MW and Household Consumption: Evidence from High and Low Wage Provinces in Canada

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ABSTRACT

Minimum wage (MW) has become a common policy instrument in several countries and regions across the world. However, researchers are divided regarding whether the MW achieves its intending objectives or not. The current study will examine whether MW enhances household consumption as a sustainable income policy. While the MW is set under the authority of the provinces, resulting in appealing cross-province and time-series diversity, Canada serves as an excellent research center for this type of inquiry. The fact that we can utilize Canadian data gives us the ability to examine the impact of the MW by studying cross-province and time-series variation with a high number of MW changes passed in different jurisdictions.

This research utilizes a panel-based analysis, trying to compare the four provinces that provide the highest wage levels (Alberta, British Columbia, Ontario ,and Saskatchewan) with the other six provinces that provide the lowest wage levels (Manitoba, Nova Scotia, New Brunswick, Newfound land/Lab ,Prince Edward Island, and Quebec) for the study period from 1981 to 2019, in Canada. Dynamic Autoregressive Distributed Lag Methods (i.e., Pooled Mean Group, Dynamic Fixed-Effect ,and Mean Group estimators) are used to examine the effect of minimum wage on household consumption in the short and long term. The findings demonstrate that MW has a favorable long-term impact on household consumption in both low- and high-wage regions. In both wage categories, the short-term effect is negative, although not statistically significant in the low-wage group.

Our findings imply, despite the possible negative effects of MW on employment, it can be an effective tool for improving economic growth and welfare. In other words, it might be better to pay greater attention to the spillover impacts of MW policies while designing them.

Keywords: Panel ARDL; Canada; Minimum Wage; Low-wage province; High-wage province; Household consumption

ÖZ

Asgari ücret (MW), dünya çapında birçok ülke ve bölgede ortak bir politika aracı haline gelmiştir. Bununla birlikte, araştırmacılar, asgari ücretin amaçlanan hedeflerine ulaşıp ulaşmadığı konusunda bölünmüşlerdir. Mevcut çalışmada, asgari ücretin hanehalkı tüketimini sürdürülebilir bir gelir politikası olarak artırıp artırmadığı incelenmiştir. Asgari ücret, illerin yetkisi altında belirlenir ve iller arası ve zaman serisi çeşitliliğine çekici gelirken, Kanada bu tür araştırmalar için mükemmel bir araştırma merkezi olarak hizmet eder. Kanada verilerini kullanabilmemiz bize, farklı yetki alanlarında geçirilen çok sayıda asgari ücret değişikliği ile iller arası ve zaman serisi varyasyonlarını inceleyerek MW'nin etkisini inceleme yeteneği verir.

Bu araştırma, Kanada'da 1981'den 2019'a kadar olan çalışma dönemi için en yüksek ücret seviyelerini sağlayan dört il (Alberta, British Columbia, Ontario ve Saskatchewan) ile en düşük ücret seviyelerini sağlayan diğer altı il, (Manitoba, Nova Scotia, New Brunswick) karşılaştırmamızı sağlayan panel tabanlı bir analiz kullanmaktadır. Asgari ücretin kısa ve uzun döenmde hane tüketimi üzerindeki etkisini incelemek amacıyla Dinamik Otoregresif Dağıtılmış Gecikme Yöntemleri (örneğin Havuzlanmış ortalama grup, Dinamik sabit etkiler, ve Ortalama grup) kullanılmıştır. Bulgular, asgari ücretin hem düşük hem de yüksek ücretli bölgelerde hane tüketimi üzerinde uzun vadeli olumlu bir etkiye sahip olduğunu göstermektedir. Her iki ücret kategorisinde de, düşük ücret grubunda istatistiksel olarak anlamlı sonuç bulunamasada, kısa vadede etkisi negatiftir.

Bulgularımız, MW'nin istihdam üzerindeki olası olumsuz etkilerine rağmen, ekonomik büyümeyi ve refahı iyileştirmede etkili bir araç olabileceğini göstermektedir. Başka bir deyişle, asgari ücret politikalarını tasarlarken yayılma etkilerine daha fazla dikkat etmek daha iyi olabilir.

Anahtar Kelimeler: Panel ARDL; Kanada; Asgari ücret; düşük ücretli eyalet; yüksek ücretli eyalet; Hanehalkı tüketimi

DEDICATION

To my lovely family

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LIST OF ABBREVIATIONS

APC	Average Propensities to Consume
ARDL	Autoregressive Distributed Lag model
BC	British Colombia
CAD	Denotes Canadian Dollars
CADF	Cross-sectional Augmented Dickey-Fuller
CD	Cross-Sectional Dependence
CIPS	Cross-sectional Augmented test Im et al. (2003) test
COVID-19	Coronavirus disease of 2019
DEMND	Final domestic demand
DFE	Dynamic Fixed-Effect method
ECM	Error Correction Model
ECT	Error Correction Test
EU	European Union
FRPS	Federally Regulated Private Sector
FJWS	Federal Jurisdiction Workplace Survey
GDP	Gross Domestic Product
GDPC	Gross Domestic Product per Capita, income-based
GMM	Generalized Method of Moments
HCON	Household final consumption expenditure
HNC	Homogenous non-causality
ILO	International Labour Organozation

LCH	Life Cycle Hypothesis
LFS	Labour Force Survey
LM	Lagrange Multiplier
LOW_INCME	Percentage of individuals in low income
MG	Mean Group Method
MPC	Marginal Propensities to Consume
MW	Minimum Wage
OECD	Organization for Economic Co-operation and Development
OLS	Ordinary Least Square
PIH	Permanent Income Hypothesis
PMG	Pooled Mean Group method
RINT	Interest paid on consumer credit
SDG	Sustainable Development Goal
StatCan	Statistics Canada
UK	United Kingdom

Chapter 1

INTRODUCTION

1.1 Background

MW was initially instituted in New Zealand in the late nineteenth century, and it is now used in several countries. In several countries and locations worldwide, MW has become a frequent policy measure. The strategy is frequently aimed at reducing poverty among (low-skilled) workers and correcting the defects of the labor market (Belser and Rani, 2015; Boal and Ransom, 1997). However, there is a highly controversial issue of MW policy. Economists and policymakers are divided as to whether or not the MW fulfills its intended goals. The opponents of the MW policy argue that greater MW reduces employment of low-skilled workers. Since wage rules encourage companies to raise the wages of low-paid workers, this can lead to firms reducing the job opportunities of the same working group that the policy is aimed at protecting. They argue that an increase in MW or the introduction of pay floors increases the expense of untrained, low-quality work, decreases labor consumption and, ultimately, contributes to a rise in unemployment (Ehrenberg and Smith 2018). In contrast, the MW supporters argue that MW reduces income gap, boosts low-income workers' consumption and boosts the economy. They therefore claim that an increase in MW reduces low-skilled employees' unemployment and increases consumption, leading to economic growth.

MW may be a key and strong tool for supporting decent labor objectives, but can also be critical for improving the level of social protection, poverty reduction efforts and equal working conditions. In recent decades, there has been a rise of interest in the role of the minimum wage; for example, it has been considered a vital factor for the reduction of poverty in Brazil, whereas in China it has been considered a policy to reduce inequality in the country. MW is a successful government strategy in the United Kingdom. Equality and MW have also been seen as a redistributive strategy in the United States (Moscariello 2015).

MW measures in the empirical literature which are most frequently used include: the log of the real minimum wage, the Kaitz index, the MWfraction and the proportion below the MW (Lemos 2004; Pratomo 2011). The Kaitz index is calculated as the ratio of MW to average wage, weighted by the percentage of workers covered by minimum wage. Card (1992) criticizes the Kaitz index, claiming that average wages are positively correlated with MW due to total adjustments in wage levels associated with inflation, productivity growth, or changes in economic activity. In his regressions, he instead prefers using real or otherwise nominal MW (Card 1992). For over a century, MW has been a major component of social policy (Neumark and Wascher 2008). The Law report on the working conditions of the International Labour Organozation (ILO) shows that the number of workers affected by the MW is expanding to 151 countries/territories.

The success of MW policy is determined by the level at which it is implemented. If it is too low, it may be ineffective in ensuring living standards, resulting in a lack of investment and consumption, which would result in a decline in aggregate demand. However, if it rises rapidly, it may cause inflation and harm employment

(Belser and Sobeck 2012). The main point to bear in mind is that the low-paid worker will receive benefits if the MW is properly and efficiently set up. Empirically, for several decades there has been a discussion between scientists and politicians about the employment effect of the MW (Neumark 2019). Numerous empirical research studies have continued to emerge in support and against MW.

Many studies (Card and Krueger, 1995; Neumark and Wascher, 1992; Burkhause et al., 2000) have found positive effects of MW on employment while some other studies (Brown et al. 1982; Maloney, 1995; Neumark and Wascher, 2004; Addison and Ozturk, 2012; Meer and West, 2016; Clemens and Wither, 2019) have presented evidence of the policy's negative employment impact. Others came to the conclusion that MW has no significant influence on employment (Katz and Krueger, 1992; Dube et al. 2010; Draca et al. 2011; Giuliano, 2013; Ahlfeldt et al.2018).

The debate on whether the implementation of national MW laws can lead to improved welfare and subsequently the stimulation of economic activities has been controversial. These controversies are associated with the growing discussions on whether MW could stimulate aggregate demand or lead to inflationary effects – especially during economic recessions such as the recent one induced by the COVID-19 global pandemic . The MW can be perceived as the core foundation on which most of the Sustainable Development Goals are anchored. This is because; poverty reduction (goal one), zero hunger (goal two), quality health and well-being (goal three), quality education (goal four), gender equality (goal five)**,** clean water and sanitation (goal six), affordable and clean

energy (goal seven), decent work and economic growth (goal eight), reduced inequality (goal ten) as well as responsible production and consumption are all core tenets of sustainable development which require sustainable wage levels in varying degrees.

The proponents of MW argue that MW raises the prosperity of all workers, lowers income inequality, and improves the overall performance of the economy (Lee, 1999; Card et al., 1995). Lee (1999) explores the influence of the MW and explains how it influences the distribution of wages. He found that part of this increase is due to reductions in the real MW at the lower part of the distribution. Card et al. (1995) demonstrate that the federal MW stops growth and temporarily eliminates rises in wage inequality in the United States. Additionally, heterodox economists argue that an increase in MW would help to raise workers' incomes and thus boost aggregate demand in the economy (Barba et al., 2009).

Thus, despite the plethora of studies, the debate on the cost and benefits of MW is inconclusive. Besides, most of the studies in the extant literature are focused on the United States. MW policy is currently a global phenomenon, and there are significant developments concerning MW in other countries. Hence, studies on the United States, including the state-level studies, cannot be generalized to other countries because of certain fundamental differences, such as labor market structures and other macroeconomic fundamentals. The studies carried out for the United States, with a homogenous institutional framework do not capture the reality of the MW nexus of other countries across the world, and cannot be confidently applied to heterogeneous settings such as Canada. The provinces in Canada are different in many dimensions such as labor market structure, demographics, industrial opuses, and several other

unobserved characteristics. Therefore, there is a need to evaluate the recent impact of the MW policy in Canadian provinces.

1.2 Differences between high and low wages provinces in Canada

Canada is divided into three regions: Atlantic (Newfoundland, Prince Edward Island, Nova Scotia, and New Brunswick), Central (Ontario and Quebec), and Western (Manitoba, Saskatchewan, Alberta, and British Columbia). As Baker (2005) states, Canadian data are well-suited for analyzing MW effects because they cover a long period and contain both time series and cross-sectional variations in MW changes.

The Labour Force Survey (LFS) is a nationally representative sample survey of the civilian, noninstitutionalized population aged 15 years and above (Statistics Canada 2019). According to the LFS survey, the largest group of workers are found in Ontario (39%), Quebec (20%), and British Columbia (BC) (13 %). Banking (28%) is the industry with the highest percentage of employees, followed by telecommunications and broadcasting (16%) and road transportation (16%).

According to the Canadian Constitution, the authority for enacting and enforcing labor laws, including the minimum wage, is assigned to the 10 provinces and three territories by federal legislation. As Baker (2005) notes, Canadian data are better suitable for analyzing MW implications than those from the United States and the United Kingdom because they cover a longer time period and include both time series and cross-sectional variations in MW modifications.

Provincial and territorial governments establish their MW rates differently. They normally establish them via labor legislations, and five of the thirteen jurisdictions

have established mechanisms for annual rate changes in accordance to the Consumer Price Index.

According to the 2015 Federal Jurisdiction Workplace Survey (FJWS) and Labour Force Survey (LFS), three of the four provinces with the largest concentration of federal institutions have a MW of about $15 per hour (Alberta, British Columbia, and Ontario). Three of Canada's four most populated provinces lack a program of temporal variation (namely, British Columbia, Quebec, and Alberta). The MW in British Colombia was increased by 28 percent through one year in May 2011 (Statistics Canada 2019). Recently, Ontario has increased the MW by 21%. In 2018, there are significant differences in average and median incomes across provinces (Statistics Canada 2019).

Several studies in the United States and Canada have concluded that there is a weak correlation between MW and poverty. One explanation is that many MW employees in middle and upper-income households are teens.

Another major category of MW is young adults who live at home or go to school (Morissette and Dionne-Simard, 2018). Many of these students come from middle-class households who are also going to school. In the case of teenage and full-time students, both of these problems can have less relevance in the FRPS among those with a federal minimum wage.Many poor families have family members who either do or do not work part-time, so increases in the MW have almost no impact on their household incomes.MW workers work less than employees within a higher wage distribution (Statistics Canada 2019).

According to Green (2016), Rising Canada's MW to $15 hourly would most likely have negative job prospects, particularly for teens, but it is predicted that poverty would be decreased, since more MW employees will be adults (some of whom are the family's major earner). Poverty rates in Canada in recent years have either been constant or declining, depending on whether relative or absolute poverty levels are considered (Heisz, 2016). MW grew considerably in comparison to living expenditures during this time period.

The Gini coefficient of salary and income inequality in Canada climbed considerably over the 1980s and 1990s and has been reasonably constant since 2000 at these higher levels (Green et al. 2016).

According to Fortin and Lemieux (2015), adjustments in MW between1997 to 2013 had a crucial impact on wage inequality patterns in Canada. After investigating the effects of lower MW throughout this time period, Fortin and Lemieux discover that a decline in the MW had a modest impact on rising income inequality in the late 1990s and early 2000s.In addition, Fortin and Lemieux find that greater MW' inequalities are highest at the very low end of the scale – the fifth percentile and the 10th – and reduced but still noticeable at the fifteenth percentile.

Baker, et al. (1999) study the effects of successive MW rises in Canada that began in the early 1990s, following a long period of decline in the real minimum wage. They found no immediate effect of unemployment on a person's performance, but they expect extremely substantial negative impacts over longer time, particularly on younger employees. A number of other studies corroborated these findings (Campolieti et al. 2006; Baker 2005; Brochu and Green , 2013; Campolieti et

al.2005), which revealed that a 10% MW rise resulted in a 3% to 5% loss of employment for young workers.

As a result, the Canadian literature implies that unemployment effects are a potential negative outcome of MW rises that policymakers should consider. These implications are particularly apparent for young people and teens, which represent a substantial share of MW employees in many parts of Canada.

Employers might also increase product pricing in response to the additional expenses connected to MW hikes. As consumers adapt to changes in relative costs by reducing expenditure on goods and services provided with low-wage workers, it may then result in lower employment for the industry. These changes take time to evolve so that studies focusing on short-term effects are not taken into account. Numerous large Federally Regulated Private Sector (FRPS) businesses stated that they were unconcerned about MW because their firm or industry had considerably few employees earning MW.

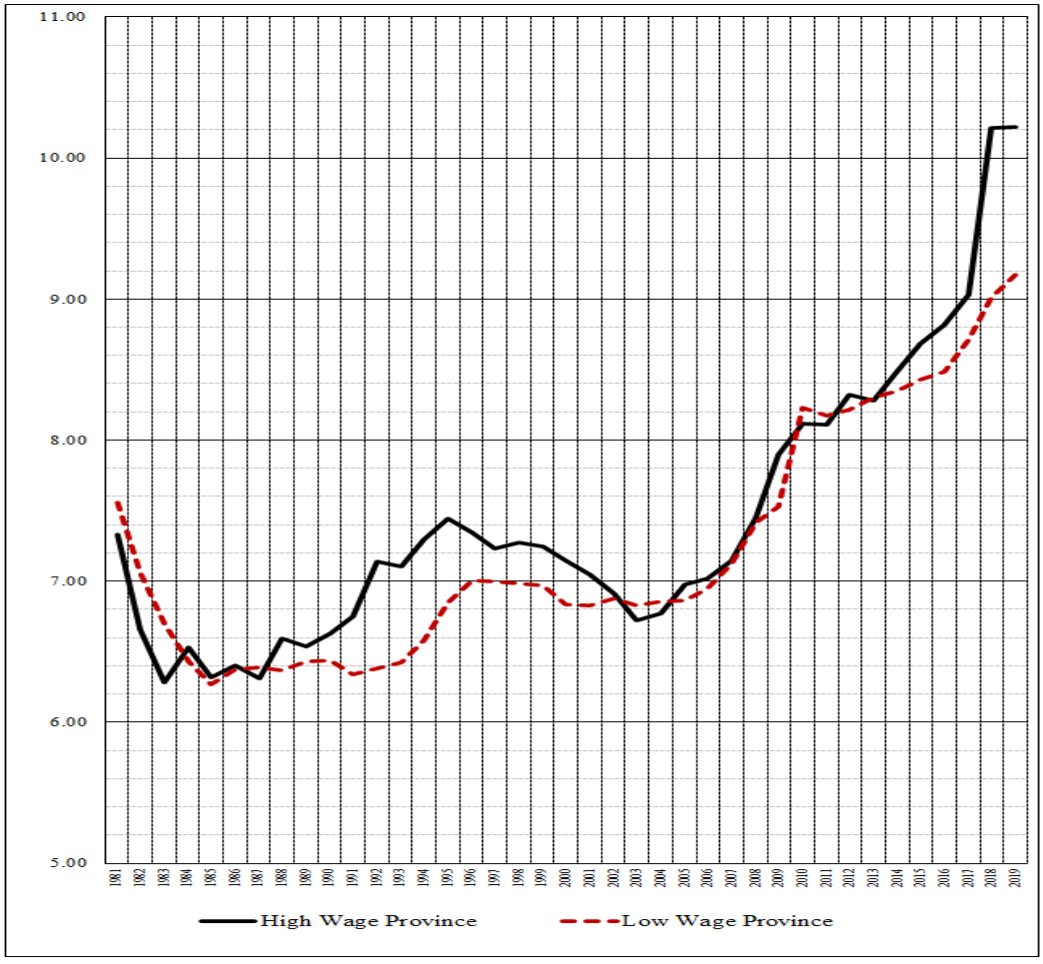
However, there is no straightforward method to predict the precise effects of MW rises on the level of employment, the competitiveness of companies and consumer prices, and a variety of other concerns in a particular jurisdiction, such as Canada's FRPS. In view of the varied labor markets and economy of each province and territory within Canada in such big and economically diverse countries, these uncertainties are particularly challenging.

In 1996, the federal MW was removed and the provincial MW set the appropriate federal compensation for federal employees working for a particular

province.According to studies based on data from the pre- and post-1996 sample periods (Akyeampong 1989; Galarneau and Fecteau 2014; Sussman 2005), the vast majority of MW earners in the retail trade and services (food and accommodation) industries are teenagers and young adults. In particular, these Canadian estimates imply that teenagers make up approximately half of wage earners and one in three teenagers work for the MW (Galarneau and Fecteau 2014; Sussman 2005).

A different image appears in the comparison of the low-wage provinces (Manitoba, New Brunswick, Newfoundland/Lab, Nova Scotia, Quebec, and Prince Edwards Island) and the high-wage provinces as a group (Alberta, Saskatchewan, Ontario and British Colombia). Differences in the weighted real MW across provinces could also result in varying trends of real household consumption per capita, real GDP per capita, and real interest- consumer credit per capita. We explore these potential differences by demarcating provinces as low-wage provinces (Group1) and high-wage provinces (Group 2) while evaluating the effect of the MW on Canadian household consumption.

In Figure 1 it is shown that in both high and low wage groups; there has been a sharp decline of MW rates in the first few years. Then in the following years, there is a gradual fluctuation until 2014 in both groups. Afterwards, a sharp increase in rate takes place in both groups with high wage province having a greater growth rate than low wage province.



High Wage Province=Alberta+British Columbia+Ontario+Saskatchewan

Low Wage Province=Manitoba+New Brunswick+New Fpundland/Lab+Novascotia+PEI+Quebec

Figure1: The weighted* average real MW rates for each of the two groups of provinces

Source: Developed by authors using data from the Statistics Canada (statcan 2019)

Note *: Base on author's computation you find the weighted average (real CAD 2002) minimum wage rate for each group of provinces by multiplying the real minimum wage rates (CAD 2002 prices) by the proportion of the group's labour force that is located in that province. Then you add up these values across all the provinces in the group and that gives you the weighted average minimum wage rate for that group of provinces for that year.

In figure 2, the changes in average household consumption per capita in high wage and low wage groups were somewhat similar. There has been a rise of about 40% in both groups from 1981 to 2019. Throughout the period, the high wage group remained higher than low wage group.

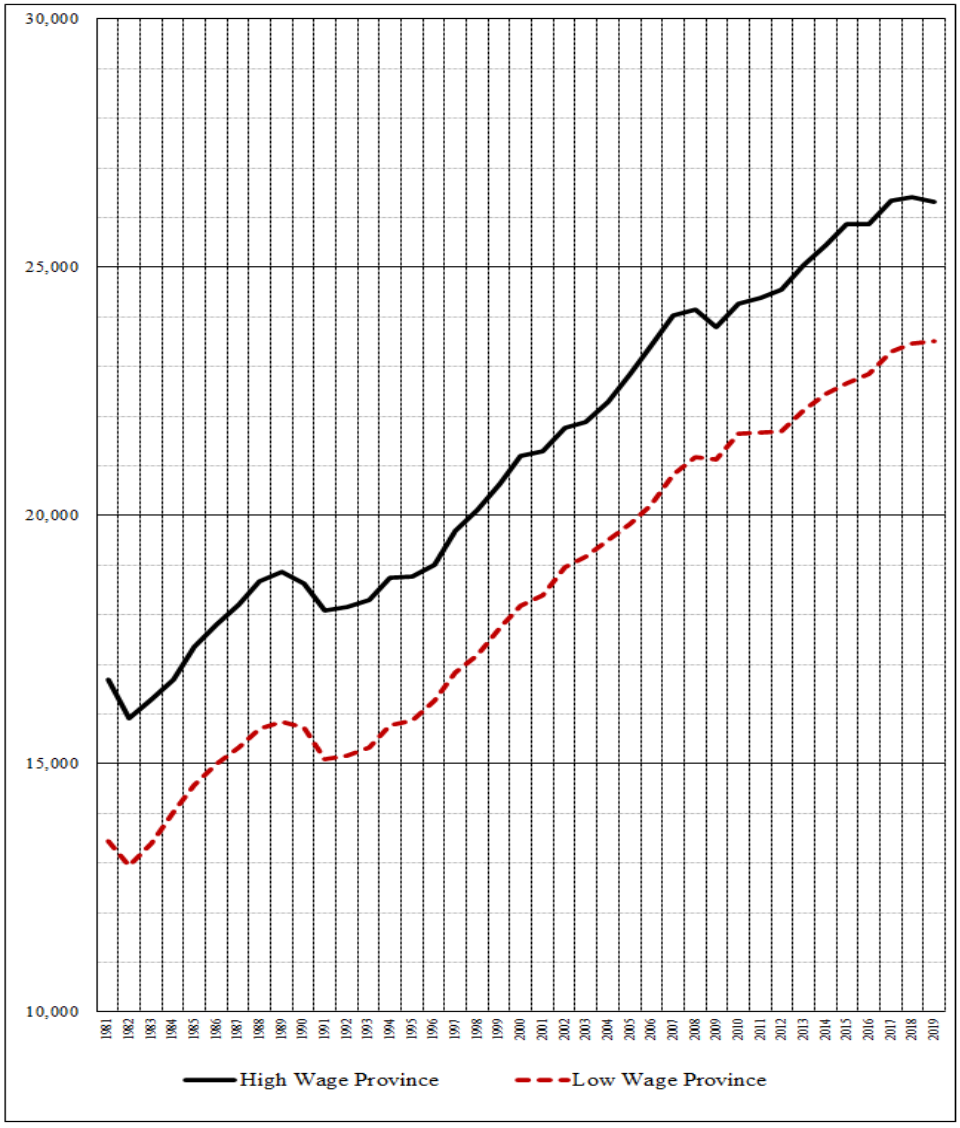
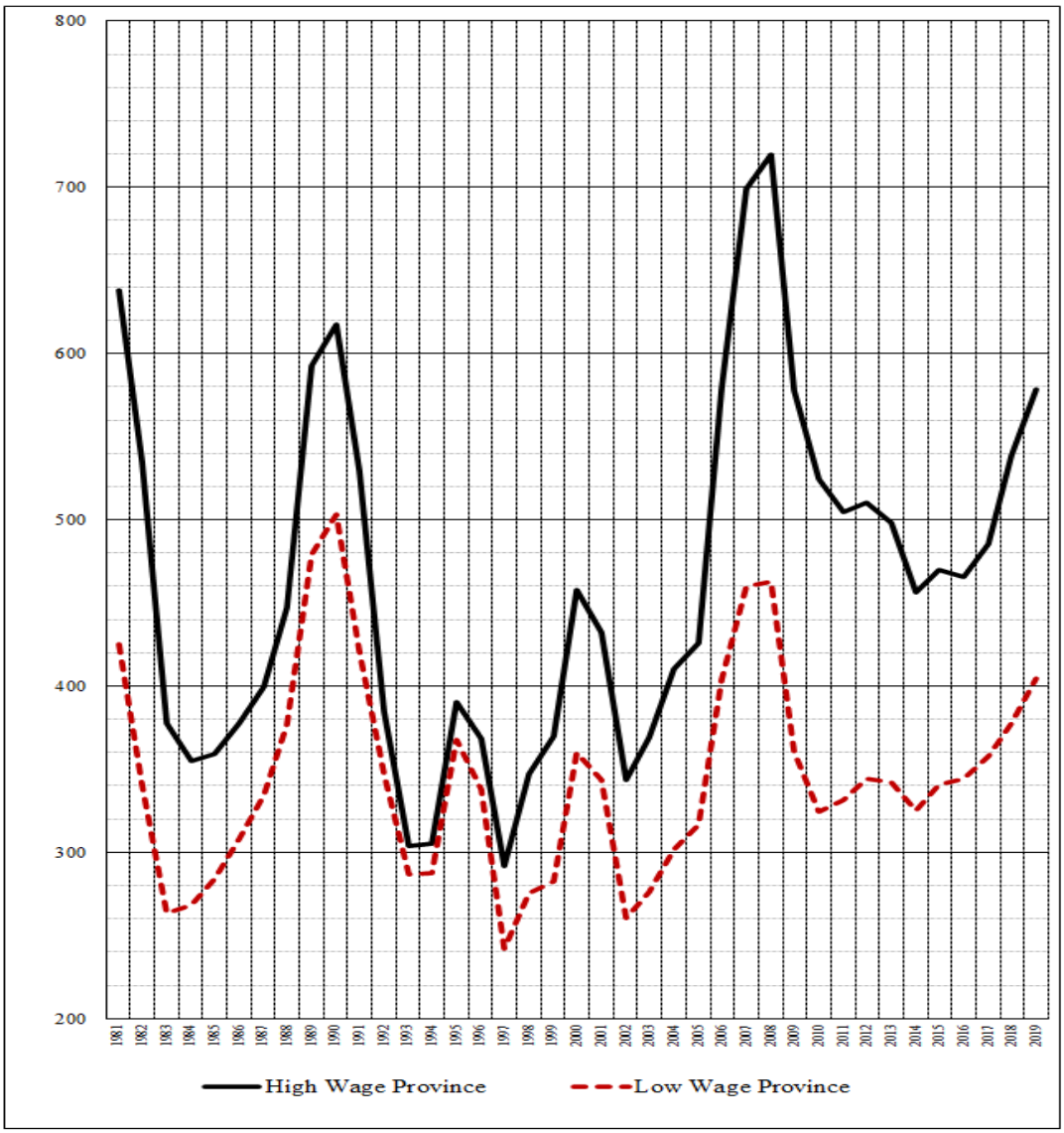


Figure 2: Average household consumption per capita (HCON) for each of the two groups of provinces
Source: Own calculation by authors using data from the Statistics Canada based on 2002 CAD (statcan 2019)

In figure 3 a significant fluctuation is seen in per capita consumer interest paid in both high and low wage groups. The rates of both groups come closest to each other in 1992-1994 which is around 300. An interesting fact is that the pattern of fluctuation is quite similar in both groups.

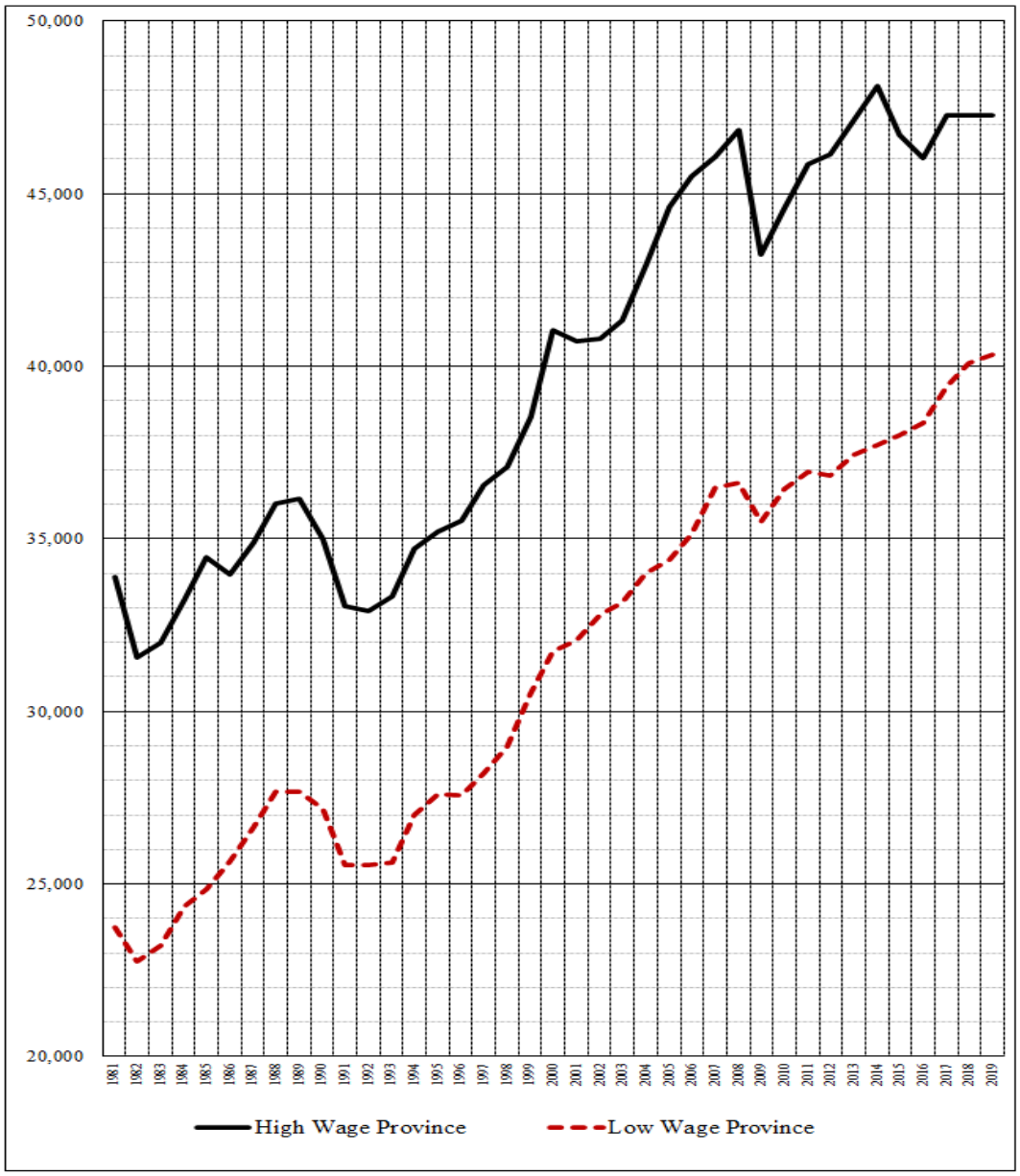


High Wage Province=Alberta+British Columbia+Ontario+Saskatchewan

Low Wage Province=Manitoba+New Brunswick+New Fpundland/Lab+Novascotia+PEI+Quebec

Figure 3: The per capita consumer interest paid (RINT) by each of the two groups of provinces
Source: Author's computation using data from the Statistics Canada base on 2002 CAD (statcan 2019)

In figure 4 there is an increase in GDP per capita, in both groups throughout the whole period. In 2019, the high wage group is around 47,000 and the low wage group is just above 40,000. The difference between the groups was about 10,000 in 1981, but it decreased to 7,000 in 2019.



High Wage Province=Alberta+British Columbia+Ontario+Saskatchewan

Low Wage Province=Manitoba+New Brunswick+New Fpundland/Lab+Novascotia+PEI+Quebec

Figure 4: Average Real Gross Domestic Product per Capita (GDPC) for each of the two groups of provinces

Source: Developed by authors using data from the Statistics Canada base on 2002 CAD (statcan 2019)

Since these two groups also vary in terms of GDP per capita, household consumption per capita, and interest consumer per capita , as shown in the figures, further research is required to determine the interaction between the MW and household consumption and to decide if MW is linked to high household consumption. We would like to unravel the MW–household dynamics because, according to the theory, different results are predicted in two different groups of high- and low-income groups, and therefore it is preferable if they are studied differently to uncover the potential differences, not only in their income level, but also in their consumption and GDP per capita level. Thus, investigating them differently can uncover novel results.

1.3 Motivation of the study

Consumption has been proven as a key driver of economic growth. However, little focus is placed on the impact of MW on global consumption. In Canada, most of the studies on impact of MW on economic variables demonstrate a negative employment effect of MW (Campolieti et al. 2005; Baker et al. 1999). While the relationship between MW and employment has been explored in the previous studies, little is known about the linkage between MW and household consumption in Canada. To our understanding, Jung et al's (2020) work is the only study on MW and consumption relationship in Canada. Consumption variable as used in Jung et al. (2020) is proxied as real retail trade sales normalized on adult population and result indicates a positive long-run relationship between MW and the real values of retail sales trade.

The present research extends the literature by investigating the relationship between MW and household consumption in Canada. Canada presents an interesting case as one of the few North American countries that adopted a robust provincial MW

legislation. This allows provinces the complete jurisdiction over MW payments. According to Yuen (2003), there is unemployment heterogeneity between high and low-wage households which is translated across the provinces. Such income differences across provinces may also imply differences in consumption patterns and sustained quality of life. Therefore, a more concise perspective of the effect of the MW across households with heterogeneous income levels is paramount towards contributing to the SDGs 8 (Decent Work & Economic Growth) and 10 on inequality reduction within and between countries, and drive economic growth through wage-led fiscal policies. To defend the heterodox economists' approach under which MW hikes would help household consumption to rise and thus lift the economy's demand. The financial crisis of 2007-2008 has prompted a great deal of post-Keynesian articles arguing that a stronger emphasis needs to be put on consumption. During the COVID-19 global pandemic, wage policies became a significant factor moving the economy forward.

In further research into MW, household consumption, and criticism of increasing MW, the current research can be improved, primarily with a focus being on the controversial forecast of a MW reduction in jobs. Despite its potential negative effect on jobs, if the MW raises aggregate demand and is advantageous for the economy and welfare, then the MW can be useful as an approach to encourage growth and welfare.

The main objective of the thesis is to evaluate the effect of MW on household consumption in high and low wage provinces in Canada. The precise objectives provide policymakers and stakeholders with a clear understanding of the components

of the MW and consumption that they can incorporate into their policy frameworks for nations with varying income levels and economic sectors.

1.4 Research questions

Several research questions are still begging for answers in the field of MW and consumption. Therefore, this study raised the following research questions concerning the impact of MW on consumption in two groups with high and low wage provinces in Canada.

The present study empirically addresses the following research questions:

1. Is MW an effective fiscal policy tool for aggregate demand and economic growth?
2. How do changes in provincial MW relate to consumption at the household level and does this relationship differ across high and low-wage regions?
3. Are there any differences in the MW's short-run and long-run effect on consumption?

We use panel model estimation techniques of the Pooled Mean Group, the Mean Group, and the Dynamics Fixed Effects estimators to achieve our investigative goal of comparing high wage provinces in (Alberta, British Columbia, Ontario, and Saskatchewan) and low wage provinces (Manitoba, New Brunswick, Newfoundland/Lab, Nova Scotia, Prince Edward Island and Quebec) for the period 1981-2019.

1.5 Outline of the thesis

There are five chapters in the thesis. The first chapter of the thesis includes the study's background, which briefly describes the thesis's main direction. In the first chapter, the differences between Canadian provinces are discussed. It highlights the

key themes, research gaps, and the study's motivation. Moreover, Chapter 1, highlights the research questions, and properly reflects the contributions and significance of the study. In chapter two, the theoretical and empirical literature is presented. Existing theoretical frameworks are discussed and correctly linked to the thesis's major subject. In addition, in chapter two, the empirical research is examined. In this thesis, chapter three discusses the research methodology, which involves the type and data sources, the empirical model, and estimating methods. In chapter four, the empirical findings are provided and analyzed, while in chapter five, the conclusion and policy implications are properly evaluated.

Chapter 2

LITERATURE REVIEW

2.1 Theoretical literature

2.1.1 The theories of MW

MW changes can have an effect on employment, income distribution, and the price level. Numerous empirical researches in many nations and eras indicate that the relationship between MW and unemployment is not obvious. However, it has been widely agreed upon that raising MW shifts the income distribution in favor of lower-wage workers. The price level impacts of MW were not highlighted in empirical study (Herr et al.2009).

2.1.2 MW in the Keynesian Model

From a Keynesian perspective, there can be no identifiable positive or negative employment impacts correlated with an increase in MW. Keynesian employment is not dependent on processes that occur in the labour market.The aggregate demand for goods and services is essential for employment, which is dependent on a variety of factors, including business and household expectations, monetary and fiscal policy, and income distribution. A higher MW is projected to have a beneficial effect on income distribution, which means low-income households will have more income to spend. The changes in wage structure will lead to pricing adjustments and a multitude of alternatives, including new technological choices. Theoretically at least, it is impossible to identify the employment consequences of changing the minimum wage. Macroeconomic analysis of MW adjustments may shed some light on

employment consequences. However, the mechanisms of change in MW are quite complicated, and it is impossible to determine the net employment impact of these changes.

2.1.3 Price level effects of MW in heterogeneous labour

We next examine the economic implications of MW on the basis of heterogeneous labor with different salary rates. The goal inflation rate is met if the wage structure remains unchanged and MW rise in accordance with the wage standard. If MW can rise more strongly than average wages, the wage structure will be reduced in this scenario. This situation cannot eliminate the inflationary impact of MW.

A more probable scenario is one in which all wages increase in perfect agreement with the wage standard, with the exception for MW that rise rapidly. In this situation, inflation will increase somewhat quicker than the targeted pace. Thus, this will boost prices more than the target inflation rate in sectors that employ minimum-wage employees. Unless these prices are used as inputs by other sectors, those other sectors will raise their own prices in response to these increases in price.

2.1.4 Distribution effects of MW in heterogeneous labour

The distributional effect of MW is experienced mostly by the working class Keynes(1936). Money wages mainly impacts the distribution of aggregate real wages, and not the average real wage per worker, which depends on distinct causes. The distribution in the working class will alter as soon as MW affects the wage structure, as usual. If MW is raised while the wage structure is compressed, this will result in higher earnings for low-paid employees with the cost to other employees.

Naturally, as long as the standard of living of employees who are not impacted by MW increases, Productivity should not be reduced, and will grow at a lesser speed

than the real incomes of the people. As changes in the distribution of income always create winners and losers, the distribution of income is a political problem. In other instances, a flat wage structure may not be favored by all workers. And unions representing skilled workers may even be reluctant to accept increased MW.

The MW will fundamentally alter wage structures (structure of pricing, demand for end goods, and demand for inputs), as well as the overall structure of the economy. It is theoretically possible, but impossible to anticipate experimentally, how employment would be affected. MW rises will change the distribution of income, as they will disproportionately benefit low-income earners. Additionally, we believe that MW increases will help lower-income households. An increase in the MW is expected to raise aggregate demand since low-income families are more willing to spend than high-income households. This will improve productivity and production when underutilized capacity and unemployment are both present. Keynes (1936) had already advocated for a more equitable income distribution to improve aggregate demand.

MW increases redistribute income. First, increased MW will improve employees' earnings as salaries grow. This may directly bring a single-person household above the poverty line. It is vital to remember that the MW is an important tool in the battle against poverty. However, the use of this system is limited because not everyone impoverished employees work in the official sector, and others, such as children and the elderly are absolutely out of workforce (Card and Krueger 1995).

2.1.5 Employment effects of MW in heterogeneous labour

The aggregate demand component of the Keynesian model is the primary driver of employment. Changes in the relative pricing structure, and the resulting changes in

the allocation of employment and other input components, are of secondary relevance for employment.

Keynesian economists do not advocate changing the wage system to reduce unemployment. They argue that individuals should place a higher premium on investment demand in order to combat unemployment.When GDP growth is constrained, impossible, or undesirable, the only remaining option for combating unemployment is to reduce working hours in all of its forms. MW inflationary pressures are typically minor and bearable (Herr et al. 2009). Additionally, there are no applicable limitations for MW policy.

2.1.6 MW in the Neoclassical Model

MW, in principle, has a negative effect on employment under the neoclassical model. In the scenario of homogeneous labor, MW above the market-clearing wage results in unemployment. MW for low-skilled employees that are higher than the market-clearing wage lead in unemployment for low-skilled workers in the setting of heterogeneous labor markets.In a competitive labor market, monopsony has the privilege of driving the real wages of the employees below the equilibrium wage in a non-competitive labor market.Because of geographical immobility and transaction costs, people rely on jobs provided by the monopsony. Monopsony diminishes production and demand for labor, lowers wages below the level of pure competitive equilibrium and so produces monopsony benefit. This permits wage policy to increase MW enough to avoid the monopsony from abusing its demand power.

MW policies serve a critical role. The nominal wage in this paradigm becomes the nominal price level basis. Under this method, the intended nominal wage increases are equal to the sum of trend productivity growth and the central bank's target

inflation rate. When nominal wages rise in accordance with this standard, wage inflation equals the target inflation rate. This is advantageous for the central bank since it avoids combating both deflation and inflation.

2.1.7 The standard neoclassical model

In the long term, the monetary domain has no impact on factors like growth, employment, or income distribution, according to the neoclassical model. Money is a neutral exchange that solely affects the price level. It is expected that if the price of labor — the real wage rate – is flexible, the labor market will be able to reach its equilibrium. Thus, unemployment is always a labor market problem, never a demand problem. Without distortions of the market, such as asymmetrical data or trading costs, the labor market would seek to attain full employment.

Workers and employers bargain the real wage rate in a neoclassical society. In practice, the neoclassical world is a barter economy, in which employees trade a fixed number of commodities for a fixed length of labor time. Of course, neoclassical economists are well aware that in the actual world, only money wages are determinants of payment.They believe, on the other hand, that adjustments in money wages would eventually lead to changes in real wages.The central bank is in charge of inflation and deflation, while the labor market is in charge of employment and unemployment, according to the neoclassical perspective.

We begin by assuming perfect competition and homogeneous labor. In perfect competition, firms' output and input prices are both widely known.The macroeconomic production function serves as the foundation for explaining labor demand in the neoclassical paradigm. It is self-evident that physical output is dependent on physical inputs, including labor, for a business entity. The current

central argument is that each extra unit of labor engaged reduces output. Thus, companies can increase employment only if real wages fall. Typically, the supply of labour is considered to rise if real wages rise. In simpler terms, the rationale is that when real wages go up, people have more money to spend, thus it creates more chances for consumption and pushes people toward utility maximization, which requires them to sacrifice a bit of their leisure time in order to work and spend more.

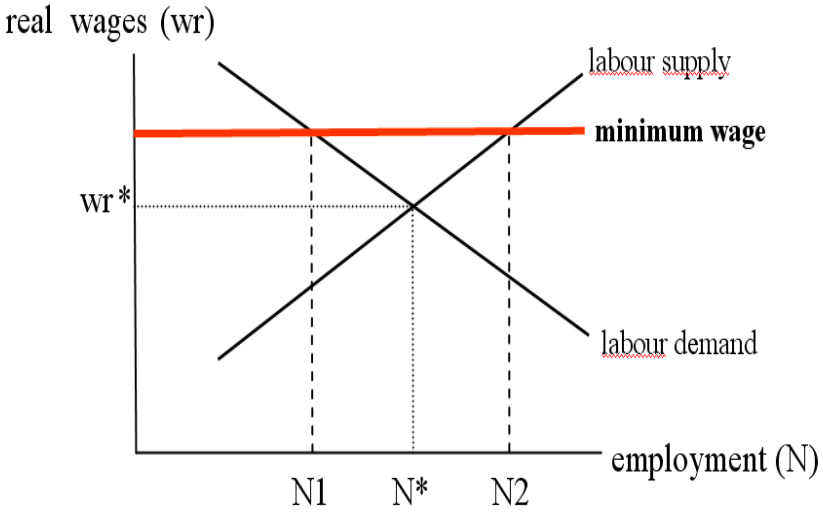


Figure 5: The Homogenous Labour neoclassical model

Figure 5 depicts a MW that is higher than the market equilibrium rate. Unemployment is the result of this minimum wage. Firms' labor demand is N1, households' labor supply is N2, and unemployment is N2 - N1 at the MW level.

It can be demonstrated that a company maximizes profits in perfect competition when the real wage rate is equal to the value of the marginal product of labor and the real cost of capital to the firm is equal to the value of the marginal product of capital.

Thus, a profit-maximizing business will boost demand for labor while real wages fall, and will raise demand for capital when interest rates fall. This model does not have a space for MW that would have to be specified as minimum real wages. They are ineffectual if they are lower than the equilibrium wage rate because the market wage is higher. They are hazardous if they are higher than the market wage because they promote unemployment. In conclusion, firms will lay off employees if MW is raised beyond the market clearing wage rate.

Numerous markets are oligopolistic or monopolistic. If we suppose that businesses are entitled to pricing over their own products and that the prices of inputs are decided simultaneously, MW have the same negative impact as they do under perfect competition.

Referring to the heterogeneous work environment, equilibrium wages in the skilled labor market (wr*) are greater than in the unskilled labor market (wr**), reflecting unskilled workers' lower (marginal) productivity. MW is established to boost wages for low-skilled workers and to lower the wage structure, which results in increased unemployment. Unemployment among unskilled employees increases from zero to N2 – N1 in Figure 6.

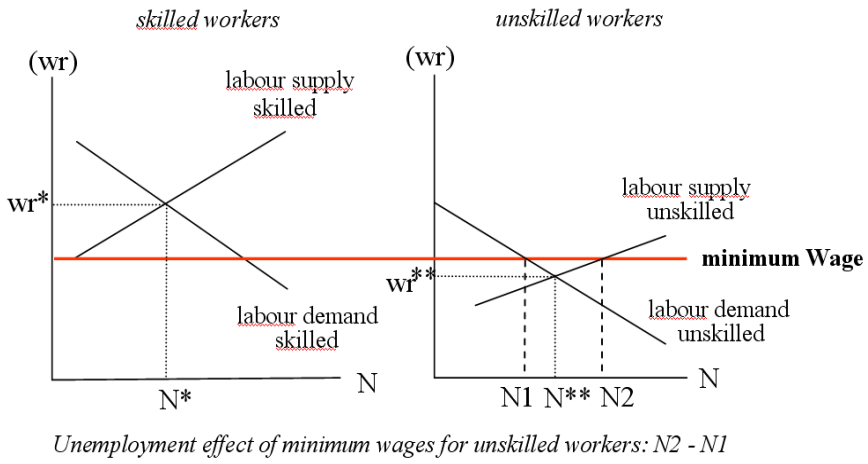


Figure 6: The Neoclassical Standard Model with Heterogeneous Labour

To sum up, the neoclassical standard model clearly shows that higher MW decrease employment and raise unemployment This assumption is founded in neoclassical economic theory, which states that supply-side factors influence employment and production.To avoid this effect, governments should not set MW.

2.2 Theories of consumption

Four major groups of theories that attempt to explain consumer behavior namely, Keynes(1936), Duesenberry (1949), Friedman (1957), and (Ando and Modigliani 1963) were all inspired by the determinants of consumption expenditure to investigate the factors affecting consumption. These factors include income, wealth, interest rates, capital gains, and liquid assets.

2.2.1 The Post-Keynesian Developments

According to Keynes, current consumption is determined by current disposable income, and as income increases, both the marginal and average propensities to consume (MPC and APC) decline. Following the Second World War, Keynesian consumption theory opened the way for policies that supported full employment and a more equitable income distribution (Bunting 2012; Glyn 1995; Lavoie and

Stockhammer 2013). Keynesian consumption, on the other hand, is indifferent to the income of other people, and as a result, it is unsuccessful at describing the social dimension of consumer behavior (Palley 2010). Post-Keynesian literature has increasingly incorporated theoretical studies that explain household consumption behavior in terms of relative income concerns (Kapeller and Schütz 2014, 2015; Kim et al. 2013; Setterfield and Kim 2016, 2017; Ryoo and Kim 2013).

The data from the postwar period (1945) gathered and supported the functioning of Keynesian consumption. Time series data gathered over extended periods indicated a different relationship between income and consumption than cross-section data suggested. In the short run, income and consumption had an asymmetric relationship. But the relationship was proportional in the long term. After generating new aggregate statistics on consumption and income by publication on the American national income from 1869, Simon Kuznets found that the ratio of consumption to income remained rather constant over the years, despite increases in income (Lundberg 1971). This contradicts Keynes' assumption that with an increase in income, the APC would decrease. Kuznets' research have shown that over long periods the APC stays rather consistent. The Keynesian hypothesis was confirmed by studies of cross-section (household) data and short time series.

Keynes was of the opinion that the primary determinant of consumption is current real income. He also postulated that the effect of the interest rate on consumption decisions is non-existent because the income and substitution effects of the interest rate neutralize each other. Keynes' proposition contained three relevant points. First, consumption expenditure is principally and contemporaneously dependent on absolute income. Second, consumption is positively related to the absolute level of

current income, and third, a higher income obtained in a particular period will induce more consumption for that particular period (Jhingan 2002).

2.2.2 Relative income hypothesis

James Duesenberry proposed the relative income hypothesis in 1949. Saving (consumption) is dependent on relative income in this theory. Thus, current spending or saving is a function of relative income rather than current income. Duensenberry noted that when income declines during a depression, consumption remains rather stable. Individuals attempt to maintain their standard of living by either decreasing their previous savings or borrowing. However, when the economy progressively enters the recovery phase and subsequently the prosperity phase of the business cycle, spending does not increase in perfect agreement with income growth. Individuals save aside a percentage of their income to either regain their previous saving rate or to settle their previous debt. As a result, we see an absence of symmetry in people's consumption behavior. It is more difficult for people to reduce their consumption than it is to increase it. Consumers' unbalanced behavior is referred to as the ratchet effect. Thus, we can detect a non-proportional link between income and consumer if we study the short term behavior of a customer. In the short run, MPC is therefore smaller than APC. However, we discover a proportionate relationship between income and consumption when we analyze the consumer's behavior across the whole business cycle. This indicates that MPC equals APC in the long run. According to Alvarez-Cuadrado and Japaridze (2017), the debt-to-income ratio declines with income, but as consumption levels grow in higher-income families, total consumption rises in all households. Further, aggregate borrowing rises with income inequality. Klein (2015) discovers long-term link in industrialized economies between income inequality and leverage. Positional concerns drive agents

to over consume, overwork, and under save relative to the welfare-maximizing levels that a planner would select,according to Alvarez-Cuadrado and Van Long (2011). Increasing income inequality, as evidenced by Christen and Morgan (2005), has resulted in higher consumer borrowing.This is because household indebtedness is more sensitive to income inequality than interest rate fluctuations , and inequality has an impact on all aspects of household debt but has the greatest effect on non-revolving debt.

Krueger and Perri (2006), Ravina (2005), and Charles Hurst and Roussanov (2009), all demonstrate that a portion of a household's consumer spending is influenced by its relative position in its community and the degree of inequality within it. Abdel-Ghany et al. (2002) demonstrate using Canadian data that consumption expenditures are affected by both permanent and relative income factors.

Duesenberry (1949) theorized that the present level of consumption is not just induced by the present level of absolute and relative income. It is however also induced by past levels of consumption. Duesenberry also put forward the theory of consumer behavior which emphasizes that consumption depends on relative rather than the absolute income of an individual (Mason 2000).

2.2.3 Milton Friedman’s permanent income hypothesis (PIH)

In 1957 a hypothesis regarding consumption behavior which was termed the PIH was claimed by Friedman. It stipulated that an individual’s consumption is dependent upon individual’s permanent income. According to Friedman's hypothesis, as the wage increases, consumers will not raise their consumption. Consumption is not predictable because it is dependent on individual preferences. One of Friedman's predictions is that there should be no relationship between the expected growth of an

individual's income during his lifetime and the real interest rate or discount rate, but only with his permanent income.

The theory asserts that consumption should not be only determined by current income. The PIH emphasizes that people's incomes fluctuate randomly and temporarily from year to year. Milton Friedman's permanent income theory of consumption asserts that people adjust their spending behavior to their long-term consumption prospects, not to their current level of income. Friedman asserts that short or transitory changes in income have a little influence on consumption, but permanent changes in income have a significant impact on consumption. Friedman believed that a higher interest rate would encourage individuals to save more and so lower their consumption spending. Friedman resolves the consumption problem by arguing that Keynes's consumption function is based on the incorrect variable. He emphasizes that changes in individual wealth, which is a stock variable, impact individual consumption, as opposed to current income, which is a flow variable. Friedman specifies that permanent income is contingent on the following variables: (i) the interest rate or range of interest rates at which the consumer unit can borrow or lend; (ii) the relative importance of property and non-property income; and (iii) the factors that determine the consumer unit's preferences and personal taste for consumption over wealth additions. In summary, current consumption is connected to some long-run measure of income (e.g., permanent income), but short-run income changes tend to have a greater effect on saving. Friedman reasoned that households with high permanent income have proportionately higher spending, based on cross-section statistics.

2.2.4 Life-Cycle Theory of Consumption

Modigliani and Brumberg (1954) are primarily concerned with the theory's cross-section or microeconomic implications, whereas Modigliani and Brumberg (1980) are concerned with the theory's time-series and macroeconomic implications. For each individual, it is assumed (via appropriate preferences) that increases in life-time resources lead to corresponding increases in consumption across all life stages. As a result, consumption is proportional to lifetime resources or, more precisely, to average lifetime income. However, it was well known previous to 1950, and it is true today, that the percentage of consumption in income is smaller for better-off households, or that the saving rate grows with income. Indeed, data frequently reveal negative savings rates among individuals at the bottom of the income range.

The life cycle hypothesis (LCH) is an effort to address how consumers settled their income through time where the PIH's significance is that short-term consumption levels will be either greater or lower than current disposable income levels.

The theory was put forward by Ando and Modigliani (1963) in the early 1950s which was termed the life-cycle hypothesis. It stipulated that a future income expectation over the whole life cycle is determined mostly through current income an individual's consumption profile over his or her lifetime. Modigliani and Brumberg (1980) argue that the long-run relationship between consumption and income is consistent with cross-sectional evidence that as income increases, people spend a larger proportion of their income, implying a significant transitional savings ratio. The statement explains why farmers and small business owners' savings rates rise faster as their wages increase (Deaton 2005). Modigliani and Brumberg (1980) concluded that over the long run, the saving ratio should be constant, but over the

business cycle, it would differ pro-cyclically. The parallels and differences of these theories is predicated on what they imply for macroeconomic stabilization policies. They also seem to propose an indirect relationship between household consumption and the macroeconomic factors that affect income.

According to the hypothesis, individuals try to balance their consumption over their lifetime by borrowing when their income is low and saving when their income is high. As a result, they take on debt once they are younger, expecting that future earnings will allow them to repay it. They then save during their middle years in order to preserve their standard of living when they retire. A graph of a person's spending over time reveals a hump-shaped pattern in which wealth accumulation is low during youth and old age and high during middle age.According to Modigliani and Brumberg, planning a life cycle involves looking into an uncertain future, and it is difficult to theorize about what individuals would do in the face of uncertainty.

Modigliani's life-cycle model assumes that individuals plan their consumption and savings to optimize overall utility over the lifetime of a person and they smooth their consumption in a lifetime. Thus, with an emphasis on the different relationship between MW and household consumption across high and low wage groups in the long and short run, Modigliani's life-cycle theory explains more relevantly the short-run negative impact of MW on household consumption and the long-run positive effect.

2.3 Empirical literature

Most EU nations have a stationary national minimum wage, whereas others – like Denmark, Finland, Sweden, Germany, Italy and Cyprus – have collective agreements

setting MW at sectoral and occupational level.The empirical results suggest that, in EU countries with a statutory minimum wage, MW tends to diminish young employment by increasing the unemployment impact among teenagers.

The literature on the influence of the MW on employment in Western Europe tends to be more diversified than in the United States or Canada. Following a large increase in the MW for Spain in the late 2000s, the probabilities of losing a job across different age groups were evaluated by Galán and Puente (2012). They discovered a disemployment effect for youth (16-24 years old), although it was considerably less than for older workers. Instead, Blázquez et al. (2009) analyze the same time period by using the usual panel data specifications in order to find that at that time there was no substantial influence of the MW on youth employment. U.K. If a negative employment effect was discovered, it was restricted to certain industries with a high concentration of low-wage occupations and was concentrated on hours rather than quantity of workers (Machin et al. 2003). In the instance of France, which has a high MW relative to its EU neighbors and a wide range of employees receiving earnings near to the MW (Abowd et al., 2000), the MW has no employment impact. Some contributions demonstrate significant disemployment impacts, either for younger workers (Abowd et al. 1997) or for the whole workforce (Abowd et al. 2000), However, some research contradicts this result (e.g. Bruno and Cazes, 1998), who discovered that in Poland, rural, less developed areas were the places where adjustments in the minimum to average wage ratio would have a negative influence on youth employment rates during the whole time.Low rates of youth employment in various parts of Poland may be due to a combination of factors including inadequate aggregate demand as well as the comparatively high expenses of employing young people.

Empirically, the association between MW and employment has been studied enormously over the years. But, the literature is dominated by studies carried out for the United States (see Dube et al, 2010; Neumark et al. 2014; Neumark, 2019; Clemens and Wither, 2019). Nonetheless, few researchers investigated the MW-employment nexus for samples of countries including the OECD countries. Meanwhile, the neoclassical economic theory posits that the rise or onset of MW reduces employment and thus increases unemployment. The theoretical conclusion is empirically investigated over time with no consensus in the literature. The principal cross-country studies concerning the MW-employment relationship for the OECD include OECD (1998), Elmeskov, et al, (1998), Neumark and Wascher (2004), and Addison and Ozturk (2012).

Furthermore, Neumark and Wascher (2004) estimated the youth and teen employment effects of MW for an unbalanced panel of seventeen OECD countries over the period 1976-2000. They used ordinary least square (OLS), fixed effect, and differenced GMM techniques. The findings reveal that MW reduces youth employment with employment elasticities ranging from -0.28 to -0.13. In other words, a 10% rise in MW brings about a 2.8 percent to 1.3 percent drop in youth employment. Likewise, Dolton and Bondibene (2012) evaluated the effect of MW on employment in OECD. Moreover, Kim and Lim (2018) examined the response of labor demand and supply to an increase in MW for a sample of 25 OECD countries over the period 2000 through 2014. The study finds that an increase in MW leads to a decrease in labor demand but it does not significantly affect labor supply.

Meanwhile, the study suggests that a moderate rise in MW has a limited effect on employment. By magnitude, a 10% increase in MW results in a 0.7% decline in

employment and a 0.64% increase in unemployment. Following the approach of Elmeskov et al. (1998), Bassanini and Duval (2006) investigate the labor market parameters (including MW) on the unemployment of ten OECD countries over the period 1982-2003. The study reveals that, while MW does not affect aggregate unemployment, it has a positive and significant effect on youth unemployment. MW hikes increase youth unemployment. This implies the disemployment effect of the MW on young workers.

Few studies also investigated the employment impact of the MW for some individual countries. For instance, considering the case of Newzealand, Hyslop and Stillman (2007) analyzed the relative effect of MW on employment using difference-in-difference methods. Comparing the results for teenagers and young adults, the study concludes that MW does not have a significant effect on employment for both the teens and youth adults. Similarly, Olssen (2011) studied the impact of ten percent (10%) increase in Mw on young workers (15-21 years old) and submit that MW increase does not significantly affect employment in the short run. Dickson et al, (2014), using discontinuity designs, equally revealed a significant positive impact of MW on employment in the United Kingdom while Fidrmuc and Tena (2013) found a negative effect of a 20% increase in MW on employment. Investigating the impact of MW on employment in Greece between 2000 and 2017, Karamanis et al. (2018), provide empirical evidence of the neutrality of the MW in terms of employment.

Attributing the disparity in the elasticities (estimates) of employment with respect to MW to methodological inadequacies, Totty (2017) uses a common factor model to examine the MW-employment relationship in the USA. The study argues that the factor model is flexible in addressing the problem of unobserved heterogeneity. The

findings suggest that the elasticities produced by the factor model are smaller than the estimates of the traditional panel data estimation methods applied in most of the existing studies. Further, the study shows that the common factor is responsible for the differences in the estimates of the MW-employment literature.

It is noticeable that the findings are mixed in nearly every country in the globe with the exception of Canada, which is a member of the OECD. Neumark and Wascher (2004) report mixed evidence on the US, France, the UK, New Zealand, and Portugal. Hammermesh (2002)'s finding is the most frequently cited argument why Canada is "an advisable laboratory" for studying MW impacts since it is provincially determined, which offers more diversity in identification. Goldberg and Green (1999) were the only researchers to find no effect, however this one unusual finding may be due to the authors' use of a logarithmic specification, which Baker et al. (1999) proven inadequate.

The empirical research on the relationship between consumption and MWs is lacking and few studies are addressing the impact of MWs on consumption. For MW-based U.S. households, Aaronson et al. (2012) found a positive spending effect and conclude that much of the consumption is driven by purchases of vehicles. This trend is seen among low-income households which confirm some constraints due to borrowing and coping costs. An insignificant impact of the MW on the consumption of a combined category of nondurables and services is also stated by Aaronson et al. (2012). Using detailed US micro-data, Aaronson et al. (2012) found that an increase in the MW by 1 US dollar per hour increased household income by 250 US dollars and consumption by 700 US dollars per quarter between 1982 and 2008 by asking households about their spending pattern for the past three months in each interview.

The authors argued that a limited number of households buying large durable goods such as vehicles accounted for much of the increased consumption. Likewise, Alonso (2016) uses sales data of the United States to assess the impact of MW on consumption and he found that a 10 percent rise in MWs raises non-durable consumption by 1 percent at the county level and demonstrates that the rise in poorer counties is larger. Dautovic et al. (2017) found that MW rises are positively associated with consumption among low-income households in China. This positive effect was driven by major expenditure on health care and the education of household members.

For Canadian studies, Brouillette et al.'s (2017) structural general equilibrium simulation suggests higher inflation induced by higher price levels. Such inflation rate are due the MW increase over the years (2018 and 2019). An increase in inflation will trigger an increase in interest rates.Their findings suggest a slight decrease in consumption. However, the findings of Jung et al.'s (2020) paper investigates the relationship between MW and consumption which is proxied by real retail trade normalized on adult population, show that a one percentage point rise in the actual MW is correlated with a 0.5 percentage point increase in the real retail trade. Jung et al.'s (2020) investigations confirm that MW boosts consumption and hence economic growth. Thus, our current research is in line with Jung et al.'s research and it examines the relationship between MW and consumption on the household level to gain a deeper overview of MW's impact and related policy implications. A different methodology and wage category was used to determine the effect of MW increases on consumption at the household level.

2.4 Research gap

This thesis is, to our comprehension, a first analytic analysis that takes into account the heterogeneity within Canada's MW framework. It considers provincial heterogeneity in MW policies in the analysis of the relationship between MW and consumption at the household level in Canada. Additionally, it employs a more robust empirical methodology than the previous analysis by Jung et al. (2020), since it employs panel data rather than a pure time series which assumes provincial homogeneity. It examines the effect not only over the long term but also over the short term, taking into account different wages groups.

From the above literature review, it is obvious that the literature on MW-consumption nexus is not enormous and conclusive. Many issues remain unsettled. Although the studies contributed to the MW-consumption literature but they suffer from serious methodological defects, which are capable of undermining the estimates (elasticities). First, the studies used OLS, two-way fixed, and random effects as well as pure time series for estimation. The panel data is susceptible to the problem of heteroscedasticity and endogeneity and slope heterogeneity and cross-sectional dependence which are not accounted for the traditional panel data models estimation.

In such a case, the regression of nonstationary variables on another nonstationary variable (s) produces spurious results and misleading conclusions. Given that the time (T) is greater than the cross-sections (N) in this thesis, there is a need to examine the time series characteristics (stationarity) of the variables before proceeding to the estimation. Most importantly, the studies failed to consider the short-run and long-run effects of the MW on consumption. The effect of policy

largely depends on the period. For instance, the effects of the MW policy on consumption in the short run could be different from the long-run effect. It takes a certain period for the firms to adjust their prices, production, and even employment. Also, the search theory explains the importance of the duration of unemployment.

Therefore, this study fills the research gap by examining the MW-consumption nexus in high and low wage provinces in Canada using state-of-the-art second generation panel time-series techniques.

Chapter 3

METHODOLOGY

3.1 Data and Methodology

The commonly used measures of MW in the MW-employment literature includes the real MW, the Kaitz index (ratio of nominal legal MW to the median wage), the fraction of at MW, the fraction below MW, and the fraction of workers affected by the MW (Siregar 2020). However, we used MW in real terms is reported in 2012 CAD. The real MW is considered superior to other measures of the MW because it is exogenously determined and consistent with different measures of employment and unemployment (Pratomo 2011). It is not determining by the employment or unemployment endogenously.

3.1.1 Data

The study included a panel of six low-wage provinces (New Brunswick, Newfoundland/Lab, Manitoba, Nova Scotia, Quebec, and Prince Edward Island) and four high-wage provinces (Alberta, British Columbia ,Saskatchewan, and Ontario) of Canada from 1981 to 2019 and the data was obtained from the database of Statistics Canada. The variable definition overview is outlined in Table 1.

Table 1: Variables

Indicator	Symbol	Source
Household final consumption expenditure (in 2002 millions of CAD)	HCON	Statcan
Real MW (measured in 2002 CAD)	MW	Statcan
Gross domestic product per capita, income-based (measured in 2002 millions of CAD)	GDPC	Statcan
Interest paid on consumer credit (in 2002 millions of CAD)	RINT	Statcan
Final domestic demand (in 2002 millions of CAD)	DEMND	Statcan
Percentage of individuals in low income	LOW_INCME	Statcan

Note: CAD denotes Canadian Dollars
Source: Statistics Canada 2019

In this study Household, final consumption expenditure is the dependent variable. The empirical models often involve several control variables. The five major determinants of consumer expenditure are current disposable income, household equity, projected future income, price level, and interest rates. While choosing control variables, two main factors are taken into account. First, control variables that influence consumption demand are chosen. Second, control variables that are commonly known as determinants of both low wage and high wage are selected in order to compare the effects of economic policy on household consumption separately. The variables that were used for control purposes are as follows: the real minimum wage, real GDP per capita, real interest–consumer credit, real domestic demand, and percentage of individuals in low income are independent variables. The term "real household final consumption expenditure" refers to all purchases made by resident households to fulfill their daily needs. The MW in real terms is reported in 2002 CAD. The Gross Domestic Product (GDP) per capita in real terms is measured in 2002 thousands of CAD. The real interest paid on consumer credit is the amount of expenses on consumer credit accounts such as private student loans, vehicle loans, and consumer debt. The real domestic demand is the overall amount spent by

individuals, businesses, and the government on goods and services. People with lower incomes are defined by the percentages of individuals in low income who earn less than half of the adjusted median household income.

3.2 Model specifications

This research aims to use a multivariate panel-based model to investigate the long-run association between household consumption and the MW while controlling for domestic demand, interest - consumer credit, percentage of individuals in low-income groups and GDP per capita. This study attempts to develop on the work of junge et al. (2020) and among other approaches in the literature, including Alonso (2016), Dautovic et al. (2017) this functional model is defined as below for our analysis:

$$HCON_{i,t}=f(MW_{it},DEMND_{it},RINT_{it},Low\_INCME_{it},GDPC_{it}) \quad (1)$$

The above economic function has a linear relationship and in figure 7 can be used to model consumption (total provinces, low wage provinces, and high wage provinces) in relation to the effect of MW when controlling for other explanatory variables for the case of Canada.

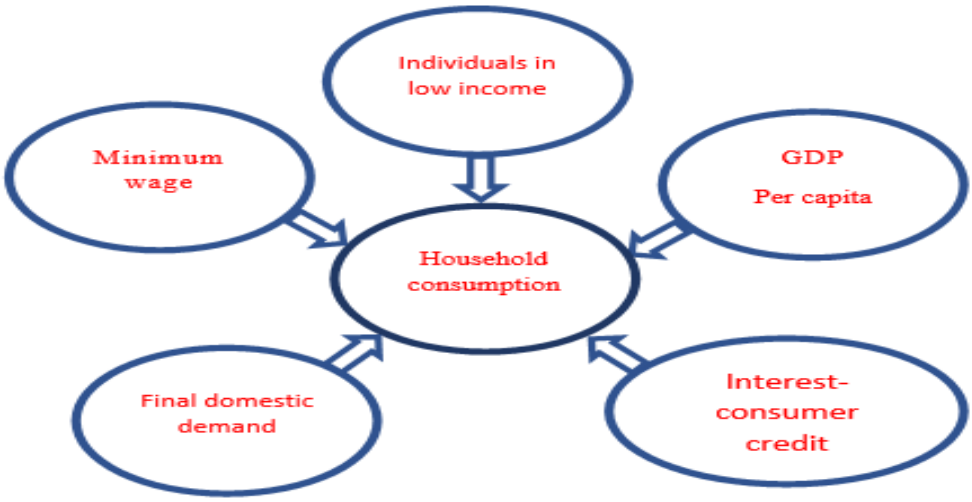


Figure7: Theoretical framework of the model
Source: Author's construction

The consumption function is the relationship between consumer expenditure and its determinants. These include wealth, income, expectations about future income, and interest rates. In our study, two major considerations are made while selecting control variables. To begin, control factors affecting consumer demand are selected. Second, control variables that are typically referred to as predictors of both low and high wages are chosen to allow for independent comparisons of the effects of economic policy on household consumption.

MW increases are likely to have a positive or negative effect on household consumption, based on Modigliani's life-cycle model, which assumes people plan their spending to maximize lifetime utility (Modigliani and Brumberg 1980). GDP per capita is used as a proxy for economic growth. Increases in GDP per capita imply an improvement in economic growth in this study (Ng et al. 2016; Lee and Brahmasrene, 2013).

The percentages of low-income individuals demonstrate that those at the bottom of the income distribution have negative savings rates (Modigliani and Brumberg 1954). Klein (2015) reveals a long-term link between income inequality and leverage in developed economies. Keynes (1936) had already argued for a more equitable distribution of income to boost aggregate demand.

Following household income paid interest-consumer credit , the theory of Modigliani's life-cycle model states that individuals try to balance their consumption during their lifetime by borrowing when their income is low and saving when their income is high (Modigliani and Brumberg1980).

In terms of final domestic demand, increased aggregate demand, according to Keynesian economists, will improve future output. According to their demand-side theory, consumer expenditure on goods and services increases total economic output. In other words, higher spending indicates higher productivity (Keynes 2018).

In equation (1), HCON refers to the household consumption, MW indicates minimum wage, DEMND is final domestic demand, RINT shows income of household paid interest-consumer credit, Low_INCME represents the percentages of individuals in low income, while GDPC denotes gross domestic product per capita.The subscript t represents the period (1981-2019) and i show the number of provinces (from 1 to 10). There are two basic reasons why we convert variables to natural logarithms. The first is to decrease skewness toward large values, which could be beneficial in both improving the interpretability of existing data and following the requirements of statistical analysis (Lee 2020). The second is to indicate Percentage change.

In the following equation (2, 3, 4); TLHCON, LLHCON and HLHCON reflect total, low wage, and high wage provinces in case Canada, respectively.

$$TLHCON_{i,t}=\beta_0+\beta_1 LMW_{i,t},+\beta_2 LDEMND_{it}+\beta_3 LRINT_{i,t}+\beta_4 Low\_INCME_{it}+\beta_5 LGDPC_{i,t+}\varepsilon_{i,t} \quad (2)$$

$$LLHCON_{i,t}=\beta_0+\beta_1 LMW_{i,t},+\beta_2 LDEMND_{it}+\beta_3 LRINT_{i,t}+\beta_4 Low\_INCME_{it}+\beta_5 LGDPC_{i,t+}\varepsilon_{i,t} \quad (3)$$

$$HLHCON_{i,t}=\beta_0+\beta_1 LMW_{i,t},+\beta_2 LDEMND_{it}+\beta_3 LRINT_{i,t}+\beta_4 Low\_INCME_{it}+\beta_5 LGDPC_{i,t+}\varepsilon_{i,t} \quad (4)$$

β_0 estimated regressor coefficient is the constant term and β_k(k=1, 2,...,5)are long-

run elasticites of TLHCON, LLHCON, HLHCON (total provinces, low wage provinces, and high wage provinces) real household consumption with respect to independent variables such as LMW (log of real minimum wage), LDEMND (log of real domestic demand), LRINT (log of real income of household paid interest-consumer credit), Low_INCME (the percentages of individuals in low income), and LGDPC which denotes log of real GDP per capita. All variables are converted into their respective natural logarithm form, we have used the prefix "L " before each variable. The subscript i and t of each variable stands for provinces at time t. The error term is given by $\varepsilon_{i,t}$.

3.2.1 Cross-Sectional Dependence (CD) Test

When doing a panel data study, one of the most relevant diagnostic tests that researchers can employ is the cross-sectional dependence test that tests for the use of first-generation over the second-generation estimations (Breitung and Pesaran, 2008). The cross-sectional dependence tests are implemented under the null hypothesis of cross-sectional independence, using the Breusch and Pagan (1980) Lagrange Multiplier (LM), Breusch and Pagan (1980) CD test, and Pesaran et al.(2008) test . The CD tests used in this analysis had the following general equations, and the results are shown in Table 2.

The following LM statistic is proposed by Breusch and Pagan (1980) to test for zero cross-equation error correlations as the null hypothesis:

$$CD_{LM} = T \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \hat{p}_{ij}^2 \qquad (5)$$

For each panel unit, $\hat{p}_{ij}$ denotes a sample estimate of the pairvise correlation of the residuals using Monte Carlo optimization. Assuming the null hypothesis,

H_0: Cov (u_{it} , u_{jt}) $= 0$ for all t and $i \neq j$

The LM statistic is a chi-squared with N (N-1)/2 degrees of freedom.Pesaran (2004) proposed a CD test based on Lagrange multiplier statistic as follow:

$$CD_P = \sqrt{\frac{2T}{N(N-1)}}\left(\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\hat{p}_{ij}\right) \quad (6)$$

Where $\hat{p}_{ij}$ represents one of the N times N-1 mutual correlation coefficients between the time series of the units i and j and T shows the period . As N and T approaches infinity, this two-sided test statistic has the limiting N (0,1) distribution (Pesaran 2015).

$$\mathrm{CD_{LMad}} = \sqrt{\frac{2}{N(N-1)}}\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\frac{\hat{p}_{ij}^2 - \mu_{Tij}}{v_{tij}} \quad (7)$$

As shown in equation (6) T is the time period where T = 1,2,...,T; N denotes the number of cross sections; $i = 1, 2, \ldots, N-1$ $j = i+1, 2, \ldots, N$ and $\hat{p}_{ij}$ defines squared correlation of residuals (Pesaran 2004). In equation (7) the specification of the bias adjustment test where k denotes the exogenous repressor; μ_{ij} denotes the mean and v_{tij} denotes the variance of $(T-k)\,\hat{p}_{ij}^2$ (Pesaran et al. 2008).

3.2.2 Panel unit root tests

We use Pesaran (2007)'s second-generation panel unit root tests to check if the variables are sensitive to cross-sectional dependence (i.e., Cross-sectional Augmented test Im et al. (2003) test (CIPS) and Cross-sectional augmented Dickey-Fuller (CADF) Pesaran (2007). Presence of cross-sectional dependency and/or slope heterogeneity could bias the results. CADF and CIPS have the following general equation forms. The results are shown in Table 3.

$$\mathrm{CADF} = \mathrm{t_i(N,T)} = \frac{y_{i,-1}^{'} M_\omega \, \Delta y_i}{\hat{\sigma}_{e,i}(y_{i,-1}^{'} M_\omega y_{i,-1})^{1/2}} \quad (8)$$

Where $M_\omega = I_{T-1} - \omega(\omega'\,\omega)\,\omega'$, $\omega = (\Delta\bar{y}, \bar{y}-1)$, $\Delta y_i = (\Delta y_{i,2}, \ldots, \Delta y_{i,T})'$,

$y_{i,-1} = (y_{i,1}, \ldots, y_{i,T-1})'$, $\Delta\bar{y} = N^{-1} \sum_{i=1}^{N} \Delta y_i$, $\bar{y}_{-1}$ and

$\hat{\sigma}_{e,i} = T^{-1}(\Delta y_i)' M_\omega \Delta y_i$

Pesaran (2007) developed the cross-sectional augmented IPS (CIPS) statistic, which can be derived using the following equation based on the CADF statistic:

$$\text{CIPS=t-bar} = \frac{1}{N}\sum_{i=1}^{N} \text{CADF} \quad (9)$$

Where CADF would be ADF statistic of N cross sections, and T is time dimension $t = 1,2 \ldots, T$ (Pesaran 2007).

3.2.3 Homogeneity

Given that Provinces in Canada apply different MW regimes and different consumption patterns as found under Figure 1, a need to apply a model that captures these heterogeneous characteristics is warranted. This study also uses Swamy's (1970) test to check whether the slope is homogeneous. The Mean Group Method (MG) estimators are consistent when the slops are heterogeneous. The MG method controls for both short-run and long-run heterogeneity; the Dynamic Fixed-Effect (DFE) method restricts homogeneity in both the short- and long-runs; and the Pooled Mean Group (PMG) method controls for short-run heterogeneity whereas assuming homogeneity in the long-run (Elsalih, et al.2020, Pesaran, et al. 1999). Data analyzed in Table 4, shows that the slope parameters are heterogeneous. As a consequence, it is preferable to use the second generation panel approach and the results of the Hausman tests indicate that the PMG and MG estimators are more efficient than DFE.

3.2.4 Panel cointegration test

This research utilized the Westerlund (2007) cointegration test. The Westerlund (2007) test has an advantage over other cointegration tests because it is based on structural dynamics rather than residuals. The error correction model is used to test

the null hypothesis of no cointegration, which is based on the principle that the error correction term is equal to zero in a conditional panel framework. In the model, four different hypotheses are evaluated. The first two statistics, panel statistics ($\boldsymbol{P_\tau}$, $\boldsymbol{P_\alpha}$),check the main interpretation that the panel as a whole has been cointegrated, while the group means statistics($\boldsymbol{G_\tau}$, $\boldsymbol{G_\alpha}$)evaluate the alternate explanation that at least one individual is cointegrated. The panel error correction model for the test is specified as follows;

$$\Delta \boldsymbol{y_{it}} = \widehat{\boldsymbol{\delta}}_{\boldsymbol{i}}' \boldsymbol{d_t} + \widehat{\boldsymbol{\alpha}}_{\boldsymbol{i}} \boldsymbol{y_{it-1}} + \widehat{\boldsymbol{\lambda}}_{\boldsymbol{i}}' \boldsymbol{x_{it}} + \sum_{\boldsymbol{j=1}}^{\boldsymbol{p_i}} \widehat{\boldsymbol{\alpha}}_{\boldsymbol{ij}} \Delta \boldsymbol{y_{it-j}} + \sum_{\boldsymbol{j=0}}^{\boldsymbol{p_i}} \widehat{\boldsymbol{\gamma}}_{\boldsymbol{ij}} \Delta \boldsymbol{x_{it-j}} + \boldsymbol{\varepsilon_{it}} \qquad (10)$$

The panel statistics ($\boldsymbol{P_\tau}$, $\boldsymbol{P_\alpha}$) and the group mean statistics ($\boldsymbol{G_\tau}$, $\boldsymbol{G_\alpha}$) are calculated as follows;

$$\boldsymbol{G_\tau} = \frac{\boldsymbol{1}}{\boldsymbol{N}} \sum_{\boldsymbol{i=1}}^{\boldsymbol{N}} \frac{\widehat{\boldsymbol{\alpha}}_{\boldsymbol{i}}}{\boldsymbol{SE}(\widehat{\boldsymbol{\alpha}}_{\boldsymbol{i}})}, \quad , \qquad \boldsymbol{G_\alpha} = \frac{\boldsymbol{1}}{\boldsymbol{N}} \sum_{\boldsymbol{i=1}}^{\boldsymbol{N}} \frac{\boldsymbol{T}\widehat{\boldsymbol{\alpha}}_{\boldsymbol{i}}}{\widehat{\boldsymbol{\alpha}}_{\boldsymbol{i}}} \qquad (11)$$

The standard error of $\widehat{\boldsymbol{\alpha}}$ in equation (11) is computed as given by :

$$\text{SE}(\widehat{\widehat{\boldsymbol{\alpha}}}) = (\hat{S}_N^2)^{-1} \sum_{i=1}^{N} \sum_{t=2}^{T} \tilde{y}_{it-1}^2)^{-1/2}$$

where $\hat{S}_N^2 = \frac{1}{N} \sum_{i=1}^{N} \hat{S}_i^2$

Where $\widehat{\boldsymbol{\alpha}}$ is the estimated regression standard error in equation (10). $\hat{s}_i$ signifies as $\hat{\sigma}_i/\hat{\sigma}_i(1)$,which is a reliable estimation of the popu lation corresponding $\sigma_i/\sigma_i(1)$,the long –run standard deviation of $\Delta \boldsymbol{y_{it}}$ conditional on all present and past values of $\Delta \boldsymbol{x_{it}}$. The following step is to compute panel statistics, which are as follows:

$$\boldsymbol{P_\tau} = \frac{\widehat{\boldsymbol{\alpha}}}{\boldsymbol{SE}(\widehat{\boldsymbol{\alpha}})} \quad , \qquad \boldsymbol{P_\alpha} = \boldsymbol{T}\widehat{\boldsymbol{\alpha}}, \qquad (12)$$

$\boldsymbol{G_\alpha}$, $\boldsymbol{P_\alpha}$ may be normalized by the cross-sectional average of the effective number of observations per individual rather than by T, similar to the group mean coefficient statistics.

$\boldsymbol{P_\tau}$ *and* $\boldsymbol{P_\alpha}$ are used to compare the null hypothesis Ho: $\sigma_i = 0$ for all i against the alternative hypothesis H0: $\sigma_i < 0$ for all i. The null hypothesis is rejected, implying

that there is no cointegration for the panel as a whole. The results of the tests are presented in table 5.

3.2.5 Error correction-based panel estimations

We were able to estimate the long-run parameters of the panel ARDL method developed by Pesaran et al. (1999). The ARDL model has been defined with an Error Correction Model (ECM) for the specified prediction, and the equation for the model is presented as below:

$$\Delta LHCON_{i,t} = \delta_i(LHCON_{i,t-1} - \theta_i T_{i,t}) + \sum_{j=1}^{p-1} \gamma_{ij}\Delta LHCON_{i,t-j} + \sum_{j=0}^{q-1} \theta_{ij}\Delta T_{i,t-j} + \varepsilon_{i,t} \quad (13)$$

$$\boldsymbol{\delta_i} = -(1-\sum_{j=1}^{p} \boldsymbol{\gamma_{ij}}), \quad (14)$$

$$\boldsymbol{\theta_i} = -\frac{\sum_{j=0}^{p} \boldsymbol{\theta_{ij}}}{(1-\sum_{j=1}^{p} \boldsymbol{\gamma_{ij}})} = -\frac{\sum_{j}^{q} \boldsymbol{\theta_{ij}}}{\boldsymbol{\delta_i}}; \quad (15)$$

$$\boldsymbol{\gamma_{ij}} = -\sum_{d=j+1}^{p} \boldsymbol{\gamma_{i,d}}; \quad (16)$$

$$\boldsymbol{\theta_i} = -\sum_{d=j+1}^{q} \boldsymbol{\theta_{id}} \quad (17)$$

The coefficient of adjustment of consumption against deviation from the equilibrium path is given by the first section of Eq. (13) = $\delta_i LHCON_{i,t-1} - \theta_i T_{i,t}$ which describes the long-term dynamic relationship between household consumption with the independent variables. The vector $\boldsymbol{\theta_i}$ is the parameter used to denote the long-run coefficient while δ is the adjustment speed for the error correction expression. If $\delta<0$ then long-run causality exists between $LHCON_{i,t}$ and the regressors employed in the model. $\sum_{j=1}^{p-1} \gamma_{ij}\Delta LHCON_{i,t-j}$ And $\sum_{j=0}^{q-1} \theta_{ij}\Delta T_{i,t-j}$ are the short-run parameters in the model in Eq. (13).This model based on equation (13) should therefore be defined for the three panels:

$$LHCON_{i,t} = \sum_{j=1}^{p} \gamma_{ij} LHCON_{i,t-j} + \sum_{j=0}^{q} \theta_{ij} LMW_{i,t-j} + \sum_{j=0}^{q} \theta_{ij} LDEMND_{i,t-j} + \sum_{j=0}^{q} \theta_{ij} LRINT_{i,t-j} + \sum_{j=0}^{q} \theta_{ij} Low\_INCME_{i,t-j} + \sum_{j=0}^{q} \theta_{ij} LGDPC_{i,t-j} + \mu_i + \varepsilon_{i,t} \quad (18)$$

Eq. 18, which follows the framework of non-stationary heterogeneous panel data models employs the following methods; Dynamic Fixed-Effect (DFE); Mean Group Method (MG); and PMG Method (Pooled Mean Group). Except for the intercept term, the DFE estimator assumes homogeneity in the short-run and long-run coefficients across the cross-sections, while the MG estimator simulates the assumption of heterogeneity as proposed by Pesaran et al. (1995). The PMG estimator allows for short-run heterogeneity by allowing slope coefficients to differ cross-sectionally but the long-run coefficients are constrained to be homogenous (Pesaran et al. 1999).

If the slope heterogeneity assumption holds, the PMG estimator becomes inconsistent. Moreover, according to Blackburne et al. (2007), the PMG estimator becomes more efficient relative to the MG estimator once the homogeneity assumption is validated (Eluwole et al. 2020).Therefore, as indicated in Tables 6 and 7, the Hausman specification test is usually the acceptable and appropriate method to use when deciding between these estimators for the total, high, and low-wage provincial groups.

3.2.6 Panel Granger causality test

Granger causality test for heterogeneous non-causality was suggested by Dumitrescu et al. (2012) and was employed in this study. This technique is acceptable for N < T panels with the existence of cross-sectional dependence, the test is valid since it is based on the autoregressive vector model.

The linear model is described by Eq. (19) below as shown:

$$X_{i,t} = \alpha_i + \sum_{j=1}^{J} \lambda_i^J X_{i,t-j} + \sum_{J=1}^{J} \beta_i^J T_{i,t-j} + \varepsilon_{i,t} \quad (19)$$

From Eq. (19) above, X denotes household consumption while T denotes the vector capturing the independent variables (i.e. LMW_{it}, $LDEMND_{it}$, $LGDPC_{it}$). The Granger panel causality analysis indicates that heterogeneity can be taken into account and spread naturally.

To examine the causal relationship between the variables in the panel model, a homogenous non-causality (HNC) proposal is required. For the HNC hypothesis, the null and alternative tests are defined:

$\boldsymbol{H_0: \gamma_i = 0}$ for all i=1,…,N

$\boldsymbol{H_1: \gamma_i = 0}$ for all i= 1,…,$\boldsymbol{N_1}$

$\boldsymbol{\gamma_i \neq 0}$ for all i = $\boldsymbol{N_1}$ +1, $\boldsymbol{N_1 + 2}$,…,N

In which N_1 denotes the unknown parameter required to fulfill the condition for $0 \leq N_1/N < 1$. The ratio N_1/N must be less than one, because if N_1=N, no causality exists for any of the panel subjects, which is identical to the HNC null hypothesis. However, if $N_1 = 0$, this is an indication that inside the cross-sections, there is a Granger causality relationship. Table 9 explains the findings of the Granger Causality Panel.

Chapter 4

RESULTS AND ANALYSIS

The results of cross-sectional dependence analysis are stated in Table 2. The null hypothesis of all three tests is no cross-section dependency among the variables. The CD tests revealed a cross–sectional dependency at a 1% significance level. The findings were provided in support of rejecting the null of no cross-sectional dependence at $p < 0.1$ significance level for all of the three tests. As the result of the existence of cross-sectional dependence, the first-generation methods are inappropriate for this analysis (Balcılar 2020).

Table 2: Cross-section dependence test

Test	**Constant**		**Trend**	
	Statistic	***P*-Value**	**Statistic**	***P*-Value**
LM	150.1	0.0000	188.9	0.0000
LM_{adj} *	32.08	0.0000	42.44	0.0000
LM_{CD} *	6.825	0.0000	10.59	0.0000

Source: Authors' computations
* two-sided test

Following the cross-sectional dependency test, the CADF and CIPS stationary tests were employed to define the order of integration. Accordingly, the results indicated that all the variables except Low_INCME and RINTin both tests are insignificant at level (I(0)). However, the variables are stationary after taking the first differences (I

(1)) at a 1% significance level. Based on the CADF and CIPS tests, the results are shown in Table (3).

Table 3: Results of the CADF and CIPS unit root tests

Variables	CIPS	CADF
Levels		
HCON	−1.128	−1.9893
MW	−1.745	1.1071
RGDPC	−1.919	−1.8023
DEMND	−1.671	−2.3707 ***
LOW-INCME	−2.901 ***	−2.7973 ***
RINT	−2.360 **	−1.9804 **
First difference		
HCON	−4.702 ***	−6.6344 ***
MW	−5.307 ***	−5.5049 ***
RGDPC	−5.737 ***	−5.8451 ***
DEMND	−4.438 ***	−6.1834 ***

Notes: stationary *** at the 1% level; ** at the 5% level
Source: Authors' computations

The Swamy (1970) test results demonstrate the heterogeneous slope parameters, with the null hypothesis of slope homogeneity being rejected at a 1% level of significance. The results of the heteroskedasticity and autocorrelation tests are also included in table 4. As a result of the diagnostic tests, we can strongly suggest that the slope parameters are heterogeneous, and using second-generation panel methods provides accurate and reliable estimates (Elsalih et al. 2021).

The results in Table 4 strongly suggest that the slope parameters are heterogeneous, implying that the second-generation panel approach should be used.

Table 4: Results of Homogeneity, Heteroskedasticity Test

	Test	**Statistics**	**Probability**
Homogeneity	Swamy (1970)	chi2 (5) = 590.41	Prob>chi2=0.00
Heteroskedasticity	Breusch-Pagan/Cook-Weisberg	chi2(20)= 199.607	Prob>chi2=0.00

Source: Authors' computations

After checking the order of integration, the cointegration concept among all variables was tested using Westerlund's (2007) tests. The results outlined in table 5, show the presence of both the group-specific and panel-based cointegration for the model. This is indicated by the statistical significance of the test statistics (Gt and Pt statistics). Therefore, it can be concluded that there is a long-run relationship among the variables considered in this study.

Table 5: The results of cointegration test

	Statistic	p-value
Gt	-2.982	0.006
Ga	-3.710	0.999
Pt	- 2.417	0.095
Pa	-8.761	0.265

Source: Authors' computations

Table 6 shows the effects of the ARDL model for total provinces using the PMG, MG, and DFE methods to analyze the relationship between the variables. However, because of the panel's heterogeneity, we only consider the PMG and MG estimates. The DFE estimate is only included to provide a comprehensive panel ARDL model

(Elsalih et al. 2021). The Hausman test is used to compare the MG and PMG. Thus, the null hypothesis of homogeneity is rejected (chi2 = 17.06; Prob > chi2 =0.0044), indicating that the MG estimate is superior to the PMG estimation. Consequently, the discussion of results will be based on the MG estimator for the total Canadian provinces household consumption.

The results emanating from the Hausman test support the superiority of the (MG) model over (PMG) in the aggregate provincial panel which is different in the Low-wage and High-wage Provinces where the PMG approach is more efficient. These results are quite intuitive because it validates short-run and long-run heterogeneity across low-wage and high-wage provinces while long-run homogeneity is validated within low-wage and high wage provinces. This shows the importance of controlling for provincial level heterogeneity. Thus, the discussion of results will be based on the MG estimator for the aggregate model and the PMG estimator for the high and low-wage provinces. The estimates of the long-run and short-run relationships between independent variables and household consumption are reported in Tables 6 for all provinces.

Table 6:Long-term and short-term results for total Canadian provinces

	(1)	(2)	(3)
Variables	**MG all Provinces**	**PMG all Provinces**	**DFE all Provinces**
ECT	−0.439 ***	−0.226 ***	−0.164 ***
	(0.059)	(0.059)	(0.029)
Short-term			
D.LMW	−0.016 **	−0.009	0.020 *
	(0.008)	(0.008)	(0.011)
D.LDEMND	0.664 ***	0.686 ***	0.579 ***
	(0.051)	(0.058)	(0.025)
D.LRINT	0.015 ***	0.011 **	0.015 ***
	(0.004)	(0.005)	(0.005)
D.Low_INCME	−0.000	0.000	−0.000
	(0.000)	(0.000)	(0.000)
D.LGDPC	−0.001 ***	−0.001 ***	−0.001 ***
	(0.000)	(0.000)	(0.000)
Long-term			
LMW	0.152 ***	0.233 ***	0.307 ***
	(0.025)	(0.019)	(0.051)
L.LDEMND	0.898 ***	0.724 ***	0.699 ***
	(0.168)	(0.030)	(0.060)
LRINT	−0.062	−0.030 **	−0.023
	(0.041)	(0.013)	(0.024)
Low_INCME	0.002 **	−0.000	0.002 *
	(0.001)	(0.001)	(0.001)
L.LRGDPC	0.003	0.002 **	0.006 **
	(0.003)	(0.001)	(0.002)
Constant	0.347 **	0.190 ***	0.149 ***
	(0.147)	(0.047)	(0.043)
Observations	380	380	338
Hausman test	MG vs. PMG		
Chi2 17.06	Prob>chi2 0.0044		

Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1
Source: developed by the authors

Table 6 summarizes the estimation results for all provinces. Throughout all three of the observed speeds of adjustment estimates, the p-values obtained in these estimations are below 0.01. The results indicate that the MW has a long-term effect on household consumption. According to the MG's estimation, a 1 percent rise in MW induces a 0.152 percent increase in HCON at a significance level of p <0.01 in the long run. In the short run, the MW and household consumption have a negative

relationship, as per the findings. Household consumption falls by 0.016 percent as a result of a percentage rise in MW in the short-run.

The MG estimation results indicate that DMND has a positive and significant effect on HCON in terms of the control variables. Both in terms of the short and long term RINT, on the other hand, has a short-run positive and meaningful effect on HCON in all provinces, but a long-run negative insignificant impact. RGDP has a negative and significant impact on HCON in the long run. In general, the MW's long-run effects outweigh its short-run effects and are significant at $p<0.5$ or stronger. Our analysis is a kind of follow-up study on the impact of MW on consumption after Jung et al.'s (2020) research. They investigate the impact of MW on adult retail consumption. This study investigates the impact of MWs on household consumption. Our finding on the long-run relationship between MWs and consumption is in line with the finding of Jung et al.'s (2020) research. Thus, we can say that MWs have a significant positive relationship with consumption at the individual and household level.

For the short-run, our findings suggest a negative relationship between MWs and household consumption as the life-cycle hypothesis suggests. The effect of MWs on consumption at the household level is negative in the short run since an individual's consumption profile is depends more on expectations of income over the whole life-cycle than on current income (Modigliani and Brumberg, 1980). The life cycle hypothesis postulates that individuals are more likely to save when their income increase, thus, an increase in the MW may induce savings and reduce consumption. Also, looking at the Canadian case, a MW increase may more likely lead to the laying off of a portion of the labor force such as individuals with relatively less skill.

This may induce a sort of “saving hysteria” on other members of the labor force who may feel compelled to save for fear of potential layoffs. The total effect of all these is the reduction of aggregate demand in the short-run and increase in aggregate demand in the long-run when the shock from the MW increments dissipates.

The following section examines the relationship between the MW and household consumption in high and low-wage provinces separately. This is to have a clear understanding of the nature of income heterogeneity while analyzing the impact of MW on households with differences in the level of their macroeconomic variables; income per capita, interest consumer credit, domestic demand level and the Percentage of individuals in the low-income.

Table 7: Long-run and Short-run results for the low-wage and high-wage panel of Canadian Provinces

	Low-wage Provinces			High-wage Provinces		
VARIABLES	MG	PMG	DFE	MG	PMG	DFE
ECT	-0.512***	**-0.309*** **	-0.231***	-0.328***	**-0.155*** **	-0.129***
	(0.067)	**(0.079)**	(0.038)	(0.090)	**(0.041)**	(0.042)
		Short –run estimates				
D.LMW	-0.022*	**-0.001**	0.036	-0.008***	**-0.011*** **	0.007
	(0.012)	**(0.009)**	(0.023)	(0.002)	**(0.004)**	(0.012)
D.LDEMND	0.695***	**0.650*** **	0.585***	0.618***	**0.635*** **	0.539***
	(0.053)	**(0.073)**	(0.038)	(0.106)	**(0.088)**	(0.030)
D.LRINT	0.013***	**0.015* **	0.019***	0.019***	**0.009** **	0.017**
	(0.005)	**(0.008)**	(0.007)	(0.006)	**(0.004)**	(0.007)
D.Low_INCME	-0.001***	**-0.000**	-0.000	0.000	**0.000**	-0.000
	(0.000)	**(0.000)**	(0.000)	(0.001)	**(0.000)**	(0.000)
D.LGDPC	-0.000	**0.000**	-0.000	-0.001	**-0.000* **	-0.000
	(0.001)	**(0.001)**	(0.001)	(0.000)	**(0.000)**	(0.001)
		Long-run estimates				
LMW	0.169***	**0.244*** **	0.259***	0.127***	**0.272*** **	0.358***
	(0.033)	**(0.022)**	(0.044)	(0.041)	**(0.046)**	(0.102)
L.LDEMND	0.706***	**0.482*** **	0.486***	1.186***	**0.940*** **	1.044***
	(0.087)	**(0.046)**	(0.076)	(0.383)	**(0.080)**	(0.119)
LRINT	-0.010	**-0.020**	-0.032	-0.140	**-0.055**	-0.109*
	(0.023)	**(0.014)**	(0.024)	(0.087)	**(0.035)**	(0.057)
Low_INCME	0.003***	**0.001** **	0.001	0.001	**0.004*** **	0.005***
	(0.001)	**(0.001)**	(0.001)	(0.002)	**(0.001)**	(0.002)
L.LGDPC	0.001	**0.003*** **	0.003	0.007	**0.004**	0.011*
	(0.001)	**(0.001)**	(0.002)	(0.008)	**(0.003)**	(0.006)
Constant	0.507***	**0.547*** **	0.436***	0.106	**-0.018** **	-0.077
	(0.187)	**(0.135)**	(0.069)	(0.208)	**(0.008)**	(0.058)
Observations	228	228	228	152	152	152
Hausman test		**MG vs PMG(Low wage)**			**MG vs PMG (high wage)**	
Chi2		0.58			0.21	
Prob > chi2		0.9888			0.9990	

Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1
Source: Own authors' computations

Table 8: summery of the Long-term and Short-term results for the low and high-wage panel of Canadian Provinces

	Low-wage Provinces	High-wage Provinces
VARIABLES	**PMG**	**PMG**
ECT	-0.309***	-0.155***
	(0.079)	(0.041)
	Short –term estimates	
D.LMW	-0.001	-0.011***
	(0.009)	(0.004)
D.LDEMND	0.650***	0.635***
	(0.073)	(0.088)
D.LRINT	0.015*	0.009**
	(0.008)	(0.004)
D.Low_INCME	-0.000	0.000
	(0.000)	(0.000)
D.LGDPC	0.000	-0.000*
	(0.001)	(0.000)
	Long-term estimates	
LMW	0.244***	0.272***
	(0.022)	(0.046)
L.LDEMND	0.482***	0.940***
	(0.046)	(0.080)
LRINT	-0.020	-0.055
	(0.014)	(0.035)
Low_INCME	0.001**	0.004***
	(0.001)	(0.001)
L.LGDPC	0.003***	0.004
	(0.001)	(0.003)
Constant	0.547***	-0.018**
	(0.135)	(0.008)
Observations	228	152

Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1
Source: Own the authors' computations

In table 7, due to the panel's heterogeneity, we consider only the PMG and MG estimations (Elsalih et al.2021). The results in Hausman test(chi2 = 0.58 ; Prob > chi2 0.9888)for low wage group and (chi2 =0.21; Prob > chi2 =0.9990) for high wage provinces imply that for both group, the PMG estimate is preferable to the MG estimate. Thus we consider the results of PMG for low and high wage provinces group. Table 7 displays separately the results of the investigation of MWs and consumption relationship on the household level in high and low wage provinces. A

long-run relationship between the variables is still supported by the negative and significant adjustment coefficients when the relationship is estimated separately for low and high-wage provinces.

Table 8 displays the summary results of PMG estimations separately for a direct comparison between high and low wage provinces, as well as the investigation of MWs and consumption relationships on a household basis in low and high wage provinces. The negative and important adjustment coefficients according to error correction test (ECT),-0.309*** and -0.155***, for low and high-wage provinces, respectively, continue to support a long-run relationship between the variables. This indicates that the overall variables predict the household consumption in both high and low wage provinces and they have long term relationship.

The model estimates a significant and positive long-run relationship between MWs and consumption at the household level both for low and high-wage provinces despite the differences in the households' macroeconomic determinants. According to PMG estimates, per each percentage increase in MW, household consumption increases by 0.272 percent for high wage and 0.244 percent for low wage provinces in the long run. Besides, the estimates show a negative relationship between MW and household consumption in high-wage provinces, with a significance level of $p<0.1$, but insignificant in low-wage provinces. According to the PMG estimates, a percent shift in MW has a period-lagged effect of 0.011 and 0.001 percent change in HCON in high wage and low wage provinces in the following periods, accordingly. The implication of this finding is that; increasing the MW in high wage provinces would induce a higher short-run cost on employers in the high-wage groups who already accrue higher labor costs. This would induce more lay-offs in such provinces with an

attendant negative effect on aggregate demand and household consumption. However, this effect would not be felt in the low-wage provinces because employers in these provinces accrue relatively lower labor costs.

The findings show substantially that the MW in both high- and low-wage provinces has a more favorable and higher effect on long-run household consumption than the short-run. Thus a percent increase in provincial MW will lead to a 0.244 and 0.272 percentage increase in annual household consumption across the low and high-wage provinces respectively. Assuming a sticky-price scenario, the MW rises may therefore possibly raise effective demand which further induces consumption-driven economic growth (Prasch et al. 1999; Stabile, 2018; Jung et al. 2020). According to Sorkin (2015) and Aaronson et al. (2012) in the long run, the effect of MWs on economic aggregates is greater than in the short run. Acemoglu et al. (1999) hold that the long-run impact of raising MWs will foster on-the-job learning for jobs on a low income which increases labor productivity and consumption.

We continue our analysis by using the same variables based on per capita (2002 CAD) to determine if the findings change. As per capita consumption was chosen as the dependent variable in the next study, we must estimate all other explanatory variables on a per capita basis for these two groups. Additionally, we estimated the real MW rates (2002 CAD) the proportion of the group's labour force that is located in that province. The summary results for the high and low wage categories are shown in the appendix.

The results show the low and high wage groups in comparison to the previous findings. There are some differences in the size of the results, but still, we have a

long-run positive effect of MW on household consumption and a short-run negative effect for the low- wage group. In the short run, increasing a percentage of MW reduces household consumption per capita by 0.024 for low-wage and increases it by 0.010 for the high-wage group, although it is not significant for low-wage provinces.In the long run, a percentage shift in MW increases 0.141 and 0.144 for the low and high wage groups, respectively. They are highly significant, just as they were in our earlier analyses.

To sum up, base on both analyses the influence of MW on overall household consumption is different between the two groups. Indeed, the high-wage provincial group, MW has a few more effects on consumption relative to low-wage in the long run.

Also, panel Granger causality shows statistical significance amongst the variables as represented in table 9. There is bidirectional Granger causality between household consumption and independent variables (i.e. minimum wage, GDP per capita, total domestic demand, interest consumer credit, and percentage of low-income people). Thus, these Granger causality results confirm earlier panel ARDL findings that the dependent variables have a significant relationship with household consumption.

Table 9: Panel Granger causality tests

			W-Statistics	*P*-Value	Granger Causality	
HCON	>>	MW	12.2101 ***	0.0000	yes	
MW	>>	HCON	1.8656 *	0.0529	yes	Bidirectional
HCON	>>	GDPC	9.7765 ***	0.0000	yes	
GDPC	>>	HCON	1.9938 **	0.0263	yes	Bidirectional
HCON	>>	DEMND	7.5353 ***	0.0000	yes	
DEMND	>>	HCON	6.2724 ***	0.0000	yes	Bidirectional
HCON	>>	RINT	2.3717 ***	0.0022	yes	
RINT	>>	HCON	3.2885 ***	0.0000	yes	Bidirectional
HCON	>>	Low_INCME	6.5738 ***	0.0000	yes	
Low_INCME	>>	HCON	5.2313 ***	0.0000	yes	Bidirectional

Notes: *** Significant at the 1% level; ** Significant at the 5% level
Source: Authors' computations

Chapter 5

CONCLUSION

5.1 Summary and Conclusion

The world has seen the critical significance of household consumption during the global COVID-19 pandemic. Income is a major factor in household consumption and wage policies pushing the economy ahead. The 2007–2008 financial crises have caused a large number of post-Keynesian studies to claim that more focus needs to be placed on consumption-led growth. The literature focusing on household consumption has increased in the recession period due to the greater significance of expenditures. In addition, apart from a very recent study by Jung et al. (2020), no other paper has attempted to analyze the relationship between the MW and consumption. Their analysis is the only paper in Canada to study consumption and the MW relationship, however, they do not address provincial heterogeneity in the MW context. Therefore, empirical research discussing the effect of MWs on household consumption in various provinces is almost non-existent. This research filled this gap by addressing provincial heterogeneity in the MW and household consumption relationship in Canada.

The results of this research give rise to the following findings and recommendations: The first argument is that the two groups of provincial economies are not only distinguished by their MW but are also differentiated by their GDP per capita, household consumption, and interest consumer credit. The MW in the low-wage and

high-wage provinces has a positive impact on household consumption in the long-term. This supports the idea of current literature that MW hikes in low-wage provinces significantly raises poor households' incomes, stimulating consumption and aggregate demand. This outcome is similar to other studies (see Jung et al. 2020; Aaronsson et al. 2012; Campolieti et al. 2012). It shows that rising wages in low-wage regions contribute to rising household consumption.

Second, the results significantly indicate that the MW has a more beneficial and higher impact on long-term household consumption than short-term consumption in both high- and low-wage provinces. However, in the short-term, the relationship between the MW and consumption varies between the low- and high-wage provinces. The findings show a negative relationship in the short-term for both the low- and high-wage provinces, but for the low-wage provinces, the relationship is not significant. In general, for all three analyses (total, low-wage, and high-wage provinces), the long-term influence of the MW is significantly stronger than the short-term effects. Our findings, therefore, defend the heterodox approach of economists, in which MW hikes would enable household consumption to improve and thus raise demand for the economy (See Sorkin, 2015; Aaronson et al. 2012; Acemoglu et al.1999).Given that the price scenario is stable, MW increases will also theoretically increase effective demand, which further causes expenditure growth in the economy (Prasch et al. 1999; Stabile, 2018; Jung et al. 2020).

MW policies are of interest because they have the potential to have a broad influence on economic activity. In this regard, household consumption expenditure has a significant impact on both the short-run and long-run path of economic growth. The recent findings demonstrate that setting MW policy, as well as raising the

minimum wage, can increase aggregate consumer spending and therefore enhance economic development.

5.2 Policy Recommendations

Policymakers should pay attention to these issues because, through successful political–economic decisions, the MW rises to build an effective financial system to boost demand and development in low-wage countries.

Since MW increases aggregate demand and it is beneficial for the economy and welfare, it can be a powerful tool for promoting economic and social welfare. When implementing MW laws, policymakers and legislators are best advised to pay consideration to the effects of the adjustment. MW laws should take into consideration the differences in regional wage levels to mitigate the effects of short-term shocks occasioned from MW increments. It is a common notion that adjusting the MW too high can have negative employment effects. Thus, the key recommendations of this paper would be that policymakers should follow an evidence-based approach when setting MW levels. MW levels should take into consideration the needs of families within a particular region as well as the economic realities unique to that region as this would help foster in a more sustainable wage level. The findings of the present research are indicating that policymakers and researches need to take the period of the MW policy in analyzing its impact on household consumption. The long-run elasticity of household consumption to MW is larger than the short-run elasticity. Full adjustment of firms' costs to the MW policy takes place in the long run. The firms' costs function fully adjusts to the realities of the MW in the long run. Thus, the full effect of the MW policy is felt in the long run.

In addition, there is a need to access how a new MW bill could affect the total wage bill. It should be the case that when setting up MW levels, only workers at the lowest end of the wage distribution should be targeted as this would have minimal effects on the total wage bill. This would ensure the entrenchment of sustainable wage levels and onward progress of the sustainable development goals.

Wage differences across all provinces may indicate differences in consumption levels and sustained standards of living. Thus, a more concise view of the minimum wage's influence on households with different income levels is critical for contributing to SDGs 10 and 8 on reducing inequality between and within nations and driving economic development through wage-led fiscal policies. SDG 10 calls for enabling everyone to succeed, plus reducing inequalities of outcome, such as through the elimination of laws and policies that discriminate.

The recovery of the financial system will pave the way for fiscal and financial stimuli to serve those who need it most, lead to stronger regional and international responses, foster lasting development, and preserve trust by engaging citizens in social dialogue and politics. Currently, tremendous counter-cyclical fiscal and financial effort is required in the face of the unprecedented global crisis of COVID-19.

In addition to financial policy, fiscal approaches that shift the balance of incentives in favor of more sustainable behaviors and choices made during the recovery process can be adopted. Another chance to make needed policy and institutional investments has arisen due to the COVID-19 pandemic crisis. All that has to be done now is to grab hold of a moment when policies and social norms are more manageable than

during normal times and use it to move the globe in the direction of the Sustainable Development Goals.

Additionally, the results of this study make a recommendation for MW policy. Many of the arguments made in opposition to raising the MW are based on the controversial claim that increasing the MW will lead to a reduction in employment. According to our findings, a rise in the minimum wage, while potentially reducing employment, can be an effective instrument for promoting economic sustainable and inclusive development. Essentially, politicians and governments would be cautious about the spillover and redistribution consequences of MW rules when formulating their plans.

5.3 Suggestions for further studies

While our findings are based on a number of statistical assumptions, we provide some recommendations for further study and policy. First, in terms of research, Given that the majority of research on the impacts of Canada's MW has revealed negative employment consequences, we may assume that spillover effects such as ripple- and/or redistribution effects must be considerably positive in Canada. As a result, additional study into the rippling and redistribution effects of MW, as well as the policy consequences, might be productive.

Second, despite the significant contribution to the literature, this research is limited to the use of macroeconomic data to empirically test and answer policy relevant questions on MW and household consumption differences across the Canadian provinces. It is therefore pertinent that future studies using microeconomic survey datasets should be advanced. This could further inform policy makers on the short-

term dynamics of MW and household consumption patterns, unemployment outcomes, and inequality across the Canadian provinces.

The key recommendations of this study may therefore consider how monetary policy and fiscal policy can improve household consumption in developed and developing countries. More research on different countries group instead of just Canada as a developed country will improve and clarify the future research findings.

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APPENDIX

Appendix : Additional results

VARIABLES	(1) MG low wage	(2) PMG high wage
ECT	-0.323***	-0.031*
	(0.084)	(0.017)
	Short run estimate	
D.LMW	**-0.024**	**0.010*** **
	(0.054)	(0.022)
D.LDEMND	0.307***	0.397***
	(0.108)	(0.012)
D.LRINT	0.008	0.006
	(0.010)	(0.008)
D.Low_incme	-0.000	0.001
	(0.001)	(0.001)
D.LGDPC	0.212***	0.145
	(0.063)	(0.094)
	Long run estimate	
LMW	**0.141*** **	**0.144*** **
	(0.114)	(0.222)
LDEMND	0.300	0.346
	(0.256)	(0.548)
LRINT	-0.181	-0.305**
	(0.119)	(0.147)
Low_incme	0.010	0.013
	(0.010)	(0.017)
L.LGDPC	0.627***	0.415
	(0.229)	(0.434)
Constant	-0.018	0.112*
	(0.108)	(0.060)
Observations	228	152

Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1

Source: Developed by authors using data from the Statistics Canada based on 2002 CAD (statcan 2019)