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Article

Safeguarding Economic Growth Amid Democratic Backsliding: The Primacy of Institutions over Innovation

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Abstract

This paper investigates how democracy influences economic growth through innovation and institutional quality. Using an augmented Solow growth model and panel-data mediation analysis across 123 countries (2011–2022), we quantify democracy's impact on GDP per capita. Our results show that institutional quality accounts for 83.3% of democracy's total effect on economic output, while innovation explains only 16.7%. This study contributes to the literature by distinguishing between institutional and innovation channels in the democracy–growth nexus and provides policy-relevant insights for promoting inclusive economic growth (SDG 8) and building resilient infrastructure and innovation (SDG 9).

Keywords: democratic institutions; innovation; economic growth; mediation analysis; democratic backsliding

1. Introduction

In recent years, global democracy has faced considerable challenges, with democratic institutions eroding in both emerging and established democracies ([Economist Intelligence Unit, 2023](#); [Freedom House, 2024](#)). This trend, often driven by the rise of populist leaders and the weakening of institutional checks and balances ([Mounk, 2018](#)), has raised growing concerns among scholars and policymakers about its economic ramifications. A well-documented body of research has linked democratic governance to stronger institutions, such as the rule of law, protection of property rights, and political accountability, that underpin long-term economic growth ([Acemoglu et al., 2019](#); [North, 1990](#)). However, while the link between democracy and economic growth is well established, the relative roles of institutional quality and innovation in driving such growth remain understudied. This study argues that, in the context of democratic backsliding, attempting to offset the erosion of democratic institutions by merely increasing national investment in innovation would be insufficient. Strengthening democratic institutions remains the primary mechanism for sustaining long-term economic growth. From a policy perspective, this distinction is not merely academic: identifying which channel matters more has direct implications for reform strategies aimed at safeguarding growth under democratic decline. Yet, few empirical studies have quantified these channels or provided guidance on their policy relevance in times of democratic backsliding.

This study addresses this empirical and policy gap by quantifying the economic impact of democracy through two distinct mechanisms: an indirect channel, whereby democracy fosters innovation that enhances total factor productivity (TFP), and a direct channel, in which democracy strengthens institutional quality and thus promotes growth independently of innovation. To capture these dynamics, we developed an augmented



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Solow growth model and applied a fixed-effects mediation framework to panel data from 123 countries (2011–2022). The analysis reveals that while democracy enhances both innovation and institutions, most of its growth impact, approximately 83.3%, operates through institutional quality, with only 16.7% mediated by innovation. These findings carry direct policy implications: they suggest that in the face of democratic erosion, preserving institutional integrity is more consequential for economic performance than innovation-focused interventions. Investment in innovation, while valuable, cannot substitute for the erosion of democratic institutions.

1.1. Democracy, Institutions, and Economic Growth: A Review

The relationship between democracy and economic growth has been the subject of extensive academic and policy-oriented research. Recent democratic backsliding across both developed and developing nations has renewed the urgency of understanding the mechanisms through which political regimes shape economic outcomes (*Financial Times*, 2024; Grzymala-Busse et al., 2020). Scholars have long emphasized that democratic institutions, through transparency, legal stability, and political accountability, create a governance environment. This environment supports secure investment, reduces uncertainty, and enables sustained market development (Acemoglu & Robinson, 2019; Tang & Tang, 2018). At the same time, democracies tend to invest more in public goods such as education, health, and research infrastructure, which contribute to human capital accumulation and long-term productivity (Barro, 1996; Rodrik, 1999). These benefits are further complemented by redistributive mechanisms and broader access to services, which enhance economic inclusion and resilience (Tavares & Wacziarg, 2001). Taken together, the institutional and developmental channels form the foundation of the theoretical link between democratic governance and economic performance.

At the core of these processes lies the institutional channel. High-quality institutions, particularly the rule of law, judicial independence, and the protection of property rights, have been shown to directly enhance economic performance by supporting private investment, reducing transaction costs, and improving the credibility of governance frameworks (Acemoglu et al., 2001; North, 1990). Scholars have also associated democracy with elevated levels of innovation, arguing that it provides a regulatory environment conducive to competition, robust intellectual property protection, and entrepreneurial activity (Acemoglu & Robinson, 2012; Aghion et al., 2021). Democratic systems tend to channel substantial resources into education and cultivate an environment that supports technological progress (Hanushek & Woessmann, 2020; Rodrik, 2000). Empirical evidence indicates that nations under democratic governance promote innovation through increased investment in research and development, bolstering their economic competitiveness over extended periods (Acemoglu et al., 2019). In addition to innovation, the economic effects of democracy are also conditioned by broader institutional arrangements. Jin Yi (2012), for example, shows that in contexts of high-income inequality, democratic tax systems tend to foster greater public demand for political accountability. This highlights how democratic settings can amplify the effectiveness of fiscal institutions and reinforce the institutional channels through which democracy contributes to economic performance. However, numerous studies have overlooked the mediating role of innovation in the democracy-growth relationship, limiting their ability to fully capture the channels through which political institutions shape economic outcomes. Our study addresses this gap by examining how democracy may influence economic performance through two distinct channels: institutional quality and innovation. To operationalize this distinction, we employ a panel-data mediation framework that enables clear identification of these mechanisms and assesses their relative policy relevance.

1.2. *The Global Decline in Democracy: Trends and Economic Implications*

Democracy metrics have been dropping worldwide over the last two decades, with 72% of the world's population residing in autocracies as of 2023, fueled by compromised electoral integrity, rule of law, and civil liberties (V-Dem Institute, 2024). The phenomenon of democratic backsliding has drawn the attention of both scholars and policymakers, leading them to question whether institutional norms are eroding. As Levitsky and Ziblatt argue, such backsliding is often sparked by the emergence of elected leaders who weaken democratic norms and institutional checks and balances. These leaders tend to exploit pre-existing levels of social polarization, as seen in countries such as Hungary and Turkey. (Levitsky & Ziblatt, 2018). This is not limited to emerging democracies. In the United States, events such as the Capitol riot on 6 January 2021 highlighted threats to democratic institutions, while in Israel, efforts to reform the judicial system and expand executive authority have raised public concerns about democratic erosion (The Economist, 2023). These developments have contributed to renewed debates over the economic and institutional consequences of weakening democratic governance. The global decline in democracy is further compounded by external pressures such as the growing influence of authoritarian regimes and the spread of disinformation, which erode public trust in democratic governance (Diamond, 2019). The deterioration of democratic institutions is frequently accompanied by the erosion of property rights and the independence of the judiciary and the resultant rise in corruption, which collectively impede the stability of institutions necessary for successful and long-lasting economic development (Acemoglu et al., 2019; Haggard & Tiede, 2011). Moreover, democratic decline often disrupts institutional frameworks that support innovation, such as intellectual property protection and competitive markets, further exacerbating the economic consequences of backsliding. The suppression of free media and academic freedom in backsliding democracies can limit knowledge dissemination and scientific inquiry, which are the key drivers of economic progress (Aghion et al., 2021; Diamond, 2019). In this context, understanding the pathways through which democracy affects economic growth via both institutions and innovation is critical for assessing the long-term consequences of democratic decline and informing policy responses to mitigate its economic risks.

1.3. *Contribution of the Study*

This study advances the understanding of the democracy-growth relationship by quantifying the relative importance of institutional quality and innovation as mediating channels, addressing a critical gap in the literature. While previous work has recognized the role of institutions in supporting economic development, few studies have formally disentangled their impact from that of innovation, limiting the ability to identify the mechanisms that are most relevant for designing effective policy responses to democratic erosion (Acemoglu & Robinson, 2019; Aghion et al., 2021). To the best of our knowledge, our study is the first to empirically assess the mediating roles of institutions and innovation in the democracy-growth nexus using fixed-effects mediation analysis. Using an augmented Solow growth model and fixed-effects mediation analysis on panel data from 123 countries (2011–2022), we find that institutional quality, measured through rule of law and property rights, accounts for 83.3% of the total effect of democracy on GDP per capita, while innovation explains only 16.7%. This highlights the structural role of institutions in sustaining economic performance under democratic governance. In light of current democratic erosion, where institutional degradation poses long-term risks to development, our findings offer policy-relevant perspectives: strengthening institutional quality is essential for safeguarding economic outcomes. This study thus offers actionable insights for

policymakers and a robust framework for future research on the economic implications of democratic governance.

The remainder of this paper is organized as follows: In the next section, we develop an augmented Solow growth model to illustrate how democracy influences GDP per capita through two distinct channels: innovation and institutional quality. The model highlights the interplay between a democratic environment and the institutional and technological foundations of growth. Following this, we outline our empirical strategy and statistical methodology, including the fixed-effects mediation analysis used to identify both the direct and indirect effects. We then present empirical results and provide a detailed analysis of the role of innovation as a mediating mechanism in the democracy-growth relationship. Finally, we conclude by discussing the theoretical and policy implications of our findings in the context of global democratic backsliding and offer suggestions for future research.

2. Theoretical Model

This section introduces the theoretical model that underpins our empirical strategy, focusing on the role of democracy in shaping economic outcomes through innovation and institutional quality. Specifically, we analyze how the level of democracy, represented by variable (D), influences innovation, which, in turn, affects GDP per capita. Given the relatively short time span of our empirical analysis (2011–2022), it is reasonable to treat democracy as exogenous to innovation and GDP per capita over this period. Our theoretical framework reflects this assumption, treating democracy as an exogenous factor affecting innovation, while our empirical analysis measures democracy using the Economist Democracy Index and innovation using the GII Innovation Index.

Democracy is treated as an exogenous variable determined by historical legacy, cultural factors, and institutional development, in accordance with the principles of New Institutional Economics (Acemoglu & Robinson, 2012; North, 1990). This assumption is reasonable, given that democratic institutions often evolve slowly and are influenced by long-term structural factors rather than short-term economic fluctuations. In this section, we develop an augmented Solow growth model to illustrate how democracy (D) influences economic output through two distinct channels: innovation and institutional quality. Our results show that the steady-state level of output per worker y^* is increasing in (D) reflecting the positive contribution of democracy.

2.1. A Solow-Based Model with Democracy, Innovation, and Institutions

This section presents the augmented Solow growth model that integrates the effects of democracy on economic output through two distinct channels: innovation and institutional quality. The model retains the core structure of the Solow framework while introducing these additional mechanisms (Solow, 1956).

2.1.1. Production Function

The aggregate output Y is produced according to a Cobb–Douglas production function:

$$Y_t = A_t K_t^\alpha L_t^{1-\alpha}$$

where K_t is physical capital, L_t is labor, A_t is TFP, and $\alpha \in (0, 1)$ represents the capital share of output. Time subscripts (t) are included for clarity, although the steady-state analysis focuses on the equilibrium values.

2.1.2. Labor and Capital Dynamics

Labor grows exogenously at a constant rate n :

$$L_t = L_0 e^{nt}$$

Capital accumulates according to the standard Solow equation:

$$\dot{K}_t = sY_t - \delta K_t$$

where $s \in (0, 1)$ is the constant savings rate, $\delta > 0$ is the depreciation rate, and $\dot{K}_t = dK_t/dt$.

This equation describes the law of motion for the capital stock, indicating that the change in capital over time is determined by the difference between gross investment, given by a constant fraction of output (sY_t), and depreciation, which occurs at a constant rate δ . This standard formulation captures the core dynamics of capital accumulation within the Solow framework.

2.1.3. Total Factor Productivity (TFP)

TFP (A_t) is modeled as a function of innovation (H_t) and democracy (D)¹:

$$A_t = \bar{A} H_t^\beta D^\varphi$$

where

$\bar{A} > 0$ is a baseline productivity parameter,

H_t denotes the level of innovation,

D represents the level of democracy (assumed constant in the baseline case),

$\beta \in (0, 1)$ captures the elasticity of TFP with respect to innovation,

$\varphi > 0$ reflects the direct effect of democracy on TFP through institutional quality.

Innovation is, in turn, a function of democracy:

$$H_t = \bar{H} D^\gamma$$

where $\bar{H} > 0$ is a constant and $\gamma \in (0, 1)$ measures the elasticity of innovation with respect to democracy. Substituting H_t into the TFP equation yields

$$A_t = \bar{A} (\bar{H} D^\gamma)^\beta D^\varphi = \bar{A} \bar{H}^\beta D^{\beta\gamma + \varphi}$$

Thus, the production function becomes:

$$Y_t = \bar{A} \bar{H}^\beta D^{\beta\gamma + \varphi} K_t^\alpha L_t^{1-\alpha}$$

Here, $D^{\beta\gamma}$ represents the indirect effect of democracy on TFP via innovation, while D^φ captures the direct effect through institutions (e.g., rule of law, property rights enforcement).

2.1.4. Steady-State Analysis

To analyze the steady state, we define capital per worker as $k_t = K_t/L_t$ and output per worker as $y_t = Y_t/L_t$. The evolution of k_t is derived as:

$$\dot{k}_t = sy_t - (n + \delta)k_t$$

This equation describes the evolution of capital per worker, adjusting for population growth and capital depreciation.

By substituting y_t into the capital accumulation equation and imposing the steady-state condition $\dot{k}_t = 0$, we derive the expression for the steady-state level of capital per worker:

$$k^* = \left(\frac{sAH^\beta D^{\beta\gamma+\varphi}}{n+\delta} \right)^{\frac{1}{1-\alpha}}$$

Steady-state output per worker is then:

$$y^* = \left(AH^\beta D^{\beta\gamma+\varphi} \right)^{\frac{1}{1-\alpha}} \left(\frac{s}{n+\delta} \right)^{\frac{\alpha}{1-\alpha}}$$

2.1.5. Interpretation

The steady-state output per worker y^* increases in D , reflecting the positive contributions of democracy through:

- (1) Innovation Channel: $D^{\beta\gamma}$, where democracy enhances innovation (H), which in turn boosts TFP.
- (2) Institutional Channel: D^φ , where democracy directly improves TFP via stronger institutions, independent of innovation.

2.2. Growth Rate in the Steady State

Empirical evidence suggests that democracy often changes in discrete jumps rather than gradually, driven by political reforms, economic crises, or regime shifts (Acemoglu & Robinson, 2019; Haggard & Kaufman, 2016). In our baseline model, we assume D is constant; thus, y^* is fixed and the growth rate of \dot{y}_t/y_t is zero, whereas Y_t grows at rate n . Such jumps in D cause immediate shifts in A_t , generating temporary fluctuations in y_t during the transitions to new steady states. Thus, the long-run average growth of y_t depends on the net trend of these discrete changes: a consistent rise in D yields growth, whereas balanced fluctuations result in near-zero growth.

2.3. Comparative Statics

To illustrate the dynamic implications of a decline in democracy, we conducted a comparative statics analysis within the framework of the model. We consider two steady states: the initial equilibrium associated with a high level of democracy (D_1), and a new, lower equilibrium corresponding to a reduced level (D_2). Given the model structure, the steady-state level of output per capita depends positively on democracy through both institutional quality and innovation. A decline from D_1 to D_2 reduces TFP and lowers the steady-state level of capital per worker. As a result, the economy's long-run output per capita declines from y_1^* to y_2^* .

Figure 1 illustrates this adjustment path. At time t_0 , the drop in democracy triggers a transitional dynamic toward a lower equilibrium. This stylized trajectory highlights the structural economic vulnerabilities posed by democratic erosion, reinforcing the policy imperative of preserving institutional strength and innovation systems to safeguard long-term development.

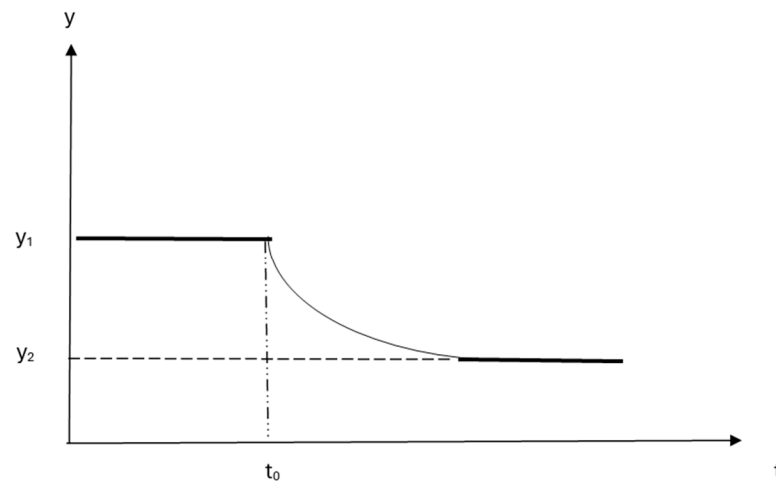


Figure 1. Transition to a lower steady state following a decline in democracy.

2.4. Statistical Methodology

To examine whether innovation mediates the relationship between democracy and GDP per capita, we applied a mediation analysis using ordinary least squares (OLS) regression models with country-fixed effects. Although our theoretical model focuses on TFP as the main channel through which democracy influences output, the empirical analysis used GDP per capita as the outcome variable, reflecting productivity gains implied by TFP, but not directly observed. The dataset consisted of 123 countries observed over the period 2011–2022, structured as balanced panel data. We selected countries for which complete data were available for democracy, innovation, and GDP per capita throughout 2011–2022. Table A1 in Appendix A lists all countries included in the dataset.

Following Baron and Kenny's (1986) approach, we estimated a series of regression models to test for mediation effects. The use of a fixed-effects approach is justified by the balanced panel structure. This enabled us to control for unobserved country-specific factors, including differences in institutions and history, which might otherwise bias our estimates. To further validate our empirical findings, we conducted a variance inflation factor (VIF) analysis, confirming that multicollinearity among the explanatory variables does not pose a substantial concern.

3. Data Sources and Variable Descriptions

In the first stage, we collected data on democracy, innovation, and GDP per capita to form an empirical foundation for our analysis. Table 1 summarizes the key variable details.

Our analysis relies on a robust set of carefully selected indicators. The Democracy Index, developed by the Economist Intelligence Unit (EIU), provides a comprehensive assessment of democracy in 167 countries. It is based on 60 indicators grouped into five key categories: electoral processes and pluralism, government functioning, political participation, political culture, and civil liberties. Each country receives a score ranging from 0 to 10, with higher values indicating stronger democratic institutions. Based on these scores, countries are classified as full democracies, flawed democracies, hybrid regimes, or authoritarian regimes. The index relies on expert assessments and public opinion surveys to evaluate democratic performance and ensures a broad and comparative analysis of global political trends (World Bank, n.d.). Given its multidimensional coverage and alignment with the GII, the Democracy Index is particularly suitable for cross-country empirical studies linking democratic quality, innovation, and living standards.

Similarly, the Global Innovation Index (GII), published by the World Intellectual Property Organization (WIPO, n.d.) evaluates the innovation performance of 133 economies

worldwide on a 1–100 scale.² The index is calculated using 80 indicators across seven key pillars: institutions, human capital and research, infrastructure, market sophistication, business sophistication, knowledge and technology outputs, and creative outputs. These indicators provide a comprehensive measure of the economy’s ability to foster and sustain innovation. The GII data are sourced from international organizations, national statistical offices, and WIPO’s databases, enabling consistent cross-country comparisons of innovation capacity and performance.

Table 1. Data Sources and Variable Details.

Variable	Definition	Unit of Measurement	Data Source	Years	Notes
The Democracy Index (EIU)	A score reflecting the level of democratization in a country, including civil and political rights.	Score (Scale: 0–10)	EIU/World Bank	2011–2022	Reflects multidimensional democratic quality across elections, governance, participation, political culture, and civil liberties.
The Global Innovation Index (GII)	The index measures an economy’s innovation ability using 80 indicators across seven pillars.	Score (Scale: 0–100)	World Intellectual Property Organization (WIPO)/World Bank	2011–2022	GII data, from diverse sources, enables consistent cross-country innovation comparisons
GDP per capita in purchasing power parity (PPP)	Adjusts economic output per person for international price differences, enabling accurate living standard comparisons	US Dollars	World Bank, World Development Indicators (WDI)	2011–2022	Serves as the primary measure of economic performance.

Finally, our measure of economic output per person, GDP per capita in purchasing power parity (PPP), is crucial for enabling accurate comparisons of living standards across different countries. This metric inherently adjusts for variations in price levels between nations, thereby eliminating distortions that can arise from fluctuating exchange rates and differences in the cost of living.³

The choice of the EIU Democracy Index and the GII reflects their global coverage, conceptual breadth, and consistent time-series availability, which are particularly suitable for cross-national mediation analysis over time.

Mediation Analysis Framework

To investigate whether innovation serves as a mediating mechanism in the relationship between democracy and GDP per capita, we applied [Baron and Kenny’s \(1986\)](#) mediation analysis framework. Specifically, we estimated the following three key pathways:

- (1) Effect of democracy on innovation (Path a)
 - o Examining whether higher levels of democracy create an institutional environment conducive to innovation by fostering market competition, protecting intellectual property rights, and encouraging R&D investment.
- (2) Effect of innovation on GDP per capita (Path b)
 - o Assessing whether higher levels of innovation lead to greater economic output, potentially through increased productivity, technological spillovers, and efficiency gains.
- (3) Total effect of democracy on GDP per capita (Path c)

- o Measuring the overall impact of democracy on economic growth before controlling for innovation, capturing both its direct influence and indirect pathways.

The total effect (c) can be decomposed into two components:

The direct effect (c') is the effect of democracy on GDP per capita after controlling for innovation.

The indirect effect ($a \times b$) is the effect of democracy on GDP per capita, which operates through innovation.

Formally, the relationship between these effects is expressed as follows:

$$c = c' + (a \times b)$$

Figure 2 illustrates the mediation analysis framework that depicts the direct and indirect pathways described above.

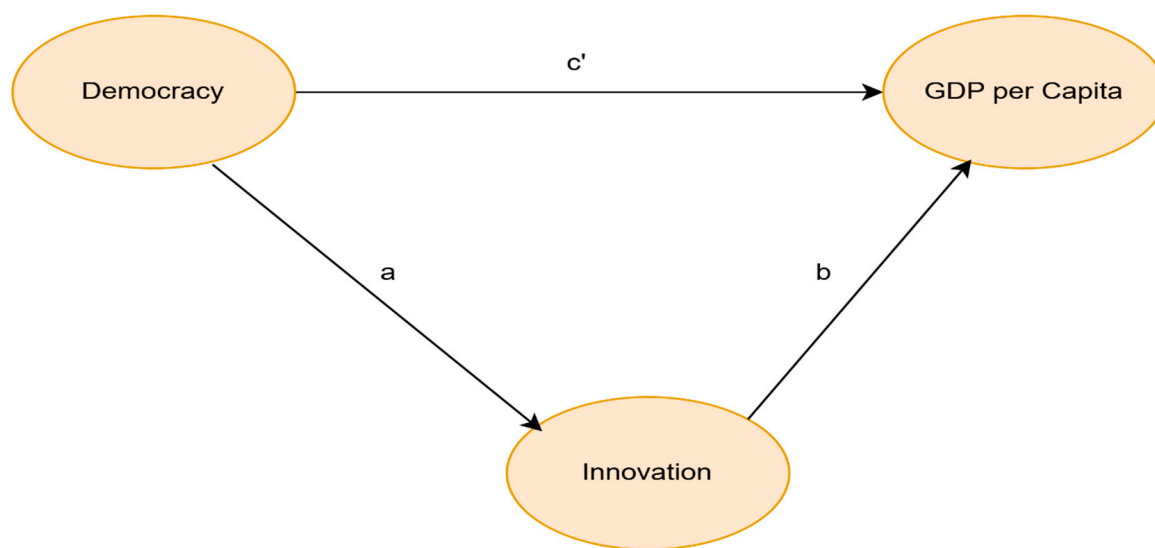


Figure 2. Mediation framework.

To assess potential multicollinearity, we conducted VIF analysis. The results indicated low VIF values for both the democracy index (VIF = 1.77) and innovation index (VIF = 1.77), well below the conventional threshold of 5.0, suggesting that multicollinearity does not pose a concern in our analysis (Hair et al., 2010).

4. Fixed-Effects Mediation Analysis Results

We estimate the following equations using two-way fixed effects (country and year). Furthermore, statistical inference is constructed based on Driscoll-Kraay standard errors with heteroskedasticity and autocorrelation consistent correction. This approach not only corrects for heteroskedasticity but also addresses serial correlation and cross-sectional dependence across units, making it robust for panel data structures where these issues are prominent.⁴

The estimated models are as follows:

$$\text{innovation}_{it} = \alpha + \beta_1 \text{democracy}_{it} + \gamma_i + \delta_t + \varepsilon_{it}$$

$$\text{gdp}_{it} = \alpha + \beta_2 \text{innovation}_{it} + \gamma_i + \delta_t + \varepsilon_{it}$$

$$\text{gdp}_{it} = \alpha + \beta_3 \text{democracy}_{it} + \gamma_i + \delta_t + \varepsilon_{it}$$

$$\text{gdp}_{it} = \alpha + \beta_4 \text{democracy}_{it} + \beta_5 \text{innovation}_{it} + \gamma_i + \delta_t + \varepsilon_{it}$$

where γ_i represents country-fixed effects, capturing time-invariant unobserved heterogeneity across countries (e.g., historical, cultural, and institutional differences). Similarly, δ_t represents time-fixed effects, accounting for global shocks and macroeconomic trends that may influence GDP per capita over time. Finally, ε_{it} is the error term. The results of the mediation analysis are presented sequentially, following the structure of Paths a, b, and c as described earlier. Path a estimates the effect of democracy on innovation (Model 1); Path b captures the effect of innovation on GDP per capita (Model 2); and Path c reflects the total and direct effects of democracy on GDP per capita (Models 3 and 4, respectively).

Table 2 presents the main regression results for the fixed-effects panel models estimated with Driscoll-Kraay standard errors. The results indicate that democracy significantly influences both innovation ($\beta_1 = 0.45$, $p = 0.089$) and GDP per capita ($\beta_3 = 1466.55$, $p < 0.001$). Furthermore, innovation positively impacts GDP per capita ($\beta_2 = 544.13$, $p < 0.001$). The direct effect of democracy on GDP per capita is strong and significant ($\beta_4 = 1224.9$, $p < 0.001$), while the indirect effect ($\beta_1 \times \beta_2$) mediated through innovation is estimated at 244.86, representing approximately 16.7% of the total effect.

Table 2. Regression summary statistics for panel fixed effects models (country and year).

Variable	Model 1	SE 1	Model 2	SE 2	Model 3	SE 3	Model 4	SE 4
Democracy	0.45 *	(0.26)			1466.55 ***	(489.51)	1224.89 **	(489.30)
Innovation			544.13 ***	(148.69)			533.91 ***	(149.13)
R^2 Within	0.39		0.30		0.27		0.31	
F-Statistic	566.49		327.56		315.77		362.02	
N	1476		1476		1476		1476	

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

To evaluate the statistical significance of the indirect effect, a bootstrap analysis with 10,000 resamples was performed. The results confirm that the indirect path from democracy to GDP per capita via innovation is statistically significant ($p = 0.045$), reinforcing the mediating role of innovation in the democracy-growth nexus.

These findings highlight the dual pathway through which democracy enhances economic performance: directly, through institutional strengthening that improves governance and economic stability, and indirectly, by fostering innovation that contributes to productivity and long-term growth. Notably, most of the impact of democracy on economic performance (83.3%) is explained by institutional quality, underscoring the critical importance of democratic institutions in driving economic development.

Robustness Tests

To ensure the robustness of our empirical findings, we conducted a series of tests comparing fixed-effect and pooled OLS models (Table A2), fixed-effect and random-effects models (Table A3), and models with and without time-fixed effects (Table A4). These tests consistently supported the appropriateness of the fixed-effects specification and confirmed that including time-fixed effects significantly improves model fit. Detailed results of these tests are presented in the Appendix A.

In addition, we replicated the mediation analysis using the Freedom House Democracy Score.⁵ Despite its high correlation with the Economist Democracy Index ($r = 0.943$, $p < 0.001$), the indirect effect of democracy through innovation disappears, whereas the direct institutional effect on GDP per capita remains significant. This supports the robustness of our main finding that democracy primarily contributes to economic growth through institutional quality, further reinforcing the primacy of institutional channels over innovation in explaining the democracy-growth link.

We further replicated the main specification using the V-Dem Polyarchy Index as an alternative measure of democracy. The results are consistent: the coefficient for democracy is similar in magnitude to that of the EIU Index but is not statistically significant, likely due to the limited variation in the Polyarchy Index in our sample. The innovation index remains strongly significant, and the overall pattern of findings is unchanged.

5. Discussion and Conclusions

5.1. Summary of Findings

This study examined the relationship between democracy and economic growth by focusing on the mediating role of innovation and the direct impact of institutional quality using an augmented Solow growth model. It theoretically demonstrated that democracy influences TFP through two channels: innovation, which enhances TFP by fostering technological progress, and institutional quality, which directly improves TFP through mechanisms such as the rule of law and property rights protection. This aligns with the principles of New Institutional Economics, which emphasizes the role of institutions in reducing transaction costs and enhancing economic efficiency (Acemoglu & Robinson, 2019; North, 1990). Our empirical analysis, based on a mediation framework with fixed effects applied to panel data from 123 countries over 2011–2022, confirmed these theoretical insights. The results indicate that democracy positively affects GDP per capita, both indirectly through innovation and directly via institutions. The total effect of democracy on GDP per capita is an increase of 1466.55 PPP dollars per unit increase in the EIU Democracy Index, of which approximately 16.7% (244.86 PPP dollars) is mediated through innovation, and the remaining 83.3% (1224.9 PPP dollars) is attributed to the direct effect of institutional quality.⁶ A fundamental finding of this study is that while innovation remains an important driver of growth, our results suggest that the quality of institutions plays an even more significant role, particularly in sustaining long-term economic performance.

5.2. Relevance to Today's Political Landscape

The findings are particularly relevant in the context of today's global political landscape, characterized by a marked decline in democratic institutions (Freedom House, 2024). The erosion of democratic governance in emerging and advanced economies poses significant risks to long-term economic growth. Our results suggest that democratic backsliding, through weakened property rights, reduced judicial independence, and rising corruption, undermines institutional quality, the primary mechanism through which democracy affects economic performance. Furthermore, restrictions on academic freedom and competitive markets may dampen innovation, which further compounds the negative economic impact. These insights underscore the importance of safeguarding democratic institutions as part of an integrated strategy for sustained development. Accordingly, policymakers should consider protecting well-functioning institutional frameworks while pursuing targeted reforms in areas where legal certainty, regulatory quality, or accountability mechanisms are weak, as these are the primary channels through which democracy contributes to economic performance.

To ensure that democratic institutions effectively support economic performance, policymakers should prioritize reforms that strengthen legal and institutional frameworks. Key strategies may include reinforcing judicial independence by creating oversight bodies, protecting property rights via transparent land and asset registries, and enhancing government accountability through financial disclosure systems. This institutional focus aligns with recent arguments that effective economic governance increasingly depends on the ability of public institutions to coordinate long-term financial strategies and development objectives. Clifton and Howarth (2025) emphasize the importance of aligning public finan-

cial architecture with democratic oversight to strengthen resilience and sustain growth. As such, efforts to preserve and improve institutional integrity should form the cornerstone of development policy in democratic and hybrid regimes alike. Building on this institutional foundation, we next consider how the timing and sequencing of reforms can shape their effectiveness in promoting sustained economic development.

5.3. Political Economy of Reform Sequencing

Our results show that institutional quality accounts for 83.3% of democracy's total effect on GDP per capita, underscoring its primacy in the growth process. This suggests the need for strategic sequencing of reforms to counter the economic risks of democratic backsliding. Our augmented Solow model expresses the impact of democracy on output through two functional channels: institutional quality, modeled as D^δ ; and innovation, modeled as $D^{\beta\gamma}$. These structural elasticities capture the theorized impact of democracy on TFP, emphasizing the foundational role of institutions relative to innovation. This primacy of institutional quality suggests that to sustain economic growth, oriented reforms should begin with strengthening democratic institutions, such as judicial independence and fiscal transparency, before introducing innovation-focused measures, like R&D tax credits. As [Rodrik \(2000\)](#) argues, democracy functions as a “meta-institution” for building high-quality institutions and aggregating local knowledge, thereby laying the institutional foundation necessary for sustainable economic development. Similarly, [Vadlamannati and Tamazian \(2009\)](#) show that institutional constraints can undermine the growth effects of FDI, highlighting the importance of robust institutional frameworks as a precondition for the success of innovation-focused policy tools. To translate these institutional priorities into actionable strategies, Table 3 outlines reform directions aligned with the five core dimensions of the EIU Democracy Index, which served as the primary measure of democratic governance in our empirical analysis. Each row reflects a domain in which strengthening, enhancing, or safeguarding democratic institutions can directly support economic performance in contexts of democratic backsliding. While general in nature, these institutional mechanisms are designed to be adaptable across political and legal systems and emphasize resilience as a foundation for sustained innovation and growth.

Table 3. Policy reform plan to safeguard growth amid democratic backsliding: institutional mechanisms by EIU Democracy Index dimension.

EIU Democracy Index Dimension	Economic Rationale	Key References
Strengthening Electoral Processes and Pluralism	Builds public and investor trust, lowers political risk, and supports higher investment and long-term growth	Touchton (2016) ; Acemoglu and Robinson (2019)
Improving the Functioning of the Government	Fosters efficient allocation of public resources and enhances fiscal credibility	Kaufmann et al. (2011) ; Olken (2007)
Enhancing Political Participation	Improves policy quality and growth, reallocates spending to human capital, and strengthens cohesion and labor-force participation	Wampler and Hartz-Karp (2012) ; Bartle et al. (2017)
Strengthening Political Culture	Fuels trust-driven growth, reduces risk, supports innovation, and strengthens national innovation systems	Horváth (2013) ; Bauhr and Grimes (2014) ; Singh et al. (2024)
Safeguarding Civil Liberties	Fosters innovation and R&D, attracts FDI, and improves public investment outcomes through enhanced transparency and rights protection	Acemoglu et al. (2019) ; La Porta et al. (1999) ; Isham et al. (1997) ; Busse and Hefeker (2007)

5.4. Limitations of the Study

While our findings provide important insights into the relationship between democracy, innovation, and GDP per capita, several limitations should be acknowledged.

First, it used the Democracy Index, a composite measure that captures dimensions such as electoral processes and civil liberties. Although widely used, it aggregates multiple aspects into a single score, limiting our ability to isolate the specific mechanisms driving the observed effects.

Second, our study treated democracy as exogenous and used a 2011–2022 panel data set, which may not fully address endogeneity concerns or capture long-term dynamics. While fixed-effects models mitigate unobserved heterogeneity, democracy may be influenced by economic conditions, and a short timeframe may miss historical trajectories or structural reforms. A more robust identification strategy and longer timeframe could strengthen causal inference and capture long-term effects.

Third, although the GII offers a broad perspective on innovation by merging inputs such as R&D expenditure and human capital with outputs such as patents and scientific publications, its comprehensive nature might obscure the specific elements of innovation most impacted by democracy. Furthermore, our analysis did not consider potential interactions with other economic factors such as human capital, financial development, and trade openness, which could affect the relationship between democracy, innovation, and GDP per capita.

5.5. Future Research Directions

In an era marked by unprecedented challenges to democracy, our study serves as a call for continued research into its economic implications. Future research could explore different ways of measuring democracy and innovation to overcome the limitations of this study. Disaggregating the GII to focus on specific innovation dimensions could better capture the nuanced ways in which democratic governance affects distinct aspects of innovation. Additionally, disaggregating the democracy index to examine which institutional dimensions, such as electoral processes, civil liberties, or government functioning, most strongly influence innovation and economic performance could help identify the specific institutional levers that drive growth. Building on this, future research could also explore which policy tools are most effective in advancing these reforms in contexts of democratic backsliding.

While our study employed fixed effects models to address unobserved heterogeneity, future research could strengthen causal inference by applying instrumental variable methods, difference in differences designs, or natural experiments based on historical democratization events. It could also explore the use of dynamic panel techniques such as System GMM to account for potential endogeneity, particularly when the structure of the data allows for valid instrumentation and moment conditions (Roodman, 2009). Additionally, alternative democracy indices such as Polity IV or the V-Dem Polyarchy index could be employed to test the robustness of institutional effects and to capture narrower components of democratic governance. It would also be valuable to examine the directionality of the relationship, namely, whether democratization spurs innovation and whether innovation in turn reinforces democratic resilience. As technological change accelerates, future studies should assess whether the democracy and innovation nexus vary across contexts, particularly in the face of digitalization, artificial intelligence, and automation.

Furthermore, future research should continue to examine not only the economic benefits of democracy but also the risks posed by its decline. By doing so, scholars and policymakers can better assess how to preserve democratic institutions while fostering the

conditions for long-term economic and technological progress, building on this study's insight into the primacy of institutions.

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Appendix A

Table A1. Sample Countries.

Albania	Honduras	Oman
Algeria	Hong Kong	Pakistan
Argentina	Hungary	Panama
Armenia	Iceland	Paraguay
Australia	India	Peru
Austria	Indonesia	Philippines
Azerbaijan	Iran	Poland
Bahrain	Ireland	Portugal
Bangladesh	Israel	Qatar
Belarus	Italy	Romania
Belgium	Jamaica	Russian Federation
Benin	Japan	Rwanda
Bolivia	Jordan	Saudi Arabia
Bosnia and Herzegovina	Kazakhstan	Senegal
Botswana	Kenya	Serbia
Brazil	Republic of Korea	Singapore
Bulgaria	Kuwait	Slovakia
Burkina Faso	Kyrgyzstan	Slovenia
Cambodia	Latvia	South Africa
Cameroon	Lebanon	Spain
Canada	Lithuania	Sri Lanka
Chile	Luxembourg	Sweden
China	Madagascar	Switzerland
Colombia	Malaysia	Tajikistan
Costa Rica	Mali	Thailand
Croatia	Malta	Togo
Cyprus	Mauritius	Trinidad and Tobago
Czech Republic	Mexico	Tunisia
Denmark	Moldova	Turkey
Dominican Republic	Mongolia	Uganda
Ecuador	Montenegro	Ukraine
Egypt	Morocco	United Arab Emirates
El Salvador	Mozambique	United Kingdom
Estonia	Namibia	United States
Ethiopia	Nepal	Uruguay
Finland	Netherlands	Uzbekistan
France	New Zealand	Vietnam
Georgia	Nicaragua	Zambia
Germany	Niger	Zimbabwe
Ghana	Nigeria	
Greece	North Macedonia	
Guatemala	Norway	

Table A2. F-Test Results for Fixed Effects vs. Pooled OLS Models.

Model	F-Statistic	p-Value	Preferred Model
Democracy on innovation	$F(133, 1341) = 156.54$	$p < 0.001$	Fixed effects
Innovation on GDP per capita	$F(133, 1341) = 89.43$	$p < 0.001$	Fixed effects
Democracy on GDP per capita	$F(133, 1341) = 155.37$	$p < 0.001$	Fixed effects
Democracy and innovation on GDP per capita	$F(133, 1340) = 87.18$	$p < 0.001$	Fixed effects

Table A3. Hausman Test Results for Model Selection.

Model	Hausman Test Statistic	p-Value	Preferred Model
Democracy on innovation	$\chi^2(1) = 442.94$	$p < 0.001$	Fixed effects
Innovation on GDP per capita	$\chi^2(1) = 265.47$	$p < 0.001$	Fixed effects
Democracy on GDP per capita	$\chi^2(1) = 59.09$	$p < 0.001$	Fixed effects
Democracy and innovation on GDP per capita	$\chi^2(2) = 955.53$	$p < 0.001$	Fixed effects

Table A4. F-Test Results for the Impact of Time-Fixed Effects.

Regression	F Statistic	p-Value	Conclusion
Democracy on innovation	$F(11, 1341) = 70.35$	$p < 0.001$	Significant improvement
Innovation on GDP per capita	$F(11, 1341) = 49.76$	$p < 0.001$	Significant improvement
Democracy on GDP per capita	$F(11, 1341) = 44.99$	$p < 0.001$	Significant improvement
Democracy and innovation on GDP per capita	$F(11, 1340) = 50.2$	$p < 0.001$	Significant improvement

Note. The F-test compares a model with country-fixed effects to a model with both country- and time-fixed effects. All regressions showed a significant improvement ($p < 0.001$) with the inclusion of time-fixed effects, indicating the presence of time-specific factors affecting the variables under study.

Appendix B. Empirical Implementation of GMM and Diagnostic Test Results

We also attempted to estimate a dynamic panel model using the two-step System GMM (Arellano-Bover/Blundell-Bond estimator) as a robustness check. Despite its theoretical appeal, the empirical implementation yielded severe identification problems, rendering the GMM results unreliable for our dataset.

Data Structure and Estimation Context

- Panel dimensions: 123 countries \times 12 years (2011–2022)
- Structure: Short time dimension ($T = 12$) but with a large cross-sectional component ($N = 123$)
- Estimation method: Two-step System GMM with lagged levels and differences as instruments
- Software and diagnostics based on: [Roodman \(2009\)](#), xtabond2 implementation

Key Diagnostic Results

1. Hansen J test of overidentifying restrictions:
 - $J = 1.15 \times 10^9$, $df = 858$, $p \approx 0.00$
 - Interpretation: The full set of instruments is strongly rejected, indicating invalidity of the instrument matrix due to overfitting and a singular weighting matrix.
2. Serial correlation in first-differenced errors:
 - AR(1): $\rho = -0.057$, $z = -1.90$, $p = 0.057$ (expected negative first-order autocorrelation)
 - AR(2): $\rho = -0.100$, $z = -3.15$, $p = 0.0016$

- Interpretation: The significant AR(2) statistic indicates a violation of the moment conditions necessary for valid GMM estimation.

Implications and Interpretation

These results reflect well-documented limitations of GMM in short panels with many cross-sectional units. Specifically:

- Instrument proliferation inflates the number of instruments relative to the number of periods, resulting in a near-singular weighting matrix and unreliable estimates.
- The failure of the Hansen and AR (2) tests confirms that the moment conditions are violated, and the instruments are invalid.
- The estimated coefficients from the GMM model, while close in magnitude to our baseline fixed-effects models, cannot be considered statistically reliable.

Conclusion and Justification

Given these diagnostic failures, we conclude that GMM is not an appropriate method for our panel structure. As noted by Roodman (2009), GMM may perform poorly in datasets with a short T, especially when the instrument count is high. In contrast, the fixed effects estimator with Driscoll-Kraay standard errors:

- Corrects for heteroskedasticity, serial correlation, and cross-sectional dependence
- It is well-suited to short panels like ours
- Produces stable and interpretable results under weaker assumptions

Our empirical strategy is thus grounded in a transparent assessment of methodological trade-offs. The GMM diagnostics presented here strengthen the rationale for using a two-way fixed effects model with robust inference.

Notes

- ¹ While Total Factor Productivity (TFP) is often broadly defined, its application here is specifically focused on its relationship with democracy and innovation, enhancing clarity and relevance for our study. For a detailed discussion on the nuances and differences in TFP, readers are directed to Bertsatos and Tsounis (2024).
- ² Due to missing values across the panel period, our final sample included 123 countries for which complete data were available between 2011 and 2022.
- ³ World Bank, World Development Indicators, <https://databank.worldbank.org/source/world-development-indicators>, accessed on 18 March 2025.
- ⁴ As a robustness check, we estimated a dynamic panel model using two-step System GMM, but encountered severe identification problems. For full results and interpretation, see Appendix B.
- ⁵ We also examined the Polity V (Polity 5) index for the years 2011–2018. Notably, the Polity V index shows no change (variance = 0) for 73% of countries in our sample, and only minimal variation for another 10%. This empirical invariance supports our assumption of short-term exogeneity and demonstrates why standard regression-based checks using Polity V are not feasible for our data.
- ⁶ The sum of the direct and indirect effects is 3.21 PPP dollars larger than the total effect. This minor difference is attributed to specification adjustments and interaction effects typical in fixed-effects models with panel data.

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