



Investigating the Impact of Bureaucratic Quality on Economic Growth in Afghanistan (1991-2020)

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Highlights:

- Bureaucratic quality is negatively but insignificantly associated with long-run growth
- Economic growth differs significantly between the civil war and Republic periods.
- Bureaucratic quality–growth association is less negative in the Republic era
- Bureaucratic quality–growth association is more negative during the civil war.

Article History

Received: 17 June 2026

Revised: 21 September 2026

Accepted: 22 September 2026

Published: 19 October 2026

JEL Classification

D73

H11

E02

O47

Keyword

Afghanistan

Bureaucracy

Growth

Independent Administrative

Reform and Civil Service

Commission (IARCSC)

Max Weber

Abstract

This study examines the relationship between bureaucratic quality and economic growth in Afghanistan over the period 1991–2020 using secondary data and an auto regressive distributed lag (ARDL) approach. The analysis examines both the long-run relationship between bureaucratic quality and economic growth and whether this relationship varies across periods characterized by distinct political and institutional conditions. The results show that, contrary to expectations, bureaucratic quality does not have a statistically significant positive effect on long-run economic growth. The findings also show that this relationship varies across political periods. During the civil war period, bureaucratic quality was negatively and significantly associated with economic growth, while this negative relationship was weaker during the republic period. The results further show that the republic period was associated with higher average economic growth. Overall, the findings suggest that the contribution of bureaucracy to economic growth depends significantly on the broader political and institutional environment. Therefore, political stability, security, and the rule of law are important conditions for enhancing the role of bureaucracy in promoting economic growth. The findings also emphasize the importance of strengthening human and physical capital as complementary foundations for long-term economic growth, so expanding education opportunities and skills development for the younger generation, especially girls, is of vital importance.

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Doi: [10.22099/ijes.2026.56440.2127](https://doi.org/10.22099/ijes.2026.56440.2127)



1. Introduction

Public administration in Afghanistan took shape under Sher Ali Khan (1869–79), with reforms under Shah Amanullah (1919–29) and the establishment of administrative courts under Shah Zahir (1933–73) (Gregorian, 1969). However, the system collapsed during the civil war, particularly during the Mujahidin and Taliban periods, and many professional employees fled abroad (BAAG, 2003; Karzai, 2012).

After the fall of the Taliban in 2001, Afghanistan restructured its administration based on the Bonn Agreement (2001). Key reforms included the establishment of the Independent Administrative Reform and Civil Service Commission (IARCSC), with the backing of the World Bank and UNDP, aiming to create a merit-based, rational-legal bureaucracy aligned with Weberian principles. These reforms sought to strengthen accountable and impartial public services (Civil Servants Law, 2008), reduce corruption, attract foreign investment, and eliminate ethnic- and class-based discrimination (Besley, Burgess, 2021; Giustozzi, 2016; Rauch & Evans, 2000).

While extensive global research exists on the relationship between bureaucratic quality and economic growth, studies on Afghanistan remain limited and largely descriptive. This study addresses this gap by analyzing the relationship between bureaucratic quality and economic growth in Afghanistan, a fragile state.

Bureaucracy plays a key role in infrastructure, workforce capacity, technology transfer, and investment management. It is hypothesized that improvements in bureaucratic quality are associated with economic growth. The Republic-era bureaucracy exhibited Weberian characteristics (Cornell et al., 2020). This raises two questions: (1) What was the relationship between bureaucratic quality and Afghanistan's economic growth during the civil war and Republic periods? (2) How did this relationship vary in the presence of weak governance, corruption, political instability, and violence?

This study has three objectives: (a) to assess the relationship between bureaucracy and economic growth (1991–2020); (b) to examine how weak governance and instability affected bureaucratic performance; and (c) to evaluate IARCSC's contribution to bureaucratic quality and its implications for real per capita output (LPCIR). The main objective is to assess IARCSC's successes and shortcomings over 20 years and compare its performance with that of the Civil War period (1991–2001 vs. 2002–2020).

The remainder of the paper is organized as follows: Introduction; Literature Review, with a focus on Afghanistan; Theoretical Framework, including Max Weber's theory and the relationship between bureaucracy and economic development; Research Methodology, covering the treatment of missing data, collinearity issues, and related matters; Findings; Discussion; Research Limitations; Conclusion; and References

2. Literature Review

In this section, we review recent research on this subject, particularly research concerning Third World countries and Afghanistan.

2.1. Bureaucracy and State Capacity

Proponents of government intervention view a strong bureaucracy as a prerequisite for development, while opponents see it as an obstacle (Besley et al., 2022). Fukuyama (2014) considers strong institutions, especially bureaucracy, essential for development. Johnson & Koyama (2017) emphasize the gradual and long-term process of economic development and state-building. Rauch & Evans (2000) found that merit-based recruitment is key to improving bureaucratic performance in 35 developing countries. Singapore is a successful example of reforms that include merit-based recruitment, anti-corruption measures, digitalization, and staff training (Triantafillou, 2016).

2.2. Bureaucracy and Economic Performance

A study of eight South Asian countries found that good governance has a positive effect on human development, including GDP growth, although the effect of government effectiveness was small (Ahmed, 2022). Some findings suggest a small and short-term effect of Weberian bureaucracy on economic growth (Cornell et al., 2020), while others indicate a negative effect of a large bureaucracy through increased government spending (Libman, 2017). A study (Pouramini, 2021) of 118 developing countries shows that the size of the bureaucracy and government spending negatively affect development and increase corruption. In countries such as Jordan, Egypt, and Sudan, administrative reforms have failed (Gebrail, 2026; Oussama Zaïbi, 2024; Ain & Emirates, 1989).

2.3. Political Instability, Conflict, and Bureaucratic Effectiveness

Several studies have examined the impact of war on the Afghan economy. Some have considered foreign aggression to have a positive effect on economic growth (Chang Meng 2024), while others view terrorism as weakening democratic institutions and state capacity (Qazizada and Wani 2020). Barrett (2022) estimates that the economic benefits of peace are equivalent to 50 percent of GDP.

2.4. Afghanistan: Existing Evidence and Research Gap

In the field of bureaucratic reform, a study by Musleh (2023) attributed the success of Georgia and Pakistan to strong political will and recommended that Afghanistan pursue reforms more decisively. Other studies have identified structural weaknesses in the Afghan bureaucracy, including the lack of a strong institutional framework, ineffective leadership, corruption, and a politicized environment (Hakimi, et al, 2004). (Yusufzada & Xia, 2019) assessed the performance of the IARCSC and recommended the establishment of a monitoring committee. However, none of the existing studies have examined the effect of bureaucratic quality on GDP growth as an independent factor. To fill this gap, this study investigates the relationship between bureaucratic quality and economic growth, arguing that administrative reforms can contribute to economic growth by attracting capital, reducing the cost of public services, and expanding the use of modern technologies.

2.5 .Review of 30 Years of Bureaucracy in Afghanistan

Given the limitations of historical data, the development of bureaucracy is examined across two distinct periods:

2.5.1 .Civil War Period (1991-2001)

This period includes the final year of Najibullah's administration, the Mujahidin period (1991–1995), and the Taliban's first period (1996–2001). During this period, the institutional structure of the previous bureaucracy collapsed, and ministries were divided along ethnic and political party lines (Giustozzi, 2016; Meng & Ghafoori, 2024). The Taliban established a system based on ethno-religious loyalty, in which merit was subordinated to loyalty (Sael, 2021; Terpstra, 2020).

2.5.2 .Republic period and the creation of a modern bureaucracy (2002-2020)

Following the adoption of the 2004 Constitution, the Islamic Republic system remained in place until its collapse in August 2021. During this period, state institutions were established, and a rational-legal bureaucracy was developed based on modern administrative standards. Laws were enacted to regulate the competitive recruitment of civil servants, performance evaluation, and merit-based promotion (Civil Servants Law, 2008). However, the system was undermined by political instability, weak governance, widespread insecurity, and pervasive corruption (world bank, 2024). Despite these challenges, institutions such as the IARCSC experienced improvements, including a more highly educated workforce and the introduction of electronic recruitment tests.

3. Theoretical Foundations

State bureaucracy has a long intellectual history, but Max Weber provided the most systematic formulation of bureaucracy as a rational-legal system grounded in formal rules and legal authority. He distinguished among three types of authority—charismatic, traditional, and rational-legal—and argued that modern public administration functions most effectively under rational-legal authority.

Under rational-legal authority, administrative roles are specialized and governed by impersonal rules. Officials are recruited based on merit and qualifications, often through competitive examinations, and a clear separation exists between public office and private interests (Weber, 1947). Such a system enhances predictability, reduces arbitrariness, and improves administrative efficiency. In institutional and economic growth theory, these characteristics are associated with lower transaction costs, more effective policy implementation, and greater economic stability.

In contrast, traditional and charismatic forms of authority rely on personal loyalty, kinship, or exceptional leadership rather than formal rules (Godazgar, 2000; Jabbar, 2022). Bureaucratic structures under such systems tend to be patrimonial and politicized (Peters, 2021). appointments based on political or personal affiliation rather than merit (Weber, 1978). These features weaken institutional capacity and reduce the effectiveness of public administration. This theoretical framework will be applied to the case of Afghanistan in the following sections.

This theoretical framework provides the foundation for distinguishing between periods of fragmented authority and institutional consolidation in Afghanistan and underpins the empirical analysis of bureaucratic quality and economic growth.

4. Research Method

This study employed a comparative-historical method. Using quantitative data and following the approach of [Fomby et al. \(1984\)](#), we examined the relationship between the independent variables and real GDP per capita and then conducted comparative analyses across two periods. For this purpose, econometric analysis was conducted using Stata, the ARDL model, and an interaction term with dummy variables.

4.1. Data Sources

This article is based on secondary data. The study period covers 1991–2020, and annual data were collected. All model data were extracted from the WBI ([The World Bank, 2024](#)), the United Nations (UN) ([United Nations, 2024](#)), and the International Labor Organization (ILO) ([ILO, 2021](#)) databases. Qualitative sources were obtained from Afghanistan laws, historical texts, scientific articles, reputable newspapers, and websites, with most sources collected from the electronic library of Ferdowsi University.

4.2. Variables and Measurement

This study uses dependent, independent, and control variables, as follows:

Dependent Variable: Real GDP per Capita. This variable is used as the dependent variable, reflecting the level of economic performance and serving as a general indicator of material well-being ([World Bank, 2024](#)).

Independent Variable. Bureaucratic Quality: Bureaucratic quality (GE) constitutes the main independent variable and is operationalized using Government Effectiveness from the Worldwide Governance Indicators (WGI) as a proxy. The indicator extends from -2.5 (lowest) to $+2.5$ (highest) ([World Bank, 2024b](#)).

Control Variables: These variables include. Gross Fixed Capital Formation (GFCF): GFCF serves as an alternative indicator of physical capital, representing the portion of output invested in fixed capital and commonly used in growth models ([Mankiw et al., 1992](#)).

Human Capital: Human capital is represented by total enrollment in primary and secondary schools as a proxy, reflecting its effect on the quality and productivity of the workforce. Since human capital is a long-term driver of economic growth, a five-year lag is assumed ([World Bank, 2024b](#)).

Technology: The impact of technology is reflected in increased productivity and efficiency, the promotion of innovation, and the creation of new industries. Productivity improvement is used to measure technological improvement.

Measurement. According to the growth accounting framework, total factor productivity growth is obtained as the residual after accounting for the roles of physical and human capital in output:

$$g_t = \Delta \ln TFP_t = \Delta \ln \left(\frac{Y_t}{L_t} \right) - \alpha \Delta \ln \left(\frac{K_t}{L_t} \right) - \beta \Delta \ln \left(\frac{H_t}{L_t} \right) = \Delta LTFP \quad (1)$$

In the growth accounting framework, L represents the labor force rather than the total population. Total factor productivity (TFP) is calculated as the residual component of output per worker after accounting for the contributions of physical and human capital per worker, as shown in equation 1.

The parameter values for the relevant variables are based on those reported by Mankiw, Romer, and Weil (Mankiw et al., 1992) for developing countries. Since country-specific estimates are unavailable for Afghanistan, the corresponding average values reported by MRW are adopted.

Another variable that must be incorporated into the model is LNGD, defined as the natural logarithm of the sum of the labor-force growth rate (n), technological progress (g), and capital depreciation (δ):

$$LNGD = \ln (n + g + \delta)$$

Due to the lack of sufficiently detailed data for Afghanistan, the capital depreciation rate (δ) and the rate of labor-augmenting technological progress (g) were not estimated directly from Afghan data. Following Mankiw, Romer, and Weil (Mankiw et al., 1992), the capital depreciation rate was set at 0.03 ($\delta = 0.03$), while the technological progress rate was set at 0.02 ($g = 0.02$). These values correspond to the average assumptions used for developing countries in their study.

The labor-force growth rate (n) was calculated using data on Afghanistan's economically active population. The term $n + g + \delta$ was then calculated for each year, and its natural logarithm was subsequently obtained.

However, for some observations, the calculated value of $n + g + \delta$ was negative. Since the natural logarithm is defined only for positive values, a constant adjustment of 0.04 was added to $n + g + \delta$ for all years. Following the adjustment procedure attributed to Smith (1974), the constant was selected to be larger than the absolute value of the largest negative observation, thereby ensuring that the adjusted values were positive. The resulting variable was calculated as:

$$LNGD = \ln(n + g + \delta + 0.04)$$

The resulting *LNGD* variable was subsequently entered into the econometric model.

Meanwhile, the prefix *L* is used to indicate variables expressed in natural logarithmic form, with the exception of *GE*. All monetary variables are converted to constant (real) US dollars to eliminate the effects of inflation and ensure comparability over time.

Types of Regression Models

A multivariate regression framework based on the ARDL model was used to analyze the data. An interaction regression model and relevant statistical tests were also used to compare relationships across political periods. To reduce potential

multicollinearity between the interaction term and its constituent variables, the variables were group-centered before constructing the interaction term (Aiken, & West, 1991).

4.3. Growth Model and Specification

This study was inspired by the growth models of Solow and Barro. The model used was the one proposed by Mankiw, Romer, and Weil (Mankiw et al., 1992). In this framework, human capital enters the model as a variable alongside physical capital. Human capital encompasses formal education and work-related skills (Sargent, 2011). The model is specified by the following Cobb–Douglas function:

$$Y(t) = K(t)^\alpha H(t)^\beta (A(t)L(t))^{1-\alpha-\beta}, \alpha > 0, \beta > 0, \alpha + \beta < 1 \quad (2)$$

In this model, Y represents GDP, H refers to human capital, K to physical capital, L to the labor force, and A to the level of technology. The distinction between this model and the Solow model lies in the inclusion of human capital (H). Equation (2) presents a Cobb–Douglas production function under the assumption of constant returns to scale., where the exponents represent the production elasticity of each input. This model rests on several key assumptions, which are outlined below:

- (1) Holding other factors constant, the marginal returns to capital diminish.
- (2) If all factors increase by the same proportion, the production function exhibits constant returns to scale.
- (3) Technology (A) and labor (L) are exogenous variables, growing at constant rates in the long run.
- (4) Bureaucracy improves productivity (Boulhol, 2004) and can be incorporated into the productivity term.

$$A(t) = A(0)e^{gt}e^{\lambda get}, ge > 0, \lambda > 0 \quad (3)$$

Technology increases labor productivity. Consequently, $A(t)L(t)$ represents the effective labor force in the production process. To transform the variables into effective per-capita terms, each of the three variables can be divided by $A(t)L(t)$. In this way:

$$y(t) = \frac{Y(t)}{A(t)L(t)}, h(t) = \frac{H(t)}{A(t)L(t)}, k(t) = \frac{K(t)}{A(t)L(t)}$$

In this situation, the production function can be written as follows:

$$y(t) = k(t)^\alpha h(t)^\beta \quad (4)$$

Steady State: In this model, savings in human capital and physical capital are used instead of the capital stocks themselves. These variables are expressed as a function of real gross domestic product (gdp). The dynamic equations are as follows:

$$\begin{aligned} \dot{k}(t) &= s_k y(t) - (n + g + \delta)k(t) \\ \dot{h}(t) &= s_h y(t) - (n + g + \delta)h(t) \end{aligned} \quad (5)$$

In a steady state, the above equations equal zero. After substituting the values and solving the equation for the capital values in the steady state, the following values are obtained:

$$k^* = \left[\frac{s_k^{1-\beta} s_h^\beta}{n + g + \delta} \right]^{\frac{1}{(1-\alpha-\beta)}} \quad (6)$$

$$h^* = \left[\frac{s_k^\alpha s_h^{1-\alpha}}{n + g + \delta} \right]^{\frac{1}{(1-\alpha-\beta)}} \quad (7)$$

By substituting the values from equations (6) and (7) into the production function and taking its logarithm, the equation for the level of per capita income is as follows:

$$\ln \left[\frac{Y(t)}{L(t)} \right] = \ln A(0) + g_t + \lambda g e_t - \frac{\alpha + \beta}{1 - \alpha - \beta} \ln(n_t + g + \delta) + \frac{\alpha}{1 - \alpha - \beta} \ln(s_k) + \frac{\beta}{1 - \alpha - \beta} \ln(s_h) \quad (8)$$

The equation shows that the growth of real per capita income depends on technological progress (gt), physical capital (s_k), human capital (s_h), bureaucratic quality (g_e), and the growth-adjusted term $\ln(n + g + \delta)$, denoted by $\ln gd$.

In the revised model, several modifications were made to the specification of the explanatory variables. First, the term gt , which represents the exogenous trend of technological progress, was removed from the equation. The reason for this modification is that technological progress, as an unobservable component of the production function, cannot be directly measured in empirical studies, and incorporating the time trend gt requires the assumption of a constant and exogenous rate of technological progress over the period under study. Given the purpose of this study, which is to examine the relationship between effective governance as a proxy for bureaucratic quality and PCIR, the role of institutional factors in explaining productivity and economic growth is captured through the bureaucratic quality variable (ge). In addition, the physical and human capital variables were modified to reflect better the specific measures used in the empirical analysis. Accordingly, the final specification of the model is presented in Equation (9).

$$\ln pcir_t = \beta_0 + \beta_1 g e_t + \beta_2 \ln g f c f_t + \beta_3 \ln a s e l 5 y_t - \beta_4 \ln g d + \varepsilon \quad (9)$$

4.4. Missing Data and Robustness Check

Data for the main variable, GE, are available from 1996 onward and are reported biennially through 2002. For the missing observations between available data points, linear interpolation was applied using the average of the adjacent observations. For the first five years, for which data were unavailable, missing values were estimated using regression models. The model with the highest R^2 and the lowest MAE was selected for the estimation (Griffiths and Smith, 2006; Bains, 1990).

Table 1 reports the coefficients and their significance levels for GE. It also presents the MAE values calculated using Equation (10) and the estimation model specified in Equation (11).

$$MAE = (1/n) * \sum |y_i - x_i| = \frac{1}{n} * \sum |ger_i - ges_i| = 0.114392 \quad (10)$$

$$ge = \beta_0 + \beta_1 \ln odaf + \beta_2 \ln pr + \varepsilon \quad (11)$$

Table 1. Estimation of bureaucracy quality using net foreign aid and labor productivity

<i>ge</i>	<i>Coefficient</i>	<i>Std. err.</i>	<i>t</i>	<i>P>t</i>	<i>[95%. conf.interval]</i>	
<i>lpr</i>	-.429648	.1068418	-4.0	0.000	-.64886	-.2104
<i>lnodaf</i>	.3439324	.0309892	11.1	0.000	.2803477	.407517
<i>cons</i>	-5.46784	.6096862	-8.9	0.000	-6.71882	-4.2168

Source: Author's calculation

Checking the Robustness of the Results with the Bureaucracy Index: To assess whether the inclusion of the estimated observations affected the results, the model was re-estimated after removing the five estimated observations and using only the actual observations from 1996 onward. As shown in Table 2, removing these observations did not materially change the coefficients, their signs, or the statistical significance of the main variables. Although the R^2 decreased from 0.85 to 0.77 and the F-statistic decreased from 77 to 38, partly reflecting the smaller sample size, the overall model remained statistically significant at the 1% level. These results indicate that the main findings are robust to the exclusion of the five estimated GE observations.

Table 2. Robustness Check: Regression Results Excluding Imputed Observations (Pre-1996 Sample)

<i>ge</i>	<i>Coefficient</i>	<i>Std. err.</i>	<i>t</i>	<i>P>t</i>	<i>[95%. conf.interval]</i>	
<i>lpr</i>	-.429648	.1540627	-2.8	0.011	-.749155	-.11014
<i>lnodaf</i>	.3439324	.0488077	7.05	0.000	.2427113	.445153
<i>cons</i>	-5.46784	.7267794	-7.5	0.000	-6.97509	-3.9606

Source: Author's calculation

4.5. Unit Root Test

Before estimation, a stationarity test is required to avoid spurious regression. Table 3 reports the stationarity results based on the DF-GLS test, which performs well in small samples (Elliott et al., Graham, 1996). For one variable for which the DF-GLS test yielded an inconclusive result, the Phillips–Perron test was subsequently applied. All variables were tested at four lag lengths. Two variables were found to be $I(1)$, while three were found to be $I(0)$. The test results were statistically significant at lags 1 and 3. Two variables were significant at the 1% level, while three were significant at the 5% level. The minimum MAIC value was used to determine the optimal lag length, although the lag length that ensured stationarity sometimes differed from that indicated by the MAIC.

Table 3. Unit root test by DF-GLS

variable	Test	Lag	Test Statistic	1%	5%	10%	Order of Integration
Lpcir	DF-GLS	3	-4.031	-3.7	-3.2	-2.85	I(0)
D_lgfcf	DF-GLS	1	-3.803	-2.654	-2.469	-2.1	I(1)
Lpst	DF-GL	1	-3.32	-3.770	-3.19	-2.8	I(0)
ge	DF-GLS	1	-2.189	-2.652	-1.95	-1.60	I(0)
D_lngd	PP	—	-2.365	-2.655	-1.95	-1.60	I(1)

Source: Author's calculation

4.6. ARDL Model Specification and Diagnostic Tests

Given that the variables are integrated at either I(0) or I(1), the ARDL methodology proposed by Pesaran et al, (2001) is employed. The ARDL framework can be applied to a mixture of I(0) and I(1) variables, as long as none of the variables is integrated at the second order, I(2). The general specification of the ARDL model is presented as follows:

$$\Delta lpcir_t = \alpha + \sum_{i=1}^p \beta_{li} \Delta lpcir_{t-i} + \sum_{j=0}^q \beta_{2j} \Delta ge_{t-j} + \sum_{k=0}^r \beta_{3k} \Delta lasel5y_{t-k} + \sum_{m=0}^n \beta_{4m} \Delta lgfcf_{t-m} + \sum_{h=0}^b \beta_{5h} \Delta lngd_{t-h} + \lambda(lpcir_{t-1} - \theta_1 ge_{t-1} - \theta_2 lasel5y_{t-1} - \theta_3 lgfcf_{t-1} - \theta_4 lngd_{t-1}) + \varepsilon_t \quad (12)$$

In addition, bounds tests were conducted to assess the existence of a long-run relationship among the model variables and the stability of the ARDL model results. Classical diagnostic tests, including tests for autocorrelation, heteroscedasticity, normality of the residuals, and linearity, as well as model stability tests, were also conducted. The optimal lag length was determined based on the Modified Akaike and Bayesian Information Criteria.

4.7. Comparative Interaction Model for the Two Periods

To examine differences between the Civil War and Republic periods, an interactive model was used to compare the two periods. Given the limited sample size (30 observations), alternative model specifications with different combinations of control variables were estimated and compared using the Akaike Information Criterion (AIC) and the Bayesian Information Criterion (BIC) (Akaike, 1973; Schwarz, 1987). In addition, the variance inflation factor (VIF) was used to assess multicollinearity, and group-mean centering was applied to the relevant variables to reduce multicollinearity.

Finally, based on the Akaike and Bayesian information criteria, multicollinearity diagnostics, theoretical considerations, and the principle of parsimony, the final model specification was selected, and some control variables were excluded. This model-selection procedure was applied only to the comparative model for the two periods. In contrast, all variables specified based on the theoretical framework were retained in the main ARDL model.

5. Empirical Results

5.1. Estimation of the ARDL Model

Based on the unit root test results, the ARDL model specified in the methodology section was estimated. Table 4 presents the estimation:

Table 4. Estimation of ARDL model

	D.lpcir	Coefficient	Std.err.	t	P>t	[95% conf.interval]	
ADJ	L1.pcir	-0.5737504	0.1019226	-5.63	0.000	-0.785125	-0.362375
LR	ge	-0.1455815	0.150831	-0.97	0.345	-0.458385	0.167222
	lgfcf	1.133241	0.2761213	4.10	0.000	0.560600	1.70588
	Lpstl5	0.1896333	0.0611118	3.10	0.005	0.062895	0.316371
	lngd	0.0397813	0.0784959	0.51	0.617	-0.123009	0.2025718
SR	cons	-12.31226	2.913476	-4.23	0.000	-18.3544	-6.27008

Source: Author's calculation

5.2. Bounds cointegration test

To examine the long-run relationship (Pesaran et al, 2001), the F-statistic (9.355 exceeds the 1% upper bound critical value (7.185), and the absolute t-statistic (-5.629) exceeds its 1% critical value (-5.082). Therefore, the null hypothesis of no long-run relationship is rejected, and cointegration among the variables is confirmed. See Table 5.

Table 5. Bounds test

	10%		5%		1%		P-value	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
F	2.802	4.116	3.466	4.992	5.141	7.185	0.000	0.002
t	-2.550	-3.663	-2.933	-4.121	-3.738	-5.082	0.003	0.037

Source: Author's calculation

5.3. ARDL Model Findings

5.3.1. General results

The final ARDL model, ARDL (1,0,0,0,0), was estimated with LPCIR as the dependent variable and GE, LGFCF, LPSTL5, and LNGD as the explanatory variables. The model provides a reasonably good fit to the data, with an R^2 of 0.6801 and an adjusted R^2 of 0.6074. The root mean squared error (RMSE) is 0.113. The AIC and BIC were used to determine the optimal lag structure. The mean variance inflation factor (VIF) is 2.82.

The results also indicate a degree of stability across alternative model specifications. Specifically, the signs and statistical significance of the main explanatory variables remain largely unchanged across the alternative specifications selected by the information criteria. This consistency provides further support for the robustness of the main findings.

5.3.2. Error Correction Coefficient

The error correction term (ECT) coefficient is negative (-.573) and highly statistically significant ($p = 0.000$). This shows that approximately 57% of the deviation from the long-run equilibrium is corrected within one period. The

negative and statistically significant ECT confirms the existence of an adjustment mechanism toward the long-run equilibrium.

5.3.3. Long-Run Coefficients

The coefficient on bureaucratic quality is negative and statistically insignificant ($\beta = -0.145581$, $p = 0.345$), indicating a negative long-run association between bureaucratic quality and per capita output, contrary to the expected relationship.

The coefficient on physical capital is positive and statistically significant ($\beta = 1.13$, $p = 0.000$), indicating that a 1% increase in LGFCF is associated with a 1.11% increase in LPCIR.

The coefficient on human capital is positive and statistically significant ($\beta = 0.19$, $p = 0.005$). This indicates that a 1% increase in LPSTL5 is associated with approximately a 0.19% increase in per capita output.

The coefficient on $\ln(n + g + \delta)$, represented by LNGD, is positive but statistically insignificant ($\beta = 0.04$, $p = 0.617$), indicating that there is no statistically significant long-run association between LNGD and LPCIR.

5.4. Classical Assumption Tests

As shown in Table 6, diagnostic tests show that the model meets the standard diagnostic assumptions. There is no evidence of severe multicollinearity, as indicated by the mean VIF of 2.82. The Shapiro–Wilk, Breusch–Pagan, and Breusch–Godfrey tests do not reject the null hypotheses of normally distributed residuals, homoskedasticity, and no serial correlation, respectively. The Ramsey RESET test also provides no evidence of functional-form misspecification. Finally, the CUSUM test shows that the model parameters remain stable over the sample period, as the test statistic (0.6563) remains below the 5% critical value (0.9479). Figure 1 also confirms the stability of the model parameters.

Table 6. Results of the Classical Assumptions Tests

Test	Null Hypothesis (H ₀)	Test Statistic/p-value	Result
Multicollinearity	No severe multicollinearity	Mean VIF = 3.38	Not rejected (VIF < 10)
Normality	Residuals are normally distributed	Shapiro–Wilk (p) = 0.4099	Not rejected (p > 0.05)
Heteroskedasticity	Residuals are homoscedastic	Breusch–Pagan (p) = 0.4705	Not rejected (p > 0.05)
Serial Correlation	No serial correlation in errors	Breusch–Godfrey test p = 0.3961	Not rejected (p > 0.05)
Functional Form	The model has a correct functional specification (no omitted variables)	Ramsey RESET (p) = 0.5168	Not rejected (p > 0.05)
Structural Stability	Coefficients are stable over time (no structural break)	CUSUM Test Statistic = 0.6563 (Critical value at 5% = 0.9479)	Not rejected (0.6563 < 0.9479)

Source: Author's calculation

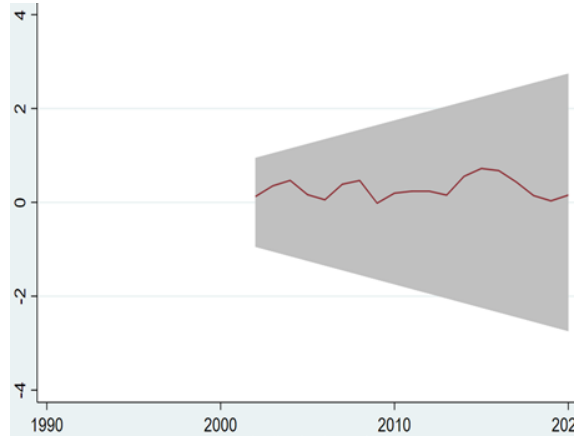


Figure 1. Stability Graph

Source: Author's calculation using Stata

5.5. Structural Break Test

To examine whether a structural change occurred between the two periods, a Wald test for a structural break in 2002 was conducted. The test rejects the null hypothesis of no structural break and confirms the existence of a structural break in 2002 ($\chi^2(1) = 23.6$, $p < 0.001$). As shown in Figure 2, the structural break point is marked by a vertical line.

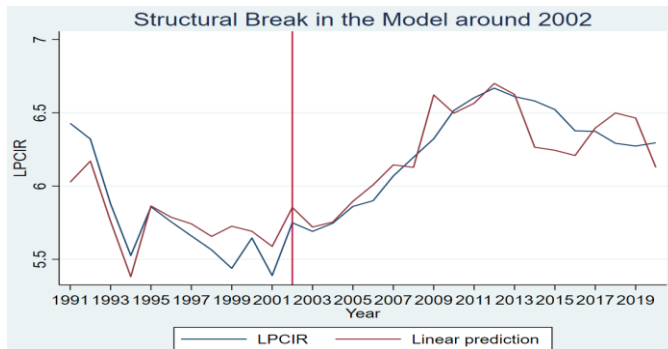


Figure 2. Structural break point in 2002.

Source: World Bank, Database, 2024

5.6. Comparing the Civil War Period with the Republic Period

To examine whether the relationship between GE and LPCIR during the republic period differs from that during the civil war period, an interactive regression model was used. The civil war period was treated as the reference period (baseline), allowing the model coefficients to be interpreted relative to this period. The model included three key variables:

GE: The main explanatory variable, capturing the relationship between bureaucratic quality and LPCIR during the civil war period.

Republic period dummy variable (*d_repub*)

A binary variable distinguishing between the civil war and republic periods.

Interaction term ($GE \times d_repub$): Captures the difference in the relationship between GE and LPCIR between the two periods.

In the initial estimation, strong multicollinearity was observed among GE, the republic period dummy variable, and the interaction term. To mitigate this problem, the number of control variables was first limited to human capital (LPSTL5), as specified in the methodology. GE was then centered within each of the two periods using within-group centering. Following these modifications, the model was re-estimated, and the final coefficients are reported in Table 7. The group means of GE were calculated separately for the two periods and used to center GE within each period.

Table 7. An interactive model for comparing the two periods in terms of bureaucracy quality

lpcir	Coefficient	Std.err.	t	P>t	[95% conf. interval]	
ge_c	-1.630718	0.7005107	-2.33	0.028	-3.073447	-0.1879896
d_repub	0.4751318	0.1000539	4.75	0.000	0.269067	0.6811967
ge_c_repub	1.54543	0.8252766	1.87	0.073	-0.1542586	3.24512
lpstl5_c	0.2413517	0.0769893	3.13	0.004	0.0827892	0.3999142
cons	5.769304	0.0796251	72.46	0.000	5.605312	5.933295

Source: Author's calculation

5.6.1. Comparison Model Findings

5.6.1.1. General Result

The model is statistically significant overall ($F(4,25) = 10.11$, $p = 0.0001$) and shows that approximately 61.8 percent of the variation in real GDP per capita (LPCIR) is explained by the explanatory variables included in the model. The adjusted R^2 value is 0.557, indicating an acceptable level of explanatory power given the number of variables in the model. The average VIF is 3.46, indicating that the model does not suffer from severe multicollinearity.

5.6.1.2. Bureaucratic quality during the civil war

The GE_c coefficient is negative and statistically significant at the 5 percent level ($\beta = -1.6307$, $p = 0.028$). This coefficient indicates a negative and statistically significant relationship between GE and LPCIR during the civil war. Since GE is within-group centered, this coefficient reflects the association between GE and LPCIR during the civil war.

5.6.1.3. Differences in the relationship between GE and LPCIR during the republic period

The most important coefficient for comparing the two periods is the interaction term ($GE_c \times d_repub$), which is positive and statistically significant at the 10 percent level ($\beta = 1.5454$, $p = 0.0729$). Therefore, there is evidence at the 10 percent level that the relationship between GE and LPCIR during the republic period differs from that during the civil war. Since the interaction coefficient is positive, the negative association between GE and LPCIR observed during the civil war is weaker than during the republic period. The estimated association between GE and LPCIR during the republic period is calculated as follows:

$$\beta_{_GE} + \beta_{_GE \times Repub} = -1.6307 + 1.5454 = -0.0853.$$

Is the GE coefficient significant during the republic period? The linear combination test of the GE and interaction coefficients shows that the association between GE and LPCIR in the republic period is not statistically significant ($\beta = -0.0853$, $p = 0.840$). Thus, the negative and statistically significant relationship between GE and LPCIR during the civil war is substantially weakened and approaches zero during the republic period.

5.6.1.4. Coefficient estimate for the republic dummy variable

The coefficient of d_repub is 0.4751 and is statistically significant at the 1 percent level ($p < 0.001$). This coefficient indicates that, at the reference levels of the centered variables, the republic period was associated with a significantly higher level of LPCIR than the civil war period. Given the within-group centering of GE and LPSTL5, this coefficient represents the difference in the level of LPCIR between the two periods at the reference point of the centered variables. Therefore, it should not be interpreted as a causal effect of the republic period on economic growth.

5.6.1.5. Human Capital

The coefficient of LPSTL5, included as a control variable, is positive and statistically significant ($\beta = 0.2414$, $p = 0.004$), indicating a positive relationship between human capital and economic growth.

5.6.1.6. Main comparative result

During the civil war, GE had a negative and statistically significant relationship with economic growth, whereas during the republic period, this relationship was substantially weaker and approached zero. The test of coefficient differences indicates that the relationship between GE and LPCIR differs between the two periods at the 10 percent significance level. However, the relationship between the two variables during the republic period is not statistically significant when considered independently.

6. Discussion

This discussion is presented in two sections: an analysis of the ARDL model and a comparative analysis of bureaucratic quality across the two periods.

6.1. Analysis of the ARDL model

In this section, we examine the coefficients of each independent variable.

6.1.1. Bureaucratic Quality

The association between GE and LPCIR is negative and statistically insignificant in the long run ($\beta = -.14558$, $p = 0.345$) (see Figure 4).

This unexpected and statistically insignificant negative relationship in the long run can be attributed to several institutional and economic factors that could help explain the observed negative association:

Politicization: Despite regulations requiring a non-political identity for IARCSC members, political actors and influential factions, including networks associated with former Mujahidin groups, influenced appointments to senior administrative positions. Such political influence weakened merit-based selection and potentially biased administrative decision-making (Hakimi et al, 2004). Political interference in appointments and dismissals, particularly during the Ghani administration, undermined job security, a key element of Weberian bureaucracy, and likely weakened incentives for productive behavior (Serpa & Ferreira, 2019; Committee, 2020).

Insecurity and political instability: Throughout much of the study period, Afghanistan experienced chronic violence and political instability. Institution-building under such conditions is inherently difficult because state organizations often struggle to maintain administrative capacity and policy continuity (Karzai, 2012). The 2014 elections and the establishment of the National Unity Government weakened executive authority and created additional institutional uncertainty, while violent groups gained greater influence (Gregory, 2022; Kermani, 2021). World Bank data also indicate a negative relationship between government effectiveness and battle-related deaths, used here as a proxy for instability and insecurity (World Bank, 2024b) (see Figure 6).

Salary disparities: The civil service system contained seven different salary categories, with some compensation packages exceeding regular salaries by up to 40 times. In addition, some employees received dollar-denominated salaries through international programs (Hakimi et al, 2004; Andaish & Assadi, 2024). These disparities may have weakened organizational commitment by creating perceptions of unfairness among civil servants, while also increasing incentives for rent-seeking behavior. As a result, the effectiveness of administrative reforms may have been limited.

Weak rule of law and corruption: Some institutions, including the General Affairs Administration, deviated from the new salary system and sought additional privileges through presidential decrees. During the Ghani administration, the expansion of administrative positions without corresponding increases in organizational output contributed to higher public expenditure and administrative expansion (Bamyani, 2017; Pouramini, 2021; Libman, 2017). Corruption became widespread across public institutions (Rahmani & Tytarenko, 2018), while administrative reforms intended to reduce corruption coincided with continued corruption challenges and weakening rule of law (Figure 7).

In sum, under conditions of politicization, insecurity, unequal compensation structures, and weak rule of law, Weberian bureaucratic reforms may fail to generate improvements in administrative effectiveness, corruption control, or economic performance. Similar challenges associated with administrative reforms have been observed in countries such as Jordan, Egypt, Sudan, and Bangladesh (Jreisat, 1989). Furthermore, a study by Cornell et al. (2020) found limited evidence of a robust long-term relationship between bureaucratic quality and economic growth.

Mechanisms Limiting the Effectiveness of Weberian Bureaucratic Reforms: The long-term negative association between GE and LPCIR can also be

understood through several organizational and institutional mechanisms. Political interference, unequal compensation systems, and weak enforcement of laws can undermine employees' perceptions of fairness and reduce their commitment to public service. When appointments and rewards are influenced by political connections or favoritism rather than merit, trust in public institutions and administrative procedures may decline. These conditions can weaken incentives for effective performance and increase reliance on informal networks and rent-seeking strategies.

Furthermore, persistent insecurity and political instability can generate uncertainty about employment, institutional continuity, and future expectations. Such conditions encourage short-term survival strategies rather than long-term commitment to administrative goals. Therefore, even formally well-designed Weberian reforms may fail to improve bureaucratic performance or generate stronger economic outcomes when implemented within weak institutional environments. The ultimate consequence may be the erosion of state capacity, weakening of the rule of law, persistence of corruption, and decline in government social capital.

6.1.2. LNGD

The long-run relationship between LNGD ($n+g+\delta$) and LPCIR is, contrary to theoretical expectations, positive but statistically insignificant ($\beta = 0.04$, $p = 0.617$). According to the theoretical specification presented in equations 8 and 9, the expected coefficient of this variable was negative. The partial correlation also indicates a positive relationship (.30), although this association is statistically insignificant ($p = 0.128$) (Figure 5).

6.1.3. Physical capital

The long-run relationship between LGFCF and LPCIR is positive and statistically significant ($\beta = 1.13$, $p = 0.000$). This result is consistent with the observed pattern of physical investment. In a post-conflict economy such as Afghanistan, where infrastructure and capital stocks have experienced substantial deterioration, physical capital formation is likely to play an important role in supporting production capacity (Figure 3). The magnitude of the coefficient suggests that LGFCF is an important factor in explaining variations in economic growth.

6.1.4. Human capital

The relationship between human capital and LPCIR is well established in the economic growth literature. However, in a post-conflict and severely constrained economy such as Afghanistan, it is understandable that the positive and statistically significant relationship between human capital and LPCIR ($\beta = 0.19$, $p = 0.005$) is smaller than that of physical investment. In such contexts, the productivity effects of human capital accumulation may depend partly on complementary physical infrastructure, including transportation networks, telecommunications, banking systems, and other essential facilities.

6.2. Two-period comparison analysis

To compare the two periods, an interaction model with within-group centering was used to reduce multicollinearity. This substantially reduced multicollinearity among the variables; the highest VIF was 4.95, while the mean VIF was 3.46. The residual collinearity between a variable and its interaction term after centering is largely due to the interaction structure and is less concerning than the underlying multicollinearity among the explanatory variables (Bradley & Srivastava, 1979).

The negative and statistically significant coefficient on bureaucratic quality during the civil war period ($\beta = -1.631$, $p = 0.028$) is consistent with the institutional context of Afghanistan during this period. The prolonged conflict severely weakened state institutions and administrative capacity, thereby limiting the bureaucracy's ability to implement policies, deliver public services, and support economic activities. Therefore, the negative relationship between bureaucratic quality and per capita output is consistent with the institutionalist perspective, which emphasizes the role of effective institutions and state capacity in supporting economic performance (Fukuyama, 2007; North, 1990).

The historical trend in bureaucratic quality also supports this interpretation. As shown in Figure 4, bureaucratic quality improved rapidly in the early years of the republic, coinciding with the establishment of the IARCSC. However, this improvement was not sustained, and GE subsequently declined, with only a temporary recovery following the 2014 political transition. Its downward trend then continued until the end of the republic.

Descriptive statistics further support the distinction between the two periods. As shown in Table 9, the average GE during the civil war period (-2.053) was significantly lower than during the First Republic (-1.375) and Second Republic (-1.411). Therefore, the lack of a statistically significant relationship between GE and LPCIR during the republic should not be interpreted as indicating that bureaucratic quality was worse during the republic. Instead, the results show that the relationship between GE and LPCIR differed between the two periods. In addition, the positive and statistically significant coefficient of the Republic dummy variable ($\beta = 0.475$, $p < 0.001$) indicates an association between the Republic period and higher LPCIR relative to the Civil War period.

Table 8. Comparison of bureaucratic periods based on some statistical indicators

Period	Mean	Min	Max
Civil war Period (1991-2001)	-2.05255	-2.175167	-1.761806
Republic Period (First Period - Karzai) (2002-2013)	-1.375446	-1.587687	-0.9098887
Republic Period (Second Period - Ghani) (2014-2020)	-1.411131	-1.585145	-1.254182

Source: (World Bank, 2024)

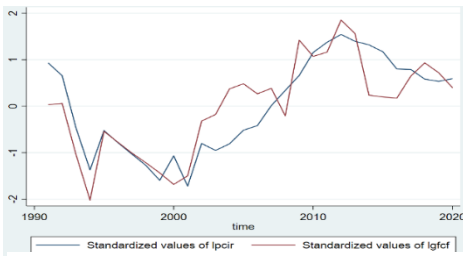


Figure 1 Relationship between lgfcf and lpcir

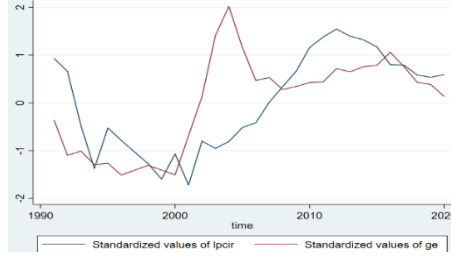


Figure 4. Relationship between ge and lpcir

Source: Source: Author's calculations based on World Bank data

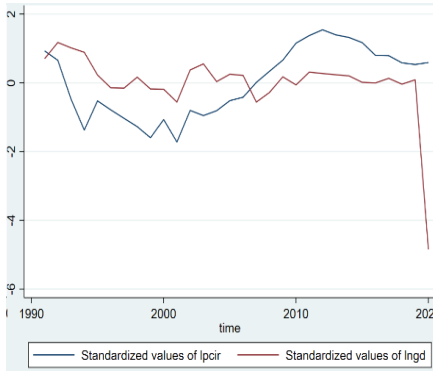


Figure 5. Relationship between lngd and lpcir

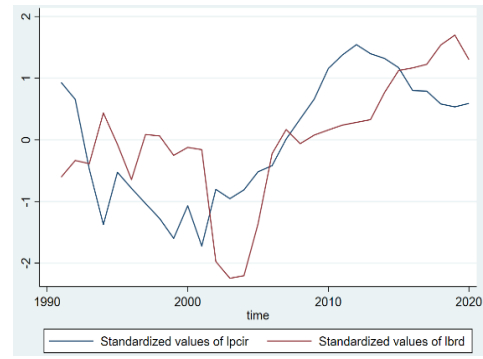


Figure 6. Relationship between lbrd and lpcir

Source: Source: Author's calculations based on World Bank data

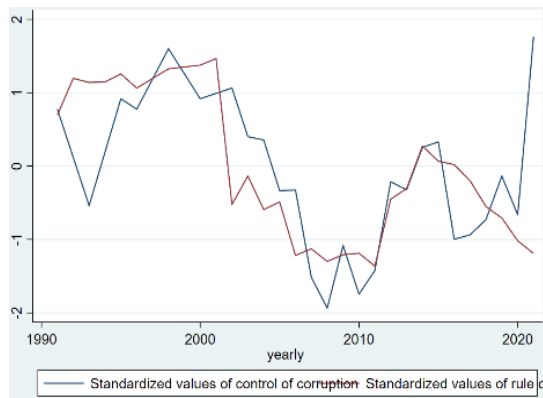


Figure7. Relationship between rule of law and corruption

Source: Source: Author's calculations based on World Bank data

6.3. Research Limitations

6.3.1. Data and Indicators

Key variables rely on international estimates that may not fully capture informal economic activities. In Afghanistan, approximately 90 percent of financial transfers are informal (Sahebe, 2020). This reflects the prominent role of the

informal sector in the Afghan economy and may limit the extent to which international estimates capture actual economic activity.

There are also limitations to using total enrollment in primary and secondary schools as a measure of human capital. Enrollment does not necessarily imply continued participation in education or the acquisition of actual skills and knowledge.

There are also limitations to using total enrollment in primary and secondary schools as a measure of human capital. Enrollment does not necessarily imply continued participation in education or the acquisition of actual skills and knowledge. Furthermore, during the civil war period, some private or informal educational activities may not have been recorded in official statistics, which could have led to an underestimation of the actual level of human capital (Education, 2015).

Another limitation concerns the measurement of physical capital. Gross fixed capital formation includes new investment but does not account for the destruction of existing physical capital caused by war. During the civil war period, significant amounts of physical capital were destroyed (Garwood, 2006; Thorne, 2018). During the republic period, the destruction of schools, bridges, buildings, and other infrastructure by armed opposition groups may also have reduced the physical capital stock (SIGAR, 2016). These losses reduce net additions to the capital stock. They are not directly captured by gross fixed capital formation, which can lead to an overestimation of the effective capital available for production.

6.3.2. Time-Related Limitations

The small sample size and missing data are limitations of this study. The Government Effectiveness Index (GE), used as a measure of bureaucratic quality, is available only from 1996 onward (World Bank, 2024a) and requires estimates for the years 1991–1995, which introduces uncertainty into the results. In addition, data for the civil war period are less reliable due to the lack of a central government. Furthermore, the limited variation in GE for Afghanistan (from -2.18 to -0.91) may reduce statistical power. Finally, GE is an indirect measure of bureaucratic quality and may not fully capture the broader dimensions of bureaucratic quality and administrative capacity.

6.3.3. Statistical Limitations

Despite using multiple sources to verify the data, the 97% correlation between official LPCIR data and nighttime light indicators (World Bank, 2024; Saenger et al., 2024) does not eliminate measurement error. Nighttime light is an indirect indicator of economic activity and may not fully capture changes in household well-being or economic conditions, particularly in areas with limited access to electricity. In addition, differences in data coverage, reporting quality, and measurement methods across sources may introduce further uncertainty into LPCIR estimates.

7. Conclusion and Recommendations

This study aims to investigate the relationship between GE and LPCIR in a crisis-ridden and insecure country such as Afghanistan over the past 30 years. The

central research question is: Has Weberian bureaucratic quality been associated with production growth in Afghanistan? The long-run association between GE and LPCIR is negative and insignificant ($-.14558$, 0.345). Furthermore, the relationships between the control variables—including physical capital (LGFCF), and human capital (LPSTL5)—and LPCIR are positive and significant, while LNGD is insignificant. These findings indicate that long-run output growth is associated with increased investment, improved education and skills among the labor force.

A group-centered model with an interaction term was used to compare the two periods. During the civil war period, the relationship between GE and LPCIR was negative and statistically significant ($\beta = -1.6307$, $p = 0.028$). This result suggests that, under conditions of war and institutional weakness, lower bureaucratic quality was associated with poorer economic performance. Such a relationship may reflect the weakening of the government's capacity to provide public services and effectively implement development programs during this period.

During the republic period, alongside the implementation of administrative reforms, the estimated association between GE and LPCIR remained negative but became much smaller and statistically insignificant ($\beta = -0.0853$). Thus, compared with the civil war period, the negative relationship between GE and LPCIR was substantially weakened. This change, together with the positive and marginally significant coefficient of the interaction term ($\beta = 1.5454$, $p = 0.0729$), indicates that the relationship between GE and LPCIR differed between the republic and civil war periods. However, the reduction in the negative value of this coefficient does not imply a positive and significant correlation. Instead, the findings suggest that the observed improvements in bureaucracy during the republic period were associated with a less negative coefficient of institutional weakness. Nevertheless, political instability and insecurity may have prevented improvements in administrative capacity from translating into sustainable economic growth.

Accordingly, it is recommended that responsible authorities, in addition to ensuring security and stability, invest in the education and skills development of the workforce. To promote public welfare and achieve sustainable economic growth and development in the future, expanding educational opportunities and skills development for the younger generation, particularly women and girls, is of vital importance. Restricting girls' access to education will hinder the progress and advancement of future generations.

Acknowledgement: The authors acknowledge that artificial intelligence tools (such as ChatGPT) were used solely for English language editing in this article.

Author Contributions

Mohammad Amir Noori: Conceptualization, methodology, data collection, formal analysis, and writing—original draft. Mostafa Salimifar: Supervision and review of the manuscript. Seyed Mohammad Javad Razmi: Oral feedback and critical comments. Ali Cheshomi: Supervision.

Acknowledgements

The authors would like to express their gratitude to all individuals and institutions

that provided valuable comments and suggestions during the preparation of this manuscript.

Ethical Approval

This article does not involve any studies with human participants or animals, and all data were obtained from reliable secondary sources.

Conflicts of Interest

The authors declare that they have no conflicts of interest related to this research.

Funding

This research received no external financial support.

Research Data Policy and Data Availability:

All data used in the study were extracted from publicly available sources (World Bank, International Labor Organization, and UN data) and can be provided by the corresponding author upon request.

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