommy's Making Her Career: Evaluating a Generous Parental Leave Regulation Using a Natural Experiment. *IZA Discussion Papers*, Article 4500. <https://ideas.repec.org/p/iza/izadps/dp4500.html>
- Lalive, R., & Zweimüller, J. (2009). How Does Parental Leave Affect Fertility and Return to Work? Evidence from Two Natural Experiments. *The Quarterly Journal of Economics*, 124(3), 1363–1402. <https://doi.org/10.1162/qjec.2009.124.3.1363>
- Lefebvre, P., Merrigan, P., & Verstraete, M. (2009). Dynamic labour supply effects of childcare subsidies: Evidence from a Canadian natural experiment on low-fee universal childcare. *Labour Economics*, 16(5), 490–502. <https://doi.org/10.1016/j.labeco.2009.03.003>
- Margolis, R., Hou, F., Haan, M., & Holm, A. (2019). Use of Parental Benefits by Family Income in Canada: Two Policy Changes. *Journal of Marriage and Family*, 81(2), 450–467. <https://doi.org/10.1111/jomf.12542>
- Mari, G., & Cutuli, G. (2021). Do Parental Leaves Make the Motherhood Wage Penalty Worse? *European Sociological Review*, 37(3), 365–378. <https://doi.org/10.1093/esr/jcaa048>
- Marshall, K. (2008). Perspectives on Labour & Income: Fathers' use of paid parental leave. <https://www150.statcan.gc.ca/n1/pub/75-001-x/2008106/article/10639-eng.htm>
- Mathieu, S., Doucet, A., & McKay, L. (2020). Parental Leave and Intra-Regime Differences in a Liberal Country: The Case of Four Canadian Provinces. *Canadian Journal of Sociology*, 45, 169–194. <https://doi.org/10.29173/cjs29504>
- Mayer, M., & Le Bourdais, C. (2019). Sharing Parental Leave Among Dual-Earner Couples in Canada: Does Reserved Paternity Leave Make a Difference? *Population Research and Policy Review*, 38(2), 215–239. <https://doi.org/10.1007/s11113-018-9497-x>
- McKay, L., Mathieu, S., & Doucet, A. (2016). Parental-leave rich and parental-leave poor: Inequality in Canadian labour market based leave policies. *Journal of Industrial Relations*, 58(4), 543–562. <https://doi.org/10.1177/0022185616643558>
- Miller, D. L. (2023). An Introductory Guide to Event Study Models. *Journal of Economic Perspectives*, 37(2), 203–230. <https://doi.org/10.1257/jep.37.2.203>
- Olivetti, C., & Petrongolo, B. (2017). The Economic Consequences of Family Policies: Lessons from a Century of Legislation in High-Income Countries. *Journal of Economic Perspectives*, 31(1), 205–230. <https://doi.org/10.1257/jep.31.1.205>
- Patnaik, A. (2019). Reserving Time for Daddy: The Consequences of Fathers' Quotas. *Journal of Labor Economics*, 37(4), 1009–1059. <https://doi.org/10.1086/703115>

- Rosenbaum, P. (2021). Pregnancy or motherhood cost? A comparison of the child penalty for adopting and biological parents. *Applied Economics*, 53(29), 3408–3422. <https://doi.org/10.1080/00036846.2021.188143>
- Schönberg, U., & Ludsteck, J. (2007). Maternity Leave Legislation, Female Labor Supply, and the Family Wage Gap. *SSRN Electronic Journal*.  
<https://doi.org/10.2139/ssrn.981179>
- Sun, L., & Abraham, S. (2021). Estimating dynamic treatment effects in event studies with heterogeneous treatment effects. *Journal of Econometrics*, 225(2), 175–199. <https://doi.org/10.1016/j.jeconom.2020.09.006>
- Waldfogel, J. (1997). The Effect of Children on Women’s Wages. *American Sociological Review*, 62(2), 209–217. <https://doi.org/10.2307/2657300>
- Wilde, E. T., Batchelder, L., & Ellwood, D. (2010). The Mommy Track Divides: The Impact of Childbearing on Wages of Women of Differing Skill Levels (w16582; p. w16582). National Bureau of Economic Research. <https://doi.org/10.3386/w16582>
- Wray, D. (2020). Paternity Leave & Fathers’ Responsibility: Evidence from a Natural Experiment in Canada. *Journal of Marriage and Family*, 82(2), 534–549. <https://doi.org/10.1111/jomf.12661>

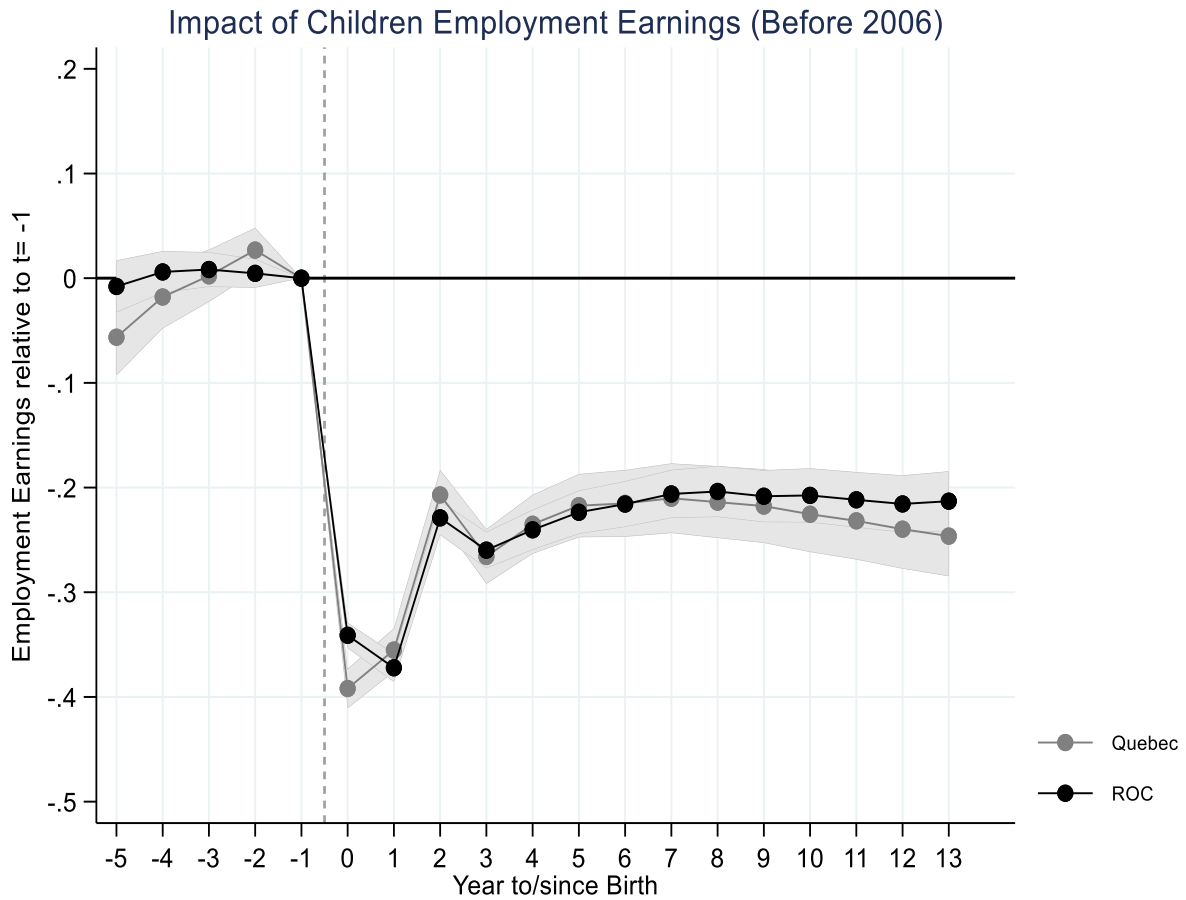
1.9 Tables and Figures

Figure 1.1: Benefit Schedules



**Notes:** Benefit Schedules under Canada's Parental Benefits Plan and Quebec's Parental Insurance Plan for different income values.

Figure 1.2: Impact of children on the earnings of mothers



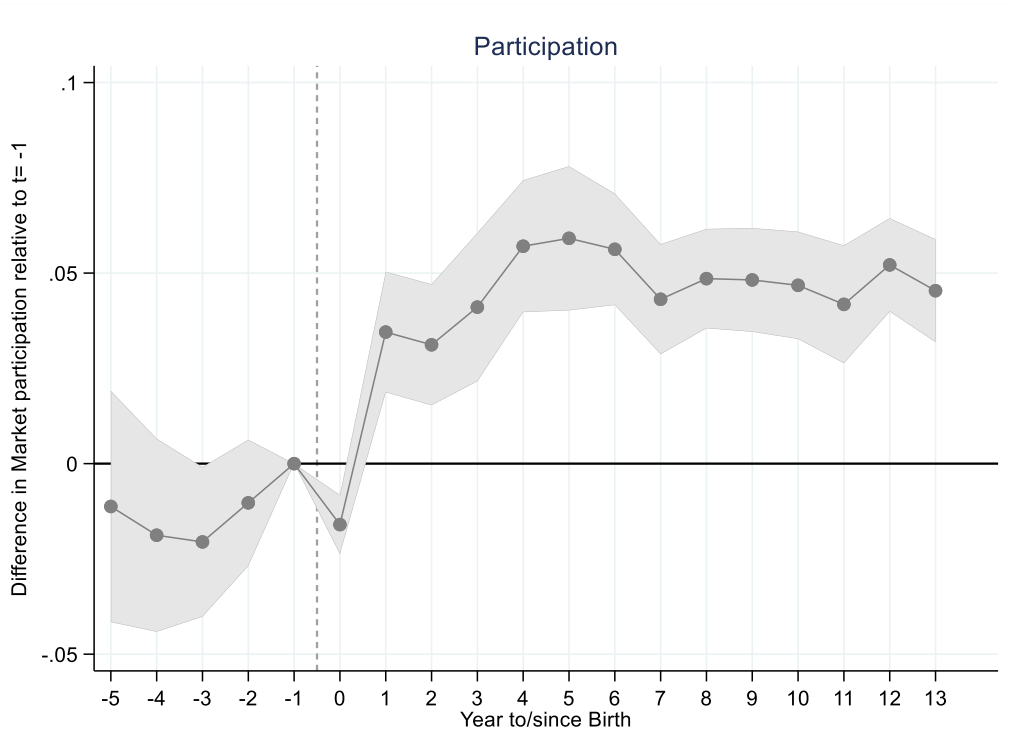
**Notes:** Impact of children on the earnings of mothers with first birth before 2006 by place of birth and 95 percent confidence intervals. Earnings are adjusted to 2021 dollars.

Figure 1.3: Difference-in-differences estimates – Employment Earnings



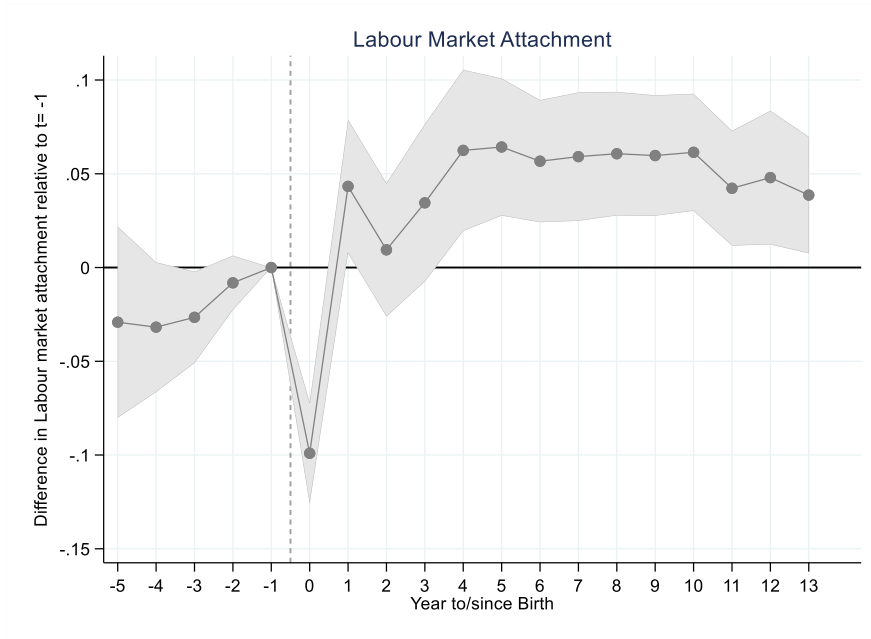
**Notes:** Difference-in-differences estimates and 95 percent confidence intervals of the impact of QPIP on the annual employment earnings. Earnings are adjusted to 2021 dollars. Standard errors are adjusted for clustering on the province and cohort (based on the year of first birth).

Figure 1.4: Difference-in-differences estimates – Market Participation



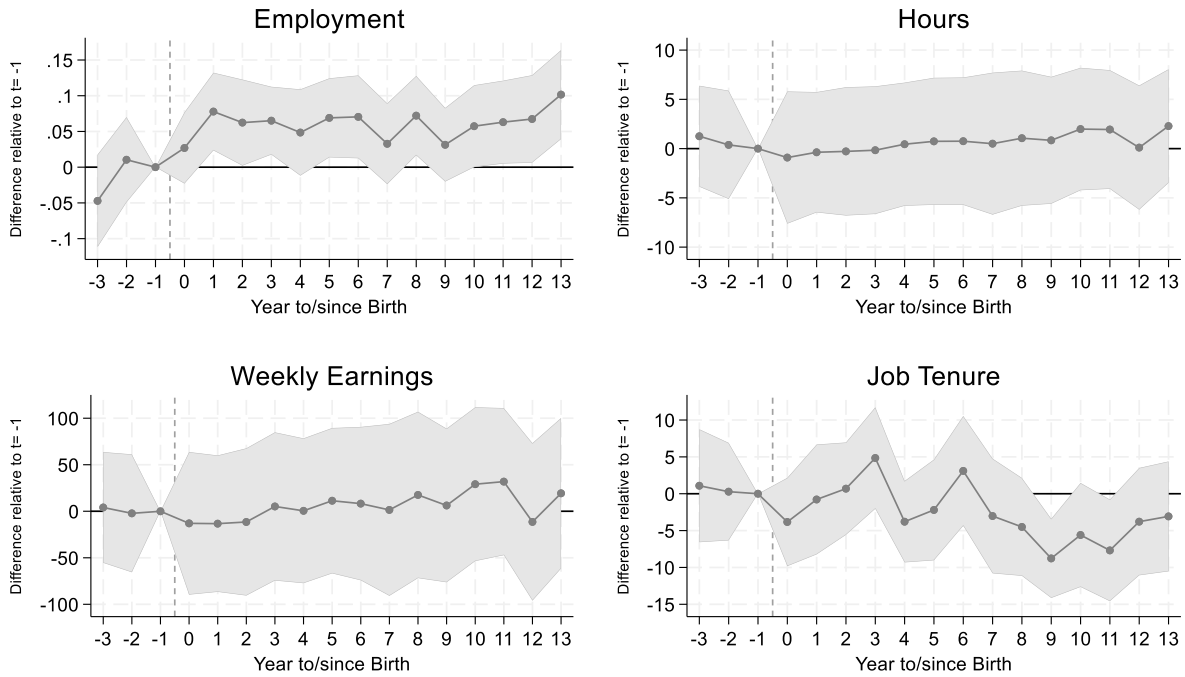
**Notes:** Difference-in-differences estimates and 95 percent confidence intervals of the impact of QPIP on the labour market attachment of mothers. Labour market attachment is defined as receiving at least \$1 in employment income in a given year. Standard errors are adjusted for clustering on the province and cohort (based on the year of first birth). Sample mothers who had a first birth between 20 and 35 years

Figure 1.5: Difference-in-differences estimates – Labour Market Participation



**Notes:** Difference-in-differences estimates and 95 percent confidence intervals of the impact of QPIP on the labour market attachment of mothers. Labour market attachment here is defined as having income above \$10,000 in a given year. Standard errors are adjusted for clustering on the province and cohort (based on the year of first birth).

Figure 1.6: Mechanisms - Difference-in-differences raw estimates



**Notes:** Difference-in-differences raw estimates and 95 percent confidence intervals of the impact of QPIP on the labour market outcomes using the Labour Force Survey. Earnings are adjusted to 2021 dollars. Standard errors are adjusted for clustering on the province and birth cohort. Sample: mothers aged 20 and 50 years.



Table 1.1: Parental Leave Programs in Canada in 2006

|  | <b>Employment Insurance</b>  | <b>QPIP Basic Plan</b>  | <b>QPIP Special Plan</b>  |
|--|--|---|---|
| <b>Eligibility</b>                       | 600 hours of insurable employment  | \$2000 of insurable earnings  | \$2000 of insurable earnings  |
| <b>Replacement Rate</b>                  | 55%  | 70% for maternity leave (30 weeks) and 55% after (25 weeks)   | 75%   |
| <b>Maximum Insurable earnings (2005)</b> | \$39000  | \$57000   | \$57000   |
| <b>Benefit Period (Per couple)</b>       | Total 50 weeks:<br>15 weeks maternity leave<br>+ 35 weeks parental leave<br>+ no paternity leave | Total 55 weeks:<br>18 weeks maternity leave<br>+ 32 weeks parental leave<br>+ 5 weeks paternity leave | Total 43 weeks:<br>15 weeks maternity leave<br>+ 25 weeks parental leave<br>+ 3 weeks paternity leave |
| <b>Waiting Period</b>                    | 2 weeks  | None  |   |
| <b>Coverage</b>                          | Employees only   | Employees+ Self employed  | Employees+ Self employed  |

Notes: This table presents a summary of the differences between the two policies examined in this paper. The information here represents the differences in 2006. Since then, both programs have experienced significant changes.

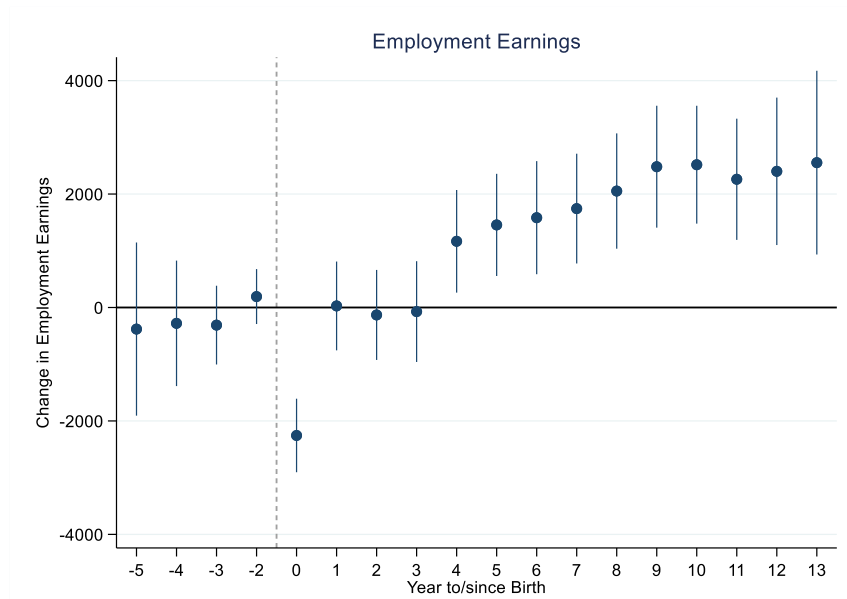
Table 1.2: Sociodemographic characteristics before and after QPIP

| Variables                | Québec          |                 | ROC             |                 |
|--------------------------|-----------------|-----------------|-----------------|-----------------|
|                          | Pre-QPIP        | Post-QPIP       | Pre-QPIP        | Post-QPIP       |
| Age                      | 32.85<br>(6.52) | 31.46<br>(5.94) | 33.39<br>(6.47) | 31.74<br>(5.92) |
| Age at first birth       | 27.97<br>(3.77) | 27.88<br>(3.84) | 28.36<br>(3.79) | 27.91<br>(3.96) |
| Median year of birth     | 2003<br>(3.91)  | 2008<br>(3.27)  | 2003<br>(3.65)  | 2008<br>(3.05)  |
| Total number of children | 1.47<br>(1.08)  | 1.37<br>(1.08)  | 1.50<br>(1.09)  | 1.43<br>(1.08)  |
| Household size           | 3.02<br>(1.22)  | 2.93<br>(1.23)  | 3.08<br>(1.21)  | 3.01<br>(1.19)  |
| Years since immigration  | 12.20<br>(8.53) | 9.04<br>(6.90)  | 11.61<br>(8.31) | 8.94<br>(6.63)  |
| Immigrant                | 0.15            | 0.28            | 0.31            | 0.45            |
| Married/Common law       | 0.68            | 0.67            | 0.69            | 0.68            |
| Legally Married          | 0.31            | 0.32            | 0.62            | 0.59            |
| EI Recipient             | 0.25            | 0.27            | 0.20            | 0.20            |
| N                        | 11510           | 12540           | 43945           | 38385           |
| N-years                  | 263715          | 180155          | 802080          | 577060          |

**Notes:** This table reports the summary statistics of the sample (30%) for the treated and control group for the entire period 2001-2019. All dollar values are in 2021 dollars and are rounded to comply with Statistics Canada rules. Standard deviations are in brackets for continuous variables.

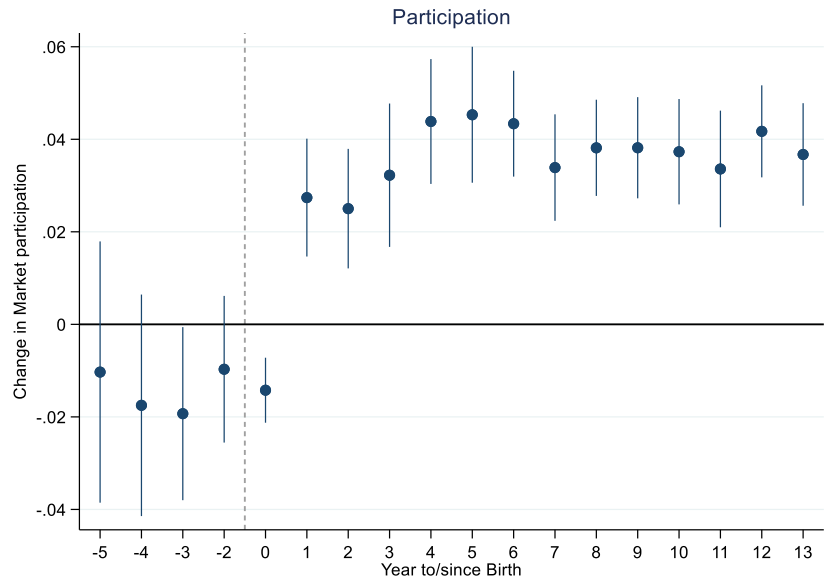
## Appendix

Figure A1. 1: Difference-in-differences raw estimates - Employment Earnings



**Notes.** Difference-in-differences raw estimates and 95 percent confidence intervals of the impact of QPIP on the annual employment earnings. Earnings are adjusted to 2021 dollars. Standard errors are adjusted for clustering on the province and cohort (based on the year of first birth). Sample mothers who had a first birth between 20 and 35 years.

Figure A1. 2: Difference-in-differences raw estimates - Market Participation



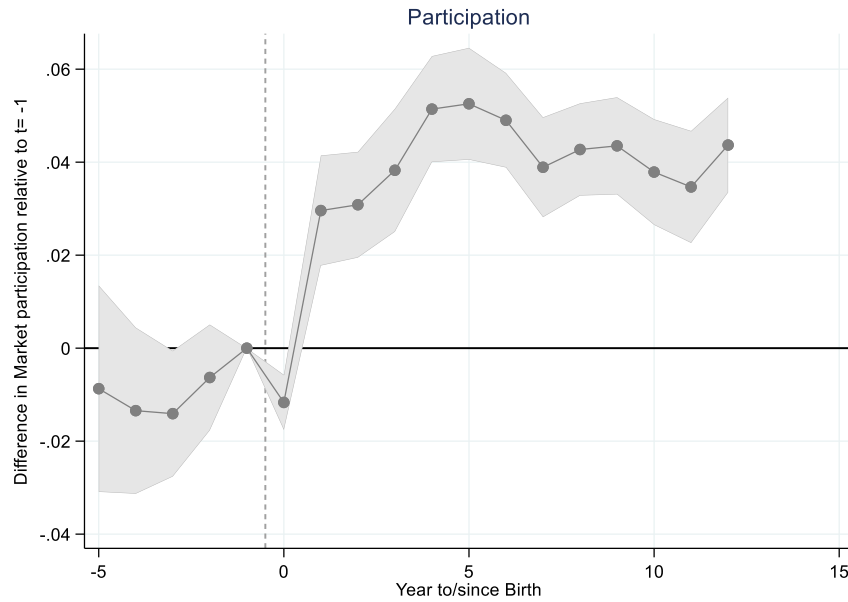
**Notes.** Difference-in-differences raw estimates and 95 percent confidence intervals of the impact of QPIP on labour market attachment. Labour market attachment here is defined as receiving at least \$1 in employment income in a given year. Standard errors are adjusted for clustering on the province and cohort (based on the year of first birth). Sample mothers who had a first birth between 20 and 35 years.

Figure A1. 3: Sensitivity Difference-in-differences estimates – Employment Earnings



**Notes.** Difference-in-differences estimates and 95 percent confidence intervals of the impact of QPIP on the annual employment earnings. Earnings are adjusted to 2021 dollars. Standard errors are adjusted for clustering on the province and cohort (based on the year of first birth). Sample mothers who had a first birth between 20 and 45 years.

Figure A1. 4 Sensitivity Difference-in-differences estimates – Market Participation



**Notes.** Difference-in-differences estimates and 95 percent confidence intervals of the impact of QPIP on labour market attachment. Labour market attachment here is defined as receiving at least \$1 in employment income in a given year. Standard errors are adjusted for clustering on the province and cohort (based on the year of first birth). Sample mothers who had a first birth between 20 and 45 years.

## **Chapter 2**

---

### **Residency-Based Pension Policies: Implications for Immigrant Seniors' Employment and Pension Receipt**

#### Abstract

Historical increases in immigration to OECD countries are leading to increasing shares of immigrants entering retirement and taking up public pensions. In Canada, a traditional immigrant receiving country, 17.0% of non-immigrants were over age 65 in 2021, whereas 23.6% of immigrant residents were in that age category. Yet little is known about immigrants' retirement patterns, especially given incentives associated with public pension eligibility criteria for those who arrive later in life. For example, in Canada immigrants must arrive younger than age 26 to obtain full public pension benefits at age 65. We document immigrant retirement and public pension take-up patterns, and examine a key constraint associated with public pension eligibility. Paradoxically, we observed that immigrants who arrive in Canada younger than age 40, especially those from the economic immigration class, have higher employment rates in their late fifties than do Canadians at birth. Immigrants who arrive later in life and have more severe public pension restrictions have lower employment rates. The influence of age at immigration seems to dominate the incentives from public pensions eligibility. Further, a 10-year minimum residency for any public pension receipt appears to be an important threshold affecting the behaviour of immigrants who arrive late in life.

## 2.1. Introduction

Immigrants, like non-immigrants, age and in due course retire from the workforce. However, while much economics research focuses on prime-age immigrants' workforce integration and related issues as surveyed in Chiswick and Miller (2015) and Edo et al. (2020), and there is a large literature looking at retirement and public pensions surveyed by Lumsdaine and Mitchell (1999), and Gruber and Wise (1999), little is known about potential differences in immigrant and non-immigrant retirement patterns and potential intersections with public pension systems. What little research looks at immigrant public pension take-up tends to address it as an element of the fiscal impacts of immigration (OECD 2013; Zhang, Zhong, & Chardon 2020). Nevertheless, understanding the behaviour and well-being of immigrant seniors is an increasingly important issue in Organization for Economic Cooperation and Development (OECD) countries, which have growing and aging immigrant populations (OECD 2023).

As a traditional immigrant receiving country, an aging immigrant population is particularly evident in Canada. Unsurprisingly, the 2021 Census (Statistics Canada 2023) showed that immigrants comprised 22.2% of the permanent resident population age 64 and under, but less appreciated is that immigrants also comprised 30.0% of those age 65 and above. Put another way, while 17.0% of the non-immigrant Canadian population is over age 65, 23.6% of the immigrant population are in that age category. It is surprising that very little economics research has been undertaken regarding immigrant seniors and their experiences, especially with respect to labour market activities and public pension take-up.



One factor influencing seniors' retirement decisions is public pension eligibility, which is correlated with immigration characteristics. In Canada, the criteria for accessing public pensions include a ten-year residency requirement for eligibility for a reduced public pension, named Old Age Security (OAS), with the pension amount increasing with each year of residency until the full benefit is obtained after 40 years. For families with low incomes, a Guaranteed Income Supplement (GIS) tops up the OAS payment for those who are OAS eligible.

We examine the differentials in immigrant and non-immigrant seniors' employment and take-up after crossing the age-65 eligibility threshold for public pension receipt. The link between residency requirements for public pension benefits, and immigrant seniors' employment and take-up decisions are also examined, as are variations across sex, immigration entry class and age-at-immigration. We implement two econometric strategies. First, we utilize an event study framework to explore how crossing the eligibility threshold affects the employment and take-up decisions of immigrant seniors relative to their non-immigrant counterparts. Next, we use a regression discontinuity design to compare the outcomes of observationally equivalent immigrants who are just above or below the ten-year rule threshold.

The rest of the paper is organized as follows: in section 2, we provide an overview of the key features and policy parameters of the OAS and GIS, as well as the CPP, programs. In section 3, we describe the data we use and our selection of the sample for analysis, and present descriptive statistics. Section 4 presents our econometric framework and

discusses our results. Finally, in section 5, we conclude by discussing the policy and welfare implications of our findings.

## **2.2. Policy Environment**

Canada's retirement income system has three public pension pillars, plus tax incentives to encourage private pension savings. The public pension system comprises, first, the non-contributory, tax-financed Old Age Security (OAS), available to individuals over 65 who meet permanent residency requirements. Second is the Guaranteed Income Supplement (GIS) designed to support seniors in low-income families, including allowances for widows/widowers and younger spouses of eligible partners. A third component is the Canada (which covers all provinces other than Québec) and Québec Pension Plans (CPP and QPP), which are contributory and earnings-related public pension schemes. Because they are contributory, their benefit-eligibility schedule depends on one's contributory work in Canada. They do not impose residency requirements. The standard eligibility age for take-up is age 65, but early (delayed) commencement is available with actuarial penalties (rewards) from age 60 (to age 70). There is no advantage to commencement after 70. For immigrants who arrived and began working in Canada later in life, the financial advantage of postponing CPP benefits and working an additional year is higher than that for those with significant work histories in Canada. Parallel to the mandatory public system, is the tax treatment of employer-sponsored registered pension plans (RPPs) and personal retirement savings vehicles such as Registered Retirement Savings Plans (RRSPs). Additionally, various tax credits and provincial low-income supplement programs cater to individuals over 65.

OAS and the GIS, funded by general tax revenue, form an income floor for those over age 65 and constitute Canada's largest transfer expense to individuals (Department of Finance Canada, 2021). In this paper, we restrict our attention to the public pension system and focus on the OAS and GIS since the CPP is close to actuarially fair. The CPP/QPP program only factors into our empirical analysis insofar as the accrual effect from generating additional entitlements from an additional year of work affects seniors' employment decisions, and CPP payments may affect OAS/GIS tax-back amounts.

To receive the OAS demogrant, one must have resided in Canada for at least ten years after age 18. Benefits are prorated with the maximum benefit obtained after 40 years of residency. OAS benefits are person-specific and subject to taxation. In 2022, the maximum monthly benefit of \$642.25 was provided to individuals whose net income from the previous year did not exceed \$79,845. Recipients whose net income exceeded this threshold were subject to a federal withholding tax of 15% on their OAS benefits. Hence, benefits were zero for net income beyond \$133,141, but this affects well less than 5% of relevant tax-filers. Since 2013, a policy shift permitted optional OAS deferral to, at most, the age of 70, with an increase of 0.6% per month and phased-in automatic enrollment for eligible 65-year-olds.

Within the OAS program is the GIS for low-income families (singles or couples), which is determined based on the combined net income of the individual and, if present, their spouse in a marriage or common-law partnership. The GIS's eligibility criteria are similar to OAS, but permanent residents can receive a full GIS after ten years of permanent residency. The GIS has a provision, known colloquially as the "super GIS," that is particularly important

for immigrant seniors' in receipt of partial OAS benefits. It tops up their GIS benefits to match full OAS amount (Baldwin & Shillington, 2017). GIS eligibility requires, for single individuals in 2022, a net income of \$19,464 or less and, for couples, a net income of \$25,728 or less if each spouse receives OAS and \$46,656 or less if only one receives OAS. GIS benefits are subject to a 50% tax-back on net income, excluding OAS, in excess of an earnings exemption. The maximum monthly GIS supplement in 2022 was \$1,219.68. GIS benefits are considered non-taxable with respect to personal income tax. Both OAS and GIS are adjusted quarterly for inflation.

OAS is akin to parts of the U.S.'s Old Age, Survivors, and Disability Insurance (OASDI) program, which legislates similar requirements, but unlike the U.S.'s OASDI program, OAS is a pure demogrant. OAS is similar to Australia's Age Pension, New Zealand's Superannuation, and the U.K.'s State Pension. GIS benefits, however, differentiate Canada's federal income support system for seniors from those in these latter countries. However, the GIS is similar to the Supplemental Security Income (SSI) program in the U.S.

### **2.2.1 Incentives and the Research Literature**

Immigrant seniors' post-age 65 employment and take-up incentives vary considerably by the years since landing as it relates to OAS and GIS eligibility. Those who by age 65 have at least 40 years of permanent residency in Canada face a similar set of incentives as non-immigrants: an income effect arising from OAS and GIS that may hasten retirement; and, for those who work beyond age 65, a substitution effect, arising from the OAS recovery tax and GIS claw-back, that tends to incentivize retirement. For immigrant

seniors with less than 40 years of residency, however, the GIS substitution effect on workers is likely much higher due to the higher average claw-back rate on the super GIS provision. It is predicted that employment more steeply declines for these immigrants compared to those with more years of residency and non-immigrants. A similar result is observed by Kaushal (2009), who finds that, given eligibility, immigrant seniors reduce their labour supply once they receive U.S.'s SSI benefits. Like SSI benefit eligibility, GIS benefits can only be received after ten years of residency. However, an important difference is that a low-income immigrant senior may receive the full inflation-indexed GIS benefit plus the super GIS, conditional on satisfying low-income eligibility criteria. Immigrant seniors in receipt of both a prorated OAS and the super GIS face a larger substitution effect on their labour supply compared to that of non-immigrants in receipt of the full OAS since the federal tax-back rate on GIS is much higher than that of OAS. These incentive effects on employment exit are stronger than those imposed by the SSI. It is expected that crossing the age-eligibility threshold for OAS and GIS hastens employment exit for immigrants with less than 40 years of residency compared to non-immigrants.

This paper is closely related to Borjas (2011), which uses pseudo cohorts generated from U.S. Censuses. However, our analysis uses the Canadian administrative tax data to construct and track separate employment and public pension take-up age profiles for non-immigrants and immigrants, spanning ages 50-75. In addition, our analysis relies on weaker identification assumptions. In particular, using a regression discontinuity design at the residency requirement threshold provides credible evidence about the causal effects of this eligibility criterion on immigrants' employment decisions. Another closely related study is

Lopez and Slavov (2021), who conducted a panel analysis of older immigrants' social security take-up decisions compared to the native-born in the U.S. using the Health and Retirement Study (HRS). Our empirical approach is similar and has the advantage of comparing immigrants labour supply separating age-at-arrival groups, immigration class and gender, which provides useful policy input since the level of benefit eligibility is a function of age-at-arrival and since there are marked differences between men and women in the labour market.

Although not directly relevant to our work, some research points out the importance of the multi-generational dynamics tying together immigration and public pensions, with the latter normally being flow-through – that is, current benefits are paid out of current taxes as is the case in Canada. In a theoretical overlapping generations framework, Razin and Sadka (1999) point out that a cohort of immigrants arriving in their working years subsidizes the pensions of older cohorts of domestic retirees. This immigrant cohort in turn ages and retires, and a new/younger cohort of immigrants is required to subsidize their pensions so as to avoid negative welfare consequences for the receiving country.

Relative to the scant existing literature, our contribution is twofold. First, we provide additional insights into heterogeneity across age-at-immigration groups, immigration class and gender. We also provide the first causal estimates of the effect of residency requirements on immigrant seniors' employment and benefit take-up decisions. Overall, we find that immigrant seniors' employment decisions are sensitive to crossing the age-65 eligibility threshold for OAS and GIS and the ten-year residency requirements threshold.

Since immigrant seniors' take-up of GIS is higher than that of non-immigrants, the super GIS provision, which elicits large substitution effects on labour supply, appears to be a driving factor in immigrant seniors' decision to reduce their employment in response to these eligibility-threshold criteria. Similar to Borjas (2011), we find that the labour supply among immigrant seniors is higher than that of their native-born counterparts. However, somewhat paradoxically, this is only the case for those who arrived at a younger age and are less subject to eligibility and entitlement limitations. It also varies markedly by immigration class. Further, like Borjas we observe that after crossing the residency requirement threshold for eligibility immigrant labour supply falls.

### **2.2.2 Labour Supply Incentives as a Function of Years Since Landing**

The post-age 65 labour supply incentives vary by years-since-landing. Consider three illustrative cases. The first case is immigrants who by age 65 have reached at least 40 years of permanent residency in Canada. These immigrants face a similar set of incentives as non-immigrants at age 65: an income effect arising from OAS and GIS that may tend to hasten retirement; and, for those who work beyond age 65, a substitution effect arising from the OAS recovery tax and GIS claw-back, that tends to incentivize retirement. Second, for immigrants who are not in low-income families and who have more than ten, but less than 40, years of residency by age 65, labour supply incentives may differ from those of non-immigrants after age 65 due to the OAS proration. If immigrants receive a prorated OAS at age 65, then the income effect at age 65 is lower than those with the full benefit. However, it may still hasten retirement. If the person's income is high enough, but not so high that OAS

is driven to zero, there will also be an earning disincentive from the OAS recovery tax. Third, if the immigrant with less than 40 years of residency is in a low-income family and GIS is applicable, then the super GIS top-up matches what they would receive in OAS benefits if they had 40 years of residency. However, with the 50% claw-back rate on GIS benefits, the super GIS strongly incentivizes less labour supply for such individuals.

## **2.3. Data and Descriptive Statistics**

### **2.3.1 Data Source and Sample Selection**

This paper utilizes Statistics Canada's Longitudinal Administrative Databank (LAD), an anonymized panel that includes 20% of tax filers. The study covers the years 1982 through 2019, with annual updates to ensure national representation. Once included in the LAD, tax filers are tracked longitudinally until they stop filing income tax. The LAD provides not only income tax-related data but also information on transfer income, demographic and geographic characteristics reported at the time of tax filing, and immigration applications. For immigrants who became permanent residents after 1952, there is a landing year variable, and detailed landing information is available for those who arrived after 1980. We define employment as having at least one dollar of employment income in the tax year.

For the analysis, we select a 5% random sample from the LAD's registry file of tax filers aged 50-75 in the years 1986 to 2019. We then follow each from age 50 to 75, or until the end of the data period, with the restriction that there must be observations up to age 61 (a year after Canada's minimum pension take-up age). Hence, those who have died, emigrated from Canada or otherwise stopped filing income tax before age 61 are excluded



from the analysis. Putting the boundary conditions differently, we restrict the sample to those born between 1936 and 1958: those born in 1936 were 50 in 1986 and 75 in 2011; those born in 1944 were 50 in 1994 and 75 in 2019; and those born in 1958 were 50 in 2008 and 61 in 2019. We allow for late-age-arrival immigrants to enter the sample after age 50. Our sample is 77% non-immigrant and 22% immigrant. From this total, for non-immigrants and immigrants who landed at or before age 50, we drop those not filing income tax at age 50. We also restrict the sample to those who are not sporadic filers (removing those with at least two consecutive years alive but not filing), which amounts to 7.2% of the initial sample. For those missing an income tax record for an individual year, we impute the missing incomes by source by averaging adjacent years. After applying these restrictions, the analysis sample consists of 82,975 cross-sectional units and 1,699,640 person-year observations.

Table 2.1 provides a breakdown of the sample's characteristics. Among women, immigrants make up 21% of the sample, with 10% being pre-1980 arrivals. About 5% are from each of the economic and family class immigration streams. When we focus on immigrants who arrived after 1980 and for whom we have detailed immigration information, 43% are from the family class, 40% are from the economic class, and 13% are refugees. The 'others' category, which includes humanitarian and compassionate cases and the backlog clearance programs, represents a small proportion of immigrants and is therefore excluded from the remainder of the analysis. The distribution of men is similar, with a higher proportion of immigrants from the economic class.

### 2.3.2 Age Profiles of Employment and Public Pension Take-Up and Income

Several interesting patterns emerge from age profiles of employment, and OAS and GIS take-up. Figure 2.1 documents the age-employment profile of seniors by immigration status, sex, landing age and immigration category. The top panel focuses on those who immigrated before age 40, the bottom panel those who migrated at age 40 or older. The left panel represents men while the right panel is for women. Focusing on men, we observe noticeable differences in the employment rates of immigrants by age at immigration and immigration class. Immigrant men who arrived before 40 are similarly likely to be employed in their early to mid-50s regardless of group. For example, at age 55, the employment rate of immigrant men who arrived before 1980 is about 90% whereas, for non-immigrants it is 89%. However, starting shortly after age 55, immigrant men are more likely to be employed until about age 67 (longer for economic class immigrants). For those who immigrated after 40 years, the pattern is quite different. Non-immigrant males are more likely to be employed both pre- and post-65, with a larger gap post-65. All groups experience a decline in their employment probabilities as they age but the decline is larger for refugees and family sponsored immigrants.

Women who migrated before age 40 in the family class or as refugees are less likely to be employed in the early 50s, but we observe crossover points as immigrant women's employment rates in all categories decline more slowly than that of their non-immigrant counterparts. Like their male counterparts, women who immigrated after the age of 40 have lower employment rates at all ages when compared to non-immigrants. In particular,

women in the refugee class have significantly lower employment at all ages. Consistent with Schaafsma and Sweetman's (2001) conclusion that younger, and especially very young, immigrants tend to have comparably better labour market outcomes than those of natives, we find that for both men and women, individuals who arrived before age 40 have higher employment rates (see also Sweetman and van Ours 2015). For all groups, we observe that immigration class is a strong predictor of employment and immigrants in the refugee category are less likely to be employed both pre- and post-65 years, especially after the age of public pension eligibility.

Figure 2.2 documents the OAS take-up probability by landing age, sex and immigration category. We observe marked differences in the probability of OAS receipt among the immigration categories. For both men and women, those who arrived before age 40, are similar to non-immigrants except for immigrants from the economic class who are less likely to use OAS at all ages. This could be because this group have higher incomes coming from their years in the Canadian labour market. In the first few years after reaching the age of OAS eligibility, we observe very little differences between immigrants who arrived before 1980 and their non-immigrant counterparts. This is because this group are more likely to have arrived young and would have faced similar experiences as the non-immigrants and therefore, more likely to meet the residency requirement. For men, the OAS take-up for these groups converge at age 70. We experience an earlier convergence point for women at age 67. As expected, virtually all non-immigrants, and immigrants who landed early in life, commence receipt of OAS benefits at age 65.

Figure 2.3 shows the probability of GIS receipt, which is also a marker of low-income status. For immigrants who arrived younger than age 40, we observe that non-immigrants and those who landed before 1980 have GIS take-up rates that are very similar, and the lowest among the five groups. This could be partly because this group is eligible for the full OAS benefits. However, immigrants who arrived before 1980, but were older than age 40 at arrival have GIS take-up rates that, while still lower than other immigrant's, are markedly above those of Canadians at birth. The largest beneficiaries of the GIS benefits are immigrants from the refugee class. This is no surprise given the lower employment probabilities shown above. Figures 2.2 and 2.3 indicate that both age-at-immigration and immigration class are predictors of public pension take-up.

## **2.4. Empirical Analysis**

### **2.4.1 Effects of Residency Requirements on Outcomes**

To examine the effects of residency requirements on immigrant seniors' employment and take-up decisions, we employ an event study in years since landing (YSL) for a sample of those aged 65 and over. In this framework, we estimate differences in outcomes for landed immigrants relative to comparable Canadians at birth, with a focus on years before and after the ten-year residency requirements threshold. We stratify the sample on gender and immigration class, omitting those who migrated before 1980 because we do not have detailed information about their immigration class. From Figure 2.1, the results indicate that immigrants who arrived before 1980 are similar to the non-immigrant group. We estimate the following equation:

$$y_{it} = \alpha_0 + \sum_{ysl=1}^{40} \beta_{ysl} YSL + X_{it}\Gamma + \epsilon_{it} \quad (1)$$

where  $y_{it}$  is the outcome of an individual at time  $t$ .  $YSL$  is a vector of year-since-landing indicators (event indicators). The main object of interest is the set  $\beta_{ysl}$ , which captures the effects of years-since-landing. Therefore,  $\beta_{ysl}$  captures the mean difference in outcomes at each year since landing when compared to similar non-immigrants. We include controls for age, marital status, province and, having made RPP or RRSP contributions or filed a Pension Adjustment at ages 50-55. Standard errors are clustered at the individual level.

Figure 2.4 presents the event study estimates by immigration category for family and economic class immigrants, and refugees. We find evidence that crossing the ten-year residency requirement threshold reduces immigrant seniors' relative employment probabilities, especially for family-class immigrants, with effects also apparent for economic-class immigrants and male refugees. For the family class, landed immigrants aged 65 and over with less than ten years of permanent residency have higher employment probabilities for both men and women. Given the scale, these magnitudes are quite substantial. Further, upon crossing the threshold, there is a roughly 20 percentage point drop in the employment probability. This difference converges to zero after 25 years of permanent residency. In the initial years, economic-class immigrants have a higher probability of employment, although it is not statistically significant in most individual years; however, crossing the threshold reduces the employment probability. This result suggests that the residency requirement eligibility threshold for OAS and GIS receipt impacts

employment decisions. Refugees have consistently lower employment probabilities than Canadians at birth, although a drop still can be seen at the ten-year mark for men, with no comparable drop for women.

In Figure 2.5, we similarly look at OAS receipt for this over age 65 population. The probability of OAS receipt increases dramatically as each group of immigrants crosses the ten-year residency requirement, but there are differences by immigration class. For both genders, family class immigrants and refugees each have OAS take-up rates indistinguishable from those of Canadians at birth within a few years of crossing threshold. However, many in the economic class appear to never receive OAS benefits, possibly because their incomes are more likely to be above the maximum threshold for receipt than is the case for the average Canadian at birth.

The findings on GIS take-up among immigrant seniors, as shown in Figure 2.6, present a different pattern. The results indicate that, relative to similar Canadians at birth, the probability of GIS take-up increases for all immigration categories immediately after crossing the ten-year threshold. This increase is particularly pronounced for family-sponsored immigrants and refugees. For instance, men in these groups experience up to roughly 75 percentage point increases in GIS take-up. For family and economic class immigrants, this difference diminishes with increasing YSL and becomes statistically insignificant by around 35 YSL, when immigrants are less reliant on super GIS as they will have attained eligibility for close-to-full OAS. For refugees, we observe a higher probability of GIS receipt event after 40 years since landing. These results suggest that a substantial

proportion of immigrant seniors are more likely to find themselves in low income than comparable Canadians at birth. For the economic class, although some individuals have extremely good outcomes as inferred from Figure 2.5, clearly the other end of the income distribution is also thicker than that of Canadians at birth with substantially higher and sustained low-income rates. Low-income economic class immigrants are also more likely to receive GIS because of the higher claw-back rate they face on GIS and the OAS recovery tax. These findings have significant implications for immigration policy and social welfare programs in Canada.

In summary, labour supply is particularly sensitive to the ten-year eligibility rule among those from the Family Class. In addition, those from the Family Class, Live-in Caregiver, and Refugee admission categories have the highest rates of GIS income receipt. These results are unlike Ostrovsky's (2012) analysis of younger, working-age immigrants, who found that their labour supply and probability of making Employment Insurance claims are not sensitive to years of permanent residency following entrance into the Canadian labour market. On the other hand, the results are related to Zhang, Zhong, and de Chardon's (2020) life-cycle analysis, which indicates that family-class immigrants and Refugees have lower net direct fiscal contributions (income taxes paid net of transfers received) than other immigration categories, especially after the natural retirement age, which is likely due to lower labour supply and higher levels of GIS receipt.

### 2.4.2 Regression Discontinuity Design

We implement a regression discontinuity design (RDD) that explicitly compares immigrant seniors who have been in Canada just short of ten years with those who have crossed that threshold. This strategy answers the question of how eligibility for OAS and GIS, based on the ten-year rule, affects employment and take-up outcomes. The argument in favour of interpreting the coefficient estimates as causal effects is that if not for the ten-year rule, there should be no reason why the outcomes vary discontinuously at any value of years-since-landing. We estimate the RDD using both local linear and quadratic specifications of the following form:

$$y_{it} = \alpha_{it} + \tau D_{it} + \beta_1(YSL_{it} - c) + \beta_2 D_{it} * (YSL_{it} - c) + \beta_x X_{it} + \epsilon_{it} \quad (2).$$

In equation (2),  $y_{it}$  represents either an indicator variable for having positive employment income or receiving GIS benefits. The ten-year residency requirement threshold is represented by  $c$ , and  $D$  is an indicator equal to one if years-since-landing,  $YSL$ , is greater than or equal to  $c$  (i.e., 10) such that, letting  $b$  represent the bandwidth,  $c - b \leq YSL \leq c + b$ . We use Calonico, Cattaneo, and Titiunik (2014), and Pei et al.'s (2022) bandwidth selection criteria. We include a set of indicators for being married, and province of residence.

The benefit of using the local linear specification is that it reduces some bias that may arise when using data that is farther away from the threshold. However, a required assumption is that treatment assignment must be “as good as random” at the threshold, which ensures that treatment status is exogenous (e.g., Imbens & Lemieux, 2008). In the



case of the ten-year residency requirement rule, we consider the threshold to be clearly exogenous, a contention supported by there being no discrete change in immigrant characteristics at the threshold.

The estimates from the regression discontinuity exercise are presented in Table 2.2. It shows the estimates in a multivariate context of the average treatment effect on immigrant seniors' outcomes by crossing the ten-year threshold. The results suggest that crossing the ten-year threshold does not have a statistically significant impact on immigrant seniors' post-65 employment probabilities for men, although there is some evidence of a 3.1 percentage point drop for women. In contrast, for OAS, we find that crossing the residency requirement increases the OAS receipt probability by 8.9 percentage points for men and 10.7 percentage points for women. Similar results to OAS are observed for GIS. These results are broadly consistent with Figures 2.1, 2.2 and 2.3, although those figures focus on age and not years since migration. There is no obvious sharp discontinuity in employment probabilities in Figure 2.1 for any of the groups – including Canadians at birth and immigrants will arrive before 1980, who would be eligible for OAS that point. Although some groups appear to have a change in slope at age 65, there is no marked discontinuity. In contrast, Figures 2.2 and 2.3 both show strong discontinuities at age 65. Although the RDD and these figures have different running variables, the basic pattern is consistent. Employment is a slowly moving variable, whereas benefit eligibility thresholds induce a sharp discontinuity.

## 2.5. Conclusion

In most high-income countries, the proportion of immigrants among the senior population has been increasing. Therefore, addressing disparities in public pension eligibility and constraints requires attention to structural inequities and policy interventions aimed at promoting economic security for vulnerable populations. We use Canadian administrative tax data to construct separate employment and public pension take-up age profiles, spanning ages 50-75, for immigrants and non-immigrants by age at arrival. We observe how reaching age 65 affects immigrants' employment and public pension take-up compared to non-immigrants by sex and immigration class. We provide evidence on how different the age-outcome profiles are for seniors based on gender, immigration status, age at landing and immigration class.

Two empirical strategies are employed to provide multiple lines of evidence. First, using an event study approach, we compare post-age 65 employment and benefit take-up outcomes of immigrants as they cross the ten-year threshold to those of non-immigrants. Second, we use a regression discontinuity design to compare outcomes between observationally equivalent immigrants who are just above or below the threshold. Our results suggest that immigrant seniors' employment decisions are sensitive to eligibility for OAS and GIS, and eligibility induces rapid benefit take-up, but there is no sharp discontinuity in employment. We also find that the impact varies by immigration category. The super GIS provision, which elicits large substitution effects on labour supply, appears to be a driving factor in immigrant seniors' decision to reduce their employment in response to crossing these eligibility thresholds.



## 2.6 References

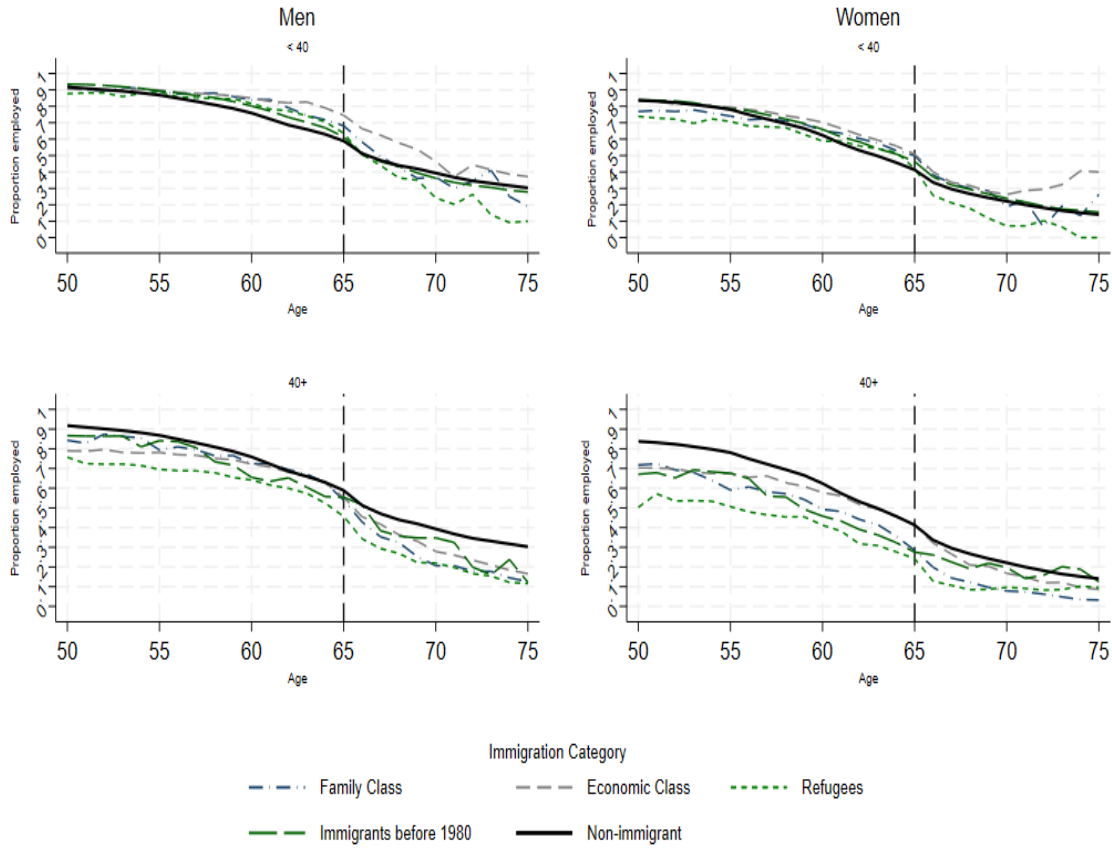
- Abdul-Razzak, N., Osili, U. O., & Paulson, A. L. (2015). Immigrants' Access to Financial Services and Asset Accumulation\*. In B. R. Chiswick and P. W. Miller (Eds.), *Handbook of the Economics of International Migration* (Vol. 1, pp. 387–442). North-Holland. <https://doi.org/10.1016/B978-0-444-53764-5.00008-6>
- Baker, M., Gruber, J., & Milligan, K. (2001). The Retirement Incentive Effects of Canada's Income Security Programs. *Social and Economic Dimensions of an Aging Population Research Papers*, Article 65. <https://ideas.repec.org//p/mcm/sedapp/65.html>
- Baldwin, B., & Shillington, R. (2017). Unfinished Business: Pension Reform in Canada. <https://irpp.org/research-studies/unfinished-business-pension-reform-in-canada/>
- Blundell, R., French, E., & Tetlow, G. (2016). Chapter 8—Retirement Incentives and Labor Supply. In J. Piggott and A. Woodland (Eds.), *Handbook of the Economics of Population Aging* (Vol. 1, pp. 457–566). North-Holland. <https://doi.org/10.1016/bs.hespa.2016.10.001>
- Bodvarsson, Ö. B., Simpson, N. B., & Sparber, C. (2015). Migration Theory\*. In B. R. Chiswick and P. W. Miller (Eds.), *Handbook of the Economics of International Migration* (Vol. 1, pp. 3–51). North-Holland. <https://doi.org/10.1016/B978-0-444-53764-5.00001-3>
- Borjas, G. J. (2011). Social Security Eligibility & the Labor Supply of Older Immigrants. *Industrial and Labor Relations Review*, 64(3), 485–501.
- Calonico, S., Cattaneo, M. D., & Titiunik, R. (2014). Robust Nonparametric Confidence Intervals for Regression-Discontinuity Designs. *Econometrica*, 82(6), 2295–2326. <https://doi.org/10.3982/ECTA11757>
- Chiswick, B. R., & Miller, P. W. (2015). Chapter 5—International Migration and the Economics of Language. In B. R. Chiswick and P. W. Miller (Eds.), *Handbook of the Economics of International Migration* (Vol. 1, pp. 211–269). North-Holland. <https://doi.org/10.1016/B978-0-444-53764-5.00005-0>
- Department of Finance. (2021). Annual Financial Report of the Government of Canada Fiscal Year 2020-2021. <https://www.canada.ca/en/department-finance/services/publications/annual-financial-report/2021/report.html>
- Docquier, F., & Rapoport, H. (2012). Globalization, Brain Drain, and Development. *Journal of Economic Literature*, 50(3), 681–730. <https://doi.org/10.1257/jel.50.3.681>
- Edo, A., Ragot, L., Rapoport, H., Sardoschau, S., Steinmayr, A., & Sweetman, A. (2020). An introduction to the economics of immigration in OECD countries. *Canadian Journal of Economics/Revue Canadienne d'économique*, 53(4), 1365–1403. <https://doi.org/10.1111/caje.12482>

- Government of Canada, S. C. (2023). Immigrant status and period of immigration by gender and age: Canada, provinces and territories. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=9810034701>
- Gruber, J., & Wise, D. (1999). Introduction to “Social Security and Retirement around the World” (pp. 1–35) [NBER Chapters]. National Bureau of Economic Research, Inc. <https://econpapers.repec.org/bookchap/nbrnberch/7247.htm>
- Gustafsson, B., & Österberg, T. (2001). Immigrants and the public sector budget – accounting exercises for Sweden. *Journal of Population Economics*, 14(4), 689–708. <https://doi.org/10.1007/s001480000043>
- Imbens, G. W., & Lemieux, T. (2008). Regression discontinuity designs: A guide to practice. *Journal of Econometrics*, 142(2), 615–635. <https://doi.org/10.1016/j.jeconom.2007.05.001>
- Kaushal, N. (2010). Elderly immigrants’ labor supply response to supplemental security income. *Journal of Policy Analysis and Management*, 29(1), 137–162. <https://doi.org/10.1002/pam.20482>
- Krieger, T. (2005). *Public pensions and immigration: A public choice approach*. Cheltenham, UK ; Northampton, MA : E. Elgar. <http://archive.org/details/publicpensionsim0000krie>
- Krueger, A. B., & Meyer, B. D. (2002). Labor supply effects of social insurance. *Handbook of Public Economics*, 4, 2327–2392.
- Liebman, J., & Feldstein, M. (2002). *Social Security* (Vol. 4, pp. 2245–2324). Elsevier.
- Lopez, M. J., & Slavov, S. (2020). Do immigrants delay retirement and social security claiming? *Applied Economics*, 52(10), 1105–1123.
- Lumsdaine, R. L., & Mitchell, O. S. (1999). Chapter 49 New developments in the economic analysis of retirement. In *Handbook of Labor Economics* (Vol. 3, pp. 3261–3307). Elsevier. [https://doi.org/10.1016/S1573-4463\(99\)30040-7](https://doi.org/10.1016/S1573-4463(99)30040-7)
- Matos, A. D. de. (2021). The fiscal impact of immigration in OECD countries since the mid-2000s. OECD. <https://doi.org/10.1787/4ccb6899-en>
- OECD. (2013). The fiscal impact of immigration in OECD countries. In *OECD, International Migration Outlook 2013* (pp. 125–189). OECD. [https://doi.org/10.1787/migr\\_outlook-2013-6-en](https://doi.org/10.1787/migr_outlook-2013-6-en)
- OECD. (2023). *International Migration Outlook 2023*. Organisation for Economic Co-operation and Development. [https://www.oecd-ilibrary.org/social-issues-migration-health/international-migration-outlook-2023\\_b0f40584-en](https://www.oecd-ilibrary.org/social-issues-migration-health/international-migration-outlook-2023_b0f40584-en)

- Ostrovsky, Y. (2012). The dynamics of immigrant participation in entitlement programs: Evidence from Canada, 1993-2007. *The Canadian Journal of Economics / Revue Canadienne d'Economie*, 45(1), 107–136.
- Pei, Z., Lee, D. S., Card, D., & Weber, A. (2022). Local Polynomial Order in Regression Discontinuity Designs. *Journal of Business & Economic Statistics*, 40(3), 1259–1267. <https://doi.org/10.1080/07350015.2021.1920961>
- Razin, A., & Sadka, E. (1999). Migration and pension with international capital mobility. *Journal of Public Economics*, 74(1), 141–150. [https://doi.org/10.1016/S0047-2727\(99\)00038-9](https://doi.org/10.1016/S0047-2727(99)00038-9)
- Schaafsma, J., & Sweetman, A. (2001). Immigrant Earnings: Age at Immigration Matters. *The Canadian Journal of Economics / Revue Canadienne d'Economie*, 34(4), 1066–1099.
- Statistics Canada. (2023). Immigrant status and period of immigration by gender and age: Canada, provinces and territories, Table 98-10-0347-01. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=9810034701>
- Sweetman, A., & van Ours, J. C. (2015). Chapter 21 - Immigration: What About the Children and Grandchildren? In B. R. Chiswick and P. W. Miller (Eds.), *Handbook of the Economics of International Migration* (Vol. 1, pp. 1141–1193). North-Holland. <https://doi.org/10.1016/B978-0-444-53768-3.00021-7>
- Zhang, H., Zhong, J., & de Chardon, C. (2020). Immigrants' net direct fiscal contribution: How does it change over their lifetime? *Canadian Journal of Economics*, 53(4), 1642–1662. <https://doi.org/10.1111/caje.12477>

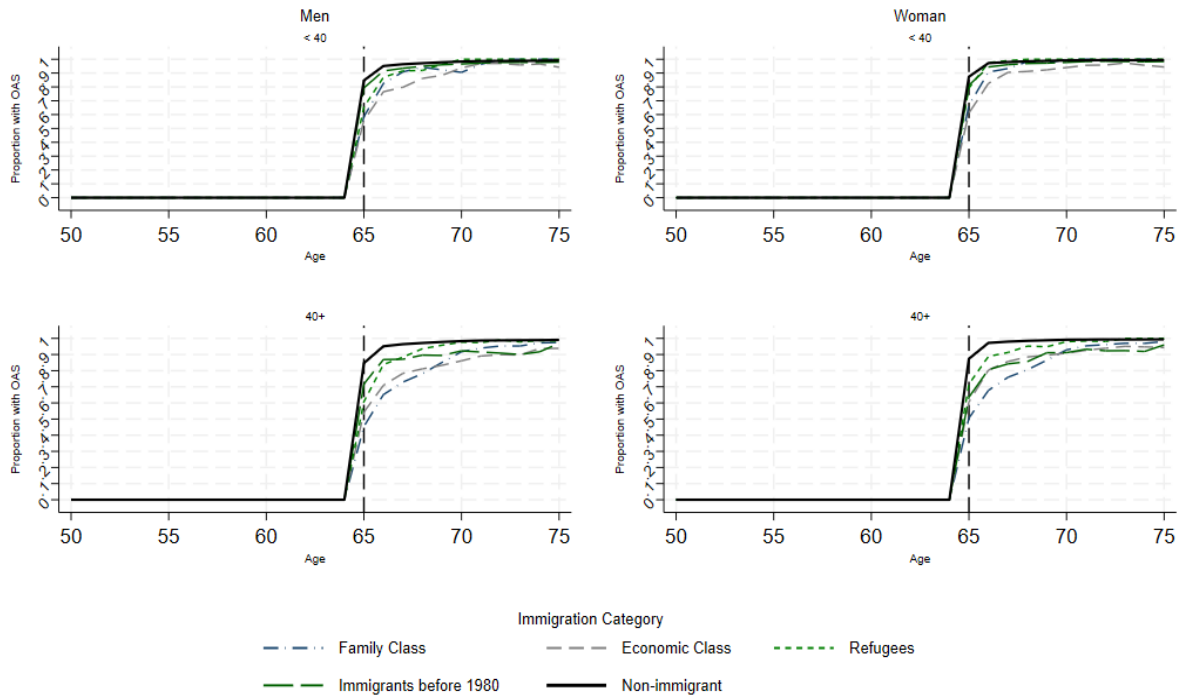
2.7 Tables and Figures

Figure 2.1: Age Profile of Employment Probabilities by Landing Age and Immigrant Status



**Notes:** Author’s calculations using the Longitudinal Administrative Databank. Employment Earnings reflect both T4 earnings and positive self-employment income.

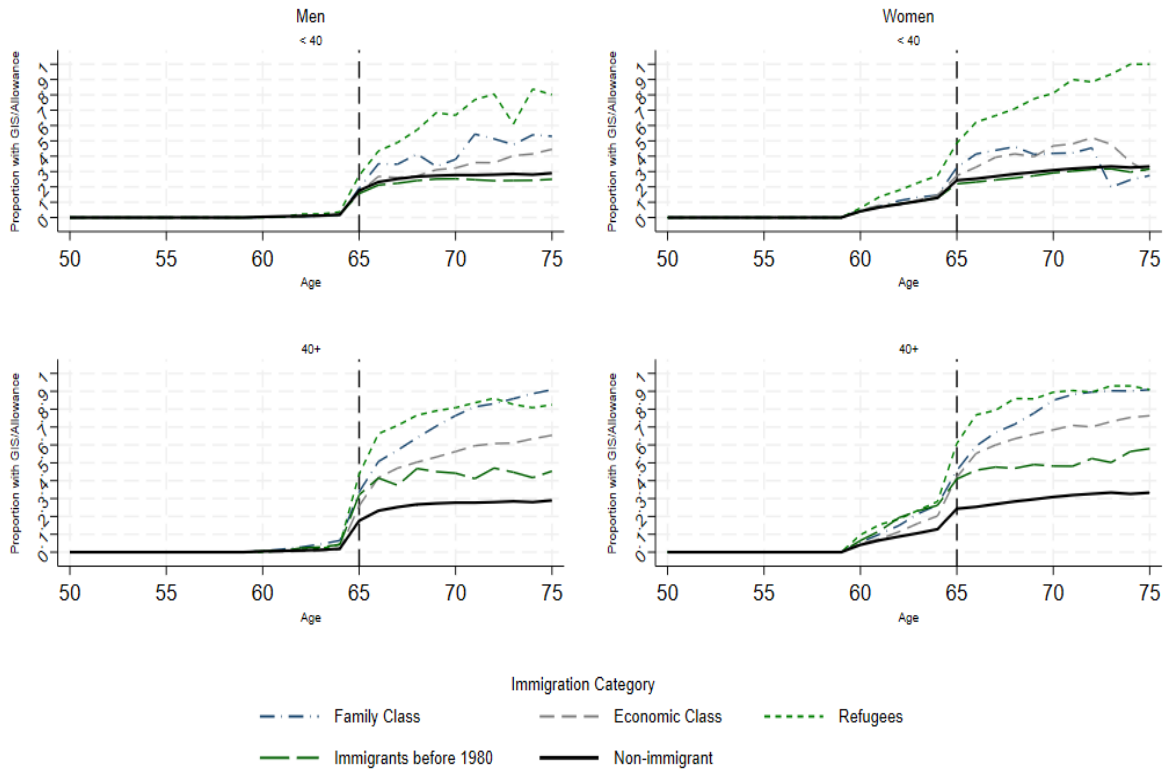
Figure 2.2: Age Profile of OAS Take-Up Probabilities by Landing Age and Immigrant Status



**Notes:** Author’s calculations using the Longitudinal Administrative Databank. Some immigrants in the 60+ landing age group are observed receiving OAS benefits before crossing the ten-year residency requirement threshold. This group is likely from a country of last permanent residency which has a signed Social Security Agreement with Canada.

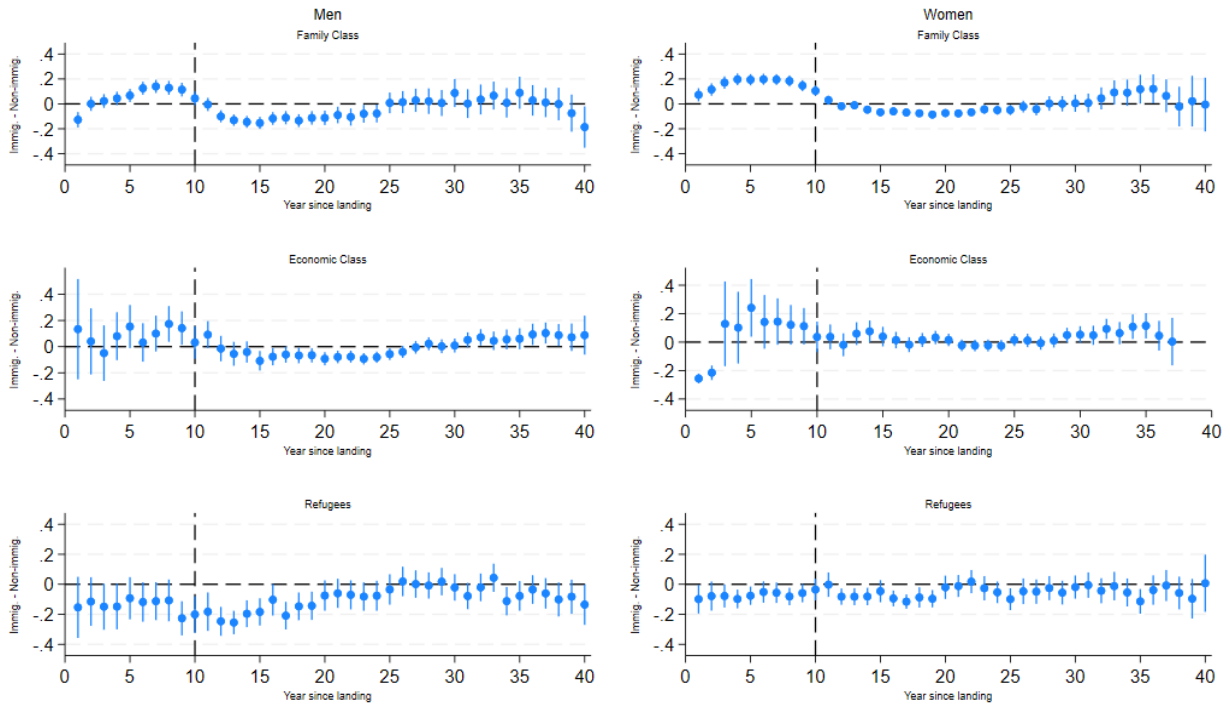


Figure 2.3: Age Profile of GIS/Allowance Take-Up Probabilities by Landing Age and Immigration Status



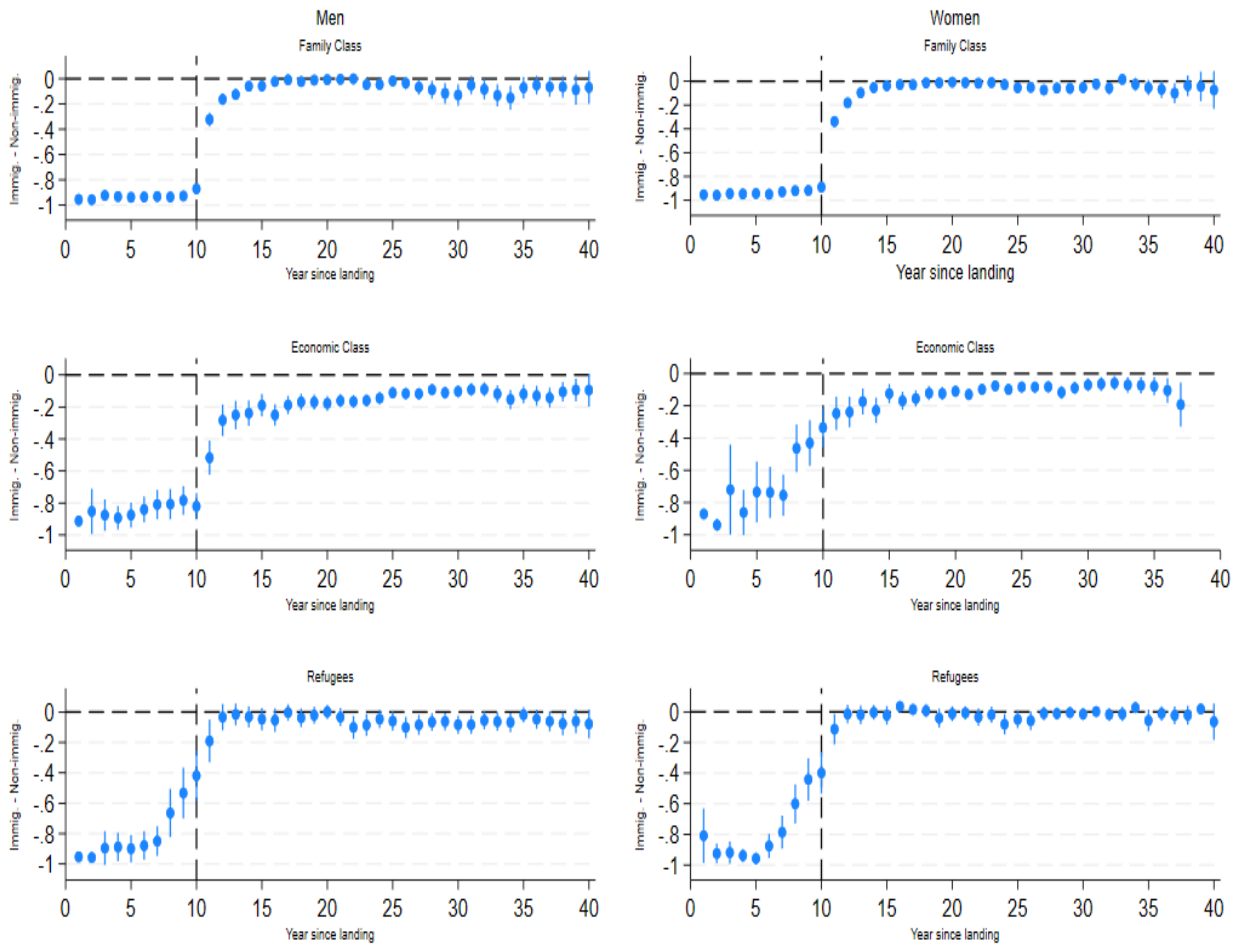
**Notes:** Author’s calculations using the Longitudinal Administrative Databank. GIS/Allowances income from the Guaranteed Income Supplement and the Allowances (Spouse’s and Survivor’s). Some immigrants in the 60+ landing age group are observed receiving GIS/Allowances benefits before crossing the ten-year residency requirement threshold. This group is likely from a country of last permanent residency which has a signed Social Security Agreement with Canada.

Figure 2.4: Event Study Estimates of Immigrants' Employment Probabilities by Years since landing



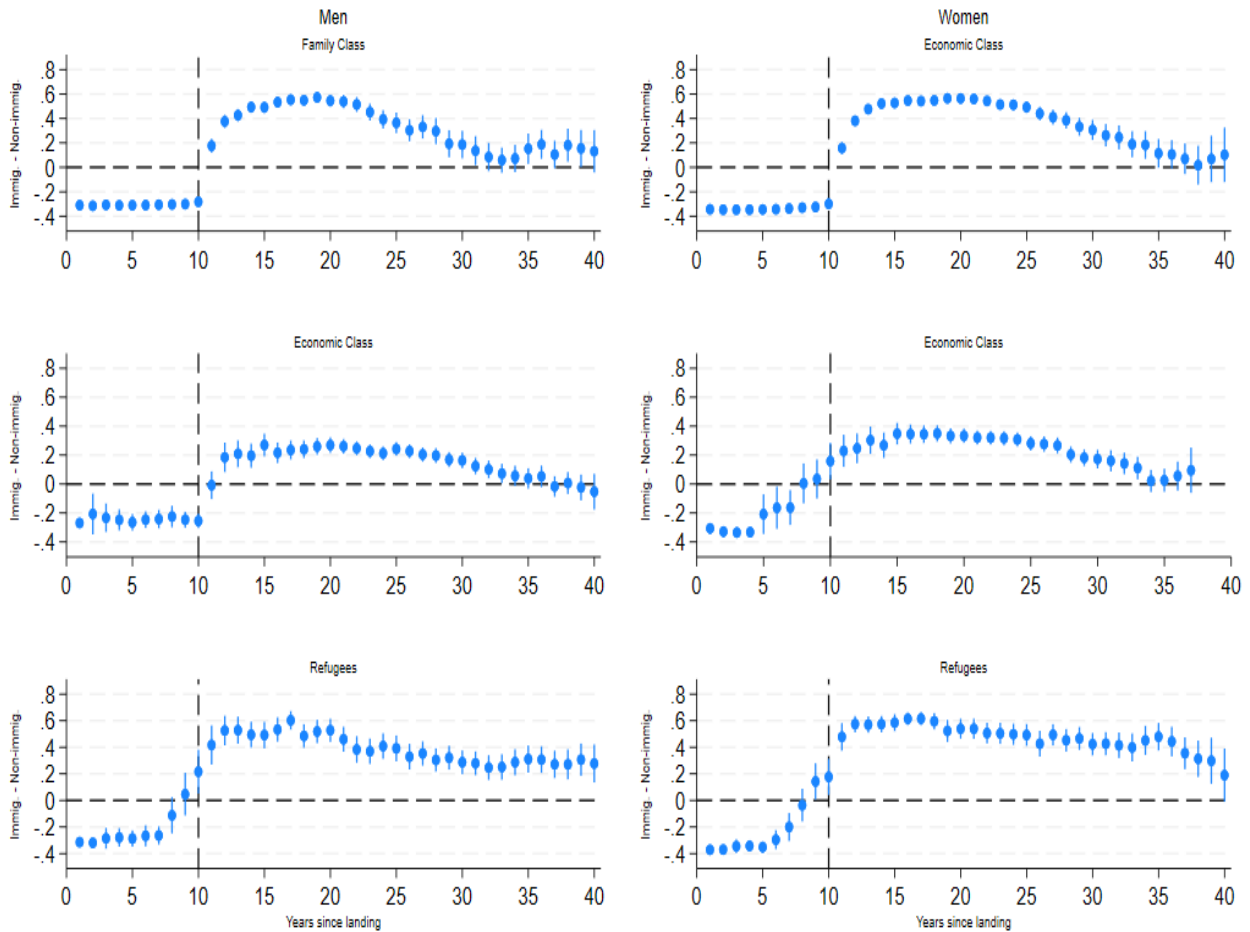
**Notes:** Author's calculations using the Longitudinal Administrative Databank. Employment earnings reflect T4-earnings (salary income) and self-employment income). This figure includes the age 65 and above sample. Omitted group consists of non-immigrants. The y-axis represents the estimated difference in the outcome for immigrants relative to that of their non-immigrant counterparts; that is, the outcome value for immigrants less that of their non-immigrant counterparts.

**Figure 2.5:** Event Study Estimates of Immigrants’ OAS Take-Up Probability by Years Since Landing



**Notes:** Author’s calculations using the Longitudinal Administrative Databank. This figure includes the age 65 and above sample. Omitted group consists of non-immigrants. The y-axis represents the estimated difference in the outcome for immigrants relative to that of their non-immigrant counterparts; that is, the outcome value for immigrants less that of their non-immigrant counterparts.

Figure 2.6: Event Study Estimates of Immigrants’ GIS Take-Up Probability by Years Since Landing



**Notes:** Author’s calculations using the Longitudinal Administrative Databank. This figure includes the age 65 and above sample. Omitted group consists of non-immigrants. The y-axis represents the estimated difference in the outcome for immigrants relative to that of their non-immigrant counterparts; that is, the outcome value for immigrants less that of their non-immigrant counterparts.

Table 2.1: Characteristics of Seniors in our Sample by Immigration Status and Class

|                        | All   | Post 1980 | Landing Age | Birth year |
|------------------------|-------|-----------|-------------|------------|
| <b>Women</b>           |       |           |             |            |
| Family Class           | 0.049 | 0.432     | 51          | 1948       |
| Economic Class         | 0.045 | 0.397     | 41          | 1952       |
| Refugees               | 0.015 | 0.128     | 43          | 1951       |
| Others                 | 0.005 | 0.043     | 46          | 1950       |
| Immigrants before 1980 | 0.100 |           | 27          | 1947       |
| Non-immigrants         | 0.786 |           |             | 1948       |
| <b>Men</b>             |       |           |             |            |
| Family Class           | 0.037 | 0.314     | 51          | 1948       |
| Economic Class         | 0.053 | 0.453     | 43          | 1951       |
| Refugees               | 0.021 | 0.174     | 40          | 1952       |
| Others                 | 0.007 | 0.059     | 41          | 1952       |
| Immigrants before 1980 | 0.115 |           | 25          | 1946       |
| Non-immigrants         | 0.767 |           |             | 1948       |

**Notes:** Author's calculations using the Longitudinal Administrative Databank. Sample consists of 50-75 in the years 1986 to 2019. Post 1980 refers to immigrants who arrived after 1980 for which we have detailed immigration class.

Table 2.2: Regression Discontinuity Design Estimates of the Effect of the Ten-Rule on Outcomes

| RDD Specification | Men          |          | Women        |          |
|-------------------|--------------|----------|--------------|----------|
|                   | Local linear | Squared  | Local linear | Squared  |
| Employment        | -0.018       | 0.001    | -0.031*      | -0.01    |
| OAS               | 0.089***     | 0.079*** | 0.107***     | 0.103*** |
| GIS               | 0.078***     | 0.071*** | 0.120***     | 0.115*** |

Notes: Author's calculations based on the Longitudinal Administrative Databank. An estimate with \*\*\* is significant at the 1% level, with \*\* is significant at the 5% level, and with \* is significant at the 10% level.

## **Chapter 3**

---

### **Then and Now: Assessing the Disparities in Low-income rates among Canadian Seniors**

#### Abstract

Population aging is raising concerns about the sustainability of public pension systems across OECD countries. In Canada, one response has been an increase in immigration, which has led to a growing immigrant population and shifts in source countries. However, little attention has been given to the aging immigrant population. This study aims to document disparities in low-income rates between immigrants and non-immigrants at older ages, focusing on the intersectionality of immigration status, racial identity, and gender. Using data from the 2001 and 2021 Canadian Censuses, we undertake a multivariate analysis in understanding low-income patterns of seniors over time. We characterize differences in low income across eight population subgroups while also examining the differences over the last two decades. We unravel the mechanism behind the changes using the complete set of tax-relevant income sources to understand how each underlying income stream is associated with the observed differences in low income. Seniors' low-income rates increase with each of immigrant, racialized and female status – and the effects are cumulative. However, the low-income rates have decreased over time. The decrease in low-income rates over time are due to increased access to public pension benefits (particularly the Canada Pension Plan), increased employment earnings and increased savings and private pensions.

### 3.1. Introduction

Population aging is of concern in many countries. In Canada, population aging has sparked debates over potential labour shortages and the expected cost and sustainability of the public pension system. One government response has been to increase permanent immigration targets to address labour shortages. This has substantially increased the proportion of immigrants in Canada over the last two decades, with an even more notable increase in the share of immigrants within the over-65 population. For example, compared to 18% in 2000, the Canadian Census in 2021 found that immigrants comprise 23% of the permanent Canadian population (Statistics Canada, 2023). For the over-65 population in 2021, 30% were immigrants, a 7% increase from 2000. However, policy and academic analyses often ignore the aging of the immigrant population and the age of new arrivals.

In addition to immigration helping to balance the size differences between birth cohorts, there has also been a compositional/demographic change in the immigrant population (McDonald and Worswick, 2013; Edo et al., 2020). Since the 1960s, the main source countries of immigrants to Canada have changed from the United States and European countries to non-European countries. This shift has altered the ethnic makeup of the immigrant population, and consequently, the broader Canadian population. The immigration literature has also documented the deteriorating outcomes of recent immigrant cohorts (see Aydemir & Skuterud, 2005; Picot, 2004). These deteriorating entry outcomes could affect their outcomes in retirement. However, little is known about immigrants' standards of living at older ages, their retirement and public pension utilization patterns, and



how much has changed over the last two decades. These patterns differ from those of non-immigrants, given the incentives associated with restricted public pension eligibility criteria for those who arrive later in life. Therefore, it is important for policy development to understand the disparities in outcomes of various demographic groups of seniors.

This paper documents the low-income profiles from individuals' peak earning years in their late 40s, focusing on transitions around the "normal retirement ages." We look at intersections across eight population subgroups: (immigrant/non-immigrant) times (racialized/non-racialized) times (male/female). We also document changes that have occurred in the last 20 years. First, we characterize differences in low income while observing the interaction with racial identity and gender. We then examine a set of tax-relevant income sources to understand how each underlying income stream is associated with the observed differences in low income. Particularly, we focus on exploring private and public sources of income as mechanisms to understand the disparities in low-income rates by immigration status, specifically emphasizing the intersectionality between immigration status and racial identity and how both vary by gender. Lastly, we look at how much has changed over the last two decades. The overarching questions are: i) What is the prevalence of low income for seniors in the eight demographic groups under study and how does it vary with age? ii) What differences in the underlying income sources explain the low-income profiles we observe across the later years of life? And, iii) How much has changed in the last 20 years?

As highlighted in previous studies, Canada's public pension programs are integral to seniors' income (e.g Milligan, 2008). Of particular relevance to immigrants is that seniors' eligibility and entitlement is a function of residency requirements, which impact the differences in retirement outcome among groups of seniors. Another contributing factor to the low-income gap among seniors is the difference in the labour market outcomes between immigrants and non-immigrants at prime age, which are well documented (see Aydemir & Skuterud, 2005; Dostie et al., 2022, 2023).

Using the 2001 and 2021 Canadian Census of Population, we document low-income differences across the eight groups and then drill down, looking at relevant mechanisms/income sources. We estimate the differences in low income for the over-65 population and examine the changes over the last two decades. Our results reveal notable differences in the low-income rates among the eight demographic groups, with immigrants more likely to be low income during their prime working years and in retirement. The intersection of racial identity and immigration status also plays a major role in understanding the low-income differentials between immigrants and non-immigrants. Notably, the intersection of racial identity and immigration status has a dominant effect for men, resulting in larger differences between immigrant and non-immigrant racialized groups than between non-racialized groups. For women, the incidence of low income is higher than that for men at almost all ages and increases with age beyond approximately age 67, whereas that for men is flat or declining at those ages. From 2001 to 2021, we observe a decline in the low-income rates for all groups and a reduction in the gap across groups. An essential takeaway

from the findings is that the combination of private and public income sources jointly explains the low-income gaps of seniors and the evolution of these gaps between 2001 and 2021. The diversification of income sources in retirement and an increase in the share of income from employment, investment and Canada Pension Plan is particularly important. These findings highlight the need for policy to consider the low-income related challenges faced by seniors who are either racialized or immigrant, and particularly the intersection of these two.

The rest of this paper is organized as follows: In the next section, we summarize the context, and research literature, and provide information on the various income sources. In section three, we describe the data, and provide summary statistics. Section four describes the descriptive results and presents the mechanisms. In section five, we provide the results from our estimation and conclude in section six.

## **3.2. Context**

### **3.2.1 Low Income**

This paper is motivated by concerns regarding poverty, but the data we employ instead measure low income. Several measures of low income are commonly employed in the Canadian context, including Low-income Cut-offs (LICOs), Low-income Measures (LIMs), and the Market Basket Measure (MBM), with the latter being Canada's official "poverty line" (Heisz, 2019). However, the latter, and indeed any low-income measure, arguably does not address traditional conceptualizations of poverty since it focuses on

income and excludes assets. In contrast, Canadian provincial governments normally base social assistance receipt and related programs using a threshold defined using both assets and income.

We employ the after-tax LICO, which is family-based, since it is available in the Canadian census. Zhang (2010) documents that the three measures previously listed have similar long-term trends, although their dynamics can be different in the short run. Statistics Canada (2024) reports for the LICO that “The approach is essentially to estimate an income threshold at which families are expected to spend 20 percentage points more than the average family on food, shelter and clothing, based on the 1992 Family Expenditures Survey. LICOs are calculated in this manner for seven family sizes and five community sizes.” The LICO combines both relative and absolute notions of poverty, comparing a particular consumption basket with average income (Milligan, 2008).

Using the LICO has several important implications for studying individuals at retirement age. Notably, it does not capture dis-savings (i.e. consuming savings that have been accumulated earlier in life). While measures of consumption would be more ideal for documenting poverty, such measures are not available, and hence the LICO has traditionally been used as a poverty proxy (Zhang, 2010; Heisz, 2019).

### **3.2.2 Senior Poverty in Canada**

Since the 1970s, there have been tremendous improvements in poverty among seniors. In 1976, the low-income rate of seniors was 34%, but by 2000 this decreased to about 8% (Statistics Canada, 2015). Milligan (2008) highlighted the large reduction in the

probability of being low income post-age 65 in the 1980s, coincides with substantial boosts in Guaranteed Income Supplement (GIS) and Canada Pension Plan (CPP) benefits. LaRochelle-Côté et al. (2008) found that low-income workers experience little to no change in their income upon entering retirement, mainly due to the public pension system. They also found declines in income instability as individuals age and attribute this to the public pension system. Regardless of the income-based poverty measure used, these studies found improvements in the financial well-being of seniors as a result of public pension benefits.

Income from private sources also accounted for variations in poverty rates among seniors. Curtis and McMullin (2019) found that the levels of private retirement income have dramatically risen for some seniors, leading to a change in the landscape of income inequality among Canadian seniors. Specifically, seniors in the bottom two quintiles were relatively more disadvantaged than in the past. One limitation of these papers is that they do not account for the compositional differences in the senior population. Veall (2008), using the proportion of seniors living below 50% of the median income, examined the degree of inequality in the income distribution. His results suggested that inequality had risen over the last three decades despite the gains in lowering poverty rates. These inequalities were primarily due to differences in marital status, especially for women, and immigration status. Schirle (2013) also highlighted the role of senior's characteristics in explaining the reduction in the poverty levels. She found that the changes in factors such as education, age, and living conditions of seniors only explained a portion of the seniors' poverty rates. Whereas poverty

levels among Canadian seniors are well documented, few have compared the poverty gaps between Canadian-born and immigrants in retirement. However, the latter is an important gap given the increasing share of immigrants among future cohorts of Canadian retirees.

We borrow from the immigration literature, highlighting the differences in outcomes between immigrants and non-immigrants (Edo et al, 2020). It is not far-fetched to postulate that the differences between immigrants and non-immigrants in prime age trickle down to the difference in outcome we observe at older ages (Grant & Townsend, 2010). Nakhaie et al. (2020) explored the role of ethnic origins in explaining retirement inequalities among seniors. Specifically, they focus on comparing the differences in retirement outcomes among various groups of immigrants by ethnicity. They found that racialized immigrants had higher levels of poverty when compared to immigrants of British descent. Hum and Simpson's (2010) study compared the retirement prospects of Canadian immigrant men to non-immigrant men and found significant gaps in the private pension income and coverage rates. Similar to our study, Kaida and Boyd (2011) compared the poverty status of elderly immigrants to their non-immigrant counterparts and found a large portion of the variation in poverty levels was due to differences in income support from public pensions. We contribute to the literature by characterizing differences in low income across eight population subgroups and examine the complete set of tax-relevant income sources to understand how each underlying income stream is associated with the observed differences in low income. We also emphasize the interaction between immigration status and racial

identity and how both vary by gender. Lastly, we document the changes that have occurred over the last two decades.

### **3.2.3 Income Sources of Canadian Seniors**

There are several channels through which seniors can receive income in retirement. In this section, we cover the full set of tax-relevant sources. A primary source is the public pension system. Canada's public pension system comprises three income maintenance programs. The first is Old Age Security (OAS), a non-contributory program funded by taxes and available to individuals over 65 who meet residency requirements. The second component which is a part of OAS, is the Guaranteed Income Supplement (GIS). It supports low-income seniors, including widows, widowers, and younger spouses of eligible recipients. Both OAS and GIS serve as core income support programs for Canadians over 65, making up the country's largest transfer expenditure. To qualify for OAS, individuals must have lived in Canada for at least 10 years after age 18, with benefits prorated according to residency length until full benefits are granted after 40 years of residency. For example, someone with 10 years of residency would receive 25% (10/40) of the full OAS benefit, while those under 10 years would not qualify. Individuals from countries with social security agreements with Canada are exempt from this residency requirement. Similarly, immigrants who meet the 10-year requirement and live in a low-income household receive a top-up on their OAS through the GIS. Since 2013, seniors have had the option of delaying OAS benefits to age 70 with a 0.6% annual increase in benefits.

The third component consists of the Canada Pension Plan (CPP) and Quebec Pension Plan (QPP), which are contributory public pension programs tied to earnings rather than residency. Benefits are based on contributory work history, with eligibility beginning at age 65. With actuarial adjustments applied, individuals can start benefits early at age 60 or delay them until age 70. Delaying benefits beyond 70 offers no additional advantage. For late age-at-arrival immigrants, extending their working years and deferring CPP claims could increase their benefits, provided they live long enough to benefit from the delay. CPP/QPP also offers survivor's benefits to partners in the event of the CPP contributor's death.

Seniors can also receive income from private investments and related sources. Parallel to the public system are employer-sponsored registered pension plans (RPPs) and personal retirement savings vehicles like Registered Retirement Savings Plans (RRSPs), with accompanying beneficial tax treatments. RPPs and RRSPs may be based on contributions by both employers and employees; they defer wages and taxes to retirement. These systems mainly benefit individuals with above-average incomes. Various tax credits and provincial low-income supplement programs also cater to individuals over 65.

Another income source available to seniors is Social Assistance. Economically constrained seniors can be eligible as part of supplementary income provided by provincial governments. These programs are intended to cover the essential needs of individuals and households in financial distress, irrespective of their labour force status. Since provincial governments administer these programs, the eligibility and generosity vary across provinces. However, a major theme across provinces is establishing 'need' in the household, by



comparing the budgetary needs to their income and assets. If the evaluated needs exceed their income and assets, they qualify for social assistance. Immigrant seniors who were sponsored to come to Canada through family reunification programs could face restrictions on receiving social assistance. Sponsored immigrants are usually ineligible for social assistance during the sponsorship period, which can last for up to 10 years, since sponsors have pledged such support. Support by immigrant sponsors is not captured in the tax files.

Employment is becoming increasingly relevant for Canadian seniors. This is happening for several reasons, possibly due to higher life expectancy, higher cost of living, shortages in the labour market or based on necessity (see Belanger et al., 2016; Milligan & Schirle, 2018). Regardless of the reasons, seniors are finding opportunities to remain in the labour market, with a growing number reporting employment income. According to Statistics Canada (2017), in 2015 approximately 20% of Canadians aged 65 and older were earning from employment, which is up from 10% in 1995, a trend that is making seniors feel more included and financially secure.

Central to our study, immigrants face different constraints/incentives when it comes to retirement income compared to non-immigrants. An immigrant must have arrived by age 25 to be eligible to receive the full OAS amount at age 65, which many immigrants have not done. Although, immigrants who satisfy the 10-year residency requirement and are part of a low-income household receive a top-up on their OAS through the GIS. In addition, the CPP benefit amount depends on years of Canadian work experience and contribution amounts, automatically providing many immigrants with a lower income stream since many have

fewer Canadian earnings years. That is, not many immigrants meet the residency requirement for full OAS benefits, and their limited work history in Canada commonly qualifies them for a lower CPP benefit, contributing to income differences between immigrant and non-immigrant seniors in Canada (Kei et al., 2019).

Aside from the public pension programs, immigrant seniors may also face barriers to accessing other income assistance programs or employment. In addition, the immigration literature has long highlighted immigrants' lower earnings and returns to foreign experience and education (Aydemir & Skuterud, 2005; Schaafsma & Sweetman, 2001). To the extent that this is the case, coupled with the limited accumulation years, immigrants also face lower working-age income levels, contributing to a retirement earnings gap. This could also affect private savings plans, as immigrants may have less disposable income to save for retirement.

### **3.3. Data and Descriptive Analysis**

#### **3.3.1 Data Source and Sample Selection**

We use the 2001 and 2021 Canadian long-form Census of Population. It provides information on age, immigration status, ethnic background and gender. It also records annual income, labour force activity and other characteristics. Income variables in 2001 are self reported while 2021 is linked to administrative tax files. The 2021 Census contains information reflecting the previous two tax years, given COVID-19's effect on employment income in 2020.

Our primary interest involves exploring the disparities in low-income rates by age, immigration, racialized (visible minority) status and gender. As mentioned, the main dependent variable is an individual's low-income status. This represents the economic well-being of the household in which a senior resides. These are driven by the full set in the tax data used to compute the LICO: employment and self-employment earnings, public pension benefits, other government transfers, and other non-government income sources.

Our definition of employment is based on having at least one dollar of employment and/or self-employed income. For the 2021 census, we focus on the 2019 earnings information to avoid COVID-19 effects. The other income measures are from 2020 since they are not available for 2019. Other non-government income (which we also refer to as private investment income) consists of income from private pension sources such as employer's registered retirement plan (RPP), retirement savings plans (RRSP) and savings accounts.<sup>3</sup> An individual is defined to have investment income if they received at least one dollar from one of these income sources. We include two indicator variables to capture public pension receipt. One is for receipt of OAS/GIS, and the other is for CPP. Other government transfers include income from social assistance programs, goods and services tax credit rebates and related.<sup>4</sup> All income variables are inflation adjusted to 2021 dollars. For our estimations, we include other variables which capture seniors' characteristics and account for the distributional differences among the various demographic groups of seniors. Such variables

---

<sup>3</sup> Note that this does not capture disposal of assets.

<sup>4</sup> This does not include public pension benefits, employment insurance benefits and child benefits from federal and provincial programs.

include age, marital status, highest level of education, household size, language use, place of residence and a set of variables to capture age at immigration.

We focus on non-institutionalized, non-temporary, non-Indigenous residents aged 45 and older who reside in one of the 10 Canadian provinces. The census provides a binary indicator variable for gender. Non-binary persons are distributed among these two categories to protect the confidentiality of the responses.<sup>5</sup> Immigration status is based on citizenship at birth, and racialized (visible minority) individuals are defined by the Employment Equity Act: those “other than Indigenous peoples, who are non-Caucasian in race or non-white in colour.” This classification is broad, and we recognize that there are differences across racialized groups (e.g., Schirle & Sogaolu 2020). We use this definition for parsimony and due to sample sizes affecting Statistics Canada's data confidentiality rules. For similar reasons, ages are aggregated into two-year groups (e.g., 45 and 46 combined) to age 70, then three-year groups to 84, and 85 and older are aggregated into a single group. These groups fall before and after the age of OAS eligibility.

### **3.3.2 Socioeconomic Characteristics of Canadian Seniors**

Understanding seniors' characteristics can help interpret disparities in poverty levels. Table 3.1 provides an overview of the average characteristics of the over-65 population in 2001 and 2021. There are marked differences across demographic groups and over time. The differences in these characteristics may explain the observed variations in low-income rates

---

<sup>5</sup> See <https://www12.statcan.gc.ca/census-recensement/2021/ref/gender-genre-eng.cfm>.

among seniors and over time. For example, in 2001, less than 1% of non-immigrants, but over 22% of immigrants, were racialized, as seen at the bottom of Tables 3.1 and 3.2. However, while the proportion of racialized individuals among non-immigrants has remained constant over the last two decades, the proportion of racialized individuals among the immigrant population has increased to about 46%. This shows that over the last two decades, there has been an increase in the ethnocultural/racial diversity of seniors.

On average, for both men and women, racialized immigrants, in comparison to their non-racialized counterparts, are younger and more likely to have migrated at an older age for both census years. Average age has increased for all groups except non-racialized non-immigrants and racialized immigrant women. In 2021, however, age at immigration is slightly younger, emphasizing the change in the immigration system over time, where the recent cohort of immigrants is larger and younger (Lu & Ng, 2019). Since we are looking at individuals' retirement, we have to consider the length of time in Canada. Non-racialized groups have been in Canada longer, with immigrants in 2021 having spent more time in Canada than their counterparts in 2001. To the extent that time in the Canadian labour market impacts retirement income, this will drive income differences in retirement and over time.

The level of education among seniors has noticeably increased over time. Seniors in 2021 are more likely to have at least a community college degree, with immigrants having higher levels of education. This reflects the general increase in the education level of Canadians over time and the immigration selection process which has valued higher levels

of education. Since education is a key predictor of earnings in prime age, and a major income source in retirement is based on contributions from employment, it is expected that individuals with higher levels of education should have higher retirement income. This does not hold when we consider differences along the lines of immigration status. Canadian immigrants, on average, typically have high levels of education, however, they also have lower income levels when compared to non-immigrants due to returns to foreign experience and education (Crossman et al., 2021). Racialized immigrants have higher levels of education but are more likely to be low income. For both genders, low-income rates are higher among racialized individuals.

Household size is another determinant of economic well-being. Racialized individuals are more likely to live in larger households, even more so for immigrants; however, household sizes have reduced over time. Similarly, for all groups, there has been a decrease in the proportion of married seniors; however, immigrants are more likely to be married.

The geographical composition of seniors has undergone substantial changes. Racialized seniors are more likely to live in census metropolitan areas (CMAs), while immigrants are highly concentrated in Alberta, BC and Ontario, and this has increased over time. Immigration tends to be regionally concentrated, with a higher proportion of immigrants settling in larger cities. This pattern is largely driven by the economic prospects and importance of social networks, as immigrants are more inclined to live in areas where they have family members, friends, or established immigrant communities.

### **3.4. Low-income Profiles**

#### **3.4.1 Low-income Profile by Immigration, Minority Status and Gender**

We begin our analysis by observing the low-income profiles from age 45 to 85+ years, accounting for differences across gender and immigration status, and how these factors interact with our indicator for racialization. We then examine changes over time. Figure 3.1 presents descriptive low-income profiles by age, immigration status, racial identity, and gender separately by Census years.

A quick glance at Figure 3.1 shows that low-income rates of seniors have fallen as we observe a substantial decline in the low-income rates over time for all groups. For instance, in 2001, the low-income rate for visible minority immigrant men at age 50 was approximately 23%, compared to 7% in 2021. In general, 2001 is marked with higher low income rates; we observe a substantial decline in the low-income rates for all groups (although a higher decline for non-immigrants) upon reaching the age of public pension eligibility. Another point worth highlighting is that the gaps between these groups (both in prime age and retirement) have changed over time. For example, the gap between racialized immigrant and non-immigrant men is smaller in 2021.

All four groups of men in 2021 (Figure 3.1, top right) experience an increase in low-income rates starting in their late 50s, a trend that persists until the age of public pension eligibility. In prime age, racialized groups, regardless of their immigration status, experience a higher low-income rate. Racialized immigrants have the highest low-income rates in their

mid- to late forties, but this changes at age 52, where we see a convergence in the low-income rates for the two racialized groups. By 54, the rates are higher for the racialized non-immigrants.<sup>6</sup> For non-racialized individuals, there are minimal differences in prime age. Upon reaching OAS eligibility, the low-income rates for the non-immigrant groups experience a sharp decline. Non-racialized immigrants exhibit a decline in their low-income rates, but the rate of decline does not continue after age 65; however, for the racialized immigrant group, while the increase stops, there is no decline. The increase just before OAS eligibility likely reflects the challenges individuals face if they lose ‘good’ jobs later in their careers. Age 65 and the onset of OAS/GIS eligibility is a critical point, associated with a substantial reduction in low income for non-immigrant seniors. The normal retirement age and the associated public pension programs lead to distinct outcomes for immigrants and non-immigrant groups. The sharp drop in low-income rates for non-immigrants can be attributed to the residency requirement for OAS/GIS and the differences in the Canadian labour market experience, which could impact public pension income. Immigrants who have not met the 10- years residency requirement do not receive OAS at 65. Those who have met the threshold and have been in Canada for less than 40 years receive prorated benefits. As a result, the decline in low-income rates for this group is less pronounced.

The gap in low-income rates is also much larger post-65 than before. For example, in 2021, the difference in low-income rates between non-racialized immigrants and non-

---

<sup>6</sup> The higher variability in the racialized non-immigrant profile is due to the smaller sample size for that group, as seen in Table 1.



racialized non-immigrants doubles from about 1-percentage point to 2-percentage points. This gap can be explained by differences in earnings during prime working years, which lead to disparities in pension contributions (both CPP and private pension) and consequently, lower income from contributory plans. Additionally, uneven access to OAS due to differences in residency in Canada further contributes to this disparity. The patterns we observe for men, suggest an association with race, with racialized individuals having higher low-income rates.

Women (Figure 3.1, bottom right) of all groups experience similar patterns in low income rates in prime age, but we observe larger variations after age 60. While low-income rates decline slowly for men after 65, after a short pause/dip, they trend upwards for women. Women generally have higher low-income rates both in prime age and retirement. Similar to men, non-immigrants (regardless of racial identity) low-income rates exhibit a sharp decline with OAS/GIS eligibility. However, strikingly, women's low-income rates increase after age 67, especially for racialized immigrant women. The increase in the low-income rates for women compared to men could be as a result of women outliving their spouses on average, leading to a loss in spouse's income from private and/or public sources. Bernard and Li's (2006) results corroborate this. Using the Low Income Measure (LIM), they found that the low-income rate of widows increases by one percent in the year of the death of their spouse, but eight percent five years after. Finnie and Sweetman (2003) and Veall (2008) long ago noted that changing family status is a major determinant of entering poverty. For women, the

immigrant effect dominates the racial identity effect, where we observe higher low-income rates for immigrants.

We observe a common pattern for both genders; on average, the low-income rate is lowest for the non-racialized, non-immigrant group and highest for the racialized immigrant group, with those who are one immigrant or racialized falling in between. Variations across groups are larger after age 65 and are more pronounced in 2001. Working-age low-income gaps are accentuated in what are commonly thought of as the retirement years. One interpretation is that accumulated gaps in opportunities to save and to contribute to public pensions in working years manifest in larger gaps at older ages and eligibility for non-contributory programs is reduced by residency requirement.

### **3.4.2 Income Sources**

In this section, we examine the various income sources and unravel potential explanations for the trends and changes in low-income rates over time. We consider five major tax-relevant income sources namely from: employment, CPP, OAS/GIS, investment income and other government transfers.

We begin by exploring the changes in employment rates over time. Figure 3.2 shows noticeable differences in the two periods, particularly later in life. Across all groups, individuals are working more in 2021, than they did in 2001. In prime age, the differences among the demographic groups are more pronounced in 2001. For example, at age 50, racialized immigrant men are about 5 percentage points less likely to work compared to non-racialized non-immigrant men. By 2021, the reverse is the case as racialized immigrant men

are more likely to be employed. For both years, immigrants are more likely to work between the ages of 60 and 65, possibly working longer due to the OAS residency requirement and its impact on household budget constraint. However, the reverse occurs for the over-65 population. While all groups experience a decline in their employment rates as they age, by age 70, racialized immigrants experience a larger measurable decline, which could explain the differences we observe in the low-income rates among these demographic groups. We observe similar trends among women, with a more sizable increase in employment at all ages. One thing we can get from these plots is that employment rates have increased over time for all groups, across all ages, especially for seniors, putting them in a better financial position in 2021.

In terms of CPP benefits (Figure 3.3), over the last two decades, there have been changes in the proportion of seniors receiving CPP. Benefits in 2021 are deferred to a later age for all groups, suggesting that individuals are working more and opting to receive benefits at older ages than in the past. The proportion of women receiving CPP has increased considerably. For example, at age 70, in 2001, about 83% of senior women receive CPP compared to about 95% in 2021. This is due to the increase in women's labour force participation that occurred while this cohort of seniors was younger (Goldin, 2006). For both genders, immigrants are less likely to receive CPP, especially in 2021. Racialized immigrants have the lowest probability of receiving CPP, possibly due to arriving later in life (about 20 years later than non-racialized immigrants on average), but the gaps in receipt have reduced over time. However, at ages 80 and higher, the differences from 2001 are small.

Another public pension benefit we consider is the OAS/GIS (Figure 3.4). Seniors are less likely to receive OAS in 2021. Specifically, we observe a delay in benefits receipt, possibly to maximize income in later years due to the increasing life expectancy and working later. This could be attributed to the 2013 policy change that incentivized delaying OAS until age 70 by offering a 0.6% annual increase. Additionally, since OAS benefits are clawed back for higher-income seniors, postponing OAS receipt until a period of lower income can help maximize the benefit. Similar to CPP, racialized immigrants are less likely to receive OAS/GIS benefits, possibly due to the residency requirement associated with OAS receipt. This is less important for non-racialized immigrants, as they often come from countries that have social security agreements with Canada and, as shown in Tables 3.1 and 3.2, have been in Canada longer on average. In 2021, there was no difference between non-immigrants and non-racialized immigrants. The primary difference between genders is that women are more likely to receive OAS before age 65 due to the survivor's component of the OAS, as women are typically younger than their husbands. However, over time, the proportion of individuals between 60 and 65 years receiving OAS has reduced.

Investment income (Figure 3.5) for all demographic groups has grown over the last two decades. This change can partly explain the reduction in low-income rates we observed over time. For both genders, there has been an increase in the proportion of individuals with investment and related income. Racialized immigrants are less likely to have investment income in both periods when compared to others. Coupled with the differences in employment, CPP and OAS, differences in investment income further exacerbate the

differences in low-income rates among these groups. Put differently, the gaps in private investment (i.e. savings and private pensions), employment, OAS/GIS and CPP income (particularly CPP) jointly explain why certain groups are more likely to be low income than others. Over time, the gap between the non-racialized non-immigrant and racialized immigrant groups has diminished, as racialized immigrants are better off in 2021.

The last income (Figure 3.6) source we consider is other government transfers unrelated to the public pension. For men, the proportion of individuals receiving government benefits has increased over time for immigrants of all ages, albeit more for racialized individuals. Government transfers play a growing role in mitigating low-income rates, especially among racialized individuals, as all groups experience an increase in these benefits over time. However, it should be noted that the higher receipt of government transfer in 2021 for prime age individuals is due to COVID benefits and related programs that was available in 2020.

### **3.4.3 Income Sources for Low-Income Individuals**

So far, we have considered the incidence of income receipt by type. Next, we look at the differences in the average income from each source. For this, we restrict the analysis to those with total income below the 25th percentile of total income for the entire sample since we focus on low income and divide the sample into bins based on age. The first group consists of those we refer to as “prime age” individuals 45-59 years old; the second group includes those 60-66 years, and the last group comprises those 67 and above. We find differences in the income levels among demographic groups and over time. All groups

experience a substantial increase in real income from all sources. However, the proportion of total income derived from each source has changed over the last two decades.

The increase in total income for all groups is a positive trend that explains the reduction in low-income rates for prime-age (Figure 3.7) individuals over time. The higher average income for racialized immigrants contributes to the catchup process that occurs between racialized non-immigrants and immigrants in 2021. One pattern holds true for all prime-age groups. While there has been an increase in total income, the share of total income from employment is lower over time. This is primarily due to the increase in government transfers that occurred in 2020 among the general population. Most of the prime age groups (except racialized immigrant men), experience an increase in the proportion of their total income from investment has increased over time.

Figure 3.8 shows that individuals 60-66, receive less income from employment than prime-age individuals. For example, in 2021, the income from employment is about half that of their prime age. This reflects the transition to retirement that typically occurs during these years. The decline in employment income is also associated with the increase in income from public pension sources (OAS/GIS and CPP). Nonetheless, there has been an increase in the income for this group over time, suggesting that individuals stay longer in employment. Within this age group, in 2021, there is very little difference between most groups, except the racialized non-immigrants, who have lower incomes on average). This explains the similar low-income rates for all groups. While all demographic groups experience an increase in the share of their income from employment over time, racialized immigrant men experience a

decline. This decline in the share of total income from employment is accompanied by a larger increase in the proportion of their total income from other government transfers. This explains the increase in the proportion of low-income individuals among the racialized immigrants before reaching the age of public pension eligibility. Additionally, this group has the lowest income in 2021, which explains the higher low-income rates for this group.

Among the lowest 25th percentile of the total income distribution, those aged 67 and above (Figure 3.9) have higher incomes than their younger counterparts, with most of their income coming from the public pension system. For all groups, public pension accounts for over 50% of their retirement income; however, this share has declined over time as a smaller proportion now comes from OAS/GIS. Racialized immigrants experienced the largest decline. For example, racialized immigrant men had 83.4% of their total income from public pensions in 2000, and by 2020, this reduced to 72.8%. In both years, immigrant groups have lower public pension benefits due to the shorter work and residency history on average. In 2021, we also observe large variation in income levels, with non-racialized non-immigrants having the highest income. Racialized immigrants have higher incomes from employment in old age, with a larger share of their income (about 4%) from employment income compared to 1% for non-racialized non-immigrants. Similarly, there are variations in the CPP amount received. Indeed, lower CPP benefits appear to account for most of the difference between racialized immigrant and the other groups. Racialized immigrants tend to have lower CPP benefits on average when compared to other groups. This could be due to the lower CPP receipt rate or smaller contributions to the program, potentially due to fewer years spent in

Canada. Unsurprisingly, the average income from OAS/GIS stays mostly the same over these periods because OAS benefits only increase relative to inflation. In addition, for many low-income immigrants, the differences in OAS payments are less important because of the GIS top-ups. For the over 67 population, there has been an increase in all income categories for all groups over time. However, the proportion of income from investments has increased, especially for non-racialized immigrants, causing a relatively lower low-income rate for this group.

These differences in income sources across demographic groups and genders illustrate the complex interplay of employment, pensions, investments, and government support in shaping economic security. While all groups have experienced improvements in income over time, it is clear that racialized immigrants and women continue to face more challenges in reducing their low-income rates, particularly as they age.

### **3.5. Low-Income Gaps over Time**

Our goal is to observe the low-income gaps among Canadian seniors while controlling for differences across age, education, marital status, living arrangements and access to income and how these gaps have changed over time. Until now, the results have shown unconditional differences as we have not controlled for individual demographic and socioeconomic characteristics that could affect poverty. To account for these characteristics, we estimate the following equation using a linear probability model (LPM) for the two years separately using a sample of all Canadian seniors aged 66 years and older:



$$lowinc_i = \alpha + \sum \beta_g Group_i \mathbf{1}[1 = g] + X_i \Gamma + \epsilon_i \quad (3)$$

where  $lowinc_i$  represents the low-income status of a senior  $i$ .  $Group_i$  represents one of the seven demographic groups. The indicator function takes the value 1 if the individual is in one of the seven groups and zero otherwise. Here, we compare the different groups using the non-racialized Canadian born men as the base for the comparison.  $X$  contains a set of demographics, socioeconomic and economic characteristics of seniors. Specifically, we control for age, marital status, highest level of education, household size, language use, place of residence, and a set of dummy variables for age at immigration. We also control for economic characteristics of an individual, which includes five dummy variables. Each dummy variable captures whether a senior received income from one of the five income sources mentioned above. The main coefficient of interest,  $\beta_g$ , is the difference in probability of low income between a particular group and non-racialized non-immigrant men. This yields the adjusted gaps. For immigrant groups, it is the difference in probability of low income between immigrant seniors who have arrived as a child (below the age of 13) and the base group, since we nonlinearly control for age at immigration.

We present the unadjusted and adjusted (our preferred specification) gaps in low income between demographic groups in Figure 3.10. The bars represent the raw differences (unadjusted gap) in the probability of being in a low-income household without accounting for compositional differences in demographic, socioeconomic or economic characteristics between a member of one of the seven demographic groups and non-racialized non-immigrant men (our base group). The adjusted gap is the result from Equation 1 which

controls for the distributional differences in the covariates. The red and blue bars represent the values for 2001 and 2021, respectively. The dot represents the adjusted gaps.

For the unadjusted gaps, the results show that on average, all groups have a higher probability of living in a low-income household in both years when compared to the base group. For example, in 2021, racialized immigrant men are 7 percentage points more likely to be in a low-income household than non-racialized non-immigrant men. Non-racialized immigrant men are 2 percentage points more likely to be low income, and racialized non-immigrants are 3 percentage points more likely to be low income. This suggests that while there is an immigrant-non-immigrant gap, racial identity plays an important role in understanding the differences in low-income rates. Women also have a higher probability of being low income when compared to the base group, with racialized immigrant women having a larger likelihood of being low income at 7 as opposed to 6, 3 and 4 percentage points for non-racialized immigrant, racialized non-immigrant and non-racialized non-immigrant women respectively. The higher low-income rates for women are due to limited time in the labour market compared to men due to care responsibilities, which affects contributions to private and public pension plans.

Our results also show significant differences in the low-income gaps over time. For example, between 2001 and 2021, there is a 4 percentage point drop in the gap between racialized immigrant men and non-racialized non-immigrant men. Suggesting a change in the low-income rates over time as well as changes in the differences among demographic groups. Non-racialized non-immigrant women experience the largest drop in the gap, with a

9 percentage points drop. This could be due to the increased labour force participation in the prime age for this cohort of women, increasing their access to employment and public pension income and financial well-being.

One pattern that holds true for men is that racialized groups have a higher probability of living in low-income households regardless of their immigration status. However, there is a cumulative effect of racial identity and immigration status, with visible minority immigrant men experiencing a substantially higher probability of being low-income. For women, immigrants, regardless of their racial identity, have a higher probability of being in a low-income household. However, racialized immigrant women have a higher probability of being low-income.

Next, we turn to look at the adjusted gaps. Column 2 presents the adjusted gaps after controlling for demographic factors. For both years, these gaps increase substantially for the immigrant groups, especially racialized immigrants. The adjusted gap shows that conditional on their characteristics, they would have been doing worse than the actual difference (unadjusted). That is, the unadjusted low-income rates are smaller than the rates when we adjust for individual characteristics. This is the case because immigrants typically have higher levels of education, due to the immigration selection process, which generally reduces the probability of being in a low-income household. However, education obtained outside Canada is less valued in the labour market, and immigrants also experience a higher degree of education-job mismatch (Chen and Fougère, 2014; Schimmele and Feng, 2024). Therefore, this will affect the low-income gaps when we control for education. This

difference between the adjusted and unadjusted gaps reveals structural disadvantages disproportionately affecting particular immigrant or racial groups. For example, immigrants might have limited access to public and private pensions due to duration in Canada or exposure to the Canadian labour market despite having higher levels of education. Racialized immigrant men are even more likely to be low-income due to the differences in duration in Canada, due to limited years of contribution to both CPP and private pension. Women, with the exception of racialized immigrants, experience a decline in the low-income gaps. Across both years, however, we observe a decline in the low-income gaps for all groups.

Our preferred specification includes controls for demographic, socioeconomic and economic factors (column 3).<sup>7</sup> Here, we account for the income sources of individuals. When we adjust the low-income gap for these variables, the gap between the 7 demographic groups and the base group reduces substantially for all groups. This shows that a large portion this variation between groups can be attributed to differences in access to various income sources. Put differently, the low-income gaps decrease when we account for the distributional differences in the income sources between the groups. For example, in 2021, the (unadjusted) gap between racialized immigrant men and the base group reduces from 7 to 4 percentage points. This suggests that, on average, a racialized immigrant man is 4 percentage points more likely to be in a low-income household than a non-racialized non-

---

<sup>7</sup>The control variables include age, marital status, highest level of education, household size, language use, place of residence, age at immigration, and a set of binary variables capturing income from each source mentioned above.

immigrant man who has similar age, education, official language ability, marital status and access to various income sources. A factor underlying this decrease in the probability of being low income is the role incomes from private and public resources play in retirement. This is the case for all groups in 2001, except racialized immigrant men, where the adjusted gap remains unchanged. Another point worth highlighting is that after controlling for these factors, non-racialized, non-immigrant women are less likely to be in a low-income household when compared to the base group. Women, in general, have lower low-income gaps than their male counterparts; this can be due to women having more access to public pensions as a result of the survivors' benefits. Similar to the unadjusted gaps, comparing 2001 to 2021 shows a substantial decline in the gaps, with racialized immigrant men experiencing the largest drop of about 8 percentage points.

In conclusion, while there are substantial differences in the probability of being in a low-income household, which is typically larger for immigrant groups, there is a cumulative effect of visible minority status, which increases the gaps, pointing to the intersectionality of immigration and racial identity.

### **3.6. Discussion and Conclusion**

The economic well-being of seniors has been a subject of extensive research amidst the rapidly aging population; however, there has been a noticeable gap in understanding the disparities among different demographic groups of seniors based on immigration status, racial identity, and gender and how this has changed over time. In this paper, we utilize the 2001 and 2021 confidential Census files to provide evidence of the interaction between

immigration status, racial identity, and gender and its implication on the low-income rates of seniors, thereby shedding new light on this crucial issue. We adopt an intersectionality approach to understand the disparities in low-income rates as individuals approach retirement. This approach allows us to observe variations in low-income rates for immigrants and non-immigrants across racial identity and gender, both before and after the normal retirement age.

Our results show that low-income rates have declined over the last two decades for all groups. Accompanying this is the narrowing of the differences across groups. Despite the narrowing of gaps, disparities are more pronounced post-retirement, particularly for women and racialized groups. In 2021, the dominant factor is the interaction of immigration status and racial identity, leading to larger gaps between immigrant and non-immigrant racialized groups compared to the differences among non-racialized groups for both genders. Women, irrespective of their immigration status, racial identity and gender, face higher low-income rates. Our results show that, over time, Canadian seniors have a more diversified retirement income portfolio, leading to a general decline in the low-income rates. Specifically, higher low-income rates among certain senior groups can be explained by inadequate CPP and a lack of diversification of income sources in retirement.

The sources of income are just as important as total income when considering low-income rates. Groups with a higher proportion of their income from government sources, such as OAS/GIS and other government transfers, are more likely to be low income. Employment emerges as a pivotal factor in explaining the disparities in low-income rates

among the eight sub-groups of the population and over time. Given that employment income is the primary income source during the prime age (Statistics Canada, 2013) and differences in prime age trickle down to retirement via CPP, variations in employment income account for the gaps in low-income rates. Our results show that groups with higher employment rates have a lower incidence of low income after 65 years. In addition, according to Statistics Canada (2017), employment income is increasingly becoming a major income source for seniors, implying that post-65 employment patterns and income can also influence the differences in seniors' low-income rates.

Compositional effects can also explain part of the gaps in low-income rates across groups. Milligan and Schirle (2021) show higher life expectancy for individuals at the top of the income distribution. To the extent that a specific sub-group is more likely to be wealthy and live longer, then the incidence of low income would be lower on average. In addition, with cross-sectional data, we cannot follow individuals as they age. As such, some of these differences in low-income rates across time could be attributed to cohort differences. During the period studied, the baby boomer generation started to retire. This group is more likely to have higher education levels and expanded employment opportunities than the previous cohorts. For women, their work history has changed: More women today have retirement income and do not have to rely on only spousal benefits to survive in retirement.

The results show that having additional sources of income and public pension programs reduces the probability of being in a low-income household. Particularly, it emphasizes the importance of considering the behaviour of individuals in prime age in

tandem with their behaviours and income sources in retirement. By having additional sources of income, seniors are less dependent on public pension benefits, which alone might not be sufficient to maintain their standard of living and prevent them from being low-income.

### 3.7 References

- Aydemir, A., & Skuterud, M. (2005). Explaining the Deteriorating Entry Earnings of Canada's Immigrant Cohorts, 1966—2000. *The Canadian Journal of Economics / Revue Canadienne d'Economie*, 38(2), 641–671.
- Aydemir, A., & Sweetman, A. (2007). First- and Second-Generation Immigrant Educational Attainment and Labor Market Outcomes: A Comparison of the United States and Canada. In B. R. Chiswick (Ed.), *Immigration* (Vol. 27, pp. 215–270). Emerald Group Publishing Limited. [https://doi.org/10.1016/S0147-9121\(07\)00006-4](https://doi.org/10.1016/S0147-9121(07)00006-4)
- Belanger, A., Carriere, Y., & Sabourin, P. (2016). Understanding Employment Participation of Older Workers: The Canadian Perspective: *Canadian Public Policy*. *Canadian Public Policy*, 42(1), 94–109.



- Bernard, A., & Li, C. (2006). Death of a Spouse: The Impact on Income for Senior Men and Women. Ottawa: Statistics Canada. <https://www150.statcan.gc.ca/n1/pub/11-621-m/11-621-m2006046-eng.htm>
- Bredtmann, J., & Otten, S. (2023). Culture and the labor supply of female immigrants. *Economic Inquiry*, 61(2), 282–300. <https://doi.org/10.1111/ecin.13129>
- Chen, X., and Fougère, M. (2014). How Persistent Is the Occupation-Education Mismatch in Canada? *International Scholarly Research Notices*, 2014(1), 490914. <https://doi.org/10.1155/2014/490914>
- Crossman, E., Hou, F., & Picot, G. (2021). Are the gaps in labour market outcomes between immigrants and their Canadian- born counterparts starting to close? *Statistics Canada Catalogue no. 36-28-0001* <https://doi.org/10.25318/36280001202100400004-eng>
- Curtis, J., & McMullin, J. (2019). Dynamics of Retirement Income Inequality in Canada, 1991-2011. *Journal of Population Ageing*, 12(1), 51–68. <https://doi.org/10.1007/s12062-018-9219-5>
- Doctrinal, L. (2023). Changes in Private Pensions and Income Inequality in Retirement: A Decomposition Analysis by Income Source in Nine European Countries (1986–2018). *Work, Aging and Retirement*, waad017. <https://doi.org/10.1093/workar/waad017>
- Dostie, B., Li, J., Card, D., & Parent, D. (2023). Employer policies and the immigrant–native earnings gap. *Journal of Econometrics*, 233(2), 544–567. <https://doi.org/10.1016/j.jeconom.2021.07.012>
- Dostie, B., Li, J., & Parent, D. (2022). Earnings Gaps between Native-Born Canadians and Immigrants: The Role of Firms in British Columbia, Ontario, and Quebec. *Canadian Public Policy*, 48(S1), 1–16. <https://doi.org/10.3138/cpp.2022-005>
- Edo, A., Ragot, L., Rapoport, H., Sardoschau, S., Steinmayr, A., & Sweetman, A. (2020). An introduction to the economics of immigration in OECD countries. *Canadian Journal of Economics*, 53(4), 1365–1403. <https://doi.org/10.1111/caje.12482>
- Ferrer, A., Pan, Y., & Schirle, T. (2023). The Work Trajectories of Married Canadian Immigrant Women, 2006–2019. *Journal of International Migration and Integration*, 24(Suppl 3). <https://doi.org/10.1007/s12134-023-01011-1>
- Finnie, R., & Sweetman, A. (2003). Poverty dynamics: Empirical evidence for Canada. *Canadian Journal of Economics*, 36(2), 291–325.

- Goldin, C. (2006). The Quiet Revolution That Transformed Women's Employment, Education, and Family. *American Economic Review*, 96(2), 1–21. <https://doi.org/10.1257/000282806777212350>
- Grant, H., & Townsend, J. (2010). Chapter 6—Diversity and Aging Among Immigrant Seniors in Canada: Changing Faces and Greying Temples. Brush Education.
- Heisz, A. (2019). An update on the Market Basket Measure comprehensive review. Statistics Canada: Income Research Paper Series. Catalogue no. 75F0002M
- Kaida, L., & Boyd, M. (2011). Poverty variations among the elderly: The roles of income security policies and family co-residence. *Canadian Journal on Aging*, 30(1), 83–100. <https://doi.org/10.1017/S0714980810000814>
- Kei, W., Seidel, M.-D., Ma, D., & Houshmand, M. (2019). Results from the 2016 Census: Examining the effect of public pension benefits on the low income of senior immigrants. Statistics Canada, Catalogue no. 75-006-X. <https://www150.statcan.gc.ca/n1/pub/75-006-x/2019001/article/00017-eng.htm>
- LaRochelle-Côté, S., Myles, J., & Picot, G. (2008). Income Security and Stability During Retirement in Canada. *Statistic Canada* 11F0019 No. 306, 11.
- Lu, C., & Ng, E. (2019). Healthy immigrant effect by immigrant category in Canada. *Statistics Canada, Catalogue No. 82-003-X. Health Reports*, 30(4), 3–11.
- McDonald, J., & Worswick, C. (2013). Retirement Incomes, Labour Supply and Co-residency Decisions of Older Immigrants in Canada: 1991-2006. CLSSRN working papers
- Milligan, K. (2008). The Evolution of Elderly Poverty in Canada. *Canadian Public Policy*, 34(Supplement 1), S79–S94. <https://doi.org/10.3138/cpp.34.Supplement.S79>
- Milligan, K., & Schirle, T. (2018). The Labor Force Participation of Older Men in Canada. *NBER Chapters*, 51–65. [https://www.nber.org/system/files/working\\_papers/w24874/w24874.pdf](https://www.nber.org/system/files/working_papers/w24874/w24874.pdf)
- Milligan, K., & Schirle, T. (2021). The evolution of longevity: Evidence from Canada. *Canadian Journal of Economics/Revue Canadienne d'économique*, 54(1), 164–192. <https://doi.org/10.1111/caje.12497>
- Nakhaie, R., Halliday, J., & Roberts, S. (2020). Retirement Inequalities: The Importance of Ethnic Origins. *Canadian Ethnic Studies*, 52(1), 23–48.

- Picot, G. (2004). The Deteriorating Economic Welfare of Immigrants and Possible Causes. *Statistics Canada, 11F0019 No. 222(11)*.
- Schaafsma, J. & Sweetman, A. (2001). Immigrant Earnings: Age at Immigration Matters. *Canadian Journal of Economics* 34(4): 1066-1099.
- Schimmele, C., and Feng, H. (2024). Trends in education–occupation mismatch among recent immigrants with a bachelor’s degree or higher, 2001 to 2021. *Statistics Canada Economic and Social Reports, Catalogue no. 36-28-0001*. <https://doi.org/10.25318/36280001202400500002-ENG>
- Schirle, T. (2013). Senior Poverty in Canada: A Decomposition Analysis. *Canadian Public Policy*, 39(4), 517–540. <https://doi.org/10.3138/CP.39.4.517>
- Schirle, T., & Sogaolu, M. (2020). A Work in Progress: Measuring Wage Gaps for Women and Minorities in the Canadian Labour Market. *C.D. Howe Institute Commentary* 561.
- Statistics Canada. (2013). Income Composition in Canada. Catalogue no. 99-014-X201100 <https://www12.statcan.gc.ca/nhs-enm/2011/as-sa/99-014-x/99-014-x2011001-eng.cfm>
- Statistics Canada. (2015). Low income statistics by age, sex and economic family type. <https://doi.org/10.25318/1110013501-eng>
- Statistics Canada. (2017). Working seniors in Canada. *Census in Brief*, 98, 14. <https://www12.statcan.gc.ca/census-recensement/2016/as-sa/98-200-x/2016027/98-200-x2016027-eng.cfm>
- Statistics Canada. (2023). Immigrant status and period of immigration by gender and age: Canada, provinces and territories, Table 98-10-0347-01. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=9810034701>
- Statistics Canada. (2024). Low income cut-offs (LICOs) before and after tax by community size and family size, in current dollars. Table: 11-10-0241-01 <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1110024101>
- Veall, M. R. (2008). Canadian Seniors and the Low Income Measure. *Canadian Public Policy*, 34(Supplement 1), S47–S58. <https://doi.org/10.3138/cpp.34.Supplement.S47>
- Zhang, H., Zhong, J., & de Chardon, C. (2020). Immigrants’ net direct fiscal contribution: How does it change over their lifetime? *Canadian Journal of Economics/Revue Canadienne d’économique*, 53(4), 1642–1662. <https://doi.org/10.1111/caje.12477>

Zhang, T., & Gunderson, M. (2022). The Differential Impact of COVID-19 on Labour Market Outcomes of Immigrants in Canada. *Canadian Public Policy*, 48(3), 473–490. <https://doi.org/10.3138/cpp.2021-043>

Zhang, X. (2010). Low Income Measurement in Canada: What Do Different Lines and Indexes Tell Us? Statistics Canada: Income Research Paper Series. Catalogue no. 75F0002M

### 3.8 Tables and Figures

Table 3.1: Sociodemographic Characteristics of population groups (Men)

| Men                          | 2001           |        |            |        | 2021           |        |            |        |
|------------------------------|----------------|--------|------------|--------|----------------|--------|------------|--------|
|                              | Non-Immigrants |        | Immigrants |        | Non-Immigrants |        | Immigrants |        |
|                              | Non-vis        | Vismin | Non-vis    | Vismin | Non-vis        | Vismin | Non-vis    | Vismin |
| Age                          | 74             | 74     | 74         | 73     | 74             | 75     | 76         | 74     |
| Age at Immigration           |                |        | 31         | 53     |                |        | 25         | 42     |
| Years since Migration        |                |        | 44         | 20     |                |        | 51         | 32     |
| Household size               | 2.02           | 2.3    | 2.2        | 3.83   | 1.99           | 2.17   | 2.17       | 3.32   |
| Married                      | 0.78           | 0.71   | 0.81       | 0.85   | 0.73           | 0.65   | 0.77       | 0.81   |
| <b>Education</b>             |                |        |            |        |                |        |            |        |
| Less than High School        | 0.57           | 0.54   | 0.48       | 0.52   | 0.23           | 0.19   | 0.22       | 0.23   |
| High School                  | 0.09           | 0.10   | 0.07       | 0.11   | 0.26           | 0.27   | 0.19       | 0.24   |
| Some Post-Sec.               | 0.19           | 0.21   | 0.28       | 0.12   | 0.23           | 0.19   | 0.24       | 0.12   |
| College Deg/Dipl.            | 0.05           | 0.05   | 0.06       | 0.07   | 0.08           | 0.07   | 0.11       | 0.09   |
| Bachelor's Degree            | 0.07           | 0.08   | 0.07       | 0.13   | 0.13           | 0.19   | 0.13       | 0.21   |
| Above Bachelor's             | 0.02           | 0.02   | 0.04       | 0.05   | 0.07           | 0.09   | 0.11       | 0.11   |
| <b>Province</b>              |                |        |            |        |                |        |            |        |
| Atlantic                     | 0.11           | 0.11   | 0.02       | 0.01   | 0.11           | 0.11   | 0.03       | 0.01   |
| Quebec                       | 0.28           | 0.08   | 0.13       | 0.09   | 0.30           | 0.08   | 0.14       | 0.10   |
| Ontario                      | 0.32           | 0.36   | 0.55       | 0.53   | 0.31           | 0.37   | 0.55       | 0.55   |
| Manitoba                     | 0.04           | 0.03   | 0.03       | 0.02   | 0.04           | 0.02   | 0.02       | 0.02   |
| Saskatchewan                 | 0.05           | 0.01   | 0.02       | 0.01   | 0.04           | 0.01   | 0.01       | 0.01   |
| Alberta                      | 0.08           | 0.09   | 0.08       | 0.08   | 0.09           | 0.11   | 0.08       | 0.10   |
| BC                           | 0.12           | 0.32   | 0.18       | 0.27   | 0.12           | 0.30   | 0.17       | 0.22   |
| <b>Years since Migration</b> |                |        |            |        |                |        |            |        |
| 0- 9 years                   |                |        | 0.02       | 0.26   |                |        | 0.01       | 0.10   |
| 10 to 39 years               |                |        | 0.28       | 0.65   |                |        | 0.17       | 0.55   |
| Above 40 years               |                |        | 0.70       | 0.09   |                |        | 0.82       | 0.36   |
| <b>CMA</b>                   |                |        |            |        |                |        |            |        |
| Large CMA                    | 0.24           | 0.54   | 0.48       | 0.81   | 0.22           | 0.50   | 0.48       | 0.78   |
| Other CMA                    | 0.46           | 0.35   | 0.40       | 0.18   | 0.51           | 0.39   | 0.41       | 0.21   |
| Non-CMA                      | 0.30           | 0.12   | 0.12       | 0.01   | 0.27           | 0.11   | 0.11       | 0.01   |
| Low income                   | 0.09           | 0.14   | 0.12       | 0.21   | 0.04           | 0.07   | 0.06       | 0.11   |
| Racialized                   |                | 0.01   |            | 0.22   |                | 0.01   |            | 0.45   |
| N                            | 1001840        | 9005   | 339545     | 96225  | 1894730        | 14770  | 469410     | 386360 |

**Notes:** Sociodemographic Characteristics of population groups by year. Sample includes men aged 67 and above. Source: Author's Tabulations using the 2001 and 2021 Canadian Census.

Table 3.2: Sociodemographic Characteristics of population groups (Women)

| Women                        | 2001           |        |            |        | 2021           |        |            |        |
|------------------------------|----------------|--------|------------|--------|----------------|--------|------------|--------|
|                              | Non-Immigrants |        | Immigrants |        | Non-Immigrants |        | Immigrants |        |
|                              | Non-vis        | Vismin | Non-vis    | Vismin | Non-vis        | Vismin | Non-vis    | Vismin |
| Age                          | 75             | 75     | 75         | 74     | 74             | 75     | 76         | 74     |
| Age at Immigration           |                |        | 32         | 55     |                |        | 26         | 43     |
| Years since Migration        |                |        | 44         | 19     |                |        | 50         | 31     |
| Household size               | 1.76           | 2.06   | 1.98       | 3.73   | 1.82           | 2.05   | 1.98       | 3.21   |
| Married                      | 0.45           | 0.45   | 0.49       | 0.43   | 0.53           | 0.44   | 0.51       | 0.51   |
| <b>Education</b>             |                |        |            |        |                |        |            |        |
| Less than High School        | 0.60           | 0.59   | 0.59       | 0.71   | 0.23           | 0.21   | 0.30       | 0.34   |
| High School                  | 0.14           | 0.13   | 0.12       | 0.10   | 0.33           | 0.34   | 0.29       | 0.27   |
| Some Post-Sec.               | 0.18           | 0.18   | 0.19       | 0.09   | 0.19           | 0.17   | 0.15       | 0.11   |
| College Deg/Dipl.            | 0.05           | 0.05   | 0.05       | 0.04   | 0.10           | 0.08   | 0.10       | 0.09   |
| Bachelor's Degree            | 0.03           | 0.04   | 0.04       | 0.05   | 0.12           | 0.15   | 0.11       | 0.14   |
| Above Bachelor's             | 0.01           | 0.01   | 0.01       | 0.01   | 0.04           | 0.05   | 0.06       | 0.04   |
| <b>Province</b>              |                |        |            |        |                |        |            |        |
| Atlantic                     | 0.11           | 0.11   | 0.02       | 0.00   | 0.11           | 0.09   | 0.02       | 0.00   |
| Quebec                       | 0.30           | 0.10   | 0.12       | 0.10   | 0.30           | 0.09   | 0.13       | 0.10   |
| Ontario                      | 0.32           | 0.36   | 0.56       | 0.53   | 0.31           | 0.38   | 0.57       | 0.55   |
| Manitoba                     | 0.04           | 0.03   | 0.03       | 0.02   | 0.04           | 0.02   | 0.02       | 0.02   |
| Saskatchewan                 | 0.05           | 0.01   | 0.02       | 0.01   | 0.04           | 0.01   | 0.01       | 0.01   |
| Alberta                      | 0.07           | 0.10   | 0.08       | 0.09   | 0.09           | 0.10   | 0.08       | 0.09   |
| BC                           | 0.11           | 0.29   | 0.17       | 0.25   | 0.12           | 0.32   | 0.17       | 0.23   |
| <b>Years since Migration</b> |                |        |            |        |                |        |            |        |
| 0- 9 years                   |                |        | 0.03       | 0.24   |                |        | 0.02       | 0.11   |
| 10 to 39 years               |                |        | 0.29       | 0.70   |                |        | 0.17       | 0.56   |
| Above 40 years               |                |        | 0.68       | 0.06   |                |        | 0.81       | 0.34   |
| <b>CMA</b>                   |                |        |            |        |                |        |            |        |
| Large CMA                    | 0.26           | 0.55   | 0.47       | 0.82   | 0.24           | 0.55   | 0.50       | 0.79   |
| Other CMA                    | 0.48           | 0.34   | 0.42       | 0.18   | 0.52           | 0.36   | 0.41       | 0.20   |
| Non-CMA                      | 0.26           | 0.11   | 0.11       | 0.01   | 0.24           | 0.08   | 0.09       | 0.01   |
| Low income                   | 0.21           | 0.22   | 0.22       | 0.25   | 0.07           | 0.10   | 0.11       | 0.15   |
| Racialized                   |                | 0.01   |            | 0.23   |                | 0.01   |            | 0.46   |
| N                            | 1341370        | 10120  | 398660     | 120950 | 2158600        | 16745  | 532595     | 455010 |

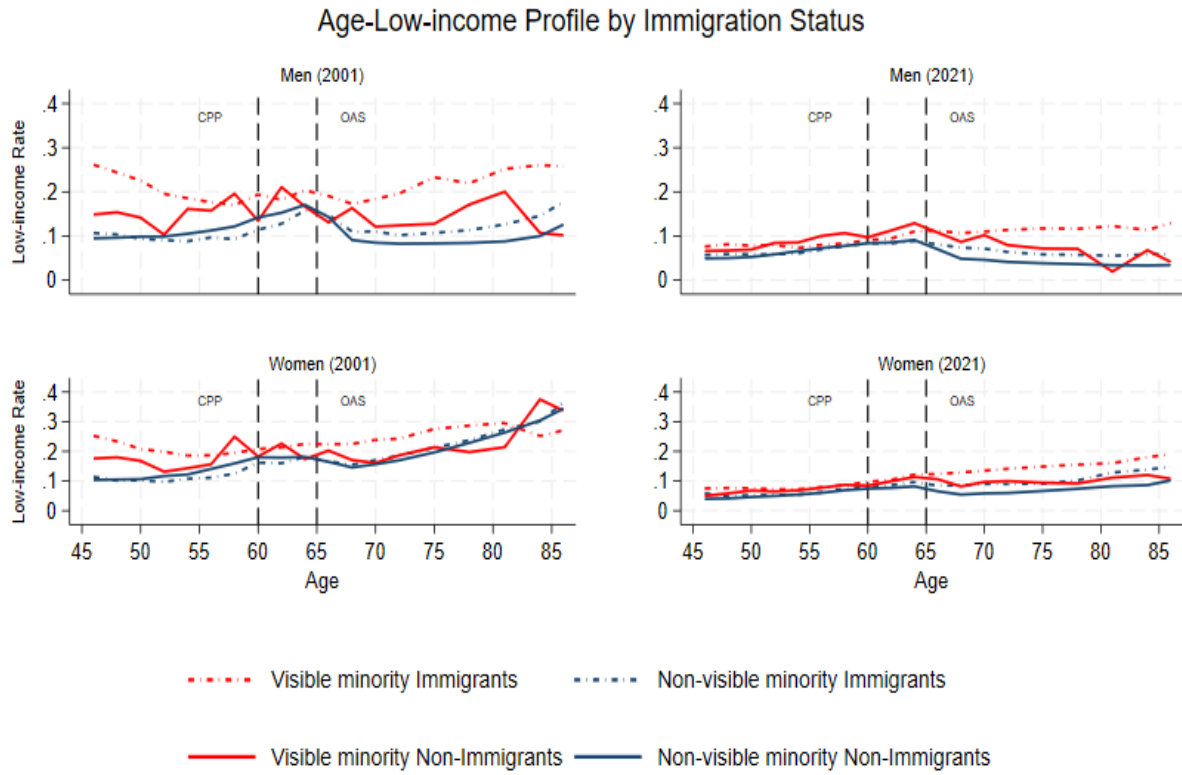
**Notes:** Sociodemographic Characteristics of population groups by year. Sample includes women aged 67 and above. Source: Author's Tabulations using the 2001 and 2021 Canadian Census.

Table 3.3: Low-Income Differentials by Immigrant, Racial identity, Gender and Year

|                          | 2001               |                    |                    | 2021               |                     |                                 |
|--------------------------|--------------------|--------------------|--------------------|--------------------|---------------------|---------------------------------|
|                          | 1                  | 2                  | 3                  | 1                  | 2                   | 3                               |
| <b>Men</b>               |                    |                    |                    |                    |                     |                                 |
| Vis. Min. Imm.           | 0.1147<br>[0.0030] | 0.2297<br>[0.0035] | 0.1143<br>[0.0048] | 0.0715<br>[0.0011] | 0.1153<br>[0.0012]  | 0.0390<br>[0.0016]              |
| Non-vis. Min. Imm.       | 0.0278<br>[0.0014] | 0.0427<br>[0.0015] | 0.0080<br>[0.0034] | 0.0205<br>[0.0008] | 0.0298<br>[0.0008]  | 0.0029<br>[0.0012]              |
| Vis. Min. Non-imm.       | 0.0465<br>[0.0084] | 0.0478<br>[0.0092] | 0.0381<br>[0.0086] | 0.0320<br>[0.0044] | 0.0266<br>[0.0043]  | 0.0210<br>[0.0041]              |
| <b>Women</b>             |                    |                    |                    |                    |                     |                                 |
| Vis. Min. Imm.           | 0.1624<br>[0.0029] | 0.1709<br>[0.0033] | 0.0513<br>[0.0048] | 0.1049<br>[0.0011] | 0.1045<br>[0.0012]  | 0.0169<br>[0.0017]              |
| Non-vis. Min. Imm.       | 0.1307<br>[0.0016] | 0.0586<br>[0.0017] | 0.0269<br>[0.0035] | 0.0647<br>[0.0009] | 0.0345<br>[0.0009]  | 0.0007<br>[0.0012]              |
| Vis. Non-imm.            | 0.1252<br>[0.0094] | 0.0469<br>[0.0093] | 0.0420<br>[0.0088] | 0.0554<br>[0.0047] | 0.0197<br>[0.0046]  | 0.0109<br>[0.0044] <sup>+</sup> |
| Non-vis. Non-imm.        | 0.1177<br>[0.0010] | 0.0301<br>[0.0010] | 0.0291<br>[0.0011] | 0.0267<br>[0.0005] | -0.0040<br>[0.0005] | -0.0105<br>[0.0005]             |
| <b>Control Variables</b> |                    |                    |                    |                    |                     |                                 |
| Demographic controls     | N                  | Y                  | Y                  | N                  | Y                   | Y                               |
| Immigration controls     | N                  | N                  | Y                  | N                  | N                   | Y                               |
| Economic controls        | N                  | N                  | Y                  | N                  | N                   | Y                               |
| Observations             | 637,980            |                    |                    | 1,435,955          |                     |                                 |

**Notes:** The dependent variable is a binary for being in a low-income household. + represents statistical significance at the 5% level. Column 1 presents the unadjusted gaps, column 2 presents the adjusted gaps with controls for age, education, marital status, household size. Column 3 adds immigration variables, such as dummies for age at immigration and includes binary variables for income sources. All other estimates are significantly different from the reference group at the 1% level. Sample includes individuals aged 67 and above. Reference group: non-racialized non-immigrant men. Robust standard errors are in parentheses.

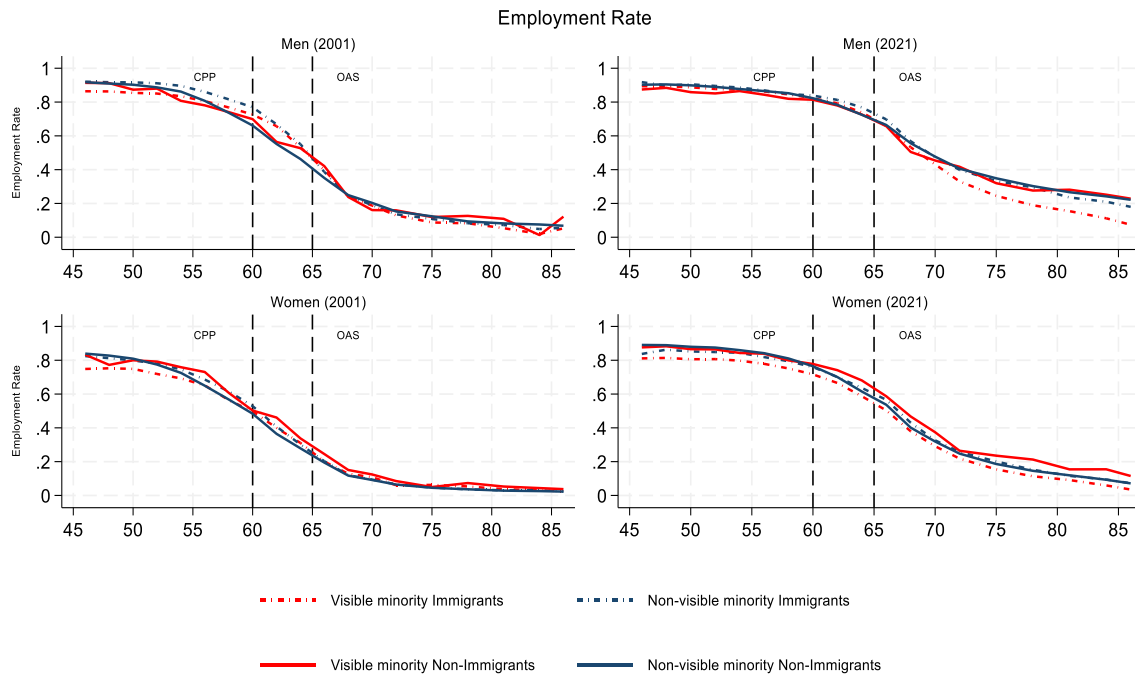
Figure 3.1: Age Profile of Low-income Probabilities



**Notes:** Age Profile of Low-income Probabilities by Immigration status, Racial identity, Gender and Year. Author's calculations using the 2001 and 2021 Censuses. Low-income rates are based on the LICO.

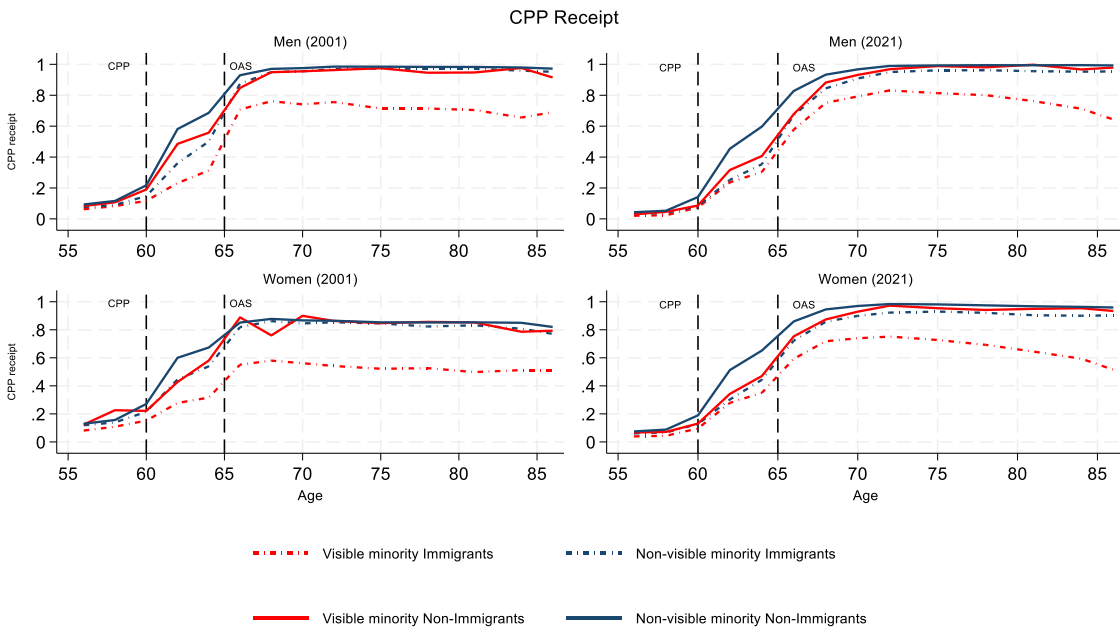


Figure 3.2: Employment Rate by Immigration status, Racial identity, Gender and Year



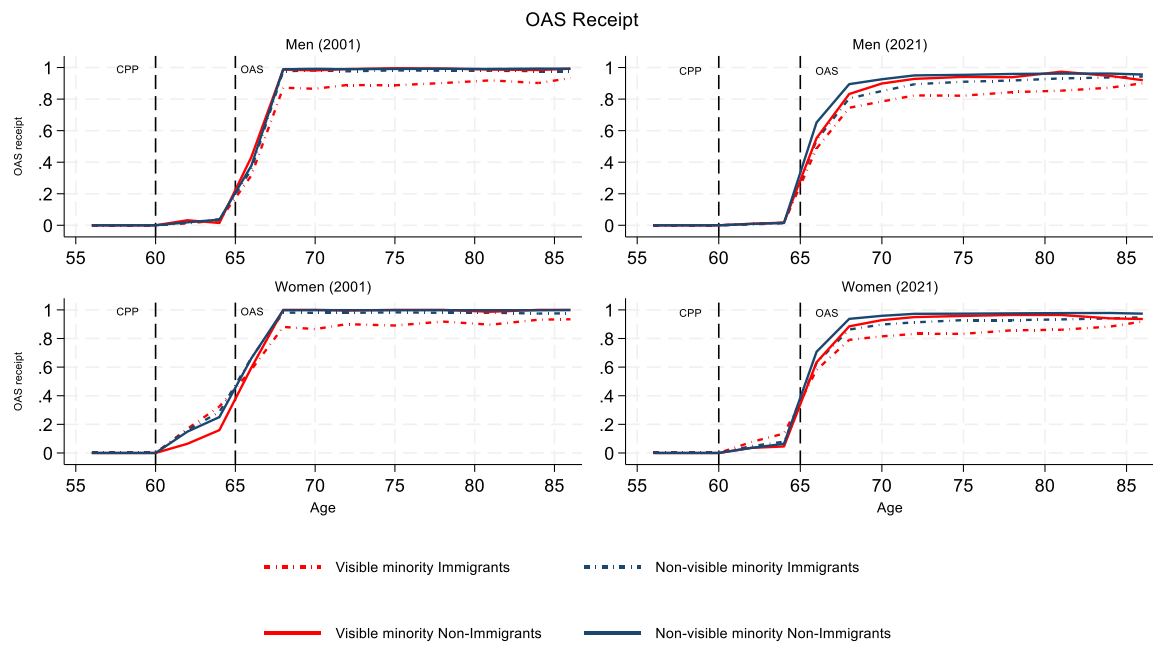
**Notes:** Employment Rate by Immigration status, Racial identity, Gender and Year. Author’s calculations using the 2001 and 2021 Censuses. Low-income rates are based on the LICO. Employment is defined as have positive earnings in the given year.

Figure 3.3: CPP Receipt by Immigration status, Racial identity, Gender and Year



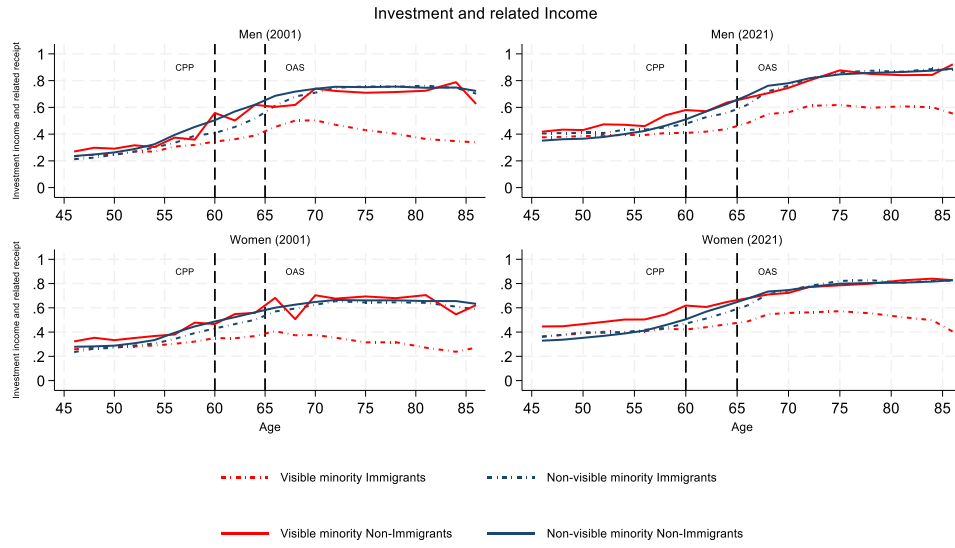
**Notes:** CPP Receipt by Immigration status, Racial identity, Gender and Year. Author’s calculations using the 2001 and 2021 Censuses. Low-income rates are based on the LICO.

Figure 3.4: OAS/GIS Receipt by Immigration status, Racial identity, Gender and Year



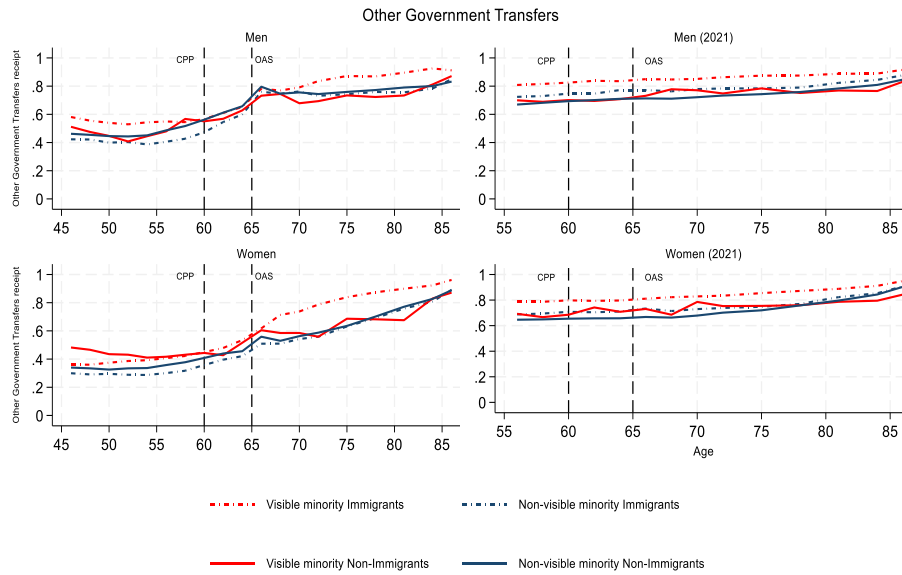
**Notes:** OAS/GIS Receipt by Immigration status, Racial identity, Gender and Year. Author’s calculations using the 2001 and 2021 Censuses. Low-income rates are based on the LICO.

Figure 3.5: Private Investment Income by Immigration status, Racial identity, Gender and Year



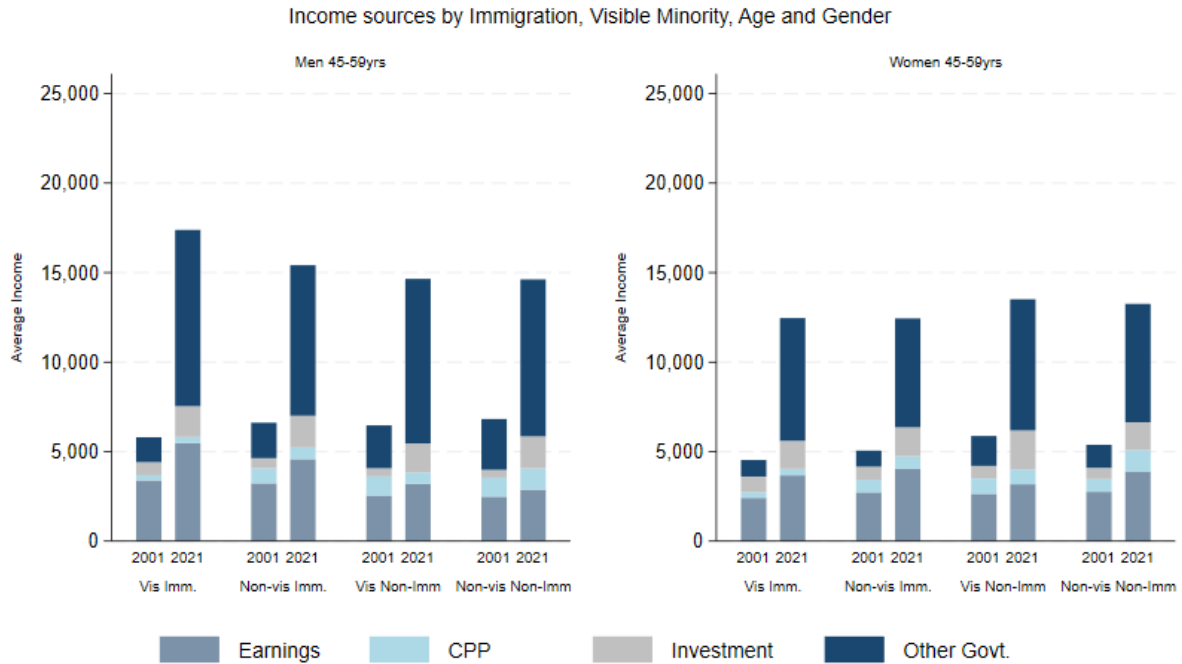
**Notes:** Author’s calculations using the 2001 and 2021 Censuses. Low-income rates are based on the LICO.

Figure 3.6: Other Government Transfers by Immigration status, Racial identity, Gender and Year



**Notes:** Author’s calculations using the 2001 and 2021 Censuses. Low-income rates are based on the LICO. Other government transfers include all government transfers except public pension benefits, employment insurance benefits and child benefits from federal and provincial programs.

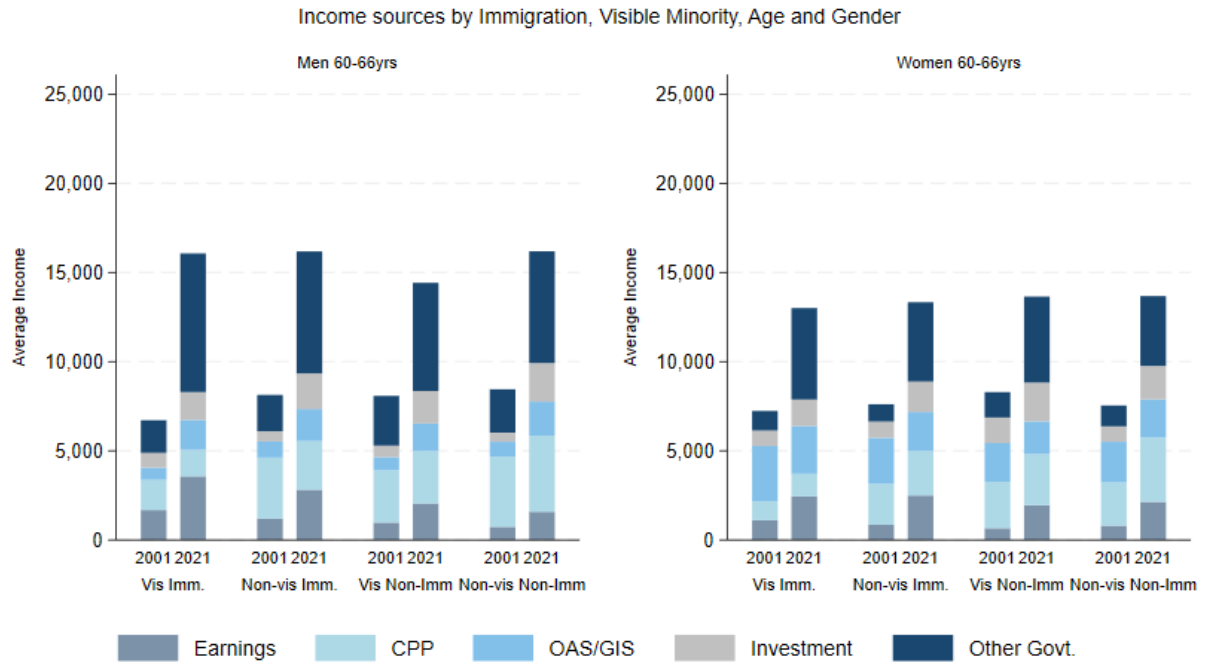
Figure 3.7: Average Income from sources by Immigration status, Racial identity, Gender and Year (45-59years)



Source: Canadian Census 2001 and 2021  
All values are 2021 dollars.

Notes: Author’s calculations using the 2001 and 2021 Censuses. Low-income rates are based on the LICO. Sample consists of men and women aged 45-59 years below the 25th percentile of total income.

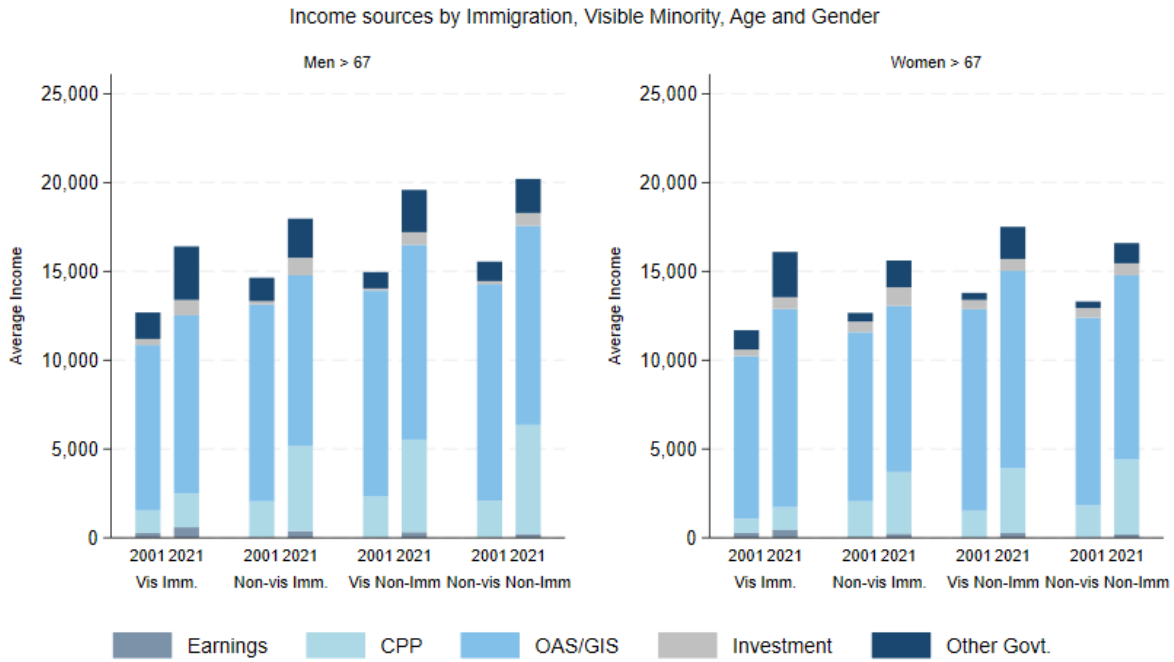
Figure 3.8: Average Income from sources by Immigration status, Racial identity, Gender and Year (60-66 years)



Source: Canadian Census 2001 and 2021  
All values are 2021 dollars.

**Notes:** Author’s calculations using the 2001 and 2021 Censuses. Low-income rates are based on the LICO. Sample consists of men and women aged 60-66 years below the 25th percentile of total income.

Figure 3.9: Average Income from sources by Immigration status, Racial identity, Gender and Year (67 years and above)

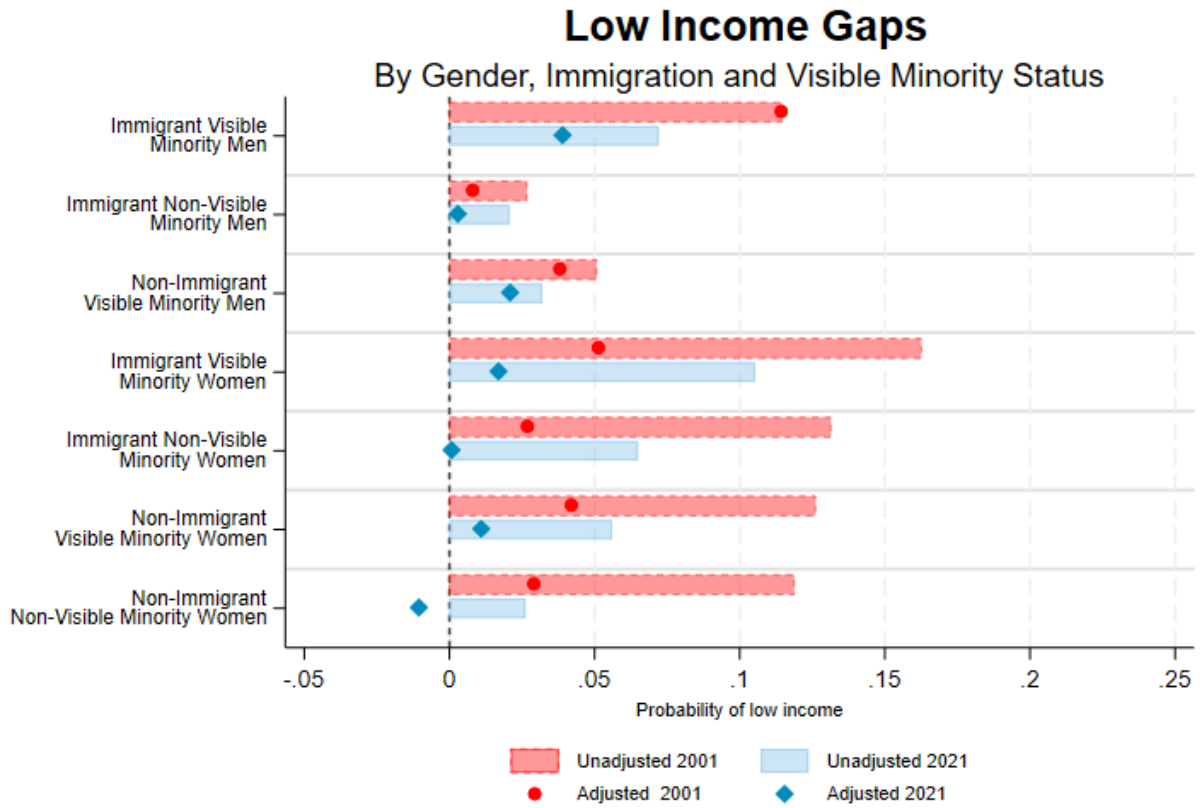


Source: Canadian Census 2001 and 2021  
All values are 2021 dollars.

**Notes:** Author’s calculations using the 2001 and 2021 Censuses. Low-income rates are based on the LICO. Sample consists of men and women 67 years and older below the 25th percentile of total income.



Figure 3.10: Low-Income gaps by Immigration status, Racial identity, Gender and Year



**Notes:** Author’s calculations using the 2001 and 2021 Censuses. Low-income rates are based on the LICO. All estimates are significantly different from the reference group at the 5% level

## **Conclusion**

---

In response to the aging population, most governments introduce policies to tackle the declining fertility rate and reduce the old-age dependency ratio. In this thesis, I examine how public policies targeted at this issue affect individuals' labour market decisions and economic well-being. Specifically, I examine three papers on the financial well-being of individuals following significant events life events such as the birth of a child and retirement.

The first paper examines how the maternity and parental leave benefits available at the time of first birth affect the income losses a mother faces. This chapter contributes to the literature by exploring Canada's unique landscape, where two different maternity and parental plans operate concurrently, to examine the long-term impact of maternity and parental leave reforms on the motherhood penalty. Here, I find that the type of benefits received at the time of first birth does affect the motherhood penalty a mother faces.

The second paper explores the differential employment and public pension receipt patterns of immigrant and non-immigrant seniors. Specifically, it examines how the 10-year residency requirement affects the employment and take-up of Canadian seniors. I find that we find that immigrant seniors' employment decisions are sensitive to crossing the age-65 eligibility threshold for OAS and GIS and the ten-year residency requirements threshold. I contribute to the existing literature by providing insights into the heterogeneity across age-at-immigration groups, immigration class and gender.

The third paper documents the differences in low-income rates of Canadian seniors, accounting for the interaction of racial identity, immigration status and gender. I also explore changes that have occurred over the last two decades. This paper adds to the scarce

literature on the differential low-income rates of seniors by immigration status by examining the changes in low-income rates over time using the complete set of tax-relevant income sources to understand how each underlying income stream is associated with the observed differences in low. Notably, it emphasizes the importance of considering the behaviour of individuals in prime age in tandem with their behaviours and income sources in retirement.