Private or Public Ownership? A Balancing Act

1 Introduction

This essay begins by summarizing key theoretical arguments and academic literature comparing the various ownership models. It then focuses on the role of government intervention and regulation in shaping a broad set of economic, social, and environmental outcomes. To examine these dynamics empirically, I designed a large-scale, longitudinal study spanning approximately 50 countries and a dozen industries per country, covering a 40-year period.

2 Theoretical Framework and Literature Review

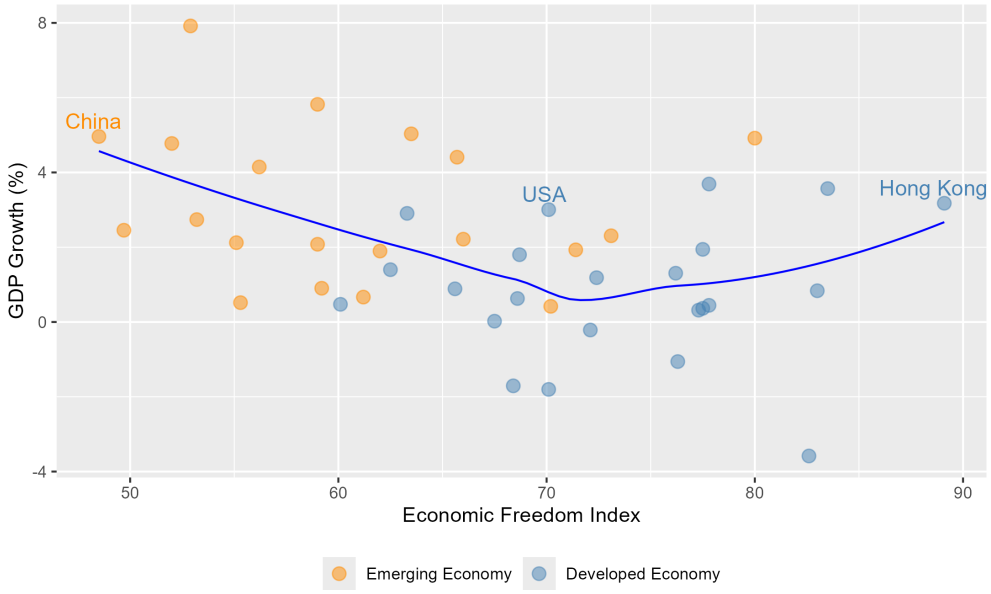
The pursuit of profit encourages both positive and negative behaviors. Classical corporate finance theory claims that the ultimate goal of private enterprises is to maximize shareholders' value.[1] Profit-seeking drives efficiency,[2] encourages entrepreneurial spirit, promotes rapid responsiveness to consumer demand and technological transformation,[3] and fosters competitive behavior and market discipline. On the other hand, it may also lead to short-termism and excessive risk-taking, as well as ethical, social, and environmental neglect.[4]

In addition to private ownership, firms can also be owned and operated by charities and government organizations, which often prioritize social and other objectives over financial gains. These entities typically focus on community services, health, education, or infrastructure. The absence of profit pressure may enable a long-term perspective, prioritizing sustainability, social equality, and future welfare.[5] On the negative side, these organizations are often criticized for their bureaucracy, inefficiency, and lack of innovation. Governments and charitable organizations can also suffer from political interference, leading to resource misallocation, favoritism, or corruption, which undermines economic efficiency and public welfare.[6]

The actual relationship between ownership model and economic efficiency and social sustainability, however, is often complex. For instance, Figure 1 plots the relationship between the Economic Freedom Index[7] and GDP growth across 47 countries in the MSCI All Country

World Index as of year-end 2024. The results reveal a U-shaped nonlinear pattern, suggesting that both extremely low and very high levels of economic freedom may be associated with stronger economic performance.[8]

Figure 1: Economic Freedom vs GDP Growth, 2024



3 Empirical Research Methodology

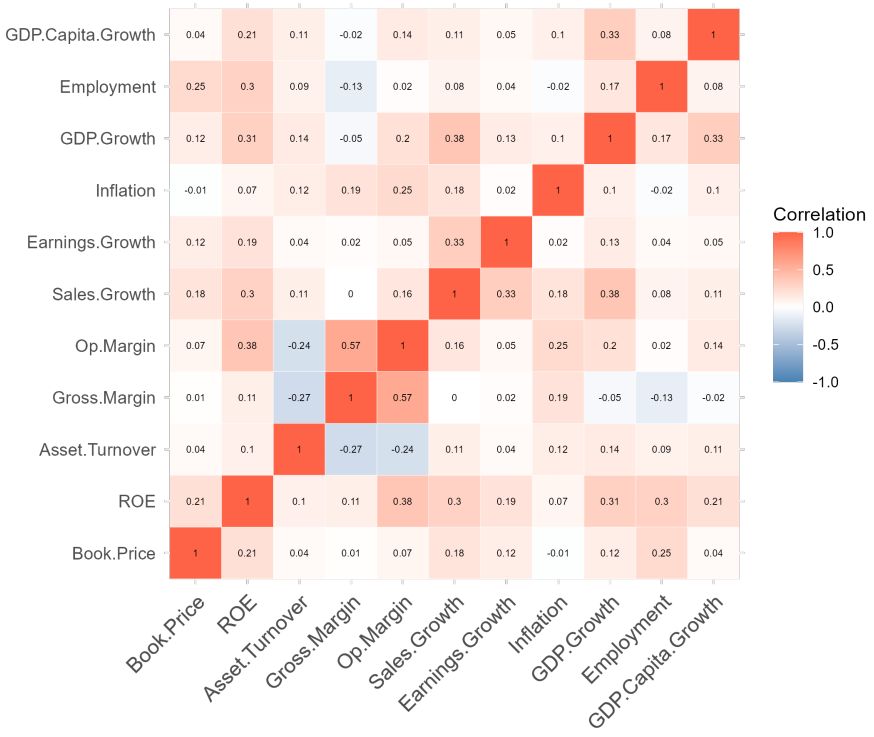
In this section, I present original empirical research on the relationship between government participation and regulation, and their effects on economic efficiency and broader social and environmental outcomes. This study contributes to the existing literature along several dimensions:

- **Cross-country analysis.** The study begins with an extensive panel of over 40 countries from the MSCI All Country World Index, examining a broad set of economic and sustainability performance metrics alongside multiple proxies for government participation.
- **Industry-level analysis.** Within each major region (e.g., the US, Europe, China), I conduct comparative analyses between regulated and non-regulated industries to assess the sector-specific effects of government involvement.
- **Causal inference using advanced econometrics.** To identify potential causal relationships, the analysis employs a suite of econometric techniques, including fixed-effects dynamic panel regression and Bayesian Vector Autoregressive (BVAR) models.

3.1 Data

Economic Prosperity metrics (Figure 2)[9] are organized into two sub-categories: top-down macroeconomic indicators (GDP growth, GDP/GNP per capita, inflation, and employment) and bottom-up aggregated firm-level performance measures [10] (profitability expressed as gross margin, operating margin,[11] asset turnover,[12] return on equity[13], revenue and earnings growth[14], and book-to-market valuation[15]).

Figure 2: Correlation Matrix: Economic Efficiency Metrics



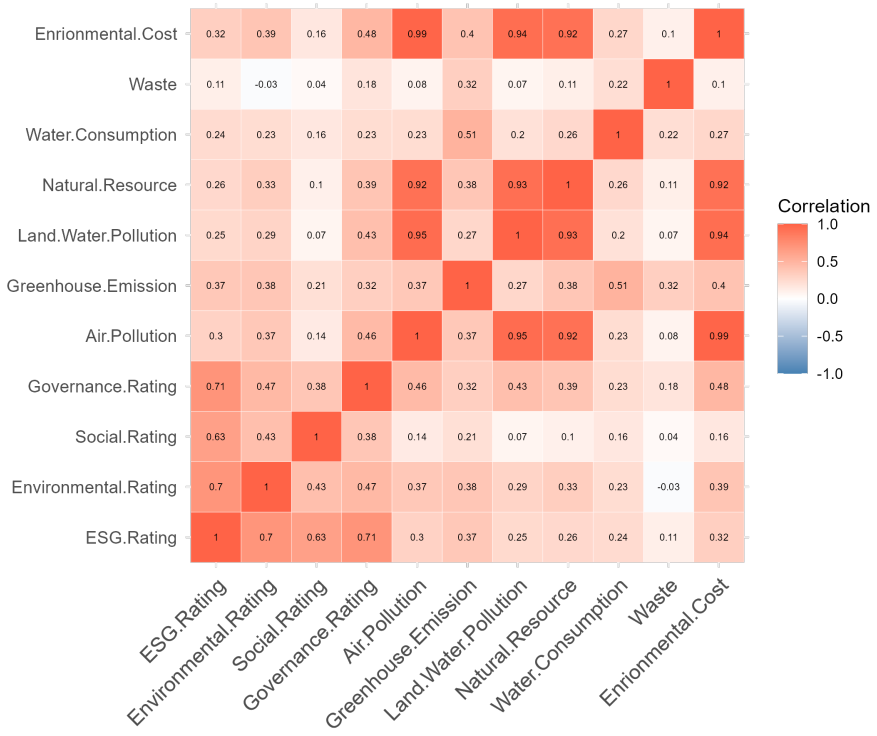
Technological innovation is measured using two complementary indicators. First, I assess the growth in patent output, defined as the percentage increase in the number of patents granted.[16] Second, I evaluated the change in the relative importance of patents using a citation-based network approach.[17]

Environmental and Social Sustainability is evaluated using three distinct data sources: country/industry ESG Rating and the three underlying pillars (environmental, social, and governance)[18], pollution and environmental costs (such as air pollution, greenhouse gas (GHG) emissions, land and water contamination, natural resource depletion, water consumption, and waste generation)[19], and UN Human Development Index as a broad measure of social development.

As illustrated in Figure 3, the various environmental metrics exhibit moderate corre-

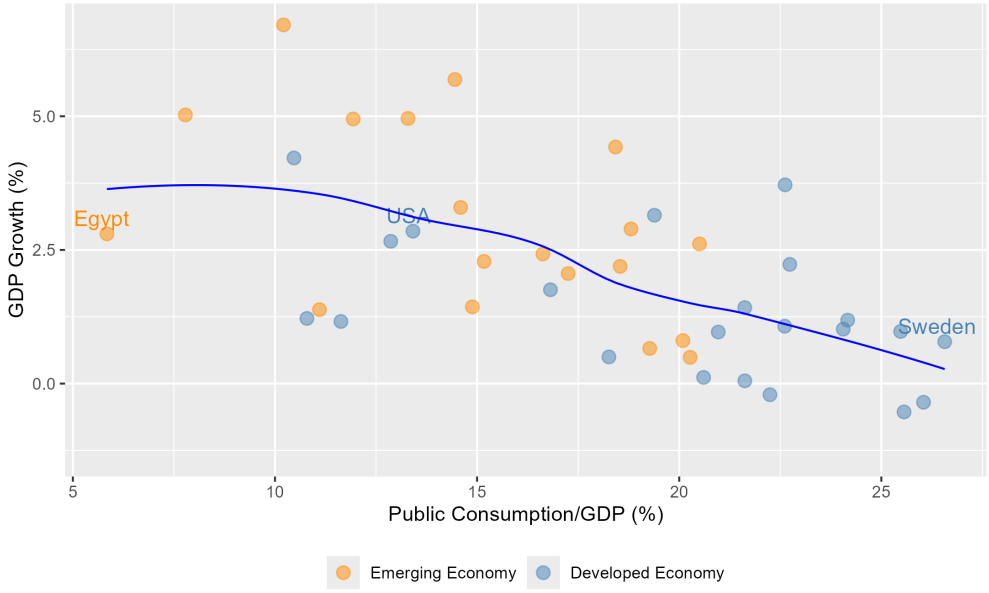
lations with one another, whereas the social and corporate governance dimensions appear relatively orthogonal, indicating limited overlap in underlying constructs.

Figure 3: Correlation Matrix: Environmental and Social Sustainability Metrics



Government Intervention is proxied by the ratio of public consumption expenditure to total GDP.[20] As an example, Figure 4 plots government consumption as a percentage of GDP against GDP growth for 47 countries in the MSCI All Country World Index as of Q1/2025. For this specific period, the data suggests a negative relationship between public sector size and economic growth.[21]

Figure 4: Government Consumption/GDP vs GDP Growth, Q1/2025



3.2 Empirical Techniques

Empirically assessing the relationship between government intervention and economic or sustainability outcomes presents methodological challenges. Both sets of variables are influenced by numerous confounding factors——such as institutional quality, cultural norms, and regional economic conditions, which evolve over time.

3.2.1 Cross Country Analysis

To address these complexities, this study starts from a series of fixed effect dynamic panel data regressions. At the country level, I examine the relationship between government intervention and various measures of economic and sustainability performance with the following framework:[22]

- The **dependent variables** are the various economic and sustainability performance metrics.
- The **main explanatory variable** is the size of government intervention, proxied by government consumption as a share of GDP.
- To control for unobserved heterogeneity across countries and over time, I include both **country fixed effects** and **time fixed effects**.

- Despite including fixed effects, I observe significant **serial correlation** in the residuals. Accordingly, I employ a **dynamic panel specification** by including the lagged dependent variable.[23]

- To ensure **robust statistical inference**, I account for serial correlation and heteroskedasticity by using **Newey-West standard errors** when computing test statistics.[24]

$$p_{i,t} = \beta_0 + \beta_1 Gov_{i,t} + \beta_2 p_{i,t-1} + \lambda_i + \delta_t + \varepsilon_{i,t}$$

Where, $p_{i,t}$ is the economic or sustainability metric for country i in period t; β_0 is the intercept; β_1 captures the marginal effect of government intervention on performance; $Gov_{i,t}$ is the government intervention proxy (i.e., government consumption as a percentage of GDP); β_2 is the coefficient of the lagged dependent variable, $p_{i,t-1}$, included to account for dynamic persistence; λ_i denotes unobserved, time-invariant country-specific fixed effects; δ_t represents common shocks or trends affecting all countries in period t (time fixed effects); and $\varepsilon_{i,t}$ is the idiosyncratic error term.

3.2.2 Industry-Level Analysis

The industry-level analysis mirrors the country-level framework, with one key distinction: the primary explanatory variable is a binary indicator denoting whether an industry is regulated or significantly owned by the government. For classification purposes, I define the following industries as regulated or substantially influenced by government ownership: Aerospace & Defense, Transportation, Biopharmaceuticals, Financials, Telecommunications Services, and Utilities.[25] In contrast, the following sectors are treated as non-regulated: Energy, Materials, Consumer Discretionary, Consumer Staples, Information Technology, and Real Estate.[26]

3.2.3 Robustness Test

As a robustness check, I estimate an alternative specification using a Bayesian Vector Autoregressive (BVAR) framework:

$$\boldsymbol{y_t} = \boldsymbol{A_1 y_{t-1}} + \cdots + \boldsymbol{A_p y_{t-p}} + \beta_0 + \boldsymbol{\varepsilon_t}$$

Where, $\boldsymbol{y_t}$ is a $K \times 1$ vector of endogenous variables at time t; β_0 is $K \times 1$ vector of intercept terms; $\boldsymbol{A_1} \cdots \boldsymbol{A_p}$ are $K \times K$ coefficient matrices corresponding to lags 1 through p; and $\boldsymbol{\varepsilon_t}$ is a $K \times 1$ vector of error terms.

The BVAR framework complements panel regression by enabling an exploration of the dynamic effects of government intervention within a country, by treating all variables as endogenous and allowing for mutual interactions effects between government intervention and sustainability metrics. This approach more closely approximates the complexity of real-world economic systems and accommodates additional macroeconomic controls such as inflation and unemployment.[27]

4 Main Findings

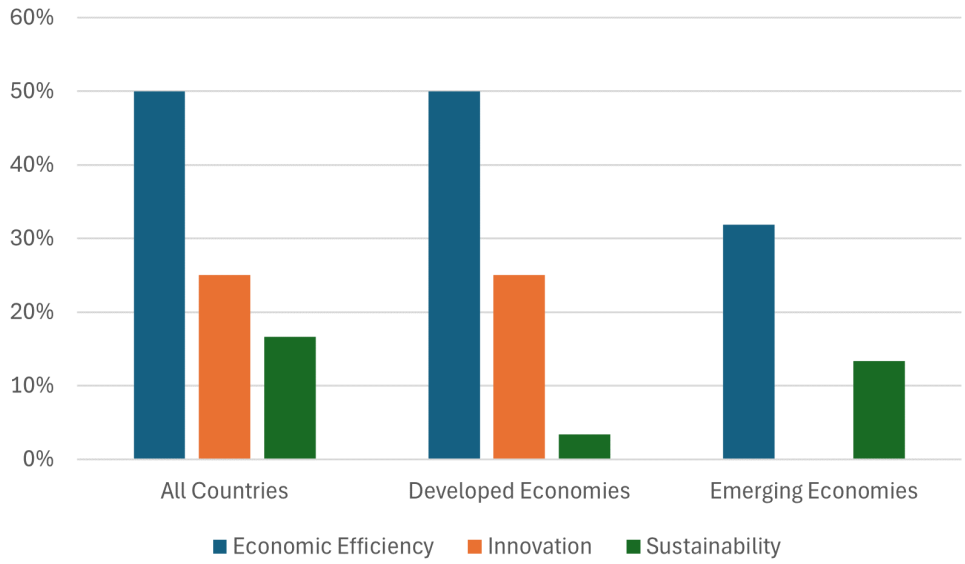
This section presents the main findings, organized into three parts: a cross-country analysis, an industry-level comparison within each major geographic region, and a set of robustness checks based on the BVAR model.

4.1 Cross-Country Analysis

The cross-country analysis is conducted across three samples: full sample (all 40+ countries), as well as developed countries and emerging economies, separately, to account for potential heterogeneity.

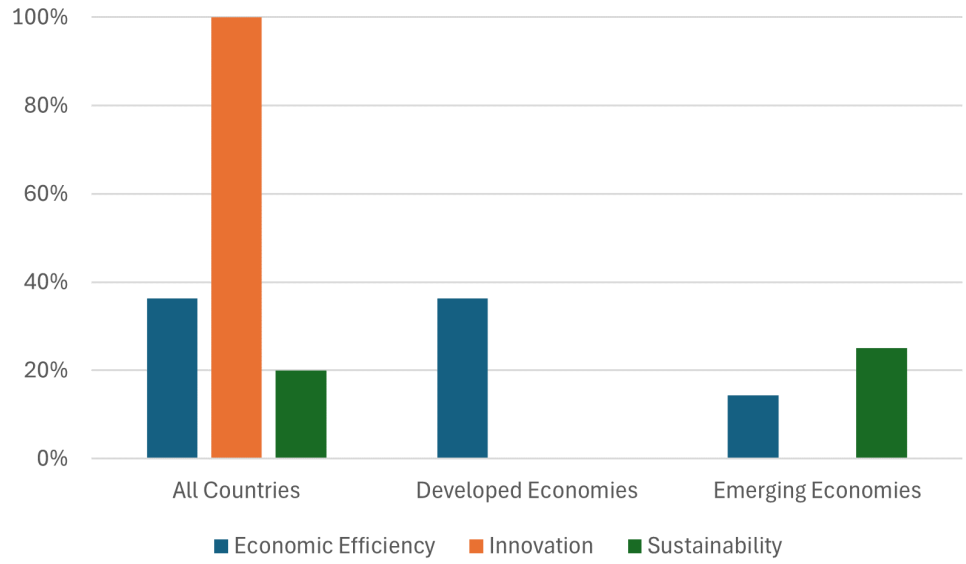
As shown in Figure 5, government intervention exhibits a substantial influence on economic efficiency. For the full sample and among developed economies, approximately half of the economic efficiency indicators are statistically significant. The effect is weaker in emerging markets. In contrast, only one of the four innovation proxies shows statistical significance. The overall impact on environmental and social sustainability is also limited, particularly among developed countries.

Figure 5: Percentage of Statistically Significant Relationships



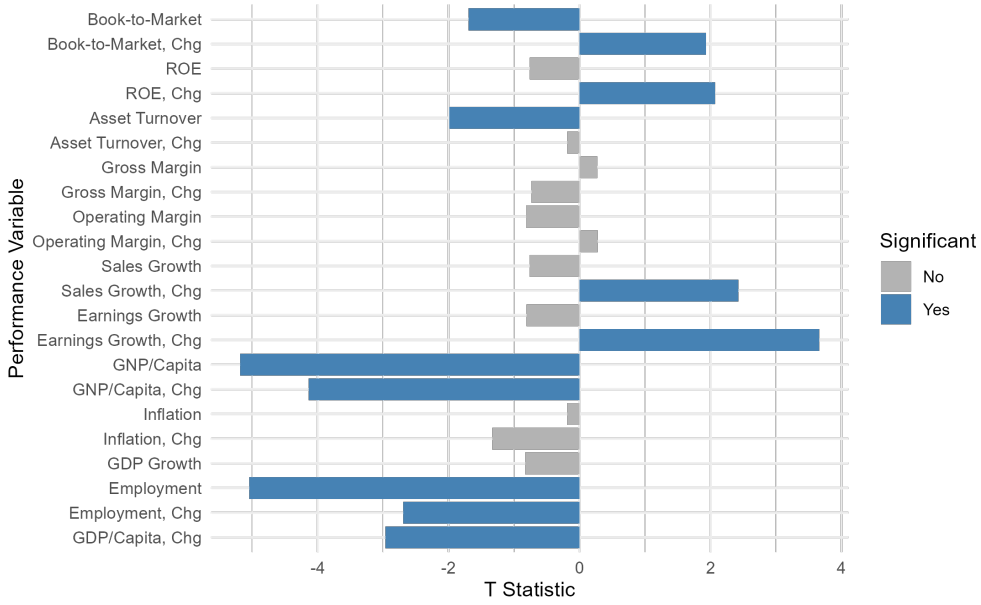
Among all statistically significant relationships, government intervention is consistently associated with negative effects on economic efficiency, innovation, and sustainability (Figure 6), with the majority of estimated coefficients being negative. On balance, the empirical evidence supports the presence of a "crowding out" effect.[28] The prominent positive bar for innovation in the all-country sample reflects a small denominator bias——only one innovation variable is statistically significant, and it happens to be positive. The negative effect of government size on output growth appears more pronounced in emerging economies, which typically exhibit weaker institutional quality.[29]

Figure 6: Percentage of Positive Relationships



Among economic efficiency metrics, the adverse impacts are particularly evident in indicators such as GDP per capita, unemployment, firm profitability, and valuation (Figure 7).[30] In contrast, the relationship between government spending and innovation is more mixed and lacks a consistent pattern.

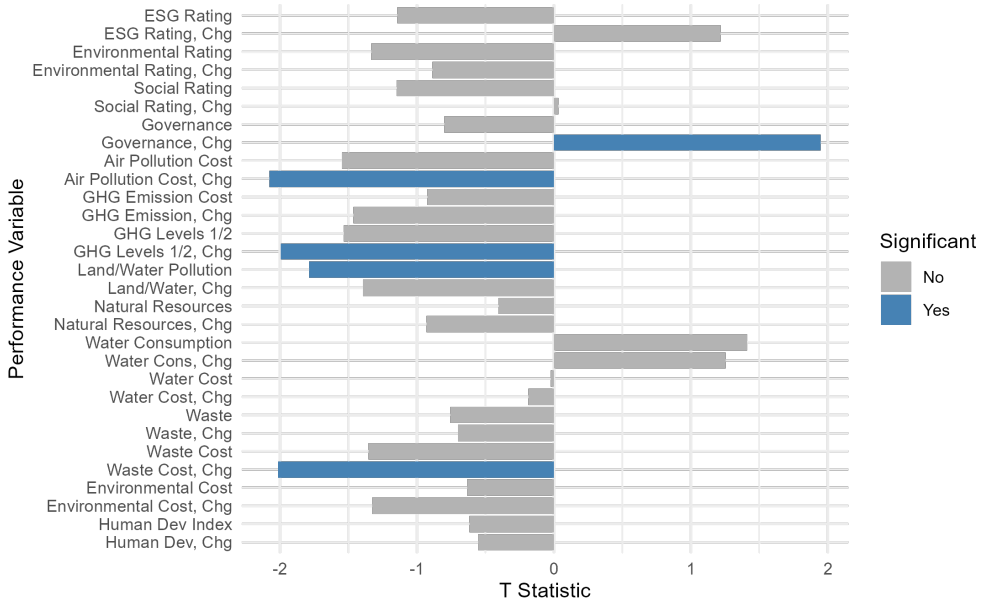
Figure 7: The Impact of Government Intervention on Economic Efficiency



Within sustainability, the main effects of government involvement are also negative. As

noted by López, Galinato, and Islam (2011), increases in total government spending alone—absent from structural reform—may be insufficient to improve environmental outcomes.

Figure 8: The Impact of Government Intervention on Environmental and Social Sustainability



4.2 Industry-Level Analysis

Statistically, there is no systematic difference between regulated and non-regulated industries in the US and Canada across all three dimensions (Table 1). In Europe and Asia, the effects of government regulation are similarly modest, except for a more pronounced positive impact on sustainability in China.[31]

Table 1: Statistically Significant Differences between Regulated vs Non-Regulated Industries

	US	Canada	Europe	Asia-ex-Japan	China
Economic Efficiency	0%	0%	7%	21%	0%
Innovation	0%	NA	0%	NA	NA
Sustainability	0%	0%	11%	25%	55%

More importantly, there is limited empirical evidence to suggest that government regulation adversely affects economic efficiency or sustainability within a given geographic region (see Table 2). In fact, regulated industries tend to exhibit higher profitability in Europe and Asia, which may reflect the rationale for their regulation. The positive environmental impacts observed across all three regions are also encouraging.

Table 2: Percentage of Positive Impact from Regulated Industries

	US	Canada	Europe	Asia-ex-Japan	China
Economic Efficiency	NA	NA	100%	67%	0%
Innovation	NA	NA	NA	NA	NA
Sustainability	NA	NA	100%	100%	100%

4.3 Robustness Test

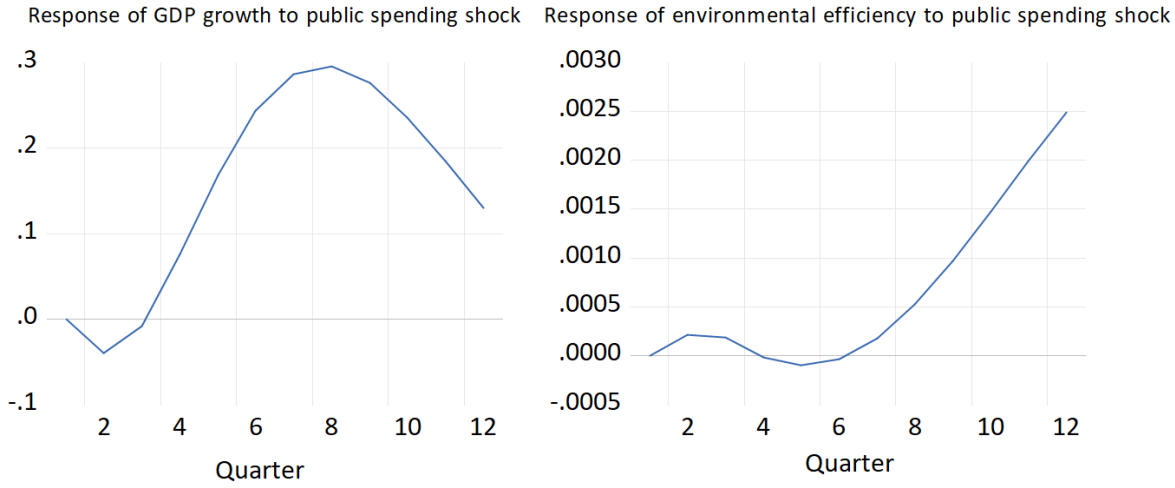
Lastly, Table 3 reports the results from a five-variable BVAR model comprising public spending/GDP, GDP growth, environmental efficiency[32], inflation, and employment in the UK. The cumulative effect suggests public spending indeed boosted both economic growth and environmental sustainability in the UK over the past two decades.

Table 3: BVAR Model: Impact of Public Spending Shock to GDP Growth and Environmental Efficiency, UK

Bayesian VAR Estimates		
Sample:	Q1/2003 to Q1/2025	
Prior type: Litterman / Minnesota		
	GDP Growth	Environmental
Public Spending/GDP, Lag 1	-22.6	0.12
Public Spending/GDP, Lag 2	44.8	-0.22
Public Spending/GDP, Lag 3	23.8	-0.16
Other Control Variables		
GPD Growth		
Inflation		
Unemployment		
R-squared	0.97	

A key advantage of the BVAR framework is the impulse response function, which traces the dynamic effects of a one-time shock—in this case, to public spending—on the current and future values of all variables in the system. As shown in Figure 9, fiscal stimulus appears to support both economic growth[33] and environmental efficiency,[34] though with differing time horizons.

Figure 9: Impact of Public Spending Shock to GDP Growth and Environmental Efficiency, UK



5 Limitations and Counterarguments

Several methodological caveats are worth highlighting. Government intervention, economic efficiency, and environmental sustainability indicators are subject to measurement error, and proxy selection can bias results. The analysis relies on linear specifications that may obscure nonlinear or threshold effects.[35] Endogeneity and omitted-variable bias——especially the feedback between government spending and economic performance——remain difficult to eliminate entirely. Structural heterogeneity, including regime shifts such as transitions from command to market economies, further complicates inference.

This study's scope is confined to public spending and selected economic, social, and environmental metrics. It does not examine alternative policy instruments (e.g., taxation, state ownership) or the composition of government spending (e.g., allocations to health, education, or defense). Moreover, the role of charitable and non-profit organizations—especially influential in developing economies—is excluded, limiting the broader applicability of the findings.

6 Conclusion

This study offers a data-driven analysis of the relationship between government size and sustainability. Cross-country evidence points to a "crowding-out" effect——larger public sectors often reduce economic efficiency without reliably improving environmental or social out-

comes. However, in regions with strong institutional quality (e.g., Europe, developed Asia), regulation can enhance sustainability without undermining efficiency.

Private ownership tends to foster innovation and growth but may neglect broader societal goals. Public ownership ensures access and stability, though often at the cost of efficiency. These trade-offs highlight the need for a tailored approach to ownership models across sectors.

Policy implications are clear: public spending alone is insufficient. Effective outcomes require strong institutions, reduced bureaucratic friction, and well-designed policies. Balancing private sector dynamism with public oversight—and fostering accountable non-profit actors—can help align growth with equity and sustainability. Future work should deepen exploration of how ownership structures and institutional contexts jointly shape long-term performance.

Notes

1. This concept is formally known as "value maximization" (Jensen and Meckling (1979)). Jensen later expanded his idea to "enlightened value maximization", where the interests of all stakeholders are considered while still prioritizing the maximization of long-term firm value (see Jensen (2002)

2. Numerous studies showed that when state companies were privatized, their profitability and productivity often improved significantly (Nellis (1999)).

3. Empirical research generally found higher innovative output in privately-owned enterprises compared to SOEs in many contexts (Szarzec, Dombi, and Matuszak (2021))

4. For instance, Lino et al. (2022) found private firms lag behind state-affiliated firms in environmental engagement on average.

5. A global study of firms in 44 countries found that companies with state ownership tend to engage more in emission reductions and eco-innovation, and actually have lower CO_2 emissions on average than fully private firms (Hsu, Liang, and Matos (2020)).

6. For instance, the Soviet Union's experience was characterized by stagnation, corruption (Clark and Wildavsky (1990)) and chronic shortages of consumer goods (Goldberg (1999)), largely due to bureaucratic inefficiencies and misallocation of resources (Hu and Khan (1997)).

7. Data is sourced from the Heritage Foundation.

8. We also noted that emerging economies were generally ranked lower than developed countries by the Economic Freedom Index, but produced higher GDP growth. Furthermore, this observation was based on a single time period; therefore should not be overinterpreted. A more rigorous econometric analysis will be presented in subsequent sections.

9. The various economic efficiency variables are not overly correlated. Therefore, they provide a balanced and comprehensive view.

10. To evaluate the economic performance of private firms within each country and industry, I

constructed aggregate indicators based on constituents of the relevant MSCI indices. MSCI is a leading global index provider whose country and industry indices include the largest publicly traded companies, representing the majority of market capitalization in each market.

11. Gross margin is defined as the ratio of gross profit—revenue minus cost of goods sold—to total revenue: $Gross\ Margin = \frac{Revenue-COGS}{Revenue}$. Operating margin excludes both COGS and SG&A costs: $OperatingMargin = \frac{Revenue-COGS-SG\&A}{Revenue}$. (Wahlen, Baginski, and Bradshaw 2011) offers a comprehensive overview of these accounting metrics

12. $\frac{Revenue}{TotalAssets}$

13. $ROE = \frac{NetIncome}{Shareholders'Equity}$

14. year-over-year change in total revenue and year-over-year change in earnings per share (EPS)

15. The book-to-market ratio is calculated as the ratio of book value to market value of equity.

16. Patent data were sourced from the United States Patent and Trademark Office (USPTO).

17. To assess patent importance, I constructed a citation network in which each company's patents were both cited by others (inward citations) and cited others' patents (outward citations). Patent importance was then quantified using the PageRank algorithm, as introduced by Brin and Page (1998).

18. ESG considerations have gained prominence in global investment analysis. I computed the aggregate country/industry overall ESG rating, as well as each of the three pillars (i.e., environmental, social, and governance), using company-level ESG data. While MSCI's headline ESG scores are normalized within industries, I applied the unadjusted ratings to better examine cross-industry differences, particularly between regulated and non-regulated sectors.

19. Environmental data was sourced from S&P Trucost. For most categories, I computed both physical quantities (e.g., metric tons of GHG emissions) and their impact costs. All metrics were normalized by firm revenue to reflect environmental intensity per dollar of output.

20. As a reminder, $GDP = C + I + G + (X - M)$, where C is consumer spending, I represents business investment, G means government spending, and lastly, net exports equal to (exports X - imports M).

21. This observation is based on a single time period; therefore should not be overinterpreted. A more rigorous econometric analysis follows in subsequent sections.

22. I also estimated alternative specifications that incorporate additional controls, such as employment, inflation, and monetary and fiscal policy indicators. In addition, I tested alternative measures of government intervention, such as economic freedom index and business freedom index. Results are qualitatively similar and omitted here for brevity.

23. Arellano and Bond (1991)

24. Newey and West (1987)

25. Industry classification is based on the Global Industry Classification Standard (GICS), jointly developed by S&P and MSCI. The corresponding GICS codes are: 20101010, 2030, 3520, 40, 5010, and 55.

26. GICS codes for these sectors are: 10, 15, 20, 25, 45, and 60.

27. A key challenge in traditional VAR models is the selection of the optimal lag order, typically guided by information criteria. However, existing literature cautions that information criteria may yield suboptimal results depending on the chosen loss function (Vrieze 2012) and the sample size (Sant'Anna et al. 2021). In this study, the lag order was set to three based on the Bayesian Information Criterion (BIC). To address the risk of over-parameterization, I employed Bayesian shrinkage using the Litterman prior (Litterman (1979), Doan, Litterman, and Sims (1984), and Sims (1989)).

28. The "crowding out" effect refers to a situation in which elevated levels of government consumption or public sector activity displace or suppress private sector investment and production. When government expenditures expand significantly——particularly through resource-intensive activities such as labor, capital, or credit——they can compete directly with the private sector for scarce economic resources. This competition may lead to higher input costs, reduced availability of capital for private enterprises, and diminished incentives for private investment. As a result, the allocative efficiency of the economy may decline, with the private sector's contribution to innovation, productivity, and growth potentially undermined. In macroeconomic theory, this phenomenon is often cited as a risk associated with sustained fiscal expansion, particularly in economies operating near full capacity.

29. Khan, Raza, and Vo (2024) reported similar findings. Mitchell (2005) offered an alternative explanation, the "negative multiplier effect": government spending can finance distortive interventions that reduce economic activity. For example, regulatory agencies may operate with limited budgets yet impose substantial costs on the productive sector.

30. Due to the differing scales of the economic efficiency metrics, t-statistics were plotted rather than raw panel regression coefficients.

31. In recent years, the Chinese government implemented a series of proactive environmental policies and achieved more success than many other emerging economies, as detailed in Ding and Lee (2024), Zheng et al. (2022), and Zhang and Du (2019).

32. To proxy environmental efficiency, I first computed the ratio of environmental impact cost over revenue. Next, the country-level environmental efficiency was calculated as the weighted average of all public companies within that country, at each point-in-time

33. While the initial impact on GDP growth is slightly negative, it turns positive within a few quarters and peaks around the sixth to seventh quarter.

34. The environmental benefits emerge with a longer lag, typically exceeding one year.

35. Introducing nonlinearities is feasible but would raise dimensionality and heighten overfitting risk.

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