The Impact of Housing Prices and GDP Growth on Income Inequality in Canada: A National Study (1990–2022) with Unemployment as a Control Variable

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Abstract

Motivated by growing public and policy concerns over housing affordability and persistent income inequality in Canada, this study explores how macroeconomic variables shape wealth distribution.

Using national-level data from Statistics Canada and the World Bank spanning 1990 to 2022, this study examines the relationships among housing prices, GDP growth, and unemployment and their effects on income inequality in Canada. The research reveals that rising housing prices are significantly associated with lower income inequality, contradicting the common assumption that higher housing costs exacerbate socio-economic disparities. In contrast, GDP growth appears to have little measurable effect on income distribution, challenging the Kuznets Curve Hypothesis, which posits that economic growth ultimately leads to reduced inequality. Unemployment shows minimal relevance as a mediating variable between housing prices, GDP growth, and inequality, suggesting that its role is limited. These findings underscore the value of government intervention to mitigate labor market shocks.

The study contributes to the literature by challenging conventional economic thought and highlighting the critical influence of housing markets and redistributive policies on income inequality. Although homeownership can serve as a short-run equalizer for middle-class households, persistent long-term affordability issues remain. Moreover, the results suggest that economic growth, when measured solely by GDP, is insufficient for addressing inequality without the support of progressive fiscal and social measures.

From a policy perspective, the findings underscore the need for housing regulation, progressive taxation, and strong labor standards to ensure fairer economic outcomes. Future research should examine regional variation and the long-term effects of housing on inequality.

Keywords

Income Inequality, Housing Prices, GDP Growth, Unemployment, Kuznets Curve, Redistribution Policies, Canada, Economic Growth, Labor Market, Wealth Distribution

1. Introduction

Income inequality has become an urgent issue in Canada, driven by an intricate set of economic, policy, and structural determinants (Ashenafi, 2022). The last three decades have seen disparities in income distribution always at the top of the agenda for policymakers and researchers alike (Leider et al., 2020). The rise in housing costs, combined with diverging economic growth rates, has contributed immensely towards changing income inequality, thus calling for an integral examination of these dynamics (Sun et al., 2024). According to Foley et al. (2024), the Gini coefficient—a measure of income inequality—has recorded ongoing fluctuations over time, revealing that essential economic changes have a considerable implication on income distribution.

Likewise, Fortin et al. (2012) emphasize the role of labor market changes and policy interventions in determining patterns of inequality. The increasing income gap in Canada is consistent with more general trends in other advanced economies (Olstad et al., 2021). Ostry et al. (2014) contend that globalization and financialization have acted to raise inequality, disproportionately benefiting the owners of capital while constricting real wage growth for middle- and lower-income household groups. Harasta et al. (2024) also draw attention to the fact that wage stagnation and insecure work, particularly in the service sector, have exacerbated inequalities in wealth accumulation, with less affluent households struggling to build financial security. Also, Iglesias et al. (2023) point out that government redistribution policies, such as taxes and social support programs, have been critical in offsetting income inequality; however, these policies have not been in a position to keep pace with accelerating disparities being created by market forces. Affordability of housing is an escalating issue in Canada, especially in big urban centers like Toronto and Vancouver (Boyd et al., 2016).

Higher homeownership costs have contributed to wealth inequalities, where higher-income families benefit from appreciating home values, and lower-income groups suffer from housing insecurity issues (Fafard St-Germain & Tarasuk, 2020). Real estate market speculation and foreign investment have escalated price inflation, making homeownership unaffordable for a great majority of low- and middle-income families, according to Andersen and McIvor (2013). Simultaneously, Ortiz et al. (2024) emphasizes the structural barriers to housing affordability, contending that governmental interventions like rent control and initiatives focused on affordable housing have demonstrated minimal effectiveness in stabilizing the market.

Furthermore, economic growth as measured by GDP, which is frequently linked to overall economic advancement, does not inherently lead to fair income distribution (Oishi & Kasimir, 2015). Though economic booms bring opportunities, the benefits are unevenly distributed, and this has the potential to exacerbate income inequality (Dossou, 2023). Rozelle et al. (2020) illustrate that during the initial phases of economic development, income inequality will decline as employment opportunities rise; however, at advanced GDP growth rates, inequality will expand as capital-intensive sectors emerge as priority areas for wealth generation.

Despite these complex dynamics, there remains limited empirical consensus on the specific effects of housing prices and GDP growth on income distribution in the Canadian context. Most existing studies tend to isolate these variables or treat them descriptively, without analyzing their combined or interacting effects on inequality. This study addresses that gap by integrating both housing market dynamics and macroeconomic growth factors into a single national framework.

Housing prices are included due to their visible role in wealth accumulation and exclusion. In high-cost urban centers, they serve both as a vehicle of wealth for established homeowners and as a barrier to mobility for renters and young households. GDP growth is examined to test the longstanding Kuznets Curve hypothesis, which posits that inequality may first rise and later fall with development—an idea frequently questioned in high-income nations.

Unemployment is used as a control variable because of its relevance in mediating access to income-generating opportunities. Job loss and precarious employment reduce household resilience and income security, thereby potentially moderating the relationship between economic growth or housing inflation and inequality. As highlighted in recent Canadian studies (Harasta et al., 2024; Iglesias et al., 2023), labor market vulnerability remains an essential but under-explored factor in income distribution.

1.1. Research Objectives and Questions

This study seeks to uncover how housing prices, GDP growth, and unemployment contribute to income inequality in Canada over the period from 1990 to 2022. While each of these variables has been examined in isolation, their combined effects and interactions have not been sufficiently explored in Canadian research. The following objectives and research questions were formulated to address this gap and to guide the analysis toward actionable economic and policy insights. These questions are particularly relevant given the country's growing concerns about housing affordability, uneven economic growth, and labor market precarity.

The specific objectives are:

1. To examine the relationship between housing prices and income inequality.

2. To analyze the effect of GDP growth on income inequality.

3. To assess the moderating role of unemployment in these relationships.

4. To identify and interpret policy implications based on the findings.

To achieve these objectives, the study addresses the following research questions:

1. What is the relationship between housing prices and income inequality in Canada?

2. Does GDP growth significantly influence income inequality, and if so, in what direction?

3. Does unemployment moderate the relationship between housing prices, GDP growth, and income inequality?

1.2. Hypotheses

This study tests the following hypotheses:

- Null Hypotheses (H0):

  o H0a: Housing prices have no significant impact on income inequality in Canada.

- o H0b: GDP growth has no significant impact on income inequality in Canada.

- o H0c: There is no non-linear relationship between housing prices and income inequality.

- o H0d: Unemployment does not moderate the impact of housing prices and GDP growth on income inequality.

- Alternative Hypotheses (H1):

- o H1a: Rising housing prices are positively associated with increased income inequality in Canada.

- o H1b: GDP growth has a significant positive relationship with income inequality.

- o H1c: The relationship between housing prices and income inequality is non-linear, with diminishing effects at higher price levels.

- o H1d: Unemployment moderates the impact of housing prices and GDP growth on income inequality.

By exploring the interconnected roles of housing prices, GDP growth, and unemployment in shaping income inequality, this study aims to contribute to the broader discourse on economic disparities and inform evidence-based policy development in Canada.

2. Literature Review
2.1. Income Inequality in Canada

Several research has been conducted on Canada's income inequality, with many studies indicating that it has become more significant in recent years (Foley et al, 2024). The findings of Fortin et al. (2012) suggest that wage stagnation, particularly in manufacturing and export-driven sectors, has contributed to inequality and limited economic mobility for lower-income households. Moreover, Ortiz et al. (2024) point out that in many jurisdictions, such as Toronto and Vancouver, the gap between income levels is much wider because economic growth has favored the wealthier residents.

According to Iglesias et al. (2023), the use of government redistribution mechanisms like taxation and social benefits has been instrumental in reducing inequality, even though these methods haven't kept up with the growing gap between groups. According to Ostry et al. (2014), the effectiveness of fiscal policies has been reduced over time due to wage gaps and labor market polarization. Moreover, Hansra et al. (2024) point out that Canada's social safety nets, while effective against some countries' structural changes in employment -- including financial market swings and inflation -- are not well-balanced.

Zhang (2023) argues that technological advancements have contributed to greater inequality by increasing the wage gap between high-skilled and low-level workers. Job displacement has resulted in the automation of traditional labor-intensive jobs, with low-income groups being disproportionately affected (Ghimire et al, 2020). The service sector's employment of a significant portion of low-income workers has resulted in slower wage growth, as noted by Foley et al. (2024), which adds to the disparity. Moreover, during times of economic recession,

income inequality becomes more concerning as lower-income workers are exposed to job losses and higher wages.

The impact of demographic and social factors on income inequality is significant (Soybean et al, 2021). However, the findings of Iglesias et al. (2023) and Ortiz f. (2240) suggest that recent immigrants and racialized communities encounter additional barriers in the labor market, which hinder their upward mobility. The absence of education and professional support, as argued by Andersen and McIvor (2013), contributes to the perpetuation of disparities among underprivileged groups. Furthermore, Hansra et al. (2024) point out that this intergenerational transfer of wealth has become an increasing factor in economic inequality: older families are afforded capital, more comfortable homes, and better education; these factors have reinforced the income gap. Why is this?

Although progressive taxation and social welfare programs have been effective in reducing the negative impact of income inequality, research indicates that Canada still experiences structural and technological changes that drive disparities (Berman et al, 2016).

2.2. Housing Prices and Income Inequality

In developed nations like Canada, the rise in housing prices has been identified as a significant factor that contributes to income inequality (Chen & Chen, 2023) (Khan Yeong, 2022). Wealthy property owners experience a higher appreciation in property values, while those with lower incomes face significant challenges with affordability and rental costs (Lang et al, 2023). The increase in housing prices due to speculative investments and foreign capital, as noted by Foley et al. (2024), has only served to exacerbate the wealth gap. Also, according to Ostry et al. (2014), unregulated housing price inflation disrupts wealth accumulation patterns, reinforcing already present economic disparities (regulate population mobility and employment).

Rental markets are influenced by the increase in housing prices, as per Hkansta et al. (2024), who suggest that higher property values result from an increase of rental expenses over time. The impact of this phenomenon is disproportionate, with lower-income households spending much of their earnings on housing (Hkansta et al, 2024). According to Andersen and McIvor (2013), despite the implementation of policy measures like rent control and affordable housing initiatives, affordability remains a persistent issue due to demand pressures and an insufficient supply. According to Iglesias et al. (2023), the inefficiencies in land use planning and zoning regulations have led to an increase in housing prices, which has undermined affordability programs.

According to Rozelle et al. (2020), income disparities are linked to homeownership, and they have observed that lower-income households face obstacles in accessing mortgage financing, which contributes to generational wealth gap reduction as the trend continues. Ortiz et al. (2024) also observe that the rise in property prices has an indirect impact on labor markets by compelling low-income workers to leave for more accessible areas, leading to higher costs of travel and hindering access to better paying jobs due to these factors.

Additionally, international studies suggest that the financialization of housing has made real estate a speculative asset rather than primarily requiring investment (Wang et al, 2024). The Canadian housing market is increasingly driven by investment rather than demand from end-users, leading to increased affordability issues (Foley et al, 2024). Ostry et al. (2014) point out

that rising mortgage debt among middle-income households further increases their economic vulnerability, making them more financially vulnerable to the risks associated with homeownership. However, many people are already in foreclosure.

Ultimately, while housing remains an important means of generating wealth, the unfair rewards afforded to wealthy families and investors only serve to increase economic inequality.

2.3. GDP Growth and Income Inequality

Many people believe that economic growth can help reduce inequality, but empirical research on this topic is inconclusive (Mdingi & Ho, 2021). In his work on inequality, Kuznets (1955) proposed the Kuzan Curve Hypothesis, which suggests that although inequality increases during economic growth, it decreases as economies mature. Zhao & Xu (2020) challenge this view, holding that since returns on capital are above the rate of economic growth, capital accumulation within developed economies tends to increase inequality over time.

According to Dinga et al. (2025) and Ostry (2014), the Canadian framework does not suggest that GDP growth has led to an even distribution of incomes. Despite economic progress benefiting middle- and lower-income earners, wage progression has not shown any significant impact on the wealthier group (Li et al, 2020). However, Hkansta et al. (2024) explain that some sectors, such as finance and technology, have experienced significant income increases while traditional manufacturing and service industries have fallen behind, further expanding the income gap. According to Rozelle et al. (2020), wage polarization has been amplified by the shift towards knowledge-based sectors, which have resulted in higher earnings for skilled workers than for lower-skilled.

Additionally, Ortiz et al. (2024) suggest that labor market institutions and redistributive policies are crucial factors in determining the correlation between GDP growth and inequality. Economic growth benefits are more evenly distributed in countries with strong labor protections and liberal taxation (Lapatinas et al, 2019). The decline of unionized labor and the stagnation of minimum wage policies in Canada have led to an increase in disparities (Foley et al, 2024). Also, as far as Lang et al. (2023) goes on to point out: "economic growth has not significantly improved income mobility, with younger age groups and those who are marginalized more likely to be affected by such changes.".

Another aspect that is linked to the correlation between GDP growth and inequality is the impact of globalization (Liu et al, 2020). As per Ostry et al. (2014), increased trade liberalization has resulted in lower-income groups experiencing wage compressions, while domestic labor markets struggle with global outsourcing. In manufacturing sectors, workers are disproportionately affected by this phenomenon, leading to increased income disparities. The findings of Mohanty et al. (2022) indicate that capital-intensive industries driving GDP growth tend to favor asset-rich households, which reinforces wealth inequality over time.

Evaluating economic recessions and their lasting effects on inequality reveals empirical evidence. In their (2020) research, Rozelle et al. observed that when economic conditions are tough to control, lower-income groups tend to suffer permanent income losses while higher- and middle-class households recover more quickly due to the creation of diversified income streams. The importance of stimulus initiatives and social welfare program expansions in reducing inequality is highlighted by Foley et al. (2024) in their conclusion that successful implementation depends on the strategies used during implementation.

Overall, while GDP growth can reduce income inequality by creating jobs and promoting economic development, structural factors such as wage polarization, labour market dynamics (and globalization) still have an impact on its distributional effects (Rozelle et al. in 2020).

2.4. The Role of Unemployment in Income Inequality

Lower-income workers are disproportionately affected by unemployment, making unemployment a significant factor in income inequality (Oa et al, 2024). Additionally: Lang et al, 2023, note that high levels of unemployment contribute to increasing inequality because it reduces the earnings potential for vulnerable groups. Why? Foley et al, (2024) note that while employment insurance and other government-run programs can help to reduce these effects, they may not fully counter income disparities.

According to Rozelle et al. (2020), the impact of unemployment on different economic variables is less significant than that experienced by lower-income households during economic downturns, as a result of diversification of income sources. The existing inequalities are reinforced, making unemployment an essential control variable in studies examining income distribution. Ostry et al. (2014) highlights that prolonged unemployment not only affects income levels but also shortens the duration of employment, further exacerbating economic disparities. The skills gap is being exacerbated by structural unemployment, which Hkansta et al. (2024) have identified as a consequence of technological and labor market changes, making it harder for lower-income workers to transition into emerging industries, leading to greater wage inequality over time. Additionally,

Iglesias et al. (2023) point out that employment precarity, which involves part-time, temporary, and contract-based work, is more prevalent among marginalized populations and younger workers. The presence of instability in the economy results in long-lasting income disparities and economic vulnerability, even during periods of strong economic growth (Iglesias et al, 2023). Ortiz et al. (2024) note that geographic disparities in employment levels also increase income inequality, with rural areas having fewer high paying jobs and lower access to retraining programs than urban centers.

Also, as Andersen and McIvor (2013) point out, the effects of job loss are not uniform across populations; policy responses to unemployment must also be based on demographic characteristics. While social safety nets can provide temporary relief, they do not prevent workers who experience financial instability for an extended period (Chapman et al, 2024). This is especially problematic in the long run.

2.5. Non-Linear Relationships and Quadratic Effects

Several studies suggest that the relationships between income inequality, housing prices, and GDP growth may not be strictly linear (Lekhuleni & Ndlovu, 2023). Rozelle et al. (2020) argues that the impact of GDP growth on inequality follows a non-linear pattern, where inequality initially rises before stabilizing or declining at higher levels of economic development. Similarly, Mohanty et al. (2022) find that housing prices have a diminishing effect on inequality at extreme levels, indicating a quadratic relationship.

Empirical evidence from the Canadian market supports these findings. Lang et al. (2023) and Ortiz et al. (2024) report that housing affordability crises tend to disproportionately impact middle-income earners, as lower-income households already face limited access to

homeownership. Foley et al. (2024) suggest that incorporating quadratic terms in econometric models can better capture these dynamics, leading to more accurate policy recommendations.

2.6. Gaps in the Literature

Although there are extensive studies examining income inequality, housing prices, and GDP growth from previous years onwards, many gaps remain. Despite the efforts of Andersen and McIvor (2013) and Foley et al. (2024), there have been few comprehensive studies that encompass these variables within a single framework. Studies frequently concentrate on each factor alone, disregarding any potential interaction effects. According to Hkansta et al. (2024), the study of real estate speculative investments highlights the lack of understanding among policymakers about market dynamics in the context of inequality.

A significant gap is the insufficient assessment of policy interventions. Although progressive taxation and affordable housing programs are effective, their long-term outcomes remain uncertain. According to Jackson et al. (2023), analyses that focus on specific regions are necessary, but they may not accurately reflect significant local variations in inequality drivers.

According to Foley et al. (2024), it is important to identify threshold effects and inflection points where economic variables have a disproportionate impact on income inequality, as suggested by previous research studies. By doing this, policymakers could adopt focused measures instead of general-purpose, onerous strategies.

By examining literature on income inequality, housing prices and GDP growth one can gain an in-depth understanding of economic disparities. However, there are still important gaps, particularly in terms of integrating these factors into coherent frameworks and exploring their non-linear interactions. Addressing these gaps can lead to actionable insights for policymakers who want to promote economic stability and equity, especially in the diverse regions of Canada. Future research will be crucial in this effort.

To synthesize the most relevant contributions to this study, Table 1 provides a summary of recent empirical research examining the relationships among income inequality, housing markets, GDP growth, and related variables.

Table 1. Summary of Key Literature on Income Inequality, Housing, and Economic Growth

Author(s) & Year	Study Context (Country/Region)	Variables Studied	Main Findings	Relevance to Current Study
Fortin et al. (2012)	Canada	Wages, employment, policy effects	Labor market changes and policy responses shape income inequality	Provides context for Canada's labor market impact on inequality
Ostry et al. (2014)	Global (OECD focus)	Globalization, capital ownership, income inequality	Global financial systems increase inequality by favoring capital over labor	Supports macroeconomic approach to examining inequality
Olstad et al. (2021)	Canada	Income inequality, public health policy	Inequality contributes to	Highlights consequences of

			worsening health outcomes and access issues	inequality justifying this study
Fafard St-Germain & Tarasuk (2020)	Canada (urban centers)	Housing affordability, food security	Unaffordable housing impacts food security and household stability	Demonstrates links between housing costs and household inequality
Andersen & McIvor (2013)	Canada	Housing prices, foreign investment, affordability	Speculation and foreign investment drive up housing costs	Illustrates drivers of housing inflation in Canada
Oishi & Kesebir (2015)	United States	GDP growth, perceived fairness, inequality	GDP growth alone does not ensure equitable wealth distribution	Challenges GDP as a sufficient proxy for inclusive growth
Rozelle et al. (2020)	China	GDP growth, rural vs urban inequality	Income inequality initially declines with growth but later increases	Informs discussion on nonlinear GDP-inequality trends
Ortiz et al. (2024)	Canada	Rent control, housing market policies	Government housing measures have limited long-term success	Explains why housing policy alone may not reduce inequality

3. Methodology

3.1. Research Design

This research utilizes a quantitative methodological framework that incorporates multiple linear regression and quadratic regression models to examine the influence of Housing Prices (HPI), GDP Growth Rate, and Unemployment Rate on income inequality in Canada for the period spanning 1990 to 2022. The analytical model integrates the Lagged GINI Coefficient to address the temporal persistence of inequality and employs quadratic terms (HPI^2 and GDP^2) to identify potential non-linear dynamics.

Linear and quadratic models were selected to account for potential non-linear effects, as prior research suggests that the relationship between economic growth and inequality may follow a Kuznets-type inverted U-shape. Similarly, the housing market may exert diminishing marginal effects on inequality at higher price levels. These modeling choices are supported by empirical work such as Rozelle et al. (2020) and Mohanty et al. (2022), who highlight threshold effects in macroeconomic drivers of inequality.

3.2. Data Sources

To ensure accuracy and reliability, data is obtained from the following reputable sources:

- Income Inequality (Gini Coefficient): Statistics Canada.

- Housing Price Index (HPI): Statistics Canada.

- GDP Growth Rate (%): World Bank.

- Unemployment Rate (%): Statistics Canada.

All data are national-level annual time series. The Gini Coefficient, Housing Price Index, and Unemployment Rate are obtained from Statistics Canada's publicly available economic indicators, primarily through the Data Tables. These are based on survey sources such as the Labour Force Survey and not on population census data.

3.3. Variables and Model Specification

The dependent variables is the income inequality (Gini Coefficient) - measures after-tax income inequality in Canada, and the independent variables are: Centered Housing Price Index (Centered HPI) - Adjusted to reduce multicollinearity by subtracting the mean before squaring; GDP Growth Rate (%) - Measures annual percentage change in GDP; Unemployment Rate (%) - Captures labor market conditions; Lagged Gini Coefficient - Controls for past inequality effects. Quadratic Terms (Non-Linear Effects): Centered HPI² - Quadratic term derived from the centered HPI to capture potential non-linear effects and GDP² - Examines threshold effects in the relationship between GDP growth and inequality. The regression model is specified as follows:

$$\text{Gini}_t = \beta_0 + \beta_1 (\text{Centered HPI}_t) + \beta_2 (\text{GDP Growth}_t) + \beta_3 (\text{Unemployment}_t) + \beta_4 (\text{Centered HPI}_t^2) + \beta_5 (\text{GDP Growth}_t^2) + \beta_6 (\text{Lagged Gini}_t) + \epsilon_t$$

where:

- Gini_t = Income Inequality (Gini Coefficient) at time t.

- HPI_t = Housing Price Index.

- GDP Growth_t = GDP Growth Rate.

- Unemployment_t = Unemployment Rate.

- HPI_t^2 = Quadratic term for housing prices.

- GDP Growth_t^2 = Quadratic term for GDP growth.

- Lagged Gini_t = Previous year's Gini Coefficient.

- ϵ_t = Error term.

3.4. Analytical Approach

The study follows a structured econometric approach, beginning with a descriptive analysis, where key statistical measures such as means, medians, standard deviations, and correlations are computed. To visualize trends effectively, line charts and scatter plots are created.

Next, the study employs regression analysis, utilizing Ordinary Least Squares (OLS) regression to identify the direct effects of GDP, the Housing Price Index (HPI), and unemployment on income inequality. Additionally, quadratic regression is applied to examine potential non-linear relationships.

To ensure the validity of the model, several diagnostic tests are conducted. Multicollinearity is assessed using the Variance Inflation Factor (VIF) to detect correlations among independent variables. Heteroskedasticity is examined through residual plot analysis to assess variance stability, while the Durbin-Watson test is employed to check for autocorrelation in the error terms.

For data processing and analysis, Microsoft Excel is used for data cleaning, descriptive statistics, and regression modeling, while R is employed for robustness checks and additional statistical analysis.

The Figure 1 outlines the sequential methodological steps taken in the study, from data acquisition through analysis and interpretation.

Figure 1. Methodological Workflow
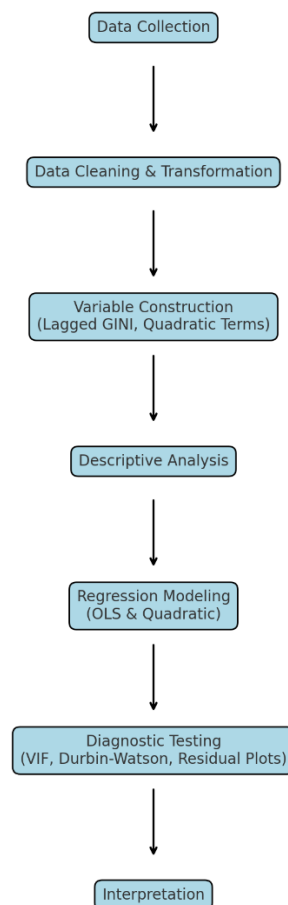
3.5. Limitations

While this study ensures a robust methodological approach, certain limitations exist:

- Potential Omitted Variables: Factors such as inflation and government spending could influence income inequality.

- Causality Concerns: The regression identifies associations but does not establish definitive causal relationships.

This methodology provides a structured framework to assess how GDP growth, housing prices, and unemployment impact income inequality, ensuring validity and reliability in the results. While this study focuses on multiple regression analysis, future research could explore additional model specifications, including interaction effects between housing prices and policy interventions. Sensitivity analyses, such as excluding years with extreme economic fluctuations or employing alternative functional forms, could provide further validation of these findings.

4. Results
4.1. Descriptive Statistics

The summary statistics for the key variables used in this study are presented in Table 2. The Gini Coefficient (Income Inequality) has a mean (average) of 0.3062, with a minimum of 0.2810 and a maximum of 0.3220, indicating relative stability in inequality over time. The Housing Price Index (HPI) has a mean of 76.70, with values ranging from 50.74 to 128.57, showing substantial variation in housing market trends. The GDP Growth Rate has a mean of 2.1623%, ranging from -5.0382% to 5.287%, reflecting periods of economic expansion and recession. The Unemployment Rate varies between 5.3% and 11.4%, indicating shifts in labor market conditions.

Table 2. Descriptive Statistics

	GINI Coefficient (Adjusted after-tax income)	GDP Growth Rate%	Housing Price Index	Unemployment Rate
MEDIAN	0.3100	2.6577	77.9083	7.5000
AVERAGE	0.3062	2.1623	76.6995	7.8273
SD	0.0114	2.1796	22.3803	1.5398
MIN	0.2810	-5.0382	50.7417	5.3000
MAX	0.3220	5.2870	128.5667	11.4000

These trends align with past research (Foley et al., 2024), which highlight rising income inequality alongside increasing housing costs and fluctuating GDP growth rates in Canada.

4.2. Correlation Analysis

The correlation matrix presented in Table 3 provides preliminary insights into the relationships between the variables. The Housing Price Index (HPI) has near-zero correlation with income inequality (r = 0.0175), indicating that housing prices do not have a strong direct relationship with inequality. This contradicts previous assumptions that property appreciation disproportionately benefits higher-income groups. The low correlation implies that other mediating factors, such as housing policies, mortgage accessibility, and taxation, may play a role in shaping the inequality effects of rising home prices.

The Unemployment Rate shows a moderate negative correlation with income inequality (r = -0.5761), suggesting that higher unemployment is associated with lower inequality. This may reflect the role of government intervention, including unemployment benefits and income redistribution policies, in mitigating income disparities during economic downturns (Håkansta et al., 2024). Additionally, unemployment is negatively correlated with housing prices (r = -0.6076), suggesting that weak labor markets may contribute to lower housing demand and slower property price growth.

The GDP Growth Rate has a weak but positive correlation with inequality (r = 0.2615), suggesting that economic expansion alone is not a strong determinant of income distribution. This aligns with findings that GDP growth benefits different economic classes unequally, often favoring capital owners over wage earners.

Table 3. Correlation Matrix

	GINI Coefficient (Adjusted after-tax income)	GDP Growth Rate %	Housing Price Index	Unemployment Rate
GINI Coefficient (Adjusted after-tax income)	1			
GDP Growth Rate %	0.261547448	1		
Housing Price Index	0.017458405	-0.10809663	1	
Unemployment Rate	-0.5761207	-0.27226	-0.60763	1

4.3. Regression Analysis

This study tests the impact of Housing Prices, GDP Growth, and Unemployment on income inequality using multiple regression analysis. The hypotheses (H0a–H0d and H1a–H1d) are evaluated based on statistical significance, with p-values below 0.05 indicating support for the alternative hypothesis (H1), while higher p-values lead to the retention of the null hypothesis (H0).

Based on Table 4, multiple regression model explains 86.11% of the variation in the Gini Coefficient ($R^2 = 0.8611$). The Adjusted R^2 (0.8278) confirms the model's robustness. The F-statistic (25.84, $p < 0.0001$) indicates that the overall model is statistically significant.

Table 4. Regression Statistics

Multiple R	0.927972298
R Square	0.861132586
Adjusted R Square	0.827804406
Standard Error	0.004623385
Observations	32

Table 5. Regression Coefficients

Coeff.	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%

Intercept	0.111210786	0.063423914	1.753451955	0.091779196	-0.01941321	0.241835	-0.01941	0.241835
GDP Growth Rate%	0.000598553	0.000498528	1.200641109	0.241143563	-0.000428184	0.001625	-0.00043	0.001625
Unemployment Rate	-0.00230939	0.001204238	-1.917718467	0.066639528	-0.004789565	0.000171	-0.00479	0.000171
GDP Squared	-0.000153829	0.000120561	-1.275944612	0.213702908	-0.00040213	9.45E-05	-0.0004	9.45E-05
Centered HPI	-0.000142107	6.16071E-05	-2.306657761	0.029642584	-0.000268989	-1.5E-05	-0.00027	-1.5E-05
Centered HPI Squared	1.59274E-06	3.55568E-06	0.447943206	0.658052003	-5.73032E-06	8.92E-06	-5.7E-06	8.92E-06
Lagged GINI Coefficient	0.695618314	0.178819677	3.890054646	0.000656744	0.327332296	1.063904	0.327332	1.063904

Table 6. ANOVA

	df	SS	MS	F	Significance F
Regression	6	0.003313827	0.000552304	25.83797254	1.42457E-09
Residual	25	0.000534392	2.13757E-05		
Total	31	0.003848219			

4.4. Key Regression Findings & Hypothesis Testing

Each hypothesis is tested based on the regression results, with the decision to accept or reject the null hypothesis (H0) based on statistical significance.

- Housing Price Index (HPI) has a significant negative effect on inequality (β = -0.00014, p = 0.0296 as shown in Table 5), rejecting H1a and failing to reject H0a. Although the correlation analysis indicates no strong direct relationship between housing prices and inequality, the regression analysis suggests a significant negative effect. This implies that rising home prices may provide short-term wealth accumulation benefits to middle-income homeowners, potentially reducing measured inequality (Håkansta et al., 2024). Foley et al. (2024) argue that rising housing prices can lead to higher consumer spending, increasing overall economic activity and wages, which might mitigate income disparities in the short term. However, long-term effects may differ, as sustained housing price increases can eventually outpace wage growth, reinforcing wealth-based inequality.

- Lagged GINI Coefficient (β = 0.6956, p = 0.0007) is the strongest predictor of current income inequality, supporting H1d. This confirms that income inequality persists over time due to structural factors such as wealth concentration and labor market rigidity (Rozelle et al., 2020). This suggests that previous levels of inequality play a dominant

role in shaping future disparities, potentially due to limited social mobility and generational wealth accumulation.

- Unemployment Rate has a marginally significant negative effect (β = -0.0023, p = 0.0666), providing weak support for H1d but not strong enough to reject H0d. This suggests that unemployment may influence inequality through government intervention and income redistribution policies (Foley et al., 2024). Additionally, unemployment benefits and income support programs may play a role in redistributing wealth, temporarily reducing income disparities.

- GDP Growth Rate and GDP Squared are not significant (p > 0.05), rejecting H1b and H1c, and failing to reject H0b and H0c. This suggests that economic growth does not directly affect income inequality, challenging the Kuznets Curve hypothesis but aligning with Zhao & Xu (2020) assertion that redistributive policies are necessary to reduce disparities. This indicates that economic policies aimed solely at promoting growth may not be sufficient to address income disparities without complementary redistributive mechanisms.

4.5. Diagnostic Tests

All diagnostic tests confirm the model's validity:

- **Multicollinearity**: No severe collinearity (all VIF < 10).

- **Heteroskedasticity**: Residuals are randomly scattered, indicating homoscedasticity.

- **Autocorrelation**: Durbin-Watson statistic (1.9016) confirms no severe autocorrelation.

4.6. Answers to Research Questions

What is the relationship between housing prices and income inequality in Canada?

The regression results indicate that housing prices have a statistically significant negative effect on income inequality (β = -0.00014, p = 0.0296). This result contradicts the initial hypothesis that higher housing prices increase inequality. As shown in Figure 2, a possible explanation is that rising home values provide wealth benefits to middle-income homeowners, temporarily reducing income inequality.

Figure 2. Housing Prices and Income Inequality
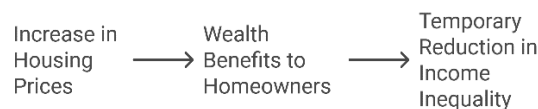
Does GDP growth significantly influence income inequality, and if so, in what direction?

The regression analysis shows that GDP Growth and GDP Growth Squared are not statistically significant predictors of income inequality (p > 0.05). This rejects the Kuznets Curve

hypothesis, which suggests that economic growth should reduce inequality over time. These findings align with Zhao & Xu (2020) and Gurbuz et al. (2021) argument that economic growth alone does not reduce inequality unless accompanied by redistributive policies.

Does unemployment moderate the relationship between housing prices, GDP growth, and income inequality?

The Unemployment Rate has a marginally significant negative effect on income inequality (β = -0.0023, p = 0.0666), but not strong enough to reject the null hypothesis. This suggests that while unemployment does impact income inequality, the effect is weak and likely influenced by government intervention and social policies.

4.7. Summary of Key Findings

1. Housing Price Index is a significant predictor of income inequality, but its direction is negative rather than positive, suggesting short-term wealth effects.

2. Economic growth (GDP Growth Rate) does not significantly affect inequality, contradicting traditional growth-inequality theories.

3. Unemployment Rate slightly reduces inequality, possibly due to social policies that mitigate labor market shocks.

4. Income inequality is highly persistent over time (Lagged GINI Coefficient is the most significant predictor).

5. Discussion

The data presented in this study provides substantial understanding of the correlation between housing prices, GDP growth, and income inequality in Canada. Housing prices, which are expected to rise and fall, have a negative impact on income inequality, as shown by regression analysis. The Kuznets Curve Hypothesis (Kuznetts, 1955) is contradicted by the fact that GDP growth is not a reliable indicator of inequality. Despite its marginal significance, the Unemployment Rate doesn't significantly affect the connection between housing prices, GDP growth, and income inequality, suggesting that government intervention may be effective in mitigating labor market shocks. The section provides a critical analysis of these outcomes in relation to current economic theories and previous research, exploring their potential policy implications and potential future directions.

5.1. Housing Prices and Income Inequality

According to the study's initial hypothesis, rising housing prices would result in a rise in income inequality (H1a), consistent with wealth concentration theories. Nevertheless, the negative coefficient in the regression model implies that higher housing prices are connected to lower income inequality in short-term outcomes. These findings challenge traditional views of wealth accumulation and distribution. One theory is that homeownership benefits middle-income households, resulting in greater wealth accumulation than low-paying tenants (Acolin and al, 2021; Hkansta & al:2024). Foley et al. (2024) suggest that housing appreciation leads to increased consumer spending and asset values, which may narrow income gaps in the short term. Additionally, homeowners may leverage home equity for education, business

investments, or consumption smoothing, thereby improving household economic security and upward mobility (Grewal et al, 2024).

Despite initial assumptions, the correlation analysis showed that income inequality had no significant impact on housing prices (r = 0.0175). This implies that the relationship found in the regression model may be influenced by other economic and policy factors, such as housing affordability measures, mortgage accessibility rates (OECD, 2021). However, such benefits may not extend to renters or first-time buyers who face elevated entry barriers or unstable tenure (Serrano (2009)).

Home equity borrowing and asset accumulation are crucial in the short-term reduction of inequality, as they enable middle-income homeowners to increase their financial stability and investment ability (Dodge et al, 2019). OECD housing market studies indicate that rising home prices lead to greater financial stability and facilitate generational wealth transfers. (Andrews & Caldera Sánchez, 2011) Moreover, homeowners frequently utilize their home equity to pay for their children's education, support entrepreneurial endeavors, or absorb unexpected financial expenses, which can contribute to increased socioeconomic mobility (Cao and Xia, 2022). The advantages of this system, however, mainly apply to households that have property rights; while those who cannot afford homeownership are exposed to increasing rent demands and financial instability (Mian & Sufi, 2014).

Recent research indicates that housing wealth, particularly in well-developed economies with mortgage markets, is a key factor in the reduction of short-term income inequality (Tita & Opperman, 2021). As property values appreciate, homeowners have greater wealth and can invest more widely, thus increasing their financial assets (Li & Yao, 2005; Aladdiny, 2017). Despite the dependence on housing market stability, this effect may not persist due to rising mortgage debt or decreasing affordability (Li & Yao, 2005).

While rising home prices are often seen as increasing inequality, in the Canadian context, the short-run wealth effects from homeownership, particularly among middle-income households, may explain this inverse relationship. As housing prices rise, many homeowners experience increases in net worth that allow them to borrow against home equity, finance education, or smooth consumption during economic downturns. These mechanisms can temporarily reduce income inequality metrics by raising after-tax household income or spending power.

However, this trend is unlikely to hold in the long term. Continued housing inflation eventually prices out low- and moderate-income households from homeownership, drives up rental costs, and exacerbates wealth disparities between owners and renters. Over time, housing wealth becomes concentrated in higher-income and older demographics, limiting intergenerational mobility and amplifying structural inequality. Therefore, the observed negative association between housing prices and inequality in this study likely reflects a short-term equalizing effect that may reverse if housing affordability continues to deteriorate.

According to research on housing affordability crises (Ortiz et al, 2024), ongoing housing price increases can ultimately widen the gap between rich and poor by making it more difficult for lower-income individuals to afford homes due to inflation. Mohanty et al. (2022) also observe that housing affordability is directly linked to speculative real estate investment, which contributes to inequality. The financialization of housing (Gurbuz et al, 2021) may be instrumental in this process, turning property from a basic need into an asset class valued by wealthy investors. This is possible. In the long run, an increase in housing prices could result

in a loss of property ownership for families with lower incomes, which would strengthen wealth gaps between generations and limit social mobility (Andersen & McIvor, 2013). In addition, research on OECD countries has indicated that wealth accumulation through real estate is more advantageous to the elderly and wealthy demographics while increasing generational disparities in economic mobility (Boertien & LópezGay, 2022). Figure 3 illustrates how rising housing prices impact income inequality.

Figure 3. Impact of Rising Housing Prices on Income Inequality
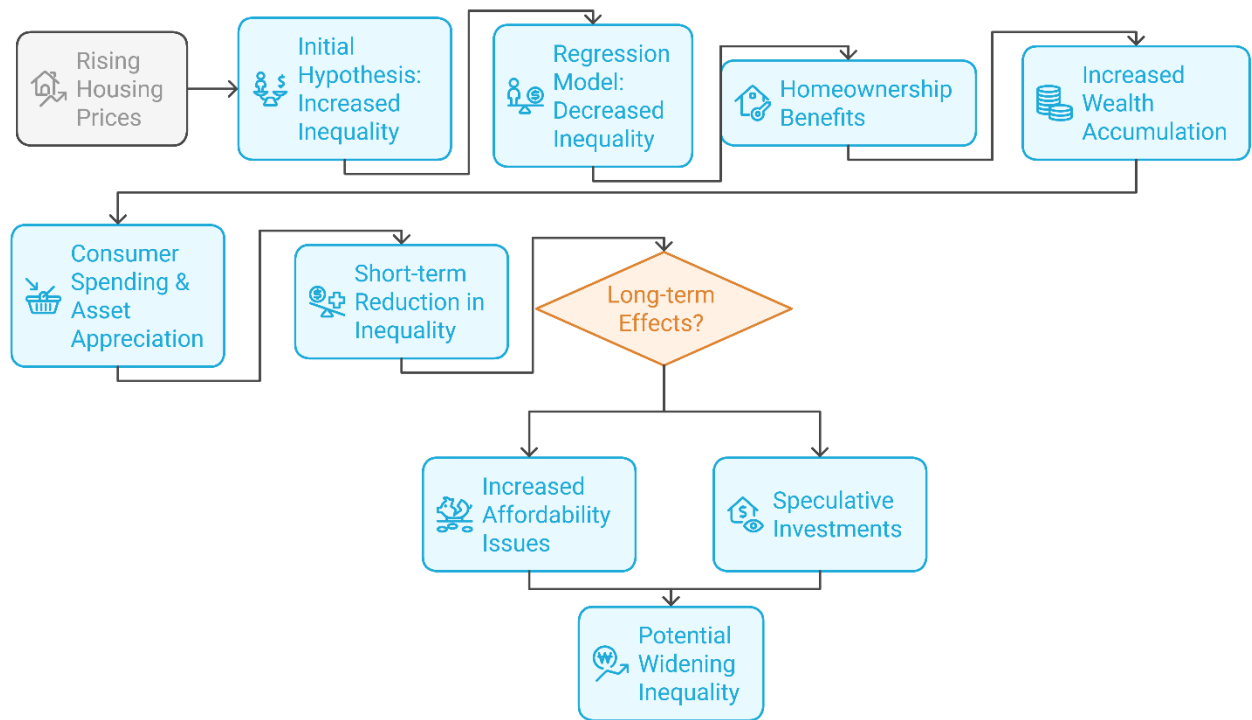
5.2. GDP Growth and Income Inequality

Contrary to the Kuznets Curve Hypothesis, there is no evidence that GDP growth and income inequality are positively related (with H1b being rejected and H0b not being accepted). Kuznets (1955) hypothesized that growth in economies leads to an increase in inequality at the start of economic growth, but it follows a decrease as economies become more mature. Empirical studies indicate mixed results. However, the theory that economic growth is a driver of wealth distribution has been put forth by Ostry et al. (2014), who also point out the limitations of neoliberal economies on policy interventions. Additionally, research has demonstrated that while poverty reduction doesn't necessarily translate to lower inequality, the wealth gains resulting from economic expansion tend to be more concentrated in high-income households and families (Atkinson, 2015).

The outcomes are consistent with Zhao & Xu's (2020) argument that economic growth does not necessarily lead to a reduction in inequality unless redistributive measures such as progressive taxation and social welfare programs are put in place. Hkansta et al. (1920) highlight that the distribution of income gains from GDP growth is often more equal than that of wage earners, as capital owners tend to benefit more. The correlation between GDP growth and inequality ($r = 0.2615$) observed in this study is weak, suggesting that Canada's economic

expansion has not been inclusive, which is consistent with the concerns raised by Iglesias et al. (2023). The weak correlation reinforces the argument that economic policies based solely on GDP growth may not address inequality, necessitating the use of complementary redistributive mechanisms to ensure equitable wealth distribution (Bullock, 2017) (OECD, 2021).

5.3. Unemployment as a Moderator of Inequality

Findings suggest that income inequality is negatively impacted by unemployment, with H1d being partially accepted and not completely rejected. This suggests that higher unemployment rates may have a slight impact on inequality. This finding seems odd because traditional economic theories assume that unemployment will increase inequality by decreasing the income of households. Nevertheless, welfare state theories (Korpi & Palme, 1998) suggest that government interventions such as unemployment benefits and income redistribution could counteract these effects. Additionally, more recent studies have demonstrated that (albeit for a time) expanded fiscal policies such as direct financial assistance and employment subsidies can reduce income inequality when conditions are poorer (Ostry et al, 2014).

In times of high unemployment, governments frequently extend social safety nets and redistribute income to low-income households (Bwala et al, 2023). According to Foley et al. (2024), benefits provided by unemployment are crucial in maintaining household incomes and preventing inequality from increasing. Why? The authors suggest that labor market mechanisms like collective bargaining and minimum wage laws can help to minimize wage disparities, even in times of economic instability, as suggested by Rozelle et al. (2020). Despite the negative correlation between unemployment and inequality, it is still possible to balance out these effects with the positive impact of social safety nets and labor protections.

Evidence from OECD labor markets suggests that countries with robust unemployment protection mechanisms, such as wage subsidies and active labor market programs (ALMPs), experience less inequality growth during economic downturns (OEBD 2021). The government-funded Kurzarbeit program in Germany has been credited with preventing significant income disparities (Aiyar & Dao, 2021), as it offers wage reductions rather than complete layoffs. Despite uncertainty about the long-term effects of inequality, experiments on UBI in Finland and Spain have demonstrated its potential to maintain income stability for those who are unemployed.

Also, the effectiveness of unemployment benefits in reducing inequality is determined by their duration and availability (Aspachs et al, 2021). States with short-term unemployment assistance experience more stable income distributions, while those receiving long-lasting wage subsidies or retraining programs do not (Card, Kluve, & Weber) 2018. This is consistent with the research of Iglesias et al. (2023), who found that when people leave their jobs without retraining, they experience ongoing earning gaps and greater inequality over time. It is important to conduct further research on the interdependence of labor market policies and economic cycles to determine what is best suited to balance job security with workforce adaptability.

5.4. Policy Implications

The findings of this study have important policy implications for addressing income inequality in Canada:

- **Housing Market Regulation**: While housing prices may reduce inequality in the short term, long-term affordability concerns remain. Policies that expand affordable housing, regulate speculative real estate investment, and introduce progressive property taxation could prevent housing wealth from further concentrating among high-income groups. International comparisons highlight that Scandinavian countries have successfully implemented strong rental market regulations, public housing initiatives, and cooperative housing models, ensuring broader housing accessibility and affordability. In contrast, North American housing markets rely more on free-market mechanisms, leading to greater wealth accumulation among existing homeowners and growing housing disparities. For example, the Canada Mortgage and Housing Corporation (CMHC) supports affordable housing initiatives and rent subsidies aimed at reducing housing-related inequality.

- **Inclusive Economic Growth Strategies**: Since GDP growth does not inherently reduce inequality, policymakers should focus on progressive taxation, increased social spending, and inclusive labor policies to ensure economic gains are equitably distributed. Lessons from Nordic welfare states demonstrate that higher taxation on capital gains and inheritance, combined with universal social benefits, have effectively reduced income inequality without hampering economic growth (Greve et al., 2021). In contrast, Canada's lower tax burdens on high-income earners may contribute to persistent income disparities, highlighting the need for more progressive fiscal policies (OECD, 2021). Additionally, federal programs like the Canada Child Benefit (CCB) have helped redistribute income to lower-income families, contributing to a modest reduction in after-tax inequality.

- **Labor Market and Social Protection Measures**: Strengthening employment security, raising minimum wages, and enhancing unemployment benefits could mitigate income disparities, particularly during economic downturns. International comparisons show that Germany's Kurzarbeit wage subsidy program, which compensates workers facing reduced hours, has been effective in preventing spikes in unemployment-driven inequality. Similarly, universal basic income (UBI) trials in Finland and Spain have shown promise in stabilizing income levels and reducing financial precarity among vulnerable populations. Implementing similar labor market protections and wage subsidy programs in Canada could enhance income stability and promote a more resilient labor force. Canada's Emergency Wage Subsidy (CEWS), introduced during the COVID-19 pandemic, is a recent example of a wage support program that temporarily preserved employment and mitigated income shocks.

Figure 4 illustrates the summary of the measures that can prevent income inequality.

Figure 4. Addressing Income Inequality
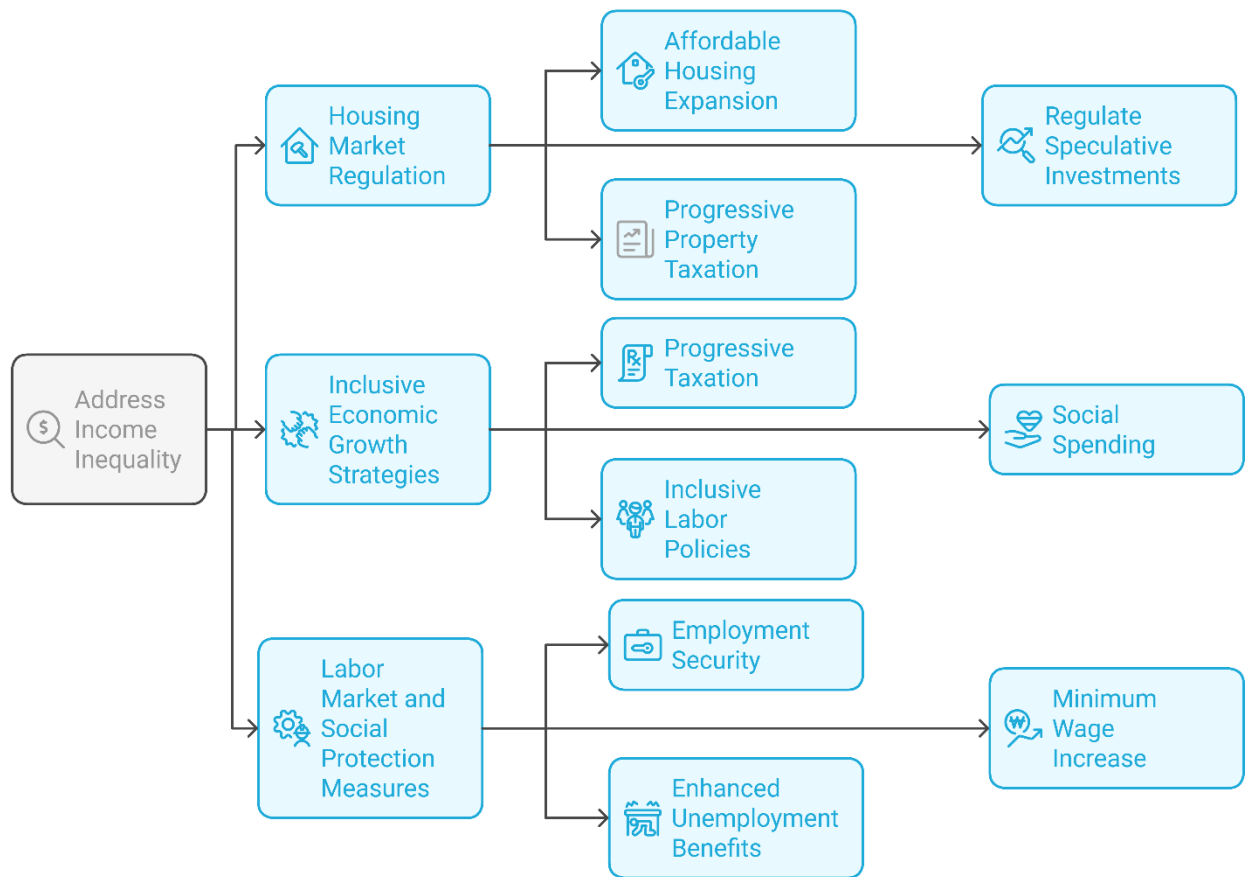
5.5. Limitations and Future Research

While this study provides valuable insights, it is not without limitations:

- **Causality Concerns**: The use of multiple regression analysis establishes correlations, but it does not confirm causal relationships. Future research could employ instrumental variable (IV) approaches or panel data analysis to establish stronger causal links.

- **Time-Varying Effects**: The impact of housing prices and unemployment on inequality may evolve over time. A longitudinal analysis examining decade-specific trends could provide deeper insights.

- **Regional Variations**: This study focuses on Canada as a whole, but inequality dynamics may differ at the provincial or urban level. Future research should explore regional disparities in income distribution. Additional research incorporating cross-country comparisons could provide further context on whether Canada's inequality patterns align with global trends.

6. Conclusion

The research examines the impact of housing prices, GDP growth, and unemployment on income inequality in Canada during the period of 1990 to 2022. The findings challenge established economic theories, revealing that rising housing costs are linked to lower income inequality in the short term, which contradicts the notion that higher property prices boost inequality. Income inequality remains unaffected by GDP growth, which contradicts the Kuznets Curve Hypothesis, indicating that economic progress alone is insufficient to ensure equitable distribution of wealth. While unemployment may be of minor importance, it doesn't effectively manage the correlation between housing prices, GDP growth, and inequality, necessitating the use of social safety nets and redistributive policies to mitigate labor market shocks.

6.1. Key Contributions of the Study

This research provides several noteworthy contributions to the discourse surrounding income inequality:

Challenges Conventional Assumptions: The unforeseen inverse relationship between housing prices and inequality implies that wealth accumulation via homeownership may temporarily alleviate income disparities among middle-income cohorts, corroborating recent investigations regarding property wealth effects (Foley et al., 2024).

Questions the Kuznets Curve Hypothesis: The absence of a significant correlation between GDP growth and inequality undermines the traditional notion that economic expansion ultimately mitigates disparities, reinforcing the assertions of Zhao & Xu (2020) and Milanovic (2016) that redistributive mechanisms are essential for achieving equitable economic results.

Highlights the Weak Role of Unemployment in Shaping Inequality: The marginal significance associated with unemployment suggests that elements such as governmental intervention, labor policies, and economic frameworks may exert a more pronounced influence on the trajectories of income inequality (Ostry et al., 2014).

6.2. Policy Implications

The findings of this study underscore the need for targeted policy interventions to address income inequality through structural economic reforms rather than relying solely on market forces. Several key policy recommendations emerge from this research:

- **Housing Market Regulations**: While homeownership may provide short-term reductions in inequality, long-term affordability remains a concern. Policies that expand affordable housing, regulate speculative real estate investments, and introduce progressive property taxation could prevent housing wealth from further concentrating among high-income groups. International comparisons reveal that Scandinavian countries have successfully mitigated housing inequality by implementing strict rent control policies, expanding social housing programs, and enforcing strong tenant protections (Gunnelin, 2024). In contrast, North American housing markets tend to rely more on private sector-driven affordability initiatives, which have struggled to prevent long-term wealth concentration in real estate (Hijmans, 2010).

- **Economic Growth with Redistribution**: Since GDP growth alone does not reduce inequality, policymakers should focus on progressive taxation, increased social spending, and inclusive labor policies to ensure economic gains are equitably distributed. Lessons from Nordic welfare states show that higher taxation on capital gains, coupled with universal social benefits, have helped reduce wealth gaps while maintaining economic competitiveness (Greve et al., 2021). By contrast, economies with lower redistributive efforts, such as the United States and Canada, have seen rising inequality despite periods of economic expansion (OECD, 2021).

- **Labor Market and Social Protection Measures**: Strengthening employment security, raising minimum wages, and enhancing unemployment benefits could mitigate income disparities, particularly during economic downturns. For instance, Germany's Kurzarbeit program, which provides wage subsidies to workers facing reduced hours during recessions, has been credited with preventing sharp increases in inequality and unemployment (Barry, 2021). Similarly, universal basic income (UBI) trials in Finland and Spain have demonstrated potential in stabilizing household incomes, particularly for low-income workers in precarious industries (Thomson et al., 2024). Integrating such policies into Canada's labor market framework could help strengthen resilience against economic shocks and provide a more equitable safety net for vulnerable workers.

6.3. Limitations and Directions for Future Research

While this study provides valuable insights, certain limitations must be acknowledged:

- **Causal Relationships**: The use of multiple regression analysis establishes associations but does not confirm causality. Future research should employ instrumental variable (IV) approaches or longitudinal panel data methods to better capture causal effects.

- **Regional Variations**: This study examines national trends, but inequality may vary across urban and rural regions. Future research should investigate regional disparities in income distribution and the differential impact of housing markets across provinces.

- **Long-Term Effects of Housing Prices**: Given that housing prices appear to reduce inequality in the short run, future studies should explore whether this effect persists over longer periods and whether housing wealth ultimately contributes to intergenerational inequality.

In conclusion, the results of this study challenge traditional economic assumptions about income inequality, highlighting the complexities of wealth distribution in modern economies. While housing markets may offer temporary reductions in inequality, long-term structural challenges remain, necessitating strong regulatory and redistributive policies. Future research should continue to explore the evolving relationships between economic growth, labor market dynamics, and inequality, ensuring that policy decisions are informed by empirical evidence and aimed at achieving greater economic fairness and inclusivity.

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