Corporate Taxation and Productivity: Disentangling Accumulation and Misallocation Channels

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Abstract

This study investigates the transmission mechanisms through which corporate income tax (CIT) policy influences aggregate productivity growth across 10 Canadian provinces from 2018 to 2023. Employing Partial Least Squares Structural Equation Modeling (PLS-SEM), this research estimates the dual-channel impact of corporate taxation on provincial productivity. We propose a framework consisting of two core pillars: an indirect accumulation channel that captures the aggregate investment and innovation responses of the provincial business sector, and a direct misallocation channel that measures how tax-induced distortions impede the flow of resources toward high-productivity activities, reflecting the aggregate allocative efficiency of provincial economies. Our findings indicate that corporate tax policy operates concurrently as a liquidity-shaping instrument and a market-cleansing mechanism, with both functions carrying distinct implications for provincial economic trajectories. By disentangling these pathways, this research provides a precise account of how fiscal policy design shapes long-run economic performance, offering critical insights for provincial policymakers aiming to foster sustained growth within the Canadian fiscal landscape.

Keywords: Corporate taxation, provincial productivity, PLS-SEM, resource misallocation, capital accumulation, economic growth, Canadian provinces

Introduction

Canada's productivity challenge has moved beyond a familiar economic concern to become a persistent constraint on long-term growth, competitiveness, and living standards. Recent Canadian evidence points to a sustained weakness in capital deepening, particularly in machinery and equipment, information and communication technologies, and intellectual property assets per worker. It also shows that labour productivity growth has continued to lag behind that of comparable advanced economies. Drummond (2025) links this underperformance to a prolonged decline in investment intensity and limited gains in multifactor productivity. Statistics Canada's recent provincial productivity data further show that this weakness is uneven across the country, with only a small number of provinces recording recent improvements while most continue to experience stagnant or declining business-sector productivity (Statistics Canada, 2025a; 2025b). This regional variation is important because it suggests that Canada's productivity problem is not only national in scale, but also provincial in structure. Some provinces appear to be constrained mainly by weak capital accumulation, others by limited efficiency gains, and many by both forces at the same time. The central issue, therefore, is not simply whether Canadian firms invest enough, but also whether capital and labour are being directed toward their most productive uses across firms, sectors, and provinces (Chen & Tombe, 2026; Globerman, 2025).

This study contributes to this debate by examining corporate taxation as a policy factor that may influence productivity through two related but distinct channels. The first is the conventional accumulation channel. From this perspective, corporate taxes affect the user cost of capital, retained earnings, and firms' ability or willingness to invest in productivity-enhancing assets (Jorgenson, 1963; Hanappi et al., 2023; Jacob, 2022). This channel remains central to public finance and investment theory. However, it does not fully explain how tax policy may shape productivity in economies where firms differ widely in efficiency, scale, financing conditions, and growth potential. For this reason, the study also emphasizes a second channel: resource misallocation. Drawing on the modern literature on heterogeneous firms, this channel captures the possibility that corporate taxation affects aggregate productivity by influencing which firms expand, which firms contract, and how resources move across the provincial business sector (Restuccia & Rogerson, 2008; Hopenhayn, 2014; Chen & Tombe, 2026). In this framework,

corporate tax policy is not treated only as a cost that affects average investment behaviour. It is also viewed as a force that can alter market selection, business dynamism, and the allocation of productive resources. The contribution of the paper is therefore both conceptual and empirical: it evaluates whether corporate taxation operates simultaneously through investment and innovation responses, and through a more direct allocative-efficiency pathway.

The model is grounded in the Canadian business-sector productivity framework, where labour productivity is shaped by capital intensity, labour composition, and multifactor productivity (Statistics Canada, 2025a; 2025b). These components are closely connected to broader economic outcomes because sustained productivity growth supports real wage growth, business competitiveness, and fiscal capacity. Recent Canadian evidence also shows that weak productivity growth has contributed to rising unit labour costs and a widening competitiveness gap with the United States, reinforcing the macroeconomic importance of productivity for wages, prices, and long-run economic resilience (Wang, 2025). This study therefore links corporate tax variation to provincial business-sector productivity through mechanisms that begin at the firm level—investment, financing, innovation, entry, exit, and scaling—but ultimately appear in province-wide economic outcomes. By connecting tax policy to productivity and, in turn, to compensation and growth, the analysis provides a unified framework for understanding how fiscal design can affect both firm behaviour and aggregate performance. This connection is particularly relevant in Canada, where persistent productivity weakness increasingly threatens the income base that supports household purchasing power and provincial public finances (Drummond, 2025; Chen & Tombe, 2026).

The study proceeds in four stages. First, it reviews two bodies of literature that are usually discussed separately: the traditional input-accumulation literature, which explains how taxation affects investment and innovation, and the frontier-misallocation literature, which explains how distortions affect the allocation of resources across heterogeneous firms (Jorgenson, 1963; Restuccia & Rogerson, 2008; Hopenhayn, 2014). Second, it develops a structural equation model that estimates these channels jointly rather than treating them as isolated mechanisms. Third, it applies this framework to a balanced panel of the ten Canadian provinces to assess whether corporate taxation affects productivity mainly through lower investment and innovation, through

allocative distortions, or through both channels together. Finally, it considers the implications of these productivity effects for provincial growth and long-run economic performance. By separating the accumulation and misallocation pathways, the study aims to offer a more policy-relevant explanation of how corporate tax design shapes productivity in a federation characterized by persistent interprovincial differences in economic structure, investment capacity, and business-sector performance (Drummond, 2025; Globerman, 2025).

Literature Review and Hypothesis Formulation

The literature review can be organized around two core pillars that mirror the structural equation model proposed in this study. The first pillar is the classical input accumulation literature, which identifies the main conduits through which corporate taxation affects productivity by shaping firms' accumulation of productive inputs (Jorgenson, 1963; Hanappi et al., 2023; Jacob, 2022). The second pillar is the modern frontier misallocation literature, which provides the core contribution of this proposal by shifting attention from average input responses to the allocation of resources across heterogeneous firms, especially the ability of frontier firms to expand and laggard firms to contract or exit (Restuccia & Rogerson, 2008; Hopenhayn, 2014; Chen & Tombe, 2026). Together, these two pillars offer a coherent framework for understanding how taxation influences aggregate productivity by altering firm-level behaviors, which then aggregate into province-wide economic outcomes.

Pillar 1: Classical Input Accumulation Literature

Classical literature treats taxation primarily as a determinant of firms' incentives to accumulate productive inputs. In the neoclassical investment tradition associated with Jorgenson (1963) and later syntheses, corporate taxation affects the user cost of capital and thereby influences the desired capital stock, the timing of investment, and the composition of investment across assets. More recent evidence continues to support this view, showing that changes in depreciation allowances, marginal effective tax rates, and other tax parameters can materially affect firm investment and capital deepening (Hanappi et al., 2023; Jacob, 2022). Contemporary reassessments emphasize that this channel remains empirically relevant but also caution that its aggregate implications depend on adjustment frictions, financing conditions, and equilibrium

responses. In this pillar, the conduits of interest are therefore capital accumulation, internal finance, innovation spending, and complementary organizational upgrading, all of which may mediate the effect of taxation on firm-level productivity. The OECD's recent firm-level evidence and newer quasi-experimental work on tax reform both reinforce the idea that tax policy alters business investment through these classic channels, even if the size of the response varies across settings (Hanappi et al., 2023; Suárez Serrato & Zidar, 2023). Consistent with this theoretical focus on input accumulation, we derive the following hypotheses regarding the tax environment's impact on provincial investment and innovation:

- **H1:** Elevated corporate taxes significantly reduce provincial investment.
- **H2a:** Innovation performance within the business sector is significantly hindered by a restrictive tax environment.
- **H2b:** Human capital acts as a critical complement, significantly fostering business innovation.

Pillar 2: Modern Frontier Misallocation Literature

The second pillar moves beyond average investment responses to examine whether corporate taxation changes who produces, who scales, and who survives. The modern misallocation literature argues that aggregate productivity depends not only on how much capital and labor an economy accumulates, but also on whether these inputs are allocated toward the most productive firms. Foundational contributions by Hopenhayn (2014) and by Restuccia and Rogerson (2008) show that distortions affecting firm growth, entry, or input prices can lower aggregate TFP by preventing efficient reallocation. These insights have since been validated and synthesized in broader research, confirming that misallocation is a primary source of productivity dispersion across jurisdictions (Restuccia & Rogerson, 2013). More recent work extends this insight by emphasizing firm-specific wedges, frontier heterogeneity, and general-equilibrium propagation (Chen & Tombe, 2026). In this perspective, tax policy matters not only because it affects the representative firm's investment decision, but because heterogeneous effective tax burdens may slow the expansion of highly productive frontier firms, protect less efficient incumbents, or distort the covariance between productivity and factor use. Recent research on tax heterogeneity finds that asymmetries in effective corporate tax rates can themselves generate

measurable productivity losses through misallocation, while broader theoretical work on wedges underscores that observed distortions often interact with existing frictions rather than operate in isolation (Colciago et al., 2023). This pillar therefore forms the core contribution of the proposed study: it connects corporate taxation to allocative efficiency, frontier dynamics, and the reallocation margin that links firm heterogeneity to aggregate productivity outcomes. Building on this framework of allocative efficiency, we examine the direct and indirect pathways through which tax policy shapes provincial productivity, leading to the following hypotheses:

H3a: Increases in provincial corporate investment and business innovation exert a significant positive effect on provincial business-sector productivity.

H3b: A significant negative direct path runs from the corporate tax burden to provincial business-sector productivity, independent of capital accumulation, representing structural losses in allocative efficiency.

Macroeconomic Implications: From Productivity to Growth

Building on these micro-foundations, we extend our analysis to consider the macroeconomic consequences of these productivity dynamics. While the two pillars of accumulation and misallocation explain the micro-foundations of productivity, the broader implications for aggregate economic growth are well-established in the literature. Endogenous growth theory posits that productivity gains are the primary drivers of sustained long-term economic expansion (Romer, 1986; Lucas, 1988). By increasing the efficiency with which labor and capital are combined, productivity improvements expand the economy's production possibility frontier. The literature on distortionary fiscal pressure suggests that corporate taxation does not merely reallocate resources, as it can impose a net drag on the economy by lowering the steady-state level of aggregate output (Barro, 1990; Gemmell et al., 2014). These theoretical frameworks suggest that the transmission of tax policy to growth is twofold: a productivity-mediated path and a direct fiscal drag that affects total output. Building on this dual-transmission perspective, we test the extent to which provincial economic trajectories are shaped by these specific fiscal and productivity mechanisms, leading to the following hypotheses:

H4a: Provincial economic growth is significantly driven by gains in business-sector productivity.

H4b: Fiscal drag from higher corporate tax rates exerts a direct, significant negative impact on provincial economic growth.

Model Motivation and Synthesis

This two-pillar literature directly motivates the structural equation model used in this study. The first pillar implies a conduit mechanism in which corporate taxation affects business productivity through input accumulation channels such as investment, internal finance, and innovation effort (Jorgenson, 1963; Hanappi et al., 2023). The second pillar posits a frontier-misalignment mechanism whereby taxation alters allocative efficiency by shaping the growth, contraction, and survival of heterogeneous firms, especially those near the productivity frontier (Restuccia & Rogerson, 2008; Hopenhayn, 2014; Chen & Tombe, 2026). The empirical model is therefore designed to estimate both pathways simultaneously: one path captures the mediated effect of taxation through classical firm-level accumulation channels, while the other captures the broader reallocation and misallocation effects that operate across firms and markets. This structure allows the analysis to distinguish whether the productivity consequences of taxation arise primarily because firms invest less, or because the economy allocates resources less efficiently across firms.

Research Methodology

Model Specification

To evaluate the proposed theoretical framework, this study employs Partial Least Squares Structural Equation Modeling (PLS-SEM), drawing on prior empirical applications reported by Khalilov and Yi (2021). Following the decision rules formalized by Hair et al. (2019), PLS-SEM is selected because the empirical architecture involves complex structural paths, utilizes secondary archival data, and accommodates the sample size limitations inherent to a 10-province Canadian macro-panel. These conditions align closely with the requirements of this study, as the analysis seeks to decompose the transmission of corporate tax policy into distinct causal pathways within a Canadian panel spanning 10 provinces. Furthermore, PLS-SEM relaxes the strict distributional assumptions required by traditional covariance-based SEM (Barclay et al., 1995), enabling robust estimation of complex causal models even when indicators deviate from multivariate normality.

We utilize a multi-period lag structure to account for the gestation period required for physical and intellectual investments to fully integrate into provincial productivity. Our model is a recursive lagged structural model that assumes unidirectional causality in which cause-and-effect relationships progress over time. Grounded in endogenous growth theory, the model posits that policy environments dictate long-term prosperity by altering incentives for capital accumulation and technological progress. Consequently, our framework identifies four distinct "channels of influence" through which corporate taxation transmits to the real economy:

1. The capital accumulation channel: Higher corporate tax burdens constrain internal cash flow and increase the cost of capital, thereby discouraging investment in physical assets.
2. The innovation channel: Corporate tax policy alters the risk-reward profile for R&D and intellectual property acquisition, determining the pace of business innovation.
3. The efficiency channel: Beyond indirect mediation, the tax environment directly affects productivity by increasing allocative distortions and reducing firms' incentives to optimize resource use.
4. The direct fiscal transmission channel: This path captures the broader impact of the tax environment on economic growth, operating independently of the investment, innovation, and efficiency channels.

By integrating human capital as a primary driver of the innovation process, the model accounts for the critical complementary relationship between a skilled workforce and technological advancement. This integrated framework allows us to isolate how tax policy transmits through the provincial economy, influencing both intermediate productivity and, ultimately, aggregate growth.

1. Measurement Model

The measurement models define how the observed variables (y_i and x_i) relate to the latent constructs.

1.1. Endogenous Measurement Model

$$y_{i,t} = \Lambda_y \eta_{i,t} + \epsilon_{i,t} \quad (1)$$

where $y_{i,t}$ is a vector of observed indicators for the endogenous variables. The term $\eta_{i,t}$ represents the vector of endogenous latent variables, which includes productivity ($\eta_{1,t+1}$), growth

($\eta_{2,t+1}$), investment ($\eta_{3,t}$), and innovation ($\eta_{4,t}$). Λ_y is the factor loading matrix and $\epsilon_{i,t}$ is the vector of measurement errors.

1.2. Exogenous Measurement Model

$$x_{i,t} = \Lambda_x \xi_{i,t} + \delta_{i,t} \quad (2)$$

where $x_{i,t}$ is a vector of observed variables for the exogenous variables. The term $\xi_{i,t}$ represents the vector of exogenous latent variables, including the corporate tax environment ($\xi_{1,t-1}$) and human capital ($\xi_{2,t}$). Λ_x is the factor loading matrix for the exogenous model, and $\delta_{i,t}$ is the vector of measurement errors.

2. Structural Model

The structural models capture the step-by-step causal paths defined in our theoretical framework.

2.1. Path 1: Investment equation

$$\eta_{3,t} = \beta_1 \xi_{1,t-1} + \zeta_1 \quad (3)$$

where $\eta_{3,t}$ is the investment construct, $\xi_{1,t-1}$ is the corporate tax environment construct, and ζ_1 is the disturbance term.

2.2. Path 2: Innovation equation

$$\eta_{4,t} = \beta_2 \xi_{1,t-1} + \beta_3 \xi_{2,t} + \zeta_2 \quad (4)$$

where $\eta_{4,t}$ is the innovation construct, $\xi_{1,t-1}$ is the corporate tax environment construct, $\xi_{2,t}$ is the human capital construct, and ζ_2 is the disturbance term.

2.3. Path 3: Productivity equation

$$\eta_{1,t+1} = \beta_4 \eta_{3,t} + \beta_5 \eta_{4,t} + \beta_6 \xi_{1,t-1} + \zeta_3 \quad (5)$$

where $\eta_{1,t+1}$ is the productivity construct, $\eta_{3,t}$ is the investment construct, $\eta_{4,t}$ is the innovation construct, $\xi_{1,t-1}$ is the corporate tax construct, which captures the residual direct effect of tax policy on productivity, and ζ_3 is the disturbance term. The residual direct effect accounts for gains in resource allocation and the reduction of "X-inefficiency" that occur independently of physical capital deepening or formal innovation.

2.4. Path 4: Aggregate growth equation

$$\eta_{2,t+1} = \beta_7 \eta_{1,t+1} + \beta_8 \xi_{1,t-1} + \zeta_4 \quad (6)$$

where $\eta_{2,t+1}$ is the aggregate growth construct, $\eta_{1,t+1}$ is the productivity construct, $\xi_{1,t-1}$ is the corporate tax environment construct, and ζ_4 is the disturbance term.

The structural paths and measurement links defined in the equations above are summarized visually in the conceptual framework (Figure 1). This model captures a comprehensive transmission mechanism in which tax policy influences the economy through three distinct indirect channels—capital accumulation, innovation, and efficiency—alongside a direct fiscal transmission channel to aggregate growth. Additionally, the model accounts for the role of human capital as a critical driver of innovation. Ultimately, these combined forces determine productivity and aggregate growth outcomes.

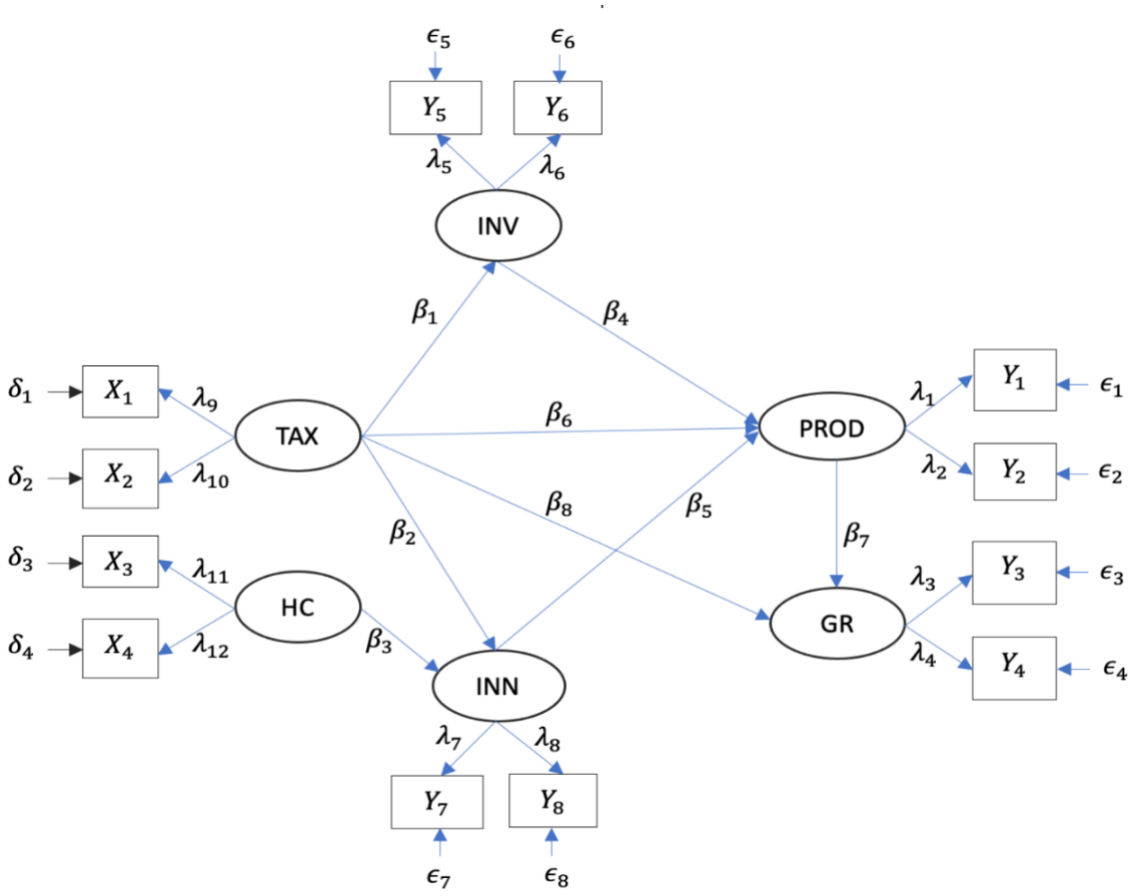


Figure 1. The theoretical model to estimate

Source: Author's elaboration.

Data

This study utilizes a balanced panel dataset covering the 10 Canadian provinces from 2018 to 2023. The data are compiled from several primary sources to ensure consistency and

comparability across jurisdictions, including Provincial Public Accounts, Statistics Canada, Finances of the Nation, and Signal 49 Research (formerly known as Conference Board of Canada).

The variables selected for this study are designed to capture structural transitions within provincial economies while controlling for jurisdictional size and labour intensity. The variables are normalized to ensure comparability across the 10-province panel and to account for differences in economic scale. Furthermore, all indicator variables were transformed into natural logarithms to standardize the model's functional form, normalize the indicators' distributions, and mitigate the influence of extreme values. To ensure accuracy, business gross fixed capital formation (BGFCF) in both physical assets—machinery and equipment and non-residential structures—and intellectual property is measured on a per-hour-worked basis. This transformation reflects the capital intensity available to the provincial workforce rather than absolute scale.

Table 1. Constructs and measures

Latent Construct	Observed Indicators (x,y)	Primary Source
Corporate Tax (TAX) (ξ_1)	CIT manufacturing and processing (X_1); Corporate tax burden (Corporate tax / Net operating surplus) (X_2)	Finances of the Nation; Provincial Public Accounts; Statistics Canada
Human Capital (HC) (ξ_2)	University degree attainment (X_3); Number of researchers (X_4);	Statistics Canada; Signal 49 Research (Conference Board of Canada)
Investment (INV) (η_3)	BGFCF (M&E) (Y_5); BGFCF (non-residential) (Y_6);	Statistics Canada
Innovation (INN) (η_4)	BGFCF (Intellectual property) (Y_7); R&D (Business to Education) (Y_8);	Statistics Canada
Productivity (PROD) (η_1)	Labour productivity (Y_1); Total compensation (Y_2);	Statistics Canada
Growth (GR) (η_2)	Real GDP per capita (Y_3); Employment rate (Y_4);	Statistics Canada

In turn, innovation is proxied by R&D expenditures (specifically, business-funded R&D in the higher education sector) expressed as a percentage of provincial GDP, which captures the jurisdiction's overall research intensity. The corporate tax environment is evaluated through a

dual approach: statutory rates focus on policy intent for the manufacturing and processing sectors, while the tax burden—calculated relative to the net operating surplus—measures the actual fiscal pressure on corporate profitability.

To measure the primary outcomes of these inputs, productivity is defined using real labour productivity and total compensation per hour, with emphasis on production efficiency and returns to labour. Finally, aggregate growth is captured through real GDP per capita and the employment rate. By using population-adjusted and rate-based growth indicators, the model identifies how specific policy levers interact with intellectual and physical capital to drive long-term provincial prosperity and economic performance. Table 1 summarizes the definitions and data sources for each indicator used to construct the model's latent variables.

Results and Discussion

1. Evaluation of the Measurement Model

Following the measurement evaluation procedure outlined in Khalilov and Yi (2021), along with the two-step framework of Fornell and Larcker (1981) and Barclay et al. (1995), the measurement (outer) model is evaluated before testing structural associations. This evaluation includes individual item reliability, internal consistency, convergent validity, and discriminant validity.

We examined individual item reliability by assessing the loadings of the observed variables (Table 2). Following the threshold suggested by Carmines and Zeller (1979) and Barclay et al. (1995), a loading of 0.7 was used as the minimum acceptable level. All indicators for our constructs, including the corporate tax environment and productivity measures, satisfied this criterion, indicating that the items share more variance with their assigned construct than with the error term.

Internal consistency is evaluated using both Cronbach's alpha and composite reliability (CR). Following benchmark criteria established by Nunnally and Bernstein (1994) and Barclay et al. (1995), values of 0.7 or higher denote robust internal consistency. As detailed in Table 3, while Cronbach's alpha varies—with the TAX construct registering lower at 0.270—all composite reliability values exceed the 0.7 threshold (ranging from 0.728 to 0.944), confirming that the measurement scales possess adequate internal consistency for subsequent confirmatory analysis.

Convergent validity was assessed using the average variance extracted (AVE), which represents the common variance captured by the latent variable (Fornell and Larcker, 1981). All

constructs achieved an AVE of at least 0.5, which is commonly accepted as evidence of convergent validity and indicates that the latent variables explain more than half of the variance in their indicators (Gefen et al., 2000) (Table 3).

Table 2. Cross-loadings for the consistency of the measures

	TAX	HC	PROD	GR	INV	INN
X_1	0.842	-0.351	-0.599	-0.789	-0.408	-0.193
X_2	0.665	0.465	-0.262	-0.359	-0.708	-0.030
X_3	-0.051	0.527	0.151	0.269	-0.328	0.040
X_4	-0.008	0.999	0.441	0.521	-0.023	0.700
Y_1	-0.686	0.278	0.923	0.710	0.912	0.678
Y_2	-0.290	0.714	0.824	0.520	0.306	0.658
Y_3	-0.741	0.239	0.850	0.935	0.815	0.503
Y_4	-0.553	-0.072	0.135	0.695	0.084	-0.321
Y_5	-0.705	-0.185	0.617	0.611	0.941	0.295
Y_6	-0.615	0.098	0.805	0.655	0.950	0.539
Y_7	-0.305	0.715	0.840	0.415	0.502	0.961
Y_8	0.107	0.505	0.485	-0.023	0.271	0.885

Source: Author's calculations.

Table 3. Reliability and validity statistics

	AVE	Composite reliability	Cronbach's α	Correlation of Constructs					
				TAX	HC	PROD	GR	INV	INN
TAX	0.575	0.728	0.270	0.758					
HC	0.638	0.763	0.654	-0.011	0.799				
PROD	0.765	0.866	0.703	-0.596	0.515	0.875			
GR	0.679	0.806	0.568	-0.793	0.159	0.717	0.824		
INV	0.894	0.944	0.882	-0.696	-0.040	0.755	0.670	0.946	
INN	0.853	0.921	0.838	-0.162	0.683	0.759	0.270	0.446	0.924

Source: Author's calculations.

We employed two criteria to ensure the constructs are empirically distinct. First, the cross-loadings were examined to confirm that each indicator loaded more heavily on its assigned construct than on others (Table 2). Second, we applied the Fornell and Larcker (1981) criterion,

which requires the square root of the AVE for each construct to be greater than its correlation with any other latent variable (Barclay et al., 1995). Our results met these conditions, supporting the model's discriminant validity (Table 3).

Before evaluating the structural model, we assessed the variance inflation factor (VIF) for all observed indicators to ensure that multicollinearity among the indicators did not bias the estimation of the latent constructs. The results confirm that all indicator VIF values are below the threshold of 5, indicating that multicollinearity is not a concern within the measurement model.

Following confirmation of measurement model reliability and validity, the structural (inner) model is assessed to test the hypothesized paths. In line with the established PLS-SEM guidelines (Barclay et al., 1995), a bootstrapping resampling procedure utilizing 5,000 subsamples is executed to generate t-statistics and evaluate the significance of the path coefficients.

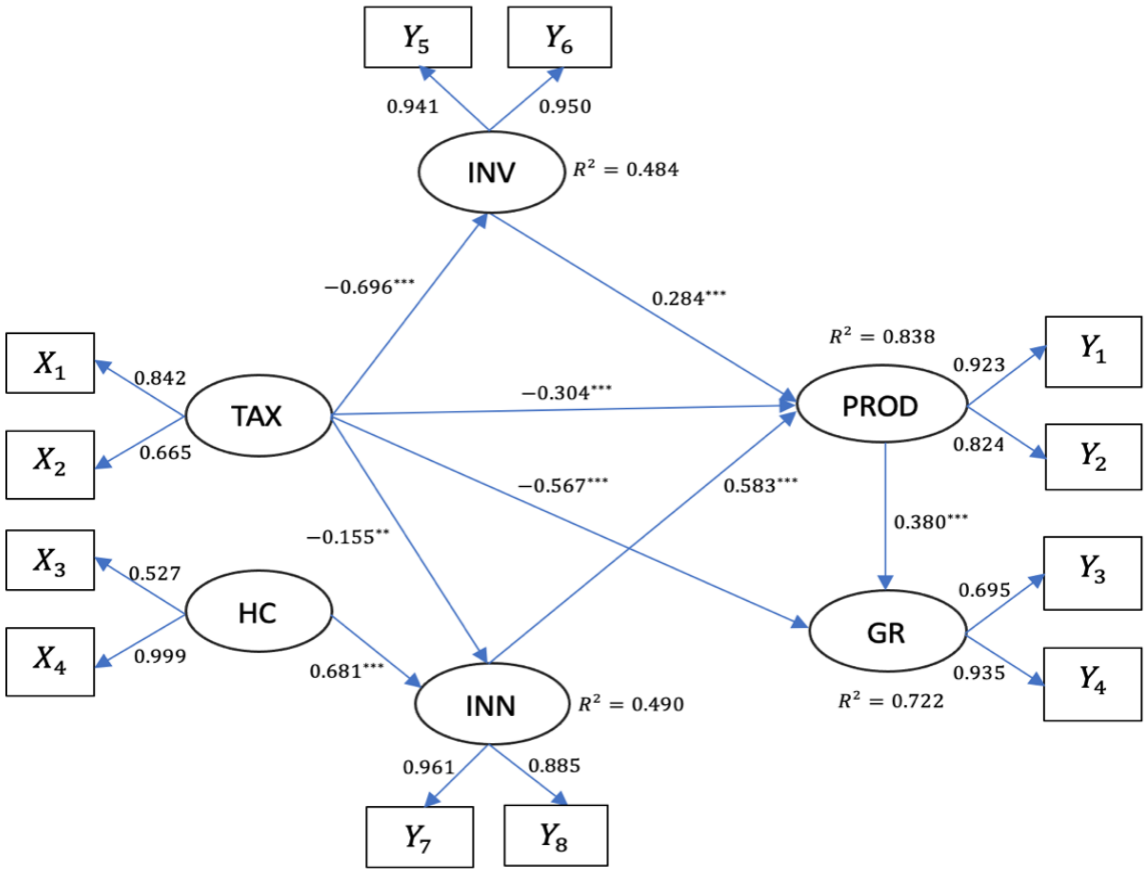


Figure 2. Structural model path coefficients and significance levels *** p < 0.01; ** p < 0.05.
Source: Author's elaboration.

The predictive capacity of the structural model is evaluated by the R^2 coefficients, which indicate the amount of variance in the endogenous constructs explained by the model. In our 10-province panel, the model exhibited substantial predictive power. The R^2 for productivity was 0.838, while aggregate growth yielded an R^2 of 0.722. These results indicate that our specified transmission mechanism—capturing the effects of tax policy, investment, innovation, and human capital—explains a substantial majority of the variance in provincial productivity and growth. This suggests that the latent constructs chosen for this study are highly relevant and effective drivers of the Canadian provincial economic landscape.

2. **Evaluation of the Structural Model**

Having established the validity and reliability of the constructs in the measurement model, we now evaluate the structural model within the structural equation modelling (SEM) framework (Table 4). This framework facilitates multi-stage transmission analysis, allowing us to decompose the impact of corporate tax policy into direct and mediated pathways.

We organize the evaluation around our theoretical transmission mechanism: first, we examine factor accumulation (H1 and H2) and identify how tax policy and human capital affect investment and innovation. Second, we analyze the productivity channel (H3), decomposing effects into mediated paths and direct tax-induced allocative distortions. Finally, we assess aggregate outcomes (H4), testing the influence of productivity and residual macro-fiscal drag on provincial economic growth.

2.1. Factor Accumulation: The Indirect Drivers (H1 & H2)

H1 is supported, as a restrictive corporate tax environment exhibits a significant negative effect on investment (β_1 = -0.696, $p < 0.01$). By increasing the user cost of capital, such unfavorable fiscal policies hinder aggregate capital formation. This inverse relationship is well documented in empirical literature, supported by both broad cross-country analyses (Djankov et al., 2010; Zwick & Mahon, 2017) and recent quasi-experimental studies demonstrating the high sensitivity of corporate investment to tax changes (Ohrn, 2018; Link et al., 2024). Within the Canadian context, our results align closely with the findings of Ferede and Dahlby (2012), confirming that regional capital flows are highly sensitive to inter-provincial fiscal variance. Crucially, this effect manifests through inter-provincial competition. As fiscal regimes diverge, jurisdictions with higher tax

burdens experience reduced capital inflows compared to their lower-tax counterparts, underscoring that regional economic competitiveness is inextricably linked to the corporate tax burden.

Table 4. Structural model estimates and hypothesis testing results

Structural Path	Path Coefficient (O)	Bootstrap Mean (M)	Bootstrap SD (STDEV)	*t*-value
TAX - > INV	-0.696***	-0.699	0.070	9.894
TAX - > INN	-0.155**	-0.164	0.073	2.108
HC - > INN	0.681***	0.700	0.051	13.291
INV - > PROD	0.284***	0.302	0.099	2.864
INN -> PROD	0.583***	0.577	0.055	10.698
TAX -> PROD	-0.304***	-0.291	0.086	3.535
PROD -> GR	0.380***	0.401	0.121	3.128
TAX -> GR	-0.567***	-0.549	0.115	4.944

Note: Significance levels are denoted as *** $p < 0.01$, ** $p < 0.05$. Coefficient of determination values: R^2 (INV) = 0.484, R^2 (INN) = 0.490, R^2 (PROD) = 0.838, R^2 (GR) = 0.722.
Source: Author's calculations.

H2a is likewise supported, with the data indicating that an unfavorable corporate tax environment generates a significant negative impact on innovation (β_2 = -0.155, p < 0.05). Given that innovation is a long-term investment sensitive to expected net returns, elevated tax burdens constrain the R&D liquidity necessary to sustain it (Bloom et al., 2002; Hall & Van Reenen, 2000). Our findings align with literature demonstrating that restrictive corporate tax pressures negatively affect both the volume and geography of innovative activity (Akcigit et al., 2022; Mukherjee et al., 2017). This evidence suggests that lower effective tax rates causally boost innovation by alleviating financial constraints and reducing resources diverted to avoidance activities. This relationship underscores the role of fiscal policy in shaping the region's technological ecosystem, suggesting that tax competitiveness is a prerequisite for fostering high-value economic clusters that drive long-term innovation and growth.

While tax policy determines the incentive to innovate, the capacity to innovate is rooted in the provincial stock of human capital. H2b is similarly confirmed, as human capital positively drives innovation (β_3 = 0.681, p < 0.01). This validates the "absorptive capacity" framework, in

which a skilled workforce is essential for technological assimilation (van Uden et al., 2017). It also supports the broader innovation and endogenous growth literature, which establishes that specialized talent and skill accumulation are critical determinants of research intensity and the successful transformation of resources into technological advancement (Ciriaci et al., 2016; McGuirk et al., 2015; Dostie, 2018; Liu et al., 2023). This highlights that the successful conversion of provincial resources into innovation rests largely on the quality of human capital, positioning workforce development as the cornerstone of any strategy aimed at long-term innovative resilience.

2.2. The Productivity Channel (H3a & H3b)

H3a is supported, as both investment (β_4= 0.284, p < 0.01) and innovation (β_5 = 0.583, p < 0.01) exert positive and significant effects on productivity. This confirms a dual transmission mechanism in which capital deepening and technological advancement serve as primary engines of productivity growth, a relationship consistently upheld by foundational research (Syverson, 2011) and endogenous growth frameworks that emphasize outward shifts in the technological production function (Aghion et al., 2015; Bloom et al., 2020). Beyond these foundational determinants, our results are consistent with recent literature showing that the efficiency of these transmission mechanisms is conditioned by firm-level heterogeneity, capital reallocation frictions, and market-driven misallocation (Choi et al., 2025). These findings indicate that the corporate tax environment indirectly hinders productivity by impeding the accumulation of the physical and technological assets needed to sustain provincial efficiency. They also emphasize that the realization of these gains depends on efficient resource allocation.

H3b is also supported, revealing a significant negative direct effect of corporate tax on productivity (β_6 = -0.304, p < 0.01). This reflects allocative distortions and “X-inefficiency” beyond the indirect impacts on capital and innovation. Empirical evidence confirms that tax shocks exert a distinct contractionary effect on aggregate productivity, while the need for tax planning diverts firms’ resources toward liability minimization rather than productive output (Gkikopoulos et al., 2025). Furthermore, high tax regimes stifle business dynamism by hindering the entry and reallocation of firms and create institutional barriers through their influence on organizational

incorporation and long-term innovative activity (Akcigit et al., 2022). Tax heterogeneity further exacerbates market frictions (Dahlby & Ferede, 2021) and distorts investment behavior by incentivizing firms to shift activity to sub-optimal locations to minimize tax burdens (Giroud & Rauh, 2019). Consequently, the tax environment functions as an independent barrier that structurally depresses provincial productivity.

H4a: The Growth Nexus (Productivity Path)

H4a is supported, as productivity significantly drives aggregate growth (β_7 = 0.380, p < 0.01). This aligns with Schumpeterian theory, in which creative destruction fuels expansion (Aghion et al., 2015). However, this engine faces headwinds as declining research productivity makes innovation increasingly costly (Bloom et al., 2020), while uneven technology diffusion contributes to regional income divergence (Comin & Mestieri, 2018). Moreover, structural frictions like capital misallocation can decouple productivity from output (Gopinath et al., 2017). Thus, while productivity is the primary engine of prosperity, its efficacy is contingent on innovative efficiency, technological integration, and the mitigation of allocative distortions.

H4b: The Direct Fiscal Drag Path

H4b is supported, revealing a significant negative direct effect of the corporate tax environment on aggregate growth (β_8 = -0.567, p < 0.01). This direct path captures the broader tax-induced headwinds associated with high rates, which deter investment, FDI, and entrepreneurial activity (Djankov et al., 2010). However, the fiscal relationship is structural. Beyond mere rate adjustments, targeted innovation supports can mitigate these growth-dampening effects. These findings align with the broader consensus that marginal tax rate adjustments—rather than shifts in average levels—exert the most significant influence on economic performance (Gemmell et al., 2014). Together with evidence from Ferede and Dahlby (2012) and Akcigit et al. (2022), these results confirm that the corporate tax burden creates systemic barriers to growth that operate independently of firm-level efficiency.

The structural model analysis demonstrates that corporate tax burdens influence provincial productivity through both unmediated channels and complex transmission

mechanisms (Table 5). Specifically, the direct impact of tax friction poses an immediate drag on economic efficiency. Beyond this direct pathway, mediated impacts operating through capital investment and innovation channels reveal a deeper mechanism: elevated tax rates dampen capital accumulation and R&D activity, thereby depressing output per worker. Ultimately, the cumulative impact—comprising both direct and mediated components—indicates that suppressing these investment and innovation vectors significantly magnifies the overall drag on provincial economic performance.

Table 5. Summary of direct, mediated, and overall path impacts

Structural Path	Direct Impact	Mediated Impact	Overall Impact
TAX - > INV	-0.696		-0.696
TAX - > INN	-0.155		-0.155
TAX -> PROD	-0.304	-0.288	-0.591
TAX -> GR	-0.567	-0.225	-0.791
HC - > INN	0.681		0.681
HC -> PROD		0.397	0.397
HC -> GR		0.151	0.151
INV - > PROD	0.284		0.284
INV -> GR		0.108	0.108
INN -> PROD	0.583		0.583
INN -> GR		0.222	0.22
PROD -> GR	0.380		0.380

Source: Author's calculations.

Conclusion

The empirical evidence presented herein establishes the corporate tax environment as a central driver of regional economic performance, closely linked to provincial productivity. These findings demonstrate that the tax burden serves as a fundamental determinant of economic efficiency and innovative capacity. By modeling these relationships, we have clarified how tax

policy functions not merely as a revenue instrument but as a critical lever influencing the core drivers of provincial prosperity.

To understand the broader macroeconomic implications of these findings, we analyzed the transmission of these effects into aggregate growth, mapping a multi-stage causal chain. The corporate tax burden shapes the economic landscape by impacting two essential inputs. We find that higher tax burdens constrain capital investment and suppress innovative activity—a process further shaped by the availability of human capital. These inputs—investment and innovation—act as primary determinants of labour productivity. Our analysis confirms that the tax environment significantly influences productivity, both indirectly through the accumulation channel and directly through tax-induced allocative distortions.

Although these findings establish a solid empirical foundation, their interpretation requires acknowledging inherent methodological boundaries. Spanning a 10-province panel covering the 2018–2023 timeframe, the dataset captures an era of unprecedented macroeconomic turbulence—characterized by pandemic disruptions and severe price volatility—that could subtly shift underlying structural trajectories. Moreover, while provincial-level aggregation remains adequate for isolating overarching policy instruments, it potentially conceals significant sub-regional disparities. Lastly, despite the model successfully incorporating core transmission channels grounded in endogenous growth theory, omitted external dynamics, such as inter-provincial migration or federal fiscal transfers, serve as exogenous shocks that can independently shape regional economic paths.

Nevertheless, this study provides empirical evidence that the tax structure is central to provincial competitiveness. Ultimately, productivity gains drive long-term economic expansion, and the data reveal that the tax burden affects growth in two ways. It operates indirectly by hindering the productivity-enhancing mechanisms of investment and innovation, and it exerts direct negative pressure on economic output via allocative inefficiencies.

In summary, policymakers seeking to enhance long-term prosperity must prioritize mitigating tax-induced distortions. By reducing the complexity and intensity of corporate tax burdens, provinces can lower investment costs, foster a more innovative business environment, and support the productivity gains necessary for robust, sustainable economic growth.

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The authors used Copilot for grammatical correction and language enhancement of the manuscript. The draft was carefully reviewed by the authors, and they take full responsibility for what is presented in the paper.

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