

THE IMPACT OF THE RULE OF LAW AND GENDER EQUALITY ON ECONOMIC GROWTH: A PANEL DATA ANALYSIS MEDIATED BY UNEMPLOYMENT AND POPULATION DYNAMICS

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ABSTRACT

Purpose- This study empirically investigates the impacts of structural factors including the rule of law, social capital, unemployment, and population growth rate on sustainable economic growth, utilizing a balanced panel dataset encompassing 34 developing and middle-income countries over the 2002–2022 period. By integrating institutional, social, and demographic dimensions, the research aims to elucidate how these elements shape long-term growth trajectories in heterogeneous emerging economies, addressing gaps in the literature on their interactive effects.

Methodology- Economic growth is proxied by the per capita gross domestic product (GDP) growth rate. Independent variables include the rule of law index, Women, Business and the Law Index score (as a measure of social capital), unemployment rate, and population growth rate. To address panel data challenges such as cross-sectional dependence, heteroskedasticity, and autocorrelation, the analysis employs a robust panel least squares method with panel-corrected standard errors (PCSE) under fixed effects specifications. Preliminary tests, including Pesaran's CIPS unit root and cross-sectional dependence tests, ensure model validity.

Findings- The results reveal that improvements in the rule of law and social capital indicators exert positive and statistically significant effects on growth, while unemployment and population growth exhibit negative influences. Specifically, a one-unit enhancement in the rule of law index boosts growth by 0.14%, and a similar rise in the social capital score contributes 0.13%. In contrast, a 1% increase in unemployment reduces growth by 13.7%, and population growth by 0.9%. The model's explanatory power ($R^2 = 0.478$) and absence of autocorrelation (Durbin-Watson = 2.066) affirm estimation reliability, with the Hausman test endorsing the fixed effects approach.

Conclusion- The findings underscore the imperative for institutional reforms and gender equality policies, alongside labor market interventions and demographic management, to foster sustainable growth. Prioritizing active employment programs, education investments, and controlled migration strategies can promote inclusive development. Future research may explore sectoral heterogeneity and climate interactions via dynamic models, such as GMM, to refine policy insights.

Keywords: Rule of law, unemployment, population growth, economic growth, panel data analysis.

JEL Codes: O11, J11, K40

1. INTRODUCTION

The dissemination of economic prosperity to broad segments of society and the establishment of equitable income distribution represent fundamental objectives of modern socio-economic development. In achieving these goals, law and economics assume a central role as two fundamental disciplines that interact reciprocally and complement one another. A historical examination reveals that, from ancient regulations such as the Code of Hammurabi to the complex international agreements of today, the legal framework has consistently been intertwined with economic elements (Çevik, 2007). Law structures life as a comprehensive body of rules, while economics seeks to fulfill the foundational layers of Maslow's hierarchy of needs (such as hunger and thirst) for individuals and society. This intersection delineates the societal roles of law, which defines rights and obligations, and economics, which examines assets and necessities (Türkbağ, 2003). Processes of production, exchange, and consumption fall within the domain of economics, whereas the cycles of rights and debts arising in commercial relations pertain to law. This interaction is grounded in statutes and regulations that govern the behaviors of market actors (Savatier, 1980; Savaş, 1993).

Beyond this institutional legal-economic framework, population dynamics constitute a critical factor shaping macroeconomic growth. Economists have historically viewed population growth from contrasting perspectives: as an optimistic force that fosters economic expansion by enlarging the labor force and accelerating technological progress (Kremer, 1993), and as a pessimistic factor that intensifies resource scarcity while constraining per capita income growth (Malthus, 1798). Thirlwall

(1994) draws attention to the complex nature of this relationship, while the demographic transition model (Cleland, 2013; Lee, 2003) anticipates changes in population structure through declines in mortality and fertility rates, leading to aging populations. These shifts in population composition directly influence poverty levels, exerting a determining impact on areas such as socio-economic growth, environmental sustainability, and social stability (Günsoy & Tekeli, 2015; UNFPA, 2014; Gu et al., 2021). In this context, the analysis of population dynamics, particularly at the macro level, is essential for understanding their implications for economic growth and informs the design of effective regional development strategies and efficient resource allocation (Güneş, 2005).

Economic growth, defined as the continuous increase in the production of goods and services, serves as the primary mechanism for enhancing societal welfare; however, the unemployment rate remains one of the most significant barriers to its equitable dissemination. Okun's Law demonstrates a strong negative correlation between economic growth and the unemployment rate, while empirical studies (Konya, 2006) confirm that growth generates new employment opportunities, supporting a long-term causal relationship. Within this cycle, the role of female employment is strategic. Although global industrialization has increased women's participation in the labor force, in societies such as Turkey, patriarchal mindsets and societal roles continue to keep these rates low (Ecevit, 2010; Ak, 2021). Nevertheless, increasing female employment fosters sustainable economic growth by generating macroeconomic and social benefits, including greater economic independence for women, advancement in gender equality, poverty reduction, and potential improvements in household savings rates that may contribute to mitigating current account deficits (BETAM, 2010).

In recent years, enhancing female employment in Turkey has been recognized as one of the core elements of sustainable economic growth and inclusive development. According to data from the Turkish Statistical Institute (TUIK), in 2024, the employment rate for women aged 15 and over stood in the range of 31.3%-32.5%, while the labor force participation rate reached approximately 35%-36.8%; the corresponding rates for men were around 65%-67% (TUIK, 2025a; TUIK, 2025b). The OECD's 2025 Economic Surveys: Türkiye report emphasizes that removing the primary barriers to women's labor market participation particularly unpaid care and domestic work burdens as well as societal norms can significantly enhance medium-term growth potential and foster a more inclusive economic structure (OECD, 2025). Similarly, the International Monetary Fund's 2024 study indicates that closing gender-based labor market gaps in Türkiye would strengthen medium-term growth, reduce informal employment rates, and contribute to a more equitable income distribution (IMF, 2024). In light of these developments, raising female employment is of strategic importance not only for women's economic independence and poverty reduction but also for improving household savings rates and exerting positive effects on the current account balance, thereby supporting sustainable growth.

In conclusion, the capacity to manage the pressures arising from population dynamics, together with the optimization of the relationship between economic growth and unemployment, is directly linked to the institutional assurances provided by the rule of law. Robust legal regulations, particularly those promoting female employment, exert a positive influence on the economic growth unemployment cycle and highlight the necessity of simultaneously implementing judicial reforms and demographic investments within policy frameworks. This study aims to examine in depth the interactions among the legal framework, population dynamics, and female employment in relation to economic growth and stability.

2. LITERATURE REVIEW

In this section, the empirical literature from the 2002-2022 period, which examines the relationships between sustainable economic growth (KGDP), the rule of law (RUL), population growth rate (POP), social capital (WBL, based on the Women, Business and the Law Index), and unemployment (UNEMP), is systematically addressed. The literature emphasizes the individual and interactive effects of these variables through methods such as panel data analyses and meta-regression, highlighting the integrated role of institutional quality (rule of law) and structural factors in influencing growth, while producing heterogeneous results. Determining the true effects thus emerges as a priority.

The empirical literature yields heterogeneous findings on the relationship between population growth rate and economic growth, investigated through panel data analyses and causality tests. In developing countries, findings commonly indicate that population growth negatively affects economic growth; for instance, studies by Thirlwall (1972) and Headey and Hodge (2009) demonstrate that a 1% increase in population reduces per capita GDP by 0.7-1%, attributing this to resource pressures and dependency ratios. In contrast, positive relationships predominate in Asia-focused panels; Bloom et al. (2003) found that population growth (specifically, increases in the working-age population) supported GDP growth by up to 2% during the 1965-1990 period, interpreted as evidence of the demographic dividend.

Causality analyses illuminate the direction of this relationship. Islam and Farid (2014) identified bidirectional causality in a panel of 111 countries, emphasizing that population growth influences economic growth, and economic growth, in turn, affects population dynamics. Similarly, in testing the Malthusian hypothesis, Crafts and Mills (2009) found a long-term neutral relationship in 19th-century data, indicating that population growth neither causes nor results from per capita GDP. Studies specific to developing countries address the relationship conditionally; for example, Azam and Khan (2016) confirmed the negative effect of population growth in an African panel but highlighted its moderation by education levels. In the case of

Singapore, low population growth (balanced by immigration) has been observed to support high economic growth (Lee and Lee, 2022).

Post-pandemic studies extend the relationship to climate and migration contexts; for instance, high population growth is noted to increase growth costs under climate pressures (Stern et al., 2022).

In the Turkish literature, the relationship is examined using panel data methods, with a predominance of Turkey-focused studies. Tiryaki and Ekinçi (2023) found, through ARDL bounds testing for 1968-2019, that population exerts a positive long-term effect on growth, with life expectancy playing a positive moderating role. Dikmen (2022) detected no causality between growth and population via Granger causality tests for 2000-2021; Coşkun Yılmaz (2023) confirmed population's positive effect on growth using Johansen cointegration for 1980-2021. Kaur (2023) identified positive causality from population to growth in an Indian panel; Lianos et al. (2023) reported, in a PMG estimator for 19 countries, that population decline positively affects GDP. Mihajlović and Miladinov (2024) emphasized, via PMG in eight developing economies, the negative impact of old-age dependency ratios on GDP; Demir and Özkaya (2024) analyzed, using mean group dynamic OLS in 25 high-income countries, the negative effect of the 65+ population on growth.

Lorizio and Gurrieri (2013), in their study on the Italian case, underscore that an economy's growth depends not only on economic factors but also on institutions and citizens' trust in those institutions. Differences between public policies and institutions are regarded as one of the most critical elements in explaining wide variations in per capita growth rates and levels across countries. Among the institutions influencing economic growth, the legal and judicial system stands out as the most determinant. In modern economies, understanding how laws and regulations shape economic behavior is of critical importance. Telli (2014) notes that the UN Millennium Development Goals evolved to incorporate principles of the rule of law and democratic society alongside economic concerns, establishing a link between sustainable human development and the rule of law. UN documents affirm that sustainable development cannot be achieved independently of the rule of law and human rights; the post-2015 Development Agenda shifted from an economy-focused approach to a rights- and law-centered framework. This reflects the full international consensus on the three-way positive proportional relationship among sustainable development, human rights, and the rule of law.

This situation reflects the full international consensus on the three-way positive proportional relationship among sustainable development, human rights, and the rule of law. Recent empirical studies further substantiate this consensus; for example, Uddin et al. (2023) confirm that institutional quality and the rule of law not only promote economic growth but also minimize macroeconomic instability factors such as unemployment (UNEMP). Furthermore, improvements in women's legal rights as a manifestation of social capital (reflected in the Women, Business and the Law [WBL] index) have been shown to accelerate structural transformations in labor markets, thereby contributing directly to sustainable economic growth (KGDP) (World Bank, 2024).

3. DATA AND METHODOLOGY

The dataset utilized in this study has been compiled from the World Bank's open-access database (World Development Indicators - WDI and related indicators). The data forms a balanced panel structure covering the period from 2002 to 2022, collected at an annual frequency for the following 34 countries: Australia, Austria, Belgium, Canada, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, Netherlands, New Zealand, Norway, Portugal, Singapore, Slovak Republic, Slovenia, Korea (Rep.), Spain, Sweden, Switzerland, United Kingdom, United States. These countries have been selected with a primary focus on developing and middle-income economies, thereby ensuring a heterogeneous sample diversity. Economic growth (KGDP) is employed as the dependent variable; the independent variables are defined as unemployment (UNEMP), population growth rate (POP), social capital indicator (WBL), and rule of law (RUL). These variables represent the economic, social, and institutional dimensions of sustainable growth, aligning with standard metrics in the literature.

The following table summarizes the definitions, measurement units, and sources of the variables:

Table 1: Variables Used and Their Sources

Variable	Description	Source
KGDP	Per capita gross domestic product (constant 2015 US dollars)	World Bank
UNEMP	Total unemployment rate (as a percentage of total labor force) (ILO estimate)	World Bank
POP	Population growth rate (annual %)	World Bank
WBL	Women, Business and the Law Index Score (1-100 scale)	World Bank
RUL	Rule of Law: Percentile Rank	World Bank

The descriptive statistics presented in Table 2 below summarize the variables KGDP (per capita GDP growth rate), RUL (rule of law index), WBL (Women, Business and the Law Index score), UNEMP (unemployment rate), and POP (population growth

rate). These statistics are based on a balanced panel dataset covering the period 2002–2022 (680 observations, 34 countries), reflecting the central tendency, distribution, and degree of variation in the variables.

Table 2: Descriptive Statistics

Variable	Number of Observations	Mean	Std. Dev.	Min	Max
KGDP	680	0.0163	0.0367	-0.1583	0.2106
RUL	680	0.0048	1.9043	-9.4097	9.0909
WBL	680	0.7390	2.0677	-9.375	17.5
UNEMP	680	-0.0134	0.1686	-0.4645	0.9097
POP	680	0.0151	0.5150	-3.8584	7.4790

The mean value of the KGDP (Per Capita GDP Growth Rate, Constant 2015 US Dollars) variable (0.0163) indicates a growth rate of 1.63% over the period, reflecting the moderate performance of developing economies. The standard deviation (0.0367) maintains volatility at a moderate level; the minimum (-0.1583) and maximum (0.2106) values highlight economic shocks (e.g., the 2008 crisis or the pandemic) and recovery phases. This distribution provides sufficient variation for testing the sustainable growth hypothesis and is suitable for elucidating cyclical dynamics in panel models.

The mean value of the RUL (Rule of Law Index, Percentile Rank) variable (0.0048) indicates a slight improvement trend in the rule of law; however, the high standard deviation (1.9043) reflects inter-country heterogeneity (institutional reforms versus declines). The minimum (-9.4097) and maximum (9.0909) values represent periods of political instability and reform successes, supporting the long-term institutional effects emphasized in studies such as Kaufmann, Kraay, and Mastruzzi (2009).

The mean value of the WBL (Women, Business and the Law Index Score, 1-100 Scale) variable (0.7390) implies progress in gender equality indicators; the standard deviation (2.0677) highlights variations in the pace of reforms. The range from minimum (-9.375) to maximum (17.5) encompasses instances of legal regression and advancement; according to World Bank analyses (Amin et al., 2019), this provides critical variation for modeling the indirect effects that enhance women's employment and growth potential.

The negative mean value of the UNEMP (Total Unemployment Rate, ILO Estimate) variable (-0.0134) reflects a slight downward trend in unemployment over the period, while the standard deviation (0.1686) emphasizes cyclical fluctuations (recessionary increases). The minimum (-0.4645) and maximum (0.9097) values symbolize employment recoveries and losses; in the context of Okun's Law (Ball et al., 2013), this relationship is suitable for testing the inverse growth-employment linkage.

The mean value of the POP (Annual Population Growth Rate) variable (0.0151) indicates a population increase rate of 1.51%; the high standard deviation (0.5150) reflects demographic heterogeneity (differences in migration and fertility). The range from minimum (-3.8584) to maximum (7.4790) covers population contractions and surges; according to the demographic dividend hypothesis (Bloom et al., 2008), this variable will help illuminate the contributions of the working-age population to growth.

The correlation matrix presented in Table 3 symmetrically summarizes the linear relationships among the KGDP (per capita GDP growth rate), RUL (rule of law index change), WBL (Women, Business and the Law Index score change), UNEMP (unemployment rate change), and POP (urbanization rate change) variables.

Table 3: Correlation Matrix

	KGDP	RUL	WBL	UNEMP	POP
KGDP	1.000				
RUL	0.156	1.000			
WBL	0.052	0.085	1.000		
UNEMP	-0.606	-0.071	0.067	1.000	
POP	0.041	-0.000	0.024	-0.245	1.000

The strong negative correlation between KGDP and UNEMP (-0.606) distinctly confirms the classic inverse relationship between economic growth and unemployment. A 1% increase in the growth rate exhibits a tendency to reduce unemployment changes by approximately 0.6%; this finding reflects the cyclical dynamics of the panel dataset while emphasizing the critical role of labor markets in growth. Similar negative correlations in the literature indicate that labor force flexibility supports macroeconomic stability (Ball et al., 2013).

On the other hand, the weak positive correlation between KGDP and RUL (0.156) suggests that improvements in the rule of law mildly support economic growth and imply its indirect effects in promoting investments and contract reliability through institutional quality. This weak relationship signals that the rule of law functions as a long-term factor; studies such as Kaufmann, Kraay, and Mastruzzi (2009) note that such connections strengthen over time in developing economies. Similarly,

the very weak relationships between KGDP and WBL and POP (0.052 and -0.123, respectively) demonstrate the minimal positive link between the social capital indicator (DSCO) and growth, reflecting the indirect contributions of gender equality reforms (WBL Index) (e.g., through women's employment) (Amin et al., 2019). POP's mildly negative correlation highlights the short-term resource pressures from population growth; however, it carries potential for a demographic dividend in the long term (Bloom et al., 2008).

4. FINDINGS AND DISCUSSIONS

In this study, the dependent variable is defined as the Gross Domestic Product growth rate (KGDP); the independent variables are the unemployment rate change (UNEMP), population change (POP), social capital indicator (WBL), and rule of law index change (RUL). It is expected that WBL and RUL will have a positive directional effect on the dependent variable; the others (UNEMP and POP) are anticipated to have a negative directional effect. The estimated econometric model is as follows:

$$DLGDP_{it} = \beta_0 + \beta_1 EDLUNEMP_{it} + \beta_2 DPOP_{it} + \beta_3 DWBL_{it} + \beta_4 DRUL_{it} + \varepsilon_{it} \quad (1)$$

This research utilizes a panel dataset constructed from data for 34 developing countries over the period 2002–2022, employing panel data methods in the analysis process. Prior to proceeding to model estimations, the basic assumptions affecting the validity of panel data analysis have been evaluated through various preliminary tests. First, to detect possible contemporaneous correlations among panel units, the cross-sectional dependence test (CD Test) developed by Pesaran (2004) has been applied. To examine the stationarity levels of the variables, the Pesaran CIPS test (2007), one of the second-generation unit root tests that accounts for dependencies between panel units, has been preferred. The advantage of this test is its ability to yield consistent results even in the presence of cross-sectional dependence in the panel.

Table 4: Pesaran CIPS Panel Unit Root Test Results

	Level		First Difference	
	Constant	With Trend	Constant	With Trend
KGDP	-1.245	-1.591	-3.019***	-3.229***
RUL	-1.893	-2.940***	-3.707***	-3.879***
WBL	-2.861***	-3.185***	-4.087***	-3.967***
UNEMP	-1.972	-2.135	-3.050***	-3.048***
POP	0.305	0.076	-3.159***	-3.338***

Note: Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

The Pesaran (2007) CIPS panel unit root test, as a second-generation method accounting for cross-sectional dependence, has been used to evaluate the stationarity levels of the variables in the panel dataset. The null hypothesis (H_0) of the test indicates the presence of a unit root (non-stationarity) in the variables, while negative statistic values and significance levels (***) $p < 0.01$ reject stationarity and support the alternative hypothesis (H_1 : Stationarity). Table 4 presents the level and first-difference models for KGDP (per capita GDP growth rate), RUL (rule of law index), WBL (Women, Business and the Law Index score), UNEMP (unemployment rate), and POP (population growth rate), under constant and trend specifications.

In the level analyses, the stationarity of the variables is generally not rejected. For KGDP, the statistics are -1.245 (constant model) and -1.591 (trend model), which fall beyond the significance threshold; similarly, UNEMP (-1.972 and -2.135) and POP (0.305 and 0.076) support the stationarity hypothesis, meaning they can be considered $I(0)$ at the level. For RUL and WBL, partial stationarity is observed, with RUL stationary in the trend model (-2.940***) and WBL in both models (-2.861*** and -3.185***). These results imply that most variables at the level exhibit integrated processes ($I(1)$) and that the panel's cyclical dynamics (e.g., economic shocks) delay stationarity.

In the first differences, all variables strongly reject the stationarity hypothesis, producing consistent results across constant and trend models. The statistics for KGDP (-3.019*** and -3.229***), RUL (-3.707*** and -3.879***), WBL (-4.087*** and -3.967***), UNEMP (-3.050*** and -3.048***), and POP (-3.159*** and -3.338***) fall below the critical values and are significant at $p < 0.01$. This confirms that the variables become $I(0)$ stationary in the first differences, validating the stationarity assumption achieved through the logarithmic differencing ($\Delta \log$) transformations applied in the study.

Overall, the findings strengthen the reliability of the panel data model; the $I(1)$ integration at the level, transitioning to stationarity in the first differences, eliminates risks in regression estimations. In the literature (e.g., Kaufmann, Kraay and Mastruzzi, 2009), similar results in panel structures support the integration of institutional and demographic variables (RUL, POP) into growth dynamics (KGDP).

Table 5: Panel Least Squares Estimation Results

Variable	Coefficient (Std. Error)	t-Statistic	p-Value
RUL	0.0020*** (0.0006)	3.444	0.001
WBL	0.0016** (0.0005)	2.918	0.004

UNEMP	-0.138*** (0.0067)	-20.434	0.000
POP	-0.008*** (0.0022)	-3.760	0.000
Constant	0.013*** (0.0012)	11.504	0.000
Number of Observations	680	-	-
R²	0.399	-	-
Adjusted R²	0.396	-	-
F-Statistic	112.10 (p < 0.001)	-	-
Durbin-Watson	1.811	-	-

Note: Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10.

The Panel Least Squares model estimates RUL (rule of law), WBL (Women, Business and the Law Index), UNEMP (unemployment rate), and POP (population growth rate) as independent variables for the dependent variable KGDP (GDP growth rate). The model is based on a balanced panel dataset of 680 observations (34 countries, 2003–2022 period) and indicates strong explanatory power through overall fit statistics. The R² value of 0.399 shows that the model explains 39.9% of the variation; the adjusted R² (0.396) confirms consistent fit after accounting for the number of parameters. The F-statistic (112.10, p < 0.001) highly affirms the overall significance of the model, while the Durbin-Watson value (1.811) indicates low autocorrelation risk (close to 2).

The independent variable coefficients produce significant results parallel to the hypotheses. The RUL coefficient (0.0020***, t = 3.444, p = 0.001) implies that a 1-unit improvement in the rule of law increases GDP growth by 0.20%; this supports the indirect effects of institutional quality in promoting investments (Kaufmann, Kraay, and Mastruzzi, 2009). The WBL coefficient (0.0016**, t = 2.918, p = 0.004) measures a 1-unit increase in the gender equality score as contributing 0.16% to growth, emphasizing the indirect role of women's employment (Amin et al., 2019). The UNEMP coefficient (-0.138***, t = -20.434, p = 0.000) confirms, in line with Okun's Law, that a 1% increase in unemployment reduces the growth rate by 13.8%; this reflects the cyclical sensitivity of labor markets (Ball et al., 2013). The POP coefficient (-0.008***, t = -3.760, p = 0.000) shows that a 1% increase in population growth reduces the growth rate by 0.8%; this highlights short-term demographic pressures (resource allocation) and implies the conditional nature of the demographic dividend hypothesis (Bloom et al., 2008). The constant term (0.013***, t = 11.504, p = 0.000) reflects an uncontrolled growth trend of 1.3%.

The findings indicate that the model is economically consistent and that sustainable growth can be reinforced with institutional factors (RUL, WBL), while unemployment (UNEMP) and population dynamics (POP) require management.

The Hausman test (1978) results have been applied to evaluate the choice between fixed effects and random effects models. The test statistic is calculated as 14.7125, with a corresponding p-value of 0.0053. This value rejects the null hypothesis (consistency of the random effects model) at the 5% significance level and supports the preference for the fixed effects model. This finding implies that individual heterogeneity in the panel dataset (country-specific differences) may affect model estimations and that the fixed effects approach controls for this effect more effectively.

Table 6: PSCE Standard Errors Test Results

Variable	Coefficient (Std. Error)	t-Statistic	p-Value
RUL	0.0014** (0.0006)	2.381	0.018
WBL	0.0013** (0.0005)	2.507	0.012
UNEMP	-0.137*** (0.0068)	-20.050	0.000
POP	-0.009*** (0.0024)	-3.845	0.000
Constant	0.014*** (0.0011)	12.125	0.000
Number of Observations	680	-	-
R²	0.478	-	-
Adjusted R²	0.448	-	-
F-Statistic	15.911 (p < 0.001)	-	-
Durbin-Watson	2.066	-	-

Note: Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10.

The RUL coefficient (0.0014**, t = 2.381, p = 0.018) implies that a 1-unit improvement in the rule of law increases GDP growth by 0.14%; this reflects the indirect effects of institutional quality in supporting investments and contract reliability (Kaufmann, Kraay, and Mastruzzi, 2009). The WBL coefficient (0.0013**, t = 2.507, p = 0.012) measures a 1-unit increase in the gender equality score as contributing 0.13% to growth, emphasizing the role of women's employment in inclusive growth (Amin et al., 2019). The UNEMP coefficient (-0.137***, t = -20.050, p = 0.000) confirms, in line with Okun's Law, that a 1% increase in unemployment reduces the growth rate by 13.7%; this highlights the cyclical sensitivity of labor markets (Ball et al., 2013). The POP coefficient (-0.009***, t = -3.845, p = 0.000) shows that a 1% increase in population growth reduces the growth rate by 0.9%; this implies short-term demographic pressures (resource allocation and infrastructure burden) and supports the conditional nature of the demographic dividend hypothesis (Bloom et al., 2008). The constant term (0.014***, t = 12.125, p

= 0.000) reflects an uncontrolled growth trend of 1.4%. Additionally, the overall fit statistics indicate that the model explains 47.8% of the variation ($R^2 = 0.478$) and provides consistent fit after parameter adjustment (adjusted $R^2 = 0.448$); the F-statistic (15.911, $p < 0.001$) confirms overall significance, and the Durbin-Watson value (2.066) verifies low autocorrelation risk.

The findings demonstrate that the PCSE correction reduces standard errors, enhancing the robustness of the estimations and confirming the model's economic consistency. It is emphasized that sustainable growth can be reinforced with institutional factors (RUL, WBL), while unemployment (UNEMP) and population dynamics (POP) require proactive management.

5. CONCLUSION AND IMPLICATIONS

The dataset utilized in this study has been compiled from the World Bank's open-access database (World Development Indicators - WDI and related indicators). The data forms a balanced panel structure covering the period from 2002 to 2022, collected at an annual frequency for the following 34 countries: Australia, Austria, Belgium, Canada, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, Netherlands, New Zealand, Norway, Portugal, Singapore, Slovak Republic, Slovenia, Korea (Rep.), Spain, Sweden, Switzerland, United Kingdom, United States. These countries have been selected with a primary focus on developing economies, thereby ensuring a heterogeneous sample diversity.

All variables have been standardized and transformed into logarithmic differenced ($\Delta \log$) form to achieve stationarity; this process strengthens model estimations by accounting for time-series properties. However, variables with limited scales, such as the rule of law (RUL) and social capital indicator (WBL) (in percentile rank and 1-100 index forms, respectively), along with the population growth rate (POP, annual %), have not been subjected to logarithmic transformation; this approach aligns with the literature, which standardizes the direct use of bounded indicators in linear regression models. Economic growth (KGDP) is employed as the dependent variable; the independent variables are defined as unemployment (UNEMP), population growth rate (POP), social capital indicator (WBL), and rule of law (RUL). These variables represent the economic, social, and institutional dimensions of sustainable growth, aligning with standard metrics in the literature.

The findings reveal that sustainable growth is also contingent upon institutional and social elements. From a policy perspective, reforms aimed at strengthening the rule of law (contractual reliability and judicial independence) and gender equality-focused policies (legal regulations to improve the WBL Index) can enhance growth potential. To manage unemployment and population pressures, active employment programs, skills development initiatives, and controlled migration policies should be prioritized; for instance, education investments to maximize the demographic dividend could reverse the negative effects of population growth by 0.5–1 percentage points (Bloom et al., 2008).

Future research could extend this model through dynamic panels (e.g., GMM) that incorporate sectoral employment distribution, the moderating role of female and youth labor forces, or the interaction between population growth and climate change. Analyses of the micro-level effects of informal employment or heterogeneity across geographic subgroups (e.g., Europe vs. Asia) would offer policymakers more nuanced insights. In conclusion, this study once again demonstrates that addressing structural factors within an integrated framework is the key to sustainable development in developing economies.

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