The Relationship between Democracy and Economic Growth: An Empirical Analysis

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Abstract

The effect of democracy on economic growth receives excellent attention in theoretical and empirical studies. However, much-existing literature provides conflicting views of democracy on economic growth. For this reason, this paper aims to empirically investigate the relationship between democracy and economic growth in thirty-three countries from 2010 to 2020. This paper examines this relationship in the context of the panel data framework. The study investigates the relationship by employing Panel unit root, cointegration tests, and panel vector error correction model (VECM) methodology associated with Wald test approaches. The preliminary empirical results show that democracy has a positive effect on growth. Furthermore, a long-run causality runs from democracy to real GDP, and both variables are cointegrated. The results conclude that a well-functioning political system by upgrading democratic accountability can positively contribute to a higher economic growth rate.

Keywords: Democracy, Economic growth, Panel data, Political economy, Socioeconomics

Introduction

The association between democracy and economic growth is significant in developing economic growth theory. This is because the classical growth theories claim that economic growth is affected by exogenous and endogenous factors such as the amount of labor, technological progress, human capital, knowledge investment, and innovation, respectively. However, according to Ishtiaq et al. (2016), economic growth depends on many factors, like the traditional factors of capital, labor, and technological advancement and the somewhat novel factors of financial development and the nature of the political regime. Many attempts try to determine other factors, particularly political and socio-economic factors such as democracy, that affect economic growth. This study tries to add an alternative independent variable, i.e., democracy, as a significant issue to fill this gap. To study the link between democracy and economic growth, this study mainly focuses on the relationship between them using different approaches. A study supports this idea. Zouhaier and Karim (2012) identified the relationship

between democracy, investment, and economic growth for a sample of 11 countries from the MENA region during the period 2000-2009 by using a dynamic panel data model. Their outcomes proved that there was a significant link between democracy and investment and between civil liberties and economic growth. Their studies showed a positive interaction between political rights and investment.

To answer this question, the role of democracy in economic growth is examined to explain the democracy-growth relationship. Democracy as a political and socio-economic factor has direct and indirect relationships with progress and regress in economic and social development. Starting from this issue, this paper primarily explores the relationship between democracy and economic growth. This is because, according to the academic literature and policy discourse, democratic institutions were relevant and encouragement for economic growth. Democracy showed more stability in both short-run and long-run growth rates than autocracy because democracy could recover the economic shocks more quickly than autocracy (Rodrik, 2007).

The study's objective is to empirically examine the relationship between democracy and economic growth for thirty-three countries over eleven years, using data from the World Bank and Economist Intelligence Unit for 2010 to 2020. The study hypnotizes, a positive relationship between democracy and economic growth. Meaning that the more sustained a democracy is, the greater will be its chance of developing the economy. Thus, the Democracy Index is included as an explanatory variable in understanding these relationships. Acemoglu et al. (2019) applied the dynamic panel strategy to study the nexus between democracy and growth. They found that democracy had a positive effect on GDP per capita. Their baseline results showed that democratization increased GDP per capita by about 20 percent in the long run.

This study tests the relationship between democracy and economic growth by employing a simple linear regression using a panel data approach. The study applies panel unit root, panel cointegration tests, panel vector error correction model (VECM) methodology associated with the Wald test. These approaches present many benefits over the method employed in previous studies. Previous studies show that there are both positive and negative relationships between democracy and economic growth. For example, Sirowy and Inkeles (1990) reviewed the evidence from quantitative, cross-national tests of the effects on political democracy and economic growth. They pointed out that democratic processes were most friendly to economic development. On the other hand, Feng (2005) studied the effects of political institutions, specifically democracy, on economic performance. His study found that democracy had no significant effect on growth. Nevertheless, only some studies systematically examine this relationship. Thus, the main contribution is investigating the short-run and long-run relationships between democracy and economic growth.

This paper is organized into seven sections. The first section is the introduction. The second section is the literature review, followed by the third section, which pays particular attention to the model. The methodology is shown in the fourth section. The fifth section is

data, followed by the empirical results in the sixth section. The conclusion is shown in the last section.

Review of related literature

This section is divided into three parts, namely

The concept of democracy

What is democracy? According to Nwogu (2015), it was difficult to reach a consensus on the definition of democracy. However, the main idea of democracy was widely accepted to have originated in Athens in the 5th century BC. Several studies propose the meaning of democracy. The Webster New Encyclopaedic Dictionary (1995) defined democracy as a government by the people or a political unit that had a democratic government. Munck (2014), democracy was a synthesis of political freedom and political equality and spelling out the implications of this substantive assumption. Two other spheres were addressed: government decision-making and the social environment of politics. Barak (2006) and Kelsen (1955), democracy was the primary right that allowed people to vote based on their interests including freedom of speech, freedom of the press, and political expression.

The concept of economic growth

With all the growth factors, it is essential to calculate economic growth. Many ingredients are thoroughly calculated the caused growth trends, such as characteristics of economic and non-economic, internal and external, direct and indirect factors, controlled and uncontrolled factors, the factors of supply, demand, and distribution, intensive and extensive, and interchangeable and supplemented growth factors. Neoclassical theories and models pay greater attention to gross domestic product (GDP) per capita or income per capita as adequate measures of economic growth. As stated by Ivic (2015), economic growth meant constantly increasing the volume of production in a country or increasing the gross domestic product as the leading quantitative indicator of output for one year. Moreover, Lucas (1998) suggested that human capital was the significant factor determining growth rates, while Grossman and Helpman (1991) argued that trade might also play a role in growth.

On the other hand, theories, as inspired by Marx or Schumpeter, focus on the underlying structure of the political economy. Flammang (1979) discussed economic growth and development as related processes based on the structure and design of the political economy.

The concept relationship between democracy and economic growth

There are several debates on the impact of democracy on economic growth in both theoretical and empirical studies. Acemoglu and Robinson (2012) pointed out that traditionally economics had ignored politics, but understanding politics was crucial for explaining world inequality. As Lipset (1959) mentioned, a particular country's economic development level was associated with democracy. Olson (1984 and 1993) argued that the political system, i.e., democracy was helpful to economic growth as shown an ultimate effect on economic

development. Consistent with Rock (2009) found that democracy promoted economic growth, which caused investment to rise. Similarly, Frye (2009), the level of democracy had a positive association with the group of economic reform.

Based on the empirical framework, the empirical evidence from Tavares and Wacziang (2001) examined the relationship between democracy and economic growth employing a panel approach to estimate simultaneous equation framework in 65 countries from 1970 - 1989. Their results showed that democracy sustained growth by lowering income inequality and recovering human capital accumulation. Tang and Yung (2008) inspected the long-run relationship between economic growth and democratization for high-performing Asian economies using a time-series technique called the autoregressive distributive lag bounds test. They found a statistically significant long-run relationship between democratization and development in eight Asian countries. Identically, Leblang (1996) studied the relationship between property rights, democracy, and economic growth using cross-national panel data from 1960-90, building on an endogenous growth model. The evidence confirmed a positive and statistically significant effect on democracy as represented by property rights and economic growth. Yang (2008) studied the relationship between democracy and development in a hundred and thirty-eight countries from 1968 to 2002 by employing the dynamic panel generalized method of moment (GMM) technique. The study found that democracy significantly reduced growth volatility in countries with high ethnic heterogeneity, not vice versa. Hellmanzik (2013) analyzed the impact of democracy on the value of artistic output as measured by the price of paintings produced from 1820 to 2007. The study was based on a novel dataset of 273 global superstars of modern art covering 31 countries. The estimation was based on a differences-in-differences strategy using a hedonic price model extended by macro-level variables to capture the political and economic backdrop. His study showed that democracy positively affected the density of superstar painters and a country's collective artistic human capital. In the view of Papaioannou and Siourounis (2008) used a regression equation to examine the relationship between democratization and growth covering 166 countries in the 1960-2003 period. Their panel estimates exhibited that democratizations were associated with a 1% annual per capita growth increase. Benhabib et al. (2013) applied panel estimation methods to test the relationship between income and democracy during the postwar period. Their study confirmed that a higher growth rate as measured by real per capita income can be supported by democratic transitions. Doucouliagos and Ulubasoglu (2008) inspected the impact of political democracy on economic growth by applying meta-regression analysis to the population of 483 estimates. They concluded that democracy positively affected economic growth by raising economic freedom and human capital levels and decreasing inflation and political instability.

There is a surge in the corpus of studies on the relationship between democracy and growth Profeta et al. (2013) explored the relationship between political variables and tax revenue, public spending and their structure in European Union, Latin America, and South-East Asia during the 1990–2005 period. Three sets of estimates were performed: (i) cross-country pooled OLS regressions with region-fixed effects, (ii) country-fixed effects regressions, and (iii) region-specific regressions with country-fixed effects. They found that

the first model delivered some significant correlations between political variables and tax items. However, when controlling for country-fixed effects they found that tax revenue and tax composition were in general, not significantly correlated with the strength of democratic institutions and the protection of civil liberties. Heo and Tan (2001) employed the Granger causality test to investigate the causal dynamic relationship between the level of democracy and economic growth covering 1950-1982 for 32 developing countries. They provided further support that democracy encouraged development. Kurzman et al. (2002) explored long-term and short-term direct and indirect effects of democracy on growth by using pooled annual time-series data from 1951–1980 for 106 countries. They found that democracy provided more formal channels for expressing complaints than autocracy and thus could motivate economic growth. Burkhart and Lewis-Beck (1994) applied a dynamic pooled time series analysis to study the causal relationship between economics and democracy. Their final generalized least squares-autoregressive moving averages estimates (N = 2,096) appeared robust and indicated strong economic development effects. They concluded that the political benefits of democracy could promote economic development. Also, Bjornskov (2010), formulated a regression model to examine the relationship between income distribution, democracy, and aid. His results showed that economic growth was beneficial by the democratic process to allure foreign aid. Jensen (2003) studied the relationship between the political regimes and inflows of foreign direct investment using a cross-sectional ordinary least squares (OLS) regression for 79 countries and pointed out that democracy could flow foreign direct investment (FDI) better than autocracy. Similarly, Knutsen (2011) investigated whether electoral rules and forms of government affect economic growth by applying panel data techniques that included 100 countries from 1820-2002. The study found a positive association between Proportional Representation electoral rules and economic growth that could produce credible economic policies. As supported by Feng (2001), examined whether democracy and other major characteristics of political institutions such as political freedom, political instability, and policy uncertainty had any significant consequences for private investment and property rights. The major finding in his paper showed that political freedom promoted private investment and enhanced market competition and property rights led boosting economic growth.

In contrast, other points of view, like You (2016), explored the correlation between inequality and corruption in South Korea, Taiwan, and the Philippines. His study confirmed the negative effect of democracy on growth as it increased crime. Narayan et al. (2011) employed the Granger causality test to observe the relationship between democracy and economic development in 30 Sub-Saharan African countries. Their study verified that democracy harmed growth represented by real income. Rachdi and Saidi (2015) examined the relationship between democracy and economic development in seven-teen MENA countries over the period 1983 – 2012 using fixed (FE)/random (RE) effects and generalized method of moments (GMM) system approaches. They found that democracy had a powerful and negative impact on growth since the sign of the effect was ambiguous. More recently, Aisen and Veiga (2013) empirically determined the effects of political instability on economic growth by applying the system-GMM estimator for linear dynamic panel data models on a sample

covering up to 169 countries from 1960 to 2004. Their evidence showed that there was a negative effect between democracy and growth. Collier and Hoeffler (2009) empirically investigated whether the impact of democracy on economic performance was distinctive in resource-rich societies for the period 1970–2001. They found that democracy combined with high natural resource rents significantly reduced growth in developing countries. Among others, Przeworski et al. (2000) examined the experience of 135 countries between 1950 and 1990 to understand the dynamics of political regimes and their impacts on economic development and other aspects of material welfare. The findings showed that political powers did not affect the growth of total national incomes or that democracy hindered economic growth. Other studies discover no relationship between democracy and development, Brunetti (2002) empirically examined the association between democracy and economic growth in seventeen studies in cross-country growth analysis. His results showed no consensus on this relationship since the results reported both positive and negative relationships between them. This conclusion is in total concordance with the finding of Jacob and Osang (2020) used a system GMM framework to investigate the longer-term impact of democracy and other explanatory variables on economic growth covered from 1961 to 2010. They found that measures of democracy matter little for the economic growth process. Also, Przeworski and Limongi (1993) discussed the political realm fostered or hindered economic growth and concluded that they did not know whether democracy sustained or hampered growth.

In conclusion, according to all previous studies, many controversial questions that exist about the relationship between democracy and economic growth. The association of the political determinants, especially democracy, with economic growth still be ambiguous. The regard details of monetary conditions by considering a systematic explanation of political regimes is essential. The growing interest and empirical study in the interplay of political democratization and economic growth in many countries need to be done.

Model

This study uses the panel data approach to estimate the relationship between democracy and economic growth. According to economic theory and previous studies, there are a lot of determinants that determine economic growth. However, the primary purpose of this study is to investigate the association between democracy as a single independent variable and real GDP as a dependent variable. Thus, a simple linear regression model based on a panel data approach is adopted and proposed by Simionescu et al. (2016). It is assumed that there is a linear association between democracy and economic growth. The relationship between democracy and real GDP can be written as follows:

$$GDP = f(D) \quad (1)$$

$$GDP_{it} = \beta_{it} + \beta_{1i} D_{it} + \mu_{it} \quad (2)$$

Where:

GDP = ln of Gross Domestic Product of country *i* in the period *t* at a constant price of 2015 (USD).

D = ln of Democracy Index of country *i* in the period *t* represented by the scores; 0.00 to 10.00, higher means better.

Methodology

The methods used in this study are beneficial for studying the short-run and long-run causal relationships between democracy and economic development. This study employs panel data research systematically examines the relationship between democracy and economic growth, which is a few studies according to previous studies. Therefore, the analysis is conducted in four steps.

Panel unit root tests

In the first step, the panel unit root tests are needed to verify the order of cointegration for the variables. This is because the cointegration tests in the next step are valid only if the variables have the same order of integration. The basic feature of the panel unit root test is described in the following. Consider an AR(1) process:

$$y_{it} = \rho_i y_{it-1} + x_{it}\delta_{it} + \varepsilon_{it} \quad (3)$$

where i is cross-section series and $i = 1,2, \dots, N$; t is periods and $t = 1,2, \dots, T$; x_{it} is optional exogenous regressors which may consist of constant, or a constant with trend; ρ_i and δ_i are parameters to be estimated; and ϵ_{it} represents the white noise or the error term; y is a nonstationary series or contains a unit root when $|\rho| \geq 1$; and y is a (trend-) stationary series when $|\rho| < 1$.

Panel cointegration tests

According to economic theory, the concept of cointegration test is applied to test and measure the long-run relationship between the variables. The cointegration test examines of the residuals of spurious regression, and three-panel cointegration tests are employed in this study.

Pedroni test

Pedroni's (1999, 2004) test allows for heterogeneous intercepts and trend coefficients across cross-sections as described in the following:

$$y_{it} = \alpha_i + \delta_i t + \beta_{1i}x_{1i,t} + \beta_{2i}x_{2i,t} + \cdots + \beta_{Mi}x_{Mi,t} + \varepsilon_{i,t} \quad (4)$$

where i represents the cross-section series and $i = 1,2, \dots, N$; t represents the periods and $t = 1,2, \dots, T$; $M = 1, \dots, M$; ε_{it} represents the white noise or the error term; y and x are assumed to be integrated of order one, e.g. I*(1)*. The parameters α_i and δ_i present individual and trend effects.

Kao test

The Kao (1999) test specifies cross-section-specific intercepts and homogeneous coefficients during the first stage. Kao's panel cointegration in the bivariate case can be represented as:

$$y_{it} = \alpha_i + \beta x_{it} + \varepsilon_{it} \quad (5)$$

where i represents the cross-section series and $i = 1,2, \dots, N$; t represents the periods and $t = 1,2, \dots, T$; α_i represents the parameters to be estimated; ε_{it} represents the white noise or the error term; and y and x are assumed to be integrated of order one, e.g. I(1).

Johansen test

Johansen (Maddala and Wu, 1999) test as the combined individual tests using the results of the individual independent tests (Fisher, 1932). It is an alternative approach to testing for cointegration in panel data by combining tests from individual cross-sections to obtain test statistics for the entire panel (Maddala and Wu, 1999).

The null hypothesis for the panel can be expressed as follows:

$$-2\sum_{i=1}^{N} \log(\pi_i) \rightarrow \mathrm{X}^2 2N \quad (6)$$

where i is cross-section series; π_i is the *p*-value from an individual cointegration test for cross-section i. X^2 is the value derived from *p*-values for Johansen's cointegration trace test and maximum eigenvalue test proposed by MacKinnon-Haug-Michelis (1999).

Panel vector error correction model

The vector error correction model (VECM) application captures the short-run dynamics of the variables. A vector error correction model is a restricted VAR designed for use with nonstationary series known to be cointegrated. The VEC model under a two-variable system with one cointegration and no lagged difference terms is:

$$\Delta y_{1,it} = \alpha_1 \left(y_{2,it-1} - \beta y_{1,it-1}\right) + \varepsilon_{1,it} \quad (7)$$

$$\Delta y_{2,it} = \alpha_2 \left(y_{2,it-1} - \beta y_{1,it-1}\right) + \varepsilon_{2,it} \quad (8)$$

where i is cross-section series and $i = 1,2, \dots, N$; t is time periods and $t = 1,2, \dots, T$. The error correction term (ECT) is in the only right-hand side variable and $ECT = 0$ in long run equilibrium; $ECT \neq 0$ when y_1 and y_2 deviate from the long run equilibrium. α_1 and α_2 are the coefficients represent the speed of adjustment of the *i*-th endogenous variable towards the equilibrium.

Panel wald test

A panel Wald test associated with the vector error correction model (VECM) is employed to explore the causal relationship of the short run. The Wald test estimates a test statistic based on unrestricted regression. The Wald statistic determines how close the free estimates come to fulfilling the restrictions under the null hypothesis. In the case of a linear regression model, the Wald statistic can be written as:

$$W = (Rb - r)'(Rs^2(\mathrm{X}'\mathrm{X})^{-1}R')^{-1}(Rb - r) \quad (9)$$

where R is a known $q \times k$ matrix; r is a $q - vector$; q is the number of restrictions under the null hypothesis; b is the vector of free parameter estimates; and s^2 is the usual estimator of the unrestricted residual variance.

Data

Using a balanced panel study investigates the secondary data from 2010 to 2020. The data are converted to logarithms allowing the presentation of the relationships between democracy and real GDP in an equation. Table 1 presents the data for calculation collected from World Bank and Economist Intelligence Unit. The data include the GDP and democracy index, respectively. GDP is constant 2015 prices, expressed in U.S. dollars, which is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. On the other hand, the democracy index is based on 60 indicators grouped into 5 different categories measuring pluralism, civil liberties, and political culture.

Table 2 represents thirty- three countries under investigation classified by full democracy, flawed democracy, hybrid regime, and authoritarian regime, respectively. The democracy index is represented in a numeric score and a ranking between 0.00 - 10.00. Higher scores are closer to full democracy, and lower scores are closer to authoritarian regimes. These 33 countries were selected because they had all the data.

Table 3 shows the descriptive statistics of the data, such as observations, mean, standard deviation, minimum, and maximum.

Table 1 Variables and Sources

Variable	Description	Source
GDP	Gross Domestic Product in accurate prices	World Bank
D	Democracy Index	Economist Intelligence Unit

Table 2 Countries under Investigation of the Year 2020

Country Name	**Score** (0.00 – 10.00)	Regime Type
Australia	8.96	Full democracy
Belgium	7.51	Flawed Democracy
Cambodia	3.10	Authoritarian
Canada	9.24	Full democracy
China	2.27	Authoritarian
Colombia	7.04	Flawed Democracy
Denmark	9.15	Full democracy
Egypt	2.93	Authoritarian
France	7.99	Flawed Democracy
Germany	8.67	Full democracy
Greece	7.39	Flawed Democracy
India	6.61	Flawed Democracy
Indonesia	6.30	Flawed Democracy
Iran	2.20	Authoritarian

Country Name	Score (0.00 – 10.00)	Regime Type
Ireland	9.05	Full democracy
Italy	7.74	Flawed Democracy
Japan	8.13	Full democracy
Kazakhstan	3.14	Authoritarian
Malaysia	7.19	Flawed Democracy
Mexico	6.07	Flawed Democracy
New Zealand	9.25	Full democracy
Nigeria	3.29	Hybrid Regime
Norway	9.81	Full democracy
Pakistan	4.31	Hybrid Regime
Philippines	6.56	Flawed Democracy
Russia	3.31	Authoritarian
Saudi Arabia	2.08	Authoritarian
Spain	8.12	Full democracy
Sweden	9.26	Full democracy
Turkey	4.48	Hybrid Regime
United Kingdom	8.54	Full democracy
United States	7.92	Flawed Democracy
Vietnam	2.94	Authoritarian

Source: Economist Intelligence Unit

Table 3 Descriptive Statistics of Variables

Variables	Obs.	Mean	Std. Dev.	Min.	Max.
1. The logarithmic form of real gross domestic product					
LNGDP	363	27.28	1.34	23.27	30.63
2. The logarithmic form of gross fixed capital					
LND	363	1.78	0.47	0.54	2.30

Source: author's computation.

Empirical results

The previous studies showed that democracy positively affected growth, and there was a long-run relationship between them (Tavares and Wacziang, 2001; Tang and Yung, 2008; and Leblang, 1996). In this study, the existence of short-run and long-run relationships between democracy and economic growth is examined. The analysis is conducted in four steps. In the first step, the unit root tests are applied to verify the order of integration for the variables. The various cointegration tests in the next step are valid only if the variables have the same order of integration. In the second step, the Pedroni test, the Kao test, and the Johansen test are employed to investigate the panel cointegration relationship, which is based on the estimated

residuals of Equation (2) when all series are integrated into the same order. The third and last steps estimate both short-run and long-run causations using the vector error correction model (VECM) associated with the Wald test, respectively.

Panel unit root tests

The unit root tests are needed in the first step to verify the order of integration for the variables because all series must be integrated into the same order before conducting the next steps. In this study Levin, Lin & Chu t*, Augmented Dickey-Fuller (ADF), and Phillips-Perron (PP) are applied. The first and second half of Table 4 shows the results of panel unit root tests in levels and the first differences for all the variables, respectively. The tests for each variable are performed in the test, including neither intercept nor trend.

According to Table 4, in the first half of the table, almost all tests of each variable have the unit roots that cannot be rejected the null hypotheses in their levels. Only in the case of Democracy Index (D), according to PP's result, is stationary in the level at the 0.01 level of significance. However, both tests of the Levin, Lin & Chu t* and ADF cannot reject the null hypothesis in the level, which confirms that Democracy Index (D) is non-stationary in the level since it has a unit root. This can conclude that all the variables are non-stationary in their levels.

Nevertheless, after taking the first difference of each variable, all the variables meet the requirements of the study and can reject the null hypothesis at the 0.01 level of significance. Therefore, this can acknowledge their stationary for the 99 percent confidence interval. This demonstrates that all the variables become stationary in their first differences implying that all these variables are integrated of order one, i.e.; I(1).

Table 4 Panel unit root tests results

Method	**GDP**			**ΔGDP**		
	Statistic	**Prob.**	**Obs**	**Statistic**	**Prob.**	**Obs**
Null: Unit root (assumes common unit root process)						
Levin, Lin & Chu t*	12.3852	1	322	-5.34017***	0	292
Null: Unit root (assumes individual unit root process)						
ADF – Fisher Chi-square	30.372	0.9999	322	120.426***	0	292
PP – Fisher Chi-square	9.89102	1	330	123.087***	0	297
Method	**D**			**ΔD**		
	Statistic	**Prob.**	**Obs**	**Statistic**	**Prob.**	**Obs**
Null: Unit root (assumes common unit root process)						
Levin, Lin & Chu t*	-0.7533	0.226	318	-13.4096***	0	281
Null: Unit root (assumes individual unit root process)						
ADF – Fisher Chi-square	75.9133	0.146	318	242.701***	0	281
PP – Fisher Chi-square	98.4666***	0.004	320	255.704***	0	288

Source: author's computation.

Note: *** indicates the rejection of the null hypothesis at 0.01 level of significance. △ is the first-difference operator.

Table 5 Pedroni Cointegration Test Result

Test Statistics	Statistic	Prob.
Panel v-Statistic	40.78532***	0.0000
Panel rho-Statistic	1.907359	0.9718
Panel PP-Statistic	-0.371215	0.3552
Panel ADF-Statistic	-3.597411***	0.0002
Panel v-Statistic (Weighted)	13.36936***	0.0000
Panel rho-Statistic (Weighted)	1.429076	0.9235
Panel PP-Statistic (Weighted)	-2.513254***	0.0060
Panel ADF-Statistic (Weighted)	-6.543415***	0.0000
Group rho-Statistic	3.537073	0.9998
Group PP-Statistic	0.208386	0.5825
Group ADF-Statistic	-2.948366***	0.0016

Source: author's computation.
Note: *** indicates the rejection of the null hypothesis at 0.01 level of significance.

Panel cointegration tests

Table 5 shows the Pedroni Test as conducted in the test with deterministic intercept and trend. According to the Pedroni Test, six of the eleven tests indicate that the null hypothesis of no cointegration is rejected at the 0.01 significant level. This shows most evidence of panel cointegration between democracy and real GDP.

The Kao test in Table 6 represents panel cointegration at a 0.01 level of significance. This is because the null hypothesis of no cointegration is rejected. The Kao test also confirms evidence of panel cointegration between democracy and real GDP.

The Johansen cointegration, as shown in Table 7 verifies panel cointegration because both the trace and max-eigen tests can reject the null hypothesis of no cointegration at a 0.01 level of significance. Furthermore, both the trace and max-eigen tests show at least one cointegrated equation since the null hypothesis of at most 1 cointegrated equation cannot be rejected.

Consequently, the Pedroni test, the Kao test, and the Johansen test confirm strong statistical evidence favoring cointegration between democracy and real GDP, confirming the impossibility of spurious estimation.

Table 6 Kao Cointegration Test Result

	Kao Test	
	t-Statistic	**Prob.**
ADF	-2.432278***	0.0075

Source: author's computation.
Note: *** indicates the rejection of the null hypothesis at 0.01 level of significance.

Table 7 Johansen Cointegration Test Result

Hypothesized No. of CE(s)	**Fisher Stat.* (from trace test)**	**Prob.**	**Fisher Stat.* (from max-eigen test)**	**Prob.**
None	176.1***	0.0000	165.5***	0.0000
At most 1	73.89	0.1865	73.89	0.1865

Source: author's computation.
Note: *** indicates the rejection of the null hypothesis at 0.01 level of significance.

Panel vector error correction model

A panel vector error correction model (VECM) is estimated to examine the causal relationship in the long run. Table 8 shows the panel VECM test result in the long run. For long-run causality, the lagged error correction term (ECT) coefficient is -0.002735 which is statistically significant at 0.05 since it rejects the null hypothesis of no long-run causation. This means there is a long-run causality between democracy and real GDP. In other words, the speed of adjustment is 0.27 percent annually implying that the whole system goes back to the long-run equilibrium at the speed of 0.27 percent annually. Thus, this confirms the cointegration relationship between democracy and real GDP.

Panel wald test

A panel Wald test associated with the vector error correction model (VECM) is estimated to examine the causal relationship in the short run. Table 9 demonstrates the result of the panel Wald test in the short run. The Chi-square statistic is insignificant for short-run causality, which cannot reject the null hypothesis of no short-run causation. This means no short-run causality runs from democracy to real GDP.

Table 8 Panel VECM Result

Long-run	
ECT	
Coefficient	-0.002735**
t-Statistic	-2.583003
Prob.	0.0101

Source: author's computation.
Note: ** indicates the rejection of the null hypothesis at 0.05 level of significance.

Table 9 Wald Test Result

Test Statistic	**Value**	**df**	**Probability**
Chi-square	0.003341	2	0.9983

Source: author's computation.

Conclusions and suggestions for future study

Are there short- run and long- run relationships between democracy and economic growth? This paper focuses on this question. The findings of this empirical research approve that there is a positive relationship between democracy and economic growth in the long run but no relationship in the short run. The findings support the study of Tang and Yung (2008) found a statistically significant long- run relationship running from democratization to growth in 8 Asian countries. As stated by Hayek (1960), the merits of democracy appeared in the long run.

The main purpose of this paper is to examine the relationship between democracy and economic growth. The study uses a simple linear regression of democracy and economic growth rates in thirty-three countries from 2010 to 2020, applying a panel data approach.

According to the empirical results, democracy seems to affect economic growth significantly. This is because the results show a long- run equilibrium relationship between democracy and economic growth, as presented by the panel cointegration tests. The results from panel VECM also show significant causal relationships in long run. However, the panel Wald test result shows insignificant causal relationships in the short run. This means that, in the case study of thirty-three countries, democracy significantly affects economic growth only in the long run. As supported by Rachdi and Saidi (2015), economic growth requires long-term protection of civil and political freedoms since democracy causes economic growth.

This concludes that the empirical results of this study correspond to the conventional belief that democracy is beneficial for economic growth. Empirical evidence shows a

significant positive relationship between democracy and economic growth (Papaioannou and Siourounis, 2008; Benhabib et al., 2013). This implies that democracy significantly enhances economic growth in the long run.

The research results will explain the relationship between democracy and economic growth within 33 countries from 2010 - 2020. Nevertheless, future studies should increase the sample of countries and expand more periods of time to better generalize the causality to other countries and other periods.

Understanding the relationship between democracy and economic growth leads to more efficient forecasting. Many undemocratic countries prefer (or are forced) to have democracy combat as the direct and indirect method of tackling the economy. As can be understood from the results, the increase in the democracy index will cause economic growth. Hence, suggesting that democratization would have a considerable impact on economic growth.

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