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The Balancing Act: Can Corruption Control and the Accountability Save Public Efficiency in India?

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Denge Oyunu: Yolsuzluğun Kontrolü ve Hesap Verebilirlik Hindistan'da Kamu Verimliliğini Kurtarabilir mi?

Öz

Yolsuzluk, hukukun üstünlüğü, hesap verebilirlik ve kamu harcamalarının denetimi genellikle hükümet etkinliğini olumlu yönde etkileyen unsurlar olarak gösterilmektedir. Ancak, son çalışmalar bu değişkenler arasındaki karmaşık etkileşimi göstermektedir. Bu bağlamda, çalışmanın amacı söz konusu faktörlerin Hindistan'da hükümet etkinliği üzerindeki etkilerini değerlendirmektir. Bu çalışma, 2002–2023 dönemi için Hindistan'da yolsuzluk, hukukun üstünlüğü, hesap verebilirlik ve kamu harcamalarının denetiminin hükümet etkinliği üzerindeki etkilerini Gecikmesi Dağıtılmış Otoregresif (ARDL) Sınır Testi modeli ile incelemektedir. Bulgular, yolsuzluğun kontrolü ve hükümet harcamaları hükümet etkinliğini pozitif etkilerken, hesap verebilirlik ise hükümet etkinliğini negatif etkilemektedir. Son olarak, Hindistan'da hukukun üstünlüğünün ise hükümet etkinliğini etkilemediği bulunmuştur. Bu bulgular, hesap verebilirlik ve harcama denetimi alanlarında mevcut uygulamaların reforme edilmesi gerektiğini, çünkü bu alanlardaki sorunların hükümet etkinliği üzerinde olumsuz sonuçlar doğurduğunu göstermektedir.

Anahtar Kelimeler: Hükümet etkinliği, yolsuzluğun kontrolü, hesap verebilirlik, kalkınma, ARDL.

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Abstract

This study investigates the effects of corruption (COR), rule of law (ROL), voice and accountability (VOA), and government spending control (GOF) on government effectiveness (GOE) in India between 2002 and 2023 using the ARDL Bounds Testing approach. The results show that reducing COR and managing GOF positively influence GOE, while VOA has a negative impact. Surprisingly, ROL appears to have no significant effect on GOE in India. These findings suggest that existing practices related to VOA and GOF require reform, as inefficiencies in these areas hinder government performance. Therefore, the study recommends public policy efforts focus on curbing corruption and enhancing the role of law to foster more effective governance and institutional development in India.

Keywords: Government effectiveness, control of corruption, accountability, development, ARDL.

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1. Introduction

Measuring government performance has emerged as a subject of growing academic and policy interest in recent years. Within this context, key components such as public sector efficiency, accountability, a robust legal framework, and the effective allocation of public expenditures have gained prominence. Democratic principles (freedom of expression, accountability, transparency, and responsiveness) alongside state capacity rule of law (ROL), control of corruption (COR), and the implementation of sound policies) play a pivotal role in enhancing the sustainability of governmental performance and enhancing the ın general quality of governance (Ramesh & Vinayagathasan, 2023).

Acemoglu and Robinson (2012), along with Rodrik (2008), clearly demonstrate the strong link between government performance and high-quality governance. While the significance of governance quality as a fundamental development objective is widely acknowledged, its specific role in enhancing government performance remains insufficiently understood, despite an extensive body of literature. Improving institutional performance and governance quality exerts a profound influence on development indicators and government effectiveness (GOE) in the long run. Nevertheless, adverse conditions—such as destructive policy choices, high inflation, black market premiums, and persistent budget deficits—continue to pose significant challenges to government performance and economic growth, particularly in developing economies (Acemoglu & Robinson, 2012; Fisman & Gatti, 2006).

Improved governance is approached through a comprehensive public administration framework that emphasizes greater public participation, efficient management of public funds, enhanced institutional performance, and the advancement of public service delivery (OECD, 2021). Kaufmann and Lafarre (2021) define this concept as a governance reform strategy aimed at making public institutions more accountable, transparent, effective, and inclusive. The literature highlights several key dimensions of improved governance, including anti-COR measures, strengthening accountability (VOA) mechanisms, empowering local governments in public service provision, ensuring the efficient and effective use of public resources, upholding the ROL, and restructuring public service delivery systems (Grindle, 2007).

Regardless of the ongoing debates surrounding the interpretation of governance concepts and indicators, improved governance is widely understood as a process grounded in a “partnership” between citizens and the state, aimed at ensuring that governmental functions are carried out in a more transparent, responsive, and effective manner (OECD, 2021). Citizen engagement in the governance process is considered a cornerstone for fostering better governance. According to scholars, citizens play a pivotal role by promoting bottom-up accountability, providing resources and feedback that enhance GOE, and actively contributing to anti-corruption efforts through their participation (Hood & Heald, 2006).

Key indicators of improved governance include provider accountability, COR control through transparency, stakeholder voice, and organizational effectiveness. While these indicators may not offer a comprehensive picture of a nation’s overall governance status, they are widely recognized as foundational pillars for fostering better governance and play a critical role in strengthening a country’s governance capacity (De Grauwe, 2012). Control of public spending (GOF) has significant implications across a range of domains, including ROL, regulatory quality, economic development, environmental protection, and energy utilization (Gholipour & Farzanegan, 2018).

An effective system of governance supports economic growth by reducing the size of the informal economy and enhancing both bureaucratic quality and the ROL, while also significantly curbing COR. Jamalmanesh et al. (2014) emphasize that well-established governance mechanisms designed in this

direction play a vital role in achieving development objectives, generating both economic and social benefits.

According to Han et al. (2014), developing countries must prioritize reforms such as establishing a more effective governmental structure, strengthening the ROL, and implementing robust anti-COR measures in order to overcome governance crises and foster sustainable economic growth. COR not only hampers the pace of economic expansion and limits opportunities for the younger population, but also severely undermines public trust in democratic institutions and the ROL (Sukhtankar & Vaishnav, 2015). In environments where COR is widespread, citizens often feel deceived, perceive their taxes as being misused, and view the government as lacking accountability. Such perceptions can erode confidence in public institutions, threatening both economic and social stability. Historically, the belief that taxes were unjustly burdensome or misappropriated has sparked numerous tax revolts, underscoring the profound impact of perceived governance failures.

Studies focusing particularly on developing countries demonstrate that strengthening governance mechanisms contributes directly to economic growth (North, 1990; Acemoglu & Robinson, 2012). India, with its vast population and complex federal administrative structure, stands out as a country requiring significant policy reforms in the efficient allocation of public resources and governance practices (Dreher & Schneider, 2010). However, there is a limited body of research that explores in depth the relationship between GOE, control of COR, and the ROL specifically within the Indian context. Despite having a large economy, India continues to face profound structural challenges in governance quality, anti-COR efforts, and the enforcement of the ROL (Mukherjee & Sah, 2021).

Elements such as public administration efficiency, VOA, and transparency are among the key factors influencing India's economic development and political stability (Kaufmann & Kraay, 2024). Historically, COR has remained a persistent issue in India, becoming entrenched in the socio-political fabric of the country. In this regard, COR is widely regarded as a structural and enduring problem within the Indian subcontinent. Notable scandals such as the 2G spectrum licensing and coal allocation cases have underscored the urgent need for greater transparency and VOA in public administration (Vittal, 2012).

Furthermore, India's federal structure, large population, and regional variations in governance practices make the evaluation of government performance all the more critical (Banerjee & Duflo, 2019). According to Transparency International's 2024 COR Perceptions Index, India ranks 96th out of 180 countries, with a score of 38, placing it among nations where COR remains widespread and exerts a negative influence on governmental efficiency (TI, 2025). This situation not only highlights the extent to which COR has become a deeply embedded societal issue, but also reflects growing public skepticism toward democratic institutions, raising serious concerns about the system's long-term resilience in the face of such deterioration.

This study aims to explore the complex nexus between GOE, the control of COR, and the ROL in the context of India. In addition, the analysis is extended by incorporating variables such as VOA and government expenditure. Existing literature predominantly focuses on developing Asian countries; however, to the best of our knowledge, no prior research has specifically investigated the effectiveness of government in India a South Asian country that having a large economy and accounts for nearly 18% of the global population through the lens of COR control and the ROL. Accordingly, this study seeks to contribute to the literature by examining GOE in India from the perspective of COR control, ROL, VOA, and public expenditure. The study spans the years 2002 to 2023 and utilizes the ARDL bounds testing methodology in conjunction with an error correction model to examine both short-term dynamics and long-term equilibrium associations among the selected variables.

The paper is organized into five main sections. Section II delivers a comprehensive review of the existing literature. Section III outlines the data set and the model specification, elaborating on the methodological framework applied in the estimation procedure. Section IV presents the empirical results, accompanied by an in-depth interpretation of the findings. Lastly, Section V summarizes the key conclusions and puts forward policy-oriented recommendations.

2. Theoretical Framework

In contemporary governance, states are responsible for carrying out public functions, including defense, education, healthcare, security, and justice. As the role of the state in both economic and social spheres continues to expand, public expenditures have correspondingly increased, heightening the need for financial resources. Given the limitations of natural resource reserves, most governments meet their financing needs through taxation and other fiscal obligations. This growing fiscal responsibility underscores the necessity for government accountability. The diversification of public services has led to a corresponding diversification in public revenue sources. Consequently, certain terminologies once exclusive to the private sector such as “efficiency” “and productivity” have increasingly been adopted in public sector discourse. With the rise of the “New Public Management” approach, the concept of governance has become integral to public administration (Arslaner & Karaca, 2017). According to the Oxford Dictionary (2025), governance refers to the activity of managing a country or controlling an organization. In the public sphere, governance implies the inclusion of all stakeholders in state administration. The aim of governance is to improve institutional frameworks, ensure economic efficiency, promote sustainable growth, and maintain financial stability. Achieving these objectives requires all parties involved in governance to fulfill their roles effectively and uphold principles of accountability. At the core of the governance paradigm lies the concept of efficiency (OECD, 2023). Therefore, it is essential to evaluate whether public services are being delivered in an efficient, economical, and productive manner through the use of various assessment techniques (Falay, 1997). Effective governance in the public sector depends on ensuring accountability, transparency, and the implementation of monitoring and control mechanisms. It also requires inclusive decision-making processes and the firm establishment of the ROL (Arslaner & Karaca, 2017).

In recent years, India has frequently drawn attention due to its challenges with COR, as well as a consistent rise in tax evasion and revenue losses in both personal and corporate income taxation (Mukherjee & Sah, 2021). The literature identifies several key components of good governance, including anti- COR efforts, enhanced accountability, efficient and effective management of public resources, and the upholding of the ROL (Grindle, 2007). Within the institutional governance model, assessing whether the ROL is adequately upheld is crucial. In this regard, the World Justice Project (WJP) provides valuable insights through its comprehensive measurements. The WJP conducts surveys with households, legal practitioners, and experts worldwide and publishes the findings annually under the title “ROL Index” (WJP, 2025a). Although the WJP Index may not fully capture every aspect of legal governance, it nonetheless serves as a meaningful reference point for assessing the degree to which countries adhere to the principles of the ROL. Table 1 presents India's rankings and corresponding index scores for selected dimensions of the ROL Index during the period from 2015 to 2023, highlighting the country's performance relative to other nations.

Table 1. WJP ROL Rankings: India (2015–2023)

Years	2015	2016	2017-2018	2019	2020	2021	2022	2023
Total Countries Surveyed	102	113	113	126	128	139	140	142
Overal Rule of Law Index	57(0,51)	66(0,52)	63 (0,52)	68 (0,51)	69(0,51)	79(0,50)	77(0,50)	79(0,49)
Constraints on Government Powers	38(0,62)	35(0,64)	36 (0,63)	40 (0,61)	41(0,61)	52(0,59)	52(0,58)	58 (0,57)
Absence of Corruption	71(0,41)	71(0,44)	67 (0,45)	80 (0,43)	85(0,42)	95(0,40)	93(0,40)	96 (0,40)
Open Government	31(0,63)	28(0,66)	32(0,63)	34 (0,61)	32(0,61)	40(0,60)	43(0,59)	42 (0,59)
Fundamental Rights	62(0,54)	81(0,50)	75 (0,52)	75 (0,53)	84(0,51)	93(0,49)	94(0,47)	99 (0,46)
Criminal Justice	43(0,49)	68(0,42)	66 (0,42)	77 (0,40)	78(0,40)	86(0,39)	89(0,39)	93 (0,37)

Source: WJP, (2025b).

The ROL Index ranges from 0 to 1, with values closer to 1 indicating a country's stronger alignment with the ideal standards in the assessed dimensions. As shown in Table 1, India ranked 57th out of 102 countries in 2015 in the overall ROL Index. By 2023, its position declined to 79th among 142 countries, indicating that India ranks behind approximately 55% of the evaluated nations and thus occupies a mid-tier position globally. In the category of *constraints on government powers*, which reflects the degree of checks and balances exercised by the legislative and judicial branches over the executive, India ranked 38th out of 102 countries in 2015 and 58th out of 142 in 2023. Despite the decline, India still performs relatively well in this dimension, suggesting the presence of a comparatively developed democratic structure. This is further supported by its performance in the *open government* and *fundamental rights* indicators. Conversely, India's ranking in the *absence of COR* dimension deteriorated from 71st in 2015 to 96th in 2023. This places India behind approximately 70% of countries, with an average score hovering around 0.40 indicating significant room for improvement in combating COR. In this context, the country's weak deterrent mechanisms and oversight systems are reflected in poor outcomes in both *absence of COR* and *criminal justice* indicators. Although India shows relatively strong performance in indicators such as *constraints on government powers* and *open government*, its weak scores in *criminal justice* and *absence of COR* suggest that enforcement mechanisms are insufficient to prevent and penalize corrupt practices effectively. Between 2015 and 2023, while dimensions such as the ROL, fundamental rights, and constraints on government powers have seen deterioration especially in recent years some modest improvements in the control of COR have been observed. This seemingly paradoxical trend may be attributed in part to the rise of digitalization. The increasing integration of digital tools in public institutions has the potential to

enhance oversight, streamline administrative procedures, and reduce discretionary power, thereby contributing to COR prevention through improved transparency and accountability.

COR exists in various forms across the world but is particularly prevalent in countries with weak institutions, political fragility, or those affected by conflict (World Bank, 2020). COR covers many behaviors such as taking bribes, using public resources for personal interests, and obtaining private profit. (World Bank, 2020). In a more nuanced sense, COR involves political actors or public officials engaging in actions outside their formal responsibilities such as selectively accelerating bureaucratic processes in order to derive personal advantage. While COR often manifests through individual actions such as bribery, nepotism, and rent-seeking, it can also be motivated by political or ideological objectives (Adaman et al., 2001). Several factors contribute to the emergence and persistence of COR, including the size of the public sector, low public sector wages, weak oversight mechanisms, inadequate punitive measures, economic volatility, poverty, high inflation, unequal income distribution, the scale of the informal economy, limited competitiveness, and the forces of globalization (Güney, 2013). COR not only erodes ethical standards and societal cohesion, but also fuels broader security threats by facilitating organized crime, terrorism, money laundering, and drug trafficking. Moreover, it presents profound social and political consequences, undermining public trust and contributing to systemic dysfunction (Taşar & Çevik, 2017). From an economic perspective, COR increases uncertainty in the business environment, discourages investment, disrupts fair competition, and places strain on public finances. Additionally, it exacerbates income inequality and weakens the implementation of environmental protection policies, thereby hindering sustainable economic growth and social welfare (European Commission, 2024).

COR is a widespread phenomenon across all societies, yet its prevalence varies significantly among countries. One of the primary determinants of this variation is the quality of institutions (Acemoglu & Robinson, 2012). In general, developed countries possess robust institutions that prevent the capture of state mechanisms by specific interest groups seeking to protect their private benefits. In contrast, institutions in poorer nations tend to be weaker and are often dominated by such groups, creating structural barriers that inhibit citizens from achieving higher levels of prosperity. As a result, COR functions as an institutional impediment that not only obstructs national wealth accumulation but also exacerbates social inequality, making the fight against COR a matter of critical importance. The prevention of COR fundamentally relies on the establishment of transparency and VOA within the public sector, as well as the comprehensive strengthening of the ROL. The ROL can only be realized through adherence to the principles of constitutionalism and legal predictability. A state governed by the ROL operates under predetermined and foreseeable rules, providing legal security for individuals against arbitrary state actions (Erdoğan, 2011). This principle emerged from the necessity to limit state power in favor of protecting individual rights and freedoms (Çağan, 1982). In a rule-of-law-based state, legal frameworks ensure that any governmental intervention in the economic, social, or legal domains of individuals is predictable and does not disrupt their future plans (Constitutional Court of Turkey, 2015). Knowing that the state cannot act arbitrarily provides individuals with a sense of legal security (Erdoğan, 2011). However, such security can only be guaranteed if all branches and institutions of the state strictly adhere to legal norms (Çağlar, 2013). Another critical component of the ROL is the principle of legal certainty, which mandates that government actions be clearly defined in terms of purpose and scope, allowing individuals to anticipate possible state interventions in their rights and freedoms (Taylar & Artun, 2022). Developing countries, in particular, must undertake institutional reforms aimed at building more effective governments, strengthening legal frameworks, and controlling COR to overcome governance crises and achieve sustainable economic growth (Han et al., 2014). Among the most effective strategies for achieving these goals is the advancement of the ROL.

Indeed, the ROL plays a foundational role in virtually all aspects of societal governance—from fighting COR and ensuring justice to safeguarding security, protecting human rights, fostering accountability, and enhancing governance systems (WJP, 2025c).

3. Literature Review

Although efforts to enhance governance effectiveness have gained momentum in developing countries in recent years, the scarcity of empirical research in this domain remains notable (Ramesh & Vinayagathasan, 2023). A substantial body of literature has explored the determinants influencing GOE. Within this scope, numerous key factors have been highlighted, including the nature of bureaucratic systems (Court et al., 1999; Rauch & Evans, 2000), socio-cultural diversity particularly in terms of religion and ethnicity levels of transparency and openness (Brunetti & Weder, 1999; Islam & Montenegro, 2002), and the implementation of administrative reforms (Brewer, 2004). Additionally, democratic governance (Brewer & Choi, 2007), as well as concerns surrounding COR and political accountability, have also been identified as essential contributors (La Porta et al., 1999; Haque, 2001; Adsera et al., 2003; Fisman & Gatti, 2006; Han et al., 2014; Jamil et al., 2013; Samaratunge et al., 2008).

Studies conducted by Aidt et al. (2008), Méndez and Sepúlveda (2006), and Fisman and Gatti (2006) Show that the impact of COR on government performance is not linear, and strongly influenced by the quality of political institutions and the type of political regime in place.

Research has consistently shown that the quality of governance is strongly and favorably related to both economic growth and GOE (Gerring et al., 2011; Persson & Tabellini, 2006). Core components of governance quality include impartiality, low levels of COR, and a system grounded in the ROL. These elements are not only vital for enhancing institutional performance but also play a crucial role in fostering public trust in government institutions (Park, 2017). GOE is typically assessed based on several criteria, such as transparency in access to government information, fiscal discipline, cost-effective service delivery, the administration of justice, and the provision of high-quality public services.

In the last quarter-century, the extensive implementation of governance reforms has positioned GOE as a pivotal theme in public sector research (Farazmand, 2017; Haque, 2001; Ingraham & Moynihan, 2000; Lee & Whitford, 2009). According to Kaufmann et al. (2000), governance encompasses the norms and institutional frameworks through which authority is exercised within a country. Their conceptualization includes three core dimensions: (1) the mechanisms through which governments are appointed, scrutinized, and changed; (2) the ability of public institutions to design and execute sound policies; and (3) the degree of public trust in institutions governing economic and social interactions between the state and its citizens. Among these dimensions, particular emphasis is placed on a government's policy implementation capacity and institutional trust in the context of GOE-related research.

The literature suggests that effective governmental institutions play a pivotal role in promoting economic growth (Fisman & Gatti, 2006; Mauro, 1995; North, 1990; Shleifer & Vishny, 1993). However, COR is often identified as a adverse component that undermines governance quality, impairs the delivery of public services, and disrupts the policy-making process. Moreover, by fostering rent-seeking behavior, COR distorts the structure of public expenditures and can exert a particularly adverse effect on economic growth in low-income countries.

By analyzing data from 71 countries, Cooray (2009) demonstrated the positive effects of the nexsus between GOF and governance quality on economic growth. The results suggest that nations possessing higher levels of governance quality tend to utilize public resources more efficiently, and increased public spending is generally associated with better governance practices. These results suggest that

the effectiveness of government expenditure depends not only on its volume but also on the extent to which it is supported by strong governance frameworks.

Although various models have been developed in the literature to explain government expenditure efficiency (GOE), comprehensive approaches that simultaneously incorporate multiple institutional and fiscal dimensions remain limited. In this context, the study conducted by Ramesh and Vinayagathasan (2023) makes a significant contribution to the field. Utilizing data from Sri Lanka for the period 1996–2020, their research employs the Johansen cointegration approach to examine the effects of control of corruption (COR), rule of law (ROL), voice and accountability (VOA), and government effectiveness (GOF) on GOE. The findings indicate that both COR and ROL have a positive impact on GOE, while VOA and GOF exert a negative influence. Thus, the model presented by Ramesh and Vinayagathasan offers a multidimensional framework for assessing government performance, enriching the literature through both methodological diversity and analytical depth.

Inspired by Ramesh and Vinayagathasan (2023), the present study builds on and extends their model by examining the institutional determinants of GOE within the context of India. As a developing country undergoing structural reforms and institutional transformation, India provides a meaningful setting for this analysis, especially from a policymaking perspective. In particular, enhancing the rule of law and reducing corruption are of critical importance for improving GOE and achieving sustainable development goals.

From a methodological standpoint, this study adopts the ARDL bounds testing approach instead of the Johansen cointegration technique. The ARDL model has become increasingly favored in the literature due to its flexibility in accommodating variables with different levels of integration (I(0) and I(1)) and its ability to estimate both short- and long-run relationships within a single equation framework. Especially in the context of developing countries, where structural breaks and data limitations are common, the ARDL approach offers a more robust and adaptable analytical tool. This methodological distinction enhances the study's contribution not only in terms of content but also from a technical perspective. In conclusion, by applying the ARDL model to Indian data covering the period 2002–2023, this study identifies the institutional dynamics that influence government expenditure efficiency. It not only addresses a significant methodological gap in the existing literature but also provides policy-relevant insights for other developing countries undergoing similar institutional reform processes.

4. Methodology

In this part, the methodological procedures applied to analyze the effects of control of COR, ROL, accountability, and GOF on GOE in the case of India are presented. The investigation commences with unit root testing procedures aimed at identifying the stationarity properties of the variables under consideration. Following this, the study outlines the implementation of ARDL bounds testing approach—a dynamic long-run estimation technique—alongside the models specifically designed for the purposes of this research. After establishing the long-run relationships, the error correction mechanism (ECM) is explained in detail as it applies to the context of this study. Furthermore, descriptive statistics and correlation analyses of the variables are provided to offer preliminary insights into the validity and internal consistency of the model employed.

4.1. Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) Unit Root Tests

In time series analysis, the presence of non-stationary variables can lead to spurious results, making it essential to test for stationarity before proceeding with statistical modeling. This study employs two widely used unit root tests the Augmented Dickey-Fuller (ADF) test (Dickey & Fuller, 1981) and the

Phillips-Perron (PP) test (Phillips & Perron, 1988) to assess the stationarity of variables prior to implementing the ARDL bounds testing approach. The ADF test, which addresses autocorrelation by incorporating lagged dependent variables, is estimated under three model specifications: without a constant, with a constant, and with both a constant and a trend, with optimal lag length determined by criteria such as Akaike Information Criterion (AIC) or Schwarz Bayesian Criterion (SBC). In contrast, the PP test applies non-parametric adjustments to correct for autocorrelation and heteroskedasticity, offering robustness without altering the test's asymptotic distribution. Both tests share the same null hypothesis of a unit root (non-stationarity) and an alternative of stationarity; rejection of the null implies that the series is stationary and suitable for further econometric analysis.

The PP test differs from the ADF test in several important respects. While the ADF test follows a parametric approach, the PP test is based on a non-parametric methodology. Unlike the ADF test, it does not require the specification of a lag length, which simplifies its implementation. Moreover, the PP test is robust to heteroskedasticity in the error terms a feature that enhances its reliability. This robustness to heteroskedasticity is considered one of the key strengths that makes the PP test more powerful than the ADF test under certain conditions (Phillips & Perron, 1988).

4.2. Autoregressive Distributed Lag (ARDL) Bounds Testing Approach

Economic time series often exhibit non-stationarity due to unit roots, leading to potentially spurious regressions with misleading significance (Granger & Newbold, 1974; Johansen & Juselius, 1990). While differencing can address non-stationarity, it may obscure long-run relationships among variables (Tarı & Yıldırım, 2009). To overcome this, cointegration analysis is employed to detect whether non-stationary variables share a stable long-term equilibrium, as assessed through methods like those of Eriçok and Yılancı (2013). Among these, the ARDL bounds testing approach (Pesaran et al., 2001) stands out for its flexibility, allowing for the inclusion of variables integrated at *I*(0) and *I*(1) without requiring pre-testing for unit roots. The ARDL method also surpasses the Engle-Granger technique in capturing both short and long-run dynamics via the Unrestricted Error Correction Model (UECM) framework (Narayan & Narayan, 2005). Moreover, its strong performance in small-sample contexts, demonstrated through Monte Carlo simulations, makes it ideal when data are limited (Narayan & Smyth, 2005). Implemented in three stages testing for cointegration, estimating long-run coefficients, and modeling short-run dynamics through an ECM the ARDL approach provides a comprehensive framework for analyzing dynamic relationships, despite not fully addressing potential endogeneity (Narayan & Smyth, 2006). In this study, the model is represented using the unrestricted error correction form within the ARDL framework, as specified below:

$$\Delta GOE_t = \beta_0 + \sum_{i=1}^{p} \beta_{1i} \Delta GOE_{t-i} + \sum_{i=1}^{p} \beta_{2i} \Delta COR_{t-i} + \sum_{i=1}^{p} \beta_{3i} \Delta ROL_{t-i} + \sum_{i=1}^{p} \beta_{4i} \Delta \mathrm{VOA}_{t-i} + \sum_{i=1}^{p} \beta_{5i} \Delta \mathrm{GOF}_{t-i} + \beta_6 GOE_{t-1} + \beta_7 COR_{t-1} + \beta_8 ROL_{t-1} + \beta_9 \mathrm{VOA}_{t-1} + \beta_9 \mathrm{GOF}_{t-1} + \varepsilon_t \quad (1)$$

In the specified equations, Δ denotes the first-difference operator, β_0 represents the constant term, $\beta_{1i} - \beta_{5i}$ correspond to the short-run coefficients, $\beta_6 - \beta_9$ indicate the long-run coefficients, ε_t is the error term, and *p* refers to the lag lengths applied to both dependent and independent variables. The F-test employed in the bounds testing procedure is highly sensitive to the selected lag length (Bahmani-Oskooee & Goswami, 2003). Therefore, the optimal lag length for each variable is determined based on standard information criteria such as the Akaike Information Criterion, Schwarz Information Criterion, and Hannan-Quinn Criterion (Narayan & Narayan, 2005).

Following the determination of the optimal lag length, the F-test is applied to assess the joint significance of the level and lagged values of both the dependent and independent variables (Narayan & Narayan, 2005). This step primarily involves examining whether the lagged level terms of the variables in the model are statistically significant. In essence, it serves as the core hypothesis test for

evaluating the null hypothesis, which assumes the absence of a cointegrating relationship among the variables (Tosunoğlu, 2025). The null hypothesis tested in the model is formulated as follows:

$$H_0: \beta_6 = \beta_7 = \beta_8 = \beta_9 = 0 \quad (2)$$

In the ARDL bounds testing framework, the computed F-statistic is evaluated against critical values provided by Pesaran et al. (2001); however, since these values are based on large-sample distributions, Narayan (2005) offers adjusted critical values more appropriate for small samples. If the F-statistic exceeds the upper bound, the null hypothesis of no cointegration is rejected, indicating a long-run relationship among the variables; if it falls below the lower bound, the null cannot be rejected, suggesting no cointegration; values between the bounds yield inconclusive results (Narayan & Narayan, 2005). Upon confirming cointegration, the long-run ARDL model is estimated to determine the stable coefficients of explanatory variables over time, with the optimal lag structure selected via the Akaike Information Criterion (AIC) to enhance model robustness and reliability. The corresponding long-run ARDL model employed in this study is specified as follows:

$$GOE_t = \beta_0 + . \sum_{i=.1}^{p} \beta_{1i} GOE_{t-i} + . \sum_{i=.1}^{p} \beta_{2i} COR_{t-.i} + . \sum_{i=1}^{p} \beta_{3i} ROL_{t-.i} + . \sum_{i=1}^{p} \beta_{4i} \mathrm{VOA}_{t-.i} + \sum_{i=1}^{p} \beta_{5i} \mathrm{GOF}_{t-.i} + \varepsilon_t \quad (3)$$

In the specified equations, β_0 represents the long-run intercept term, while $\beta_{1i} - \beta_{5i}$ denote the long-run coefficients of the respective explanatory variables. The symbol *p* indicates the lag length determined for the dependent and independent variables, and ε_t refers to the long-run error term.

4.3. Error Correction Mechanism (ECM)

The Error Correction Model (ECM) offers an efficient single-equation framework for analyzing cointegration, particularly when the variables exhibit weak exogeneity and a full system estimation is unnecessary. Developed within an extended ARDL context by Banerjee, Dolado, and Mestre (1998), the ECM utilizes the OLS estimator of the lagged dependent variable to incorporate both short-run dynamics and long-run equilibrium adjustments in a unified specification. After identifying long-run coefficients via the ARDL bounds testing approach, the ECM is estimated to capture the speed at which deviations from the long-run equilibrium are corrected, thereby quantifying the system's adjustment process following short-run disturbances (Narayan & Narayan, 2005). The ECM models employed in this study are specified as follows:

$$\Delta GOE_t = \beta_0 + \sum_{i=1}^{p} \beta_{1i} \Delta GOE_{t-i} + \sum_{i=1}^{p} \beta_{2i} \Delta COR_{t-i} + \sum_{i=1}^{p} \beta_{3i} \Delta ROL_{t-i} + \sum_{i=1}^{p} \beta_{4i} \Delta \mathrm{VOA}_{t-i} + \sum_{i=1}^{p} \beta_{5i} \Delta \mathrm{GOF}_{t-i} + \beta_1 ECT_{t-1} + \varepsilon_t \quad (4)$$

In the equation presented above, $\beta_{1i} - \beta_{5i}$ represent the short-run coefficients, while *p* indicates the optimal lag length selected for each variable. The term β_0 denotes the short-run intercept, and ε_t refers to the short-run error term. The coefficient β_1 associated with the lagged error correction term ECT_{t-1} captures the speed of adjustment, reflecting the proportion of disequilibrium from the previous period that is corrected in the current period. If the estimated coefficient of the error correction term lies between 0 and -1, it implies a gradual convergence of the system toward long-run equilibrium. A value between -1 and -2 suggests convergence with diminishing oscillations around the equilibrium path. However, if the coefficient is less than -2 or greater than 0, it indicates divergence, meaning the system is moving away from equilibrium rather than restoring it (Alam & Quazi, 2003).

4.4. Data Set and Model Specification

To measure the impact of control of COR, ROL, VOA, and GOF on GOE in India, this study utilizes annual data for the period 2002–2023. Specifically, the following indicators are employed: GOE

Estimate, Control of COR: Estimate, ROL: Estimate, VOA: Estimate, and GOF (% of GDP). All data were acquire from the World Bank's World Development Indicators (WDI) database. The table below presents a summary of the variables used in the study.

Table 2. Table of Variables

Abbreviation	Variable	Measurement	Role	Source	References
GOE	Government Effectiveness	Government Effectiveness: Estimate	Dependent variable	WDI	-
COR	Control of Corruption	Controlof Corruption: Estimate	Independent variable	WDI	(Ramesh & Vinayagathasan, 2023; Han et al., 2014; Aidt et al., 2008; Cooray, 2009)
ROL	Rule of Law	Rule of Law: Estimate	Independent variable	WDI	(Ramesh & Vinayagathasan, 2023; Han et al., 2014)
VOA	Voice and Accountability	Voice and Accountability: Estimate	Control	WDI	(Ramesh & Vinayagathasan, 2023; Norris, 2012)
GOF	General Government Final Consumption Expenditure	General government final consumption expenditure (% of GDP)	Control	WDI	(Ramesh & Vinayagathasan, 2023; Cooray, 2009)

In this research, GOE is designated as the dependent variable and is represented by a proxy indicator capturing the performance of governmental functions. GOE encompasses a government's capacity not only to design and implement sound policy frameworks but also to provide public goods and services in an efficient manner (Lio & Liu, 2008). A high-performing government is characterized by credible policy commitment, minimal bureaucratic barriers, and the ability to deliver services without undue political influence (Kaufmann et al., 2011; Arndt, 2008). The GOE metric offers a comprehensive assessment of the quality of public policymaking, the effectiveness of service provision, and the extent of political engagement in administrative processes. Elevated GOE values signal more effective public service performance. The index is measured on a scale ranging from −2.5, indicating minimal effectiveness, to +2.5, reflecting optimal government performance. In this study, control of COR is employed as an independent variable. To measure this concept, the Control of COR indicator from the Worldwide Governance Indicators (WGI) is utilized. COR generally defined as the misuse of public power for private gain and the capture of the state by vested interests plays a central role in the good governance literature (Kaufmann et al., 2011; Hellman, et al., 2003). A wide range of empirical studies has shown that a country's level of COR is influenced by several national characteristics, including economic development, religious traditions, and cultural context (Svensson, 2005; Licht et al., 2007; Su & Ni, 2018). The Control of COR indicator ranges from −2.5 (weak control) to +2.5 (strong control). This study draws conceptual inspiration from the works of Ramesh and Vinayagathasan (2023), Han et al. (2014), Aidt et al. (2008), and Cooray (2009), all of which emphasize the institutional dimension of COR. In line with these studies, it is hypothesized that stronger control of COR is expected to have a positive impact on GOE.

In this study, ROL is included as a control variable. To measure this concept, the ROL indicator from the Worldwide Governance Indicators (WGI) is utilized. ROL reflects the extent to which individuals and institutions have confidence in and abide by the rules of society (Kaufmann et al., 2011). In societies where the ROL is strong, property rights are respected and protected, the perceived incidence of both violent and non-violent crime is low, contracts are effectively enforced, and public confidence in the judiciary is high (Licht, et al., 2007; Lio & Liu, 2008). The ROL indicator ranges from −2.5 (weak adherence) to +2.5 (strong adherence). This study draws upon the frameworks established by Ramesh and Vinayagathasan (2023) and Han et al. (2014), both of which underscore the significance of legal institutional quality in shaping governance outcomes. Consistent with these studies, a favorable impact of ROL on GOE is theoretically expected (Ramesh & Vinayagathasan, 2023; Han et al., 2014).

In this study, VOA is utilized as an independent variable. To measure this concept, the Voice and VOA indicator from the Worldwide Governance Indicators (WGI) is employed. This indicator captures the extent to which individuals can express their opinions and hold those in power accountable through formal mechanisms such as the judiciary, elections, media, or other institutional platforms. The estimates for Voice and VOA range from −2.5 (weak) to +2.5 (strong), with higher values indicating greater levels of civic participation and institutional responsiveness. Based on the findings of Ramesh and Vinayagathasan (2023) and Norris (2012), VOA is expected to exert a negative influence on GOE, as heightened demands for transparency and participation may introduce administrative burdens or institutional inefficiencies within certain governance contexts.

Government expenditure is also included in this study as a control variable. To measure this, the indicator GOF (as a percentage of GDP) is employed. This variable reflects the total current government expenditures allocated to the acquisition of goods and services, encompassing employee compensation. It further includes the majority of spending on national defense and public security, while excluding military expenditures categorized under government capital investment. (WDG, 2024). In line with prior research, government expenditure is expected to have a negative effect on GOE (Ramesh & Vinayagathasan, 2023; Cooray, 2009). Ramesh and Vinayagathasan (2023) were among the first to develop a model using these variables to examine the institutional determinants of GOE, thereby contributing significantly to the literature. In this study, the measurement of all variables is aligned with this conceptual framework.

One of the effective ways to gain a preliminary understanding of the nexsus between variables is through correlation analysis. This method measures the strength and direction of the linear association between variables, thereby providing initial insights into potential linkages among them (Tosunoğlu, 2024). The table below presents the descriptive statistics for the variables used in the study.

Table 3. Descriptive Statistics and Correlation Matrix of the Variables (N = 22)

Variables	GOE	COR	ROL	VOA	GOF
GOE	1				

COR	0,601***	1			
	(0,000)				
ROL	0,098***	0,229***	1		
	(0,000)	(0,000)			
VOA	-0,789***	-0,439***	-0,043***	1	
	(0,000)	(0,000)	(0,000)		
GOF	0,133***	-0,185***	-0,400***	-0,149***	1
	(0,000)	(0,000)	(0,000)	(0,000)	
Mean	0,045	-0,393	0,013	0,358	10,666
Std. Dev.	0,201	0,094	0,092	0,137	0,462
Min	-0,223	-0,555	-0,108	0,046	9,802
Max	0,475	-0,229	0,188	0,462	11,612

Note: *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

The descriptive statistics of the variables used in this study were examined to provide preliminary insights, and the results indicate that none of the variables contain outliers. The correlation matrix analysis reveals that the correlations between GOE and COR, ROL, VOAand GOF are statistically significant at the 0.01 level. Among these relationships, the correlations between GOE and COR, ROL, and GOF are positive, whereas the correlation between GOE and VOA is negative. Notably, the correlation between GOE and COR is relatively strong at 0.60, suggesting a robust positive association. In contrast, the correlation between GOE and VOA is also strong but negative, with a coefficient of −0.79, drawing particular attention. Meanwhile, the correlations between GOE and ROL (0.09) and between GOE and GOF (0.13) are relatively weak, indicating only modest associations.

The model employed in this study is grounded in the existing literature. It is both an extension of earlier research and specifically inspired by the study conducted by Ramesh and Vinayagathasan (2023), who investigated GOE in the case of Sri Lanka using the Johansen cointegration method. Building upon this foundation, the present study expands the analytical framework by applying the ARDL approach, which allows for the inclusion of dynamic effects within the Indian context. The relationship between control of COR and ROL and their influence on GOE in India is examined using both the ARDL bounds testing procedure and the ECM. The model developed for this study is formulated as follows:

$$GOE = f(COR, ROL, VOA, GOF) \tag{5}$$

In the functional specification above, GOE represents the dependent variable of the model, while COR and VOA are the main explanatory variables. ROL and GOF are included as control variables.

5. Findings and Discussion

The empirical findings of this study were obtained using EViews 10 statistical software. One of the main strengths of the ARDL bounds testing approach lies in its flexibility it can be applied regardless of

whether the variables are integrated of order zero I(0) or order one I(1) (Pesaran et al., 2001). However, to ensure the appropriateness of the ARDL methodology, it is essential to confirm that none of the variables are integrated of order two I(2). For this aim, unit root tests were conducted, PP tests were applied to determine the stationarity properties of the variables. The results of the unit root tests are presented as follows:

Table 4. ADF and PP Unit root test Findings

	ADF		PP	
Variables	**Intercept**	**Intercept & Trend**	**Intercept**	**Intercept & Trend**
GOE	-0,012	-2,422	-0,577	-2,437
	(0,9468)	(0,3587)	(0,8560)	(0,3522)
COR	-2,533	-6,511	-2,349	-2,272
	(0,1238)	(0,0004)	(0,1670)	(0,4296)
ROL	-1,459	-1,198	-1,566	-1,346
	(0,5337)	(0,8845)	(0,4814)	(0,8468)
VOA	0,376	-0,235	0,1497	-1,243
	(0,9752)	(0,9855)	(0,9620)	(0,8741)
GOF	-2,884**	-3,557**	-2,938**	-2,986
	(0,0640)	(0,0650)	(0,0578)	(0,1589)
ΔGOE	-7,271***	-7,307***	-7,271***	-7,307***
	(0,0000)	(0,0000)	(0,0000)	(0,0000)
ΔCOR	-3,304**	-2,807	-4,886***	-4,794***
	(0,0323)	(0,2146)	(0,0010)	(0,0056)
ΔROL	-4,751***	-5,133***	-4,751***	-5,133***
	(0,0013)	(0,0029)	(0,0013)	(0,0029)
ΔVOA	-3,621**	-3,789**	-3,097**	-2,989*
	(0,0169)	(0,0436)	(0,0431)	(0,0742)
ΔGOF	-3,919 **	-4,568***	-4,731**	-4,568**
	(0,0100)	(0,0087)	(0,0014)	(0,0087)

Notes: While determining the lag length for the ADF test, the maximum lag was set to 3, and the selection was based on the Akaike Information Criterion (AIC). The values in parentheses represent probability (p) values. The symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. For the PP test, the bandwidth was selected according to the Newey-West method, and the Bartlett kernel estimator was employed.

In the unit root analyses presented above, the null hypothesis represents the presence of a unit root, implying that the series are non-stationary in their level form. Upon evaluation of both ADF and PP test results, the null hypothesis cannot be rejected for any of the variables at their level values, indicating that they exhibit unit root characteristics. However, when the first differences of the variables are considered, the null hypothesis is rejected, suggesting that whole variables become stationary after first differencing. Therefore, it can be concluded that the series are integrated of order one, i.e., I(1). Since none of the variables are integrated of order two I(2), the application of the ARDL bounds testing approach is valid. The results of the ARDL bounds test are presented below:

Table 5: ARDL F-Bound test findings

Model	Optimal Lag Length	F-Statistic	Bound test Critical Values		Decision
			I(0)	*I*(1)	
$GOE = f(COR, ROL, VOA, GOF)$	(1, 1, 0, 1, 0)	6,31	3,07	4,44	Cointegration

The table above presents the ARDL bounds test results for the model used in this study. Accordingly, the F-statistic value of 6.31 is compared against the critical values at the 1% significance level, where the lower bound (I(0)) is 3.07 and the upper bound (I(1)) is 4.44. Since the F-statistic exceeds the upper bound, the null hypothesis of no cointegration is rejected. This indicates the existence of a long-run cointegration relationship among the variables in the model at the 1% significance level.

Following the confirmation of a long-run cointegration relationship among the variables through the ARDL F-bounds test, the next step involves estimating the long-run ARDL coefficients. However, for the results derived from the F-test and subsequent estimations to be considered reliable, certain statistical assumptions must be satisfied by the model. To ensure the robustness and validity of the ARDL model, a series of diagnostic tests were conducted. These tests and their corresponding results are presented as follows:

Table 6: Diagnostic Tests of ARDL Models

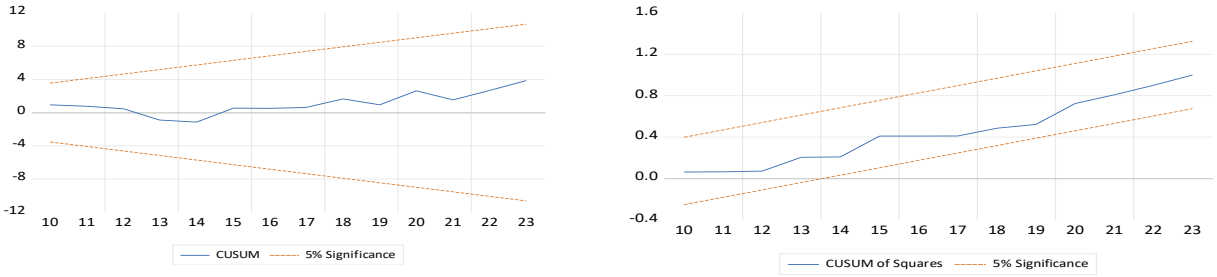
Test	Hypotesis	Test Statistic
Ramsey Reset	No model specification error	1,414 (0,2557)
Breusch-Godfrey LM	No heteroskedasticity in the residuals.	1.734 (0.1856)
Breusch- Pagan LM	No autocorrelation in the residuals	1.494 (0.2702)

Note: Values in parentheses indicate p-values corresponding to the F-statistics.

Based on the diagnostic test results, the null hypotheses could not be rejected, indicating that the model does not suffer from autocorrelation, heteroskedasticity, or model misspecification. Therefore, the ARDL model satisfies the basic classical regression assumptions. As a final step, it is essential to

assess whether the parameter estimates meet the stability condition. To examine the stability of the estimated ARDL model and to identify any potential structural breaks, the CUSUM and CUSUM of Squares (CUSUMSQ) tests, developed by Brown et al. (1975), were applied. According to the graphical results, it can be concluded that there is no structural instability in the coefficient estimates at the 5% significance level. The parameter estimates remain stable throughout the sample period. The results of the CUSUM and CUSUMSQ tests are presented below.

Figure 1. CUSUM and CUSUMSQ Plots for Model



Following the identification of a long-run cointegration relationship among the variables through the ARDL F-bounds test, the next step involved estimating the long-run coefficients of the ARDL model. These estimations aim to quantify the long-term effects of the explanatory and control variables on GOE. The results of the long-run ARDL coefficient estimations are presented as follows:

Table 7: Long-Run ARDL Coefficient Estimation Results

Variable	Coefficient	Standard Error	t-statistic	p-value
COR	1,174***	0,294	3,985	0,0014
ROL	-0,238	0,253	-0,941	0,3626
VOA	-0,895***	0,171	-5,231	0,0001
GOF	0,081***	0,012	6,987	0,0000

Note: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

The table above presents the estimated long-run coefficients for the model. According to the results COR, VOA and GOF are statistically significant at the 1% level, whereas ROL is not statistically significant. Since the variables are measured in different units, only the signs of the coefficients are interpreted. Accordingly, control of COR and GOF have a positive effect on GOE, while VOA exhibits a negative effect. Furthermore, the findings suggest that ROL does not significantly affect GOE in the case of India. The positive and significant relationship between control of COR and GOE implies that reducing COR enhances public trust in the decision-making process and contributes to the efficient implementation of policies.

The negative impact of VOA could indicate that VOA mechanisms in India may be generating excessive bureaucratic procedures, potentially reducing administrative flexibility and slowing down decision-making processes. Lastly, the positive effect of government expenditure may reflect improvements in digital public spending systems, which could have facilitated more effective and transparent resource allocation in the Indian public sector.

Table 8: Error Correction Model (ECM) Estimation Results

Variable	Coefficient	Standard Error	t-statistic	p-value
D(COR)	0,202	0,275	0,734	0,4749
D(VOA)	0,785	0,402	1,955	0,0709
ECT_{t-1}	-1,084	0,170	-6,367	0,0000
Note: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.				

The table above presents the error correction model results for the established model. ECTt-1 denotes the coefficient of the error correction term of the models. In the model, the error correction coefficient is between -1 and -2. According to Alam and Quazi (2003), if ECTt-1 is estimated between -1 and -2, it shows that the error correction process reaches equilibrium by showing decreasing fluctuations around long-run values.

The error correction coefficient in the model is statistically significant. However, the significance of the error correction coefficient is not based on the probability value. In this case, a bounds test for the t-statistic is also needed. The bounds test for the t-statistic of the error correction term is as follows:

Table 9: t-Bounds Test for the ECM

t-Statistic	Bound test Critical Value	
	I (0)	I (1)
-6,367	-2,58	-4,23

The table above presents the t-bounds test results for the error correction term of the specified model. According to the findings, the t-statistic (−6.37) is compared to the critical values at the 1% significance level, where the lower bound is −2.58 and the upper bound is −4.23. Since the calculated t-statistic exceeds the upper bound, the error correction term ECT_{t-1} is statistically significant at the 1% level, confirming the presence of a valid long-run adjustment mechanism within the model Moreover, the results suggest that any short-run deviation from the long-run equilibrium is corrected within approximately 0.93 years (1 / 1.08). In other words, the system returns to its long-run equilibrium within nearly one year after experiencing a shock, indicating a relatively swift adjustment process

6. Conclusion and Policy Recommendations

In this study, the complex relationship between GOE and COR, ROL, VOA, and GOF in India was examined for the period 2002–2023 using the ARDL bounds testing approach and the ECM. The findings reveal the distinct effects of these variables on GOE and demonstrate the existence of long-run equilibrium relationships among them.

The empirical findings of the analysis indicate that control of COR and GOF have a positive impact on GOE. This outcome aligns with the view that anti-COR policies can enhance efficiency in the public sector, strengthen citizens' trust in government institutions, and thereby improve the overall performance of the government. In contrast, VOA was found to have a negative effect on GOE. This

suggests that low levels of VOA may foster a lack of trust among citizens, thereby adversely affecting the quality of governance. In addition, the ROL variable was found to have no statistically significant effect on GOE in the Indian context. However, this lack of statistical significance does not necessarily indicate the absence of a positive or negative relationship; it merely suggests that such an effect could not be statistically established within the scope of this study. Therefore, it would be appropriate to discuss the ROL finding more extensively in the conclusion section. Indeed, the literature offers strong arguments that the rule of law (ROL) may play a limited role in enhancing public sector performance at lower levels of economic development, but could become a crucial and decisive factor as countries reach higher stages of development. In fact, some scholars argue that ROL is a key element in helping countries surpass certain development thresholds and overcome the middle-income trap. In this regard, it is possible that the impact of ROL in emerging market economies such as India may only become more apparent over the long term or at more advanced stages of development. Furthermore, differences in institutional structures, measurement limitations, delayed effects of legal reforms, or the presence of other dominant variables (such as COR, which showed a strong effect in this study) should also be taken into account, as they may indirectly constrain the impact of ROL. Finally, the discretionary power exercised by local officials may further complicate this relationship and cause the effects of ROL to unfold gradually over time.

The results obtained from the error correction model indicate that short-term disequilibria are corrected within approximately 0.93 years, allowing the system to return to its long-run equilibrium. This finding underscores the importance of rapid policy responses and effective policy design in mitigating the impact of short-term shocks, providing valuable insight for policymakers aiming to enhance government performance and institutional resilience.

The findings of this study offer several policy implications for enhancing GOE. The effective implementation of anti- COR mechanisms not only improves government performance but also reinforces public perceptions of social justice. In the case of India, GOE is primarily strengthened through the positive impacts of COR control and government expenditure, while ROL does not appear to play a significant role in this regard. This limited influence of ROL may stem from several underlying issues, including the slow functioning of the judicial system, the lack of deterrent penalties, inconsistencies in legal enforcement, bureaucratic inefficiencies, and the misalignment between central and state governments. Although some progress has been made in combating COR within public administration, the inability of the ROL to exert a direct influence on policy outcomes can be attributed to weak legal enforceability and persistent social inequalities. Strengthening the practical implementation of legal frameworks and improving institutional coordination across governance levels are essential steps to ensure that the ROL contributes meaningfully to GOE.

In India, COR remains a key factor that directly undermines GOE, particularly in areas such as public procurement, bureaucratic procedures, and political decision-making processes. The widespread nature of COR not only leads to the inefficient use of public resources and erodes citizens' trust in state institutions, but also obstructs the implementation of much-needed governance reforms. Nevertheless, in recent years, significant progress has been made in the fight against COR through initiatives such as digitalization, direct cash transfer programs, and various transparency-enhancing measures. Despite these advancements, ensuring the full functionality of VOA mechanisms requires a more robust institutional framework. To this end, it is essential to strengthen independent oversight bodies, enforce strict sanctions against public officials involved in corrupt practices, and promote transparent governance models that actively encourage citizen participation (Schatz, 2013). In particular, enabling the monitoring of government expenditures through open data platforms, and

enhancing the role of media and civil society organizations, could significantly reinforce VOA in public administration and further enhance GOE in India (Mungiu-Pippidi, 2023; Malik et al., 2014).

The findings of this study reveal that institutional determinants of GOE can vary significantly depending on country-specific contexts. In the case of India, COR and GOF are found to positively influence GOE, while VOA exert a negative impact. These results align with a substantial body of literature emphasizing the central role of corruption control in enhancing public sector performance (Fisman & Gatti, 2006; Aidt et al., 2008; Méndez & Sepúlveda, 2006), as well as the importance of governance quality in optimizing the use of public resources (Cooray, 2009; Gerring et al., 2011). The positive effect of GOF further supports the notion that stronger institutional capacity contributes to more effective and disciplined public spending. Meanwhile, the negative impact of VOA is consistent with the findings of Ramesh and Vinayagathasan (2023) and Norris (2012), who argue that increasing demands for transparency and citizen participation particularly in settings with limited institutional capacity can impose administrative burdens and reduce overall efficiency. Notably, the insignificant ROL in the Indian context diverges from Ramesh and Vinayagathasan's (2023) findings for Sri Lanka, suggesting that the influence of legal institutions on GOE may depend on the maturity and enforcement capacity of each country's governance framework. These contrasts underscore the importance of contextualizing governance indicators, as emphasized by Kaufmann et al. (2000), who highlight that the effectiveness of public institutions must be evaluated within the socio-political and administrative realities of individual countries rather than through a one-size-fits-all approach

This study was conducted under certain limitations, the most significant of which relates to the data period, which spans from 2002 to 2023. This constraint arises from the fact that the governance indicators used in the analysis have been consistently available for India only since 2001. While various models exist in the literature to explain GOE, the model employed in this study was originally used in the pioneering work of Ramesh and Vinayagathasan (2023). As this model represents a novel approach in its field, the present study remained faithful to its structure, and the variables included in the original model were preserved to maintain methodological consistency. The limited sample size of the data posed another potential challenge. However, this issue was addressed by adopting the ARDL approach, which is particularly well-suited for small-sample contexts and aligns with the structural characteristics of India's data set.

The study advances the literature through by addressing a significant gap through its focus on the relationship between GOE and governance quality in the context of India. Despite being one of the world's largest democracies, India continues to face serious structural challenges in areas such as governance, anti- COR efforts, and the ROL. However, existing studies that thoroughly examine the relationship between GOE, control of COR, and Avoa specifically for India remain limited. By analyzing the impact of these variables on government performance, this study fills an important void in the literature.

Moreover, the analytical method and findings of the study provide concrete suggestions for improving government performance, serving as a valuable reference for both policymakers and academic circles. In light of the findings, several important policy recommendations can be proposed for India:

- Effectively combating COR improves government efficiency. Transparency, digitalization, and independent audit mechanisms should be prioritized.
- The human factor in bureaucratic procedures should be reduced through digitalization, and audit trails must be recorded for accountability.

- The ROL remains weak in practice. Judicial independence and legal certainty must be enhanced.
- Audit reports should be shared with the public in a timely manner and must be protected from political interference.
- Efficient and target-oriented public spending strengthens GOE. Suggestions such as performance-based budgeting and independent audits should be considered by policymakers.

For future research, incorporating a broader set of variables and conducting comparative analyses across different countries would allow for a deeper examination of these relationships. Future studies can provide a broader perspective on improving government performance by analyzing these dynamics using various methodologies and across diverse national contexts.

The findings of this study offer a valuable reference for both policymakers and academics working to enhance the effectiveness of public governance.

Ethics approval and consent to participate

Not applicable.

Authors contribution statement

The authors contributed equally to the article.

Competing interest

The authorS declares no competing interests.

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EXTENDED ABSTRACT

This study investigates the multifaceted relationship between institutional quality and government effectiveness (GOE) in the context of India, a prominent developing country that continues to confront long-standing challenges related to corruption, legal enforcement, and public sector performance. The concept of government effectiveness, as defined by leading governance scholars and institutions, encompasses the ability of the state to formulate and implement sound policies, deliver high-quality public services, and maintain institutional legitimacy and trust. In this regard, institutional indicators such as control of corruption (COR), rule of law (ROL), voice and accountability (VOA), and the efficient management of public spending (GOF) emerge as critical components that shape the quality of governance and public administration outcomes. India presents a particularly compelling case for such an investigation due to its complex federal governance structure, immense population, and diverse administrative landscape. Although it is one of the world's largest democracies and fastest-growing economies, India remains burdened by structural governance weaknesses, ranging from endemic corruption to delays in judicial processes and institutional fragmentation. While cross-country studies have extensively examined the relationship between institutional quality and government performance, there exists a clear gap in time-series, country-specific empirical analyses that explore these dynamics in the Indian context. This study seeks to fill this void by employing a robust econometric approach to analyze the long-run and short-run relationships among key governance indicators using data from 2002 to 2023. The empirical analysis relies on annual data obtained from the World Bank's Worldwide Governance Indicators (WGI) and World Development Indicators (WDI). Government effectiveness (GOE) serves as the dependent variable, while COR, ROL, and VOA are included as independent variables, and GOF is introduced as a control variable. All indicators are measured on a standardized scale ranging from −2.5 to +2.5, where higher scores denote stronger institutional performance. COR reflects the extent to which public power is diverted for private gain, including both petty and grand forms of corruption. ROL measures the degree of confidence in and adherence to societal rules, with emphasis on property rights, judicial independence, and legal enforcement. VOA assesses the extent to which citizens are able to participate in governance, express opinions freely, and hold political leaders accountable through institutional mechanisms. GOF, expressed as a percentage of GDP, quantifies the government's final consumption expenditure on goods and services. The methodological framework employed in the study is the Autoregressive Distributed Lag (ARDL) bounds testing approach, which is well-suited for analyzing relationships among variables with mixed levels of integration. Stationarity of the variables is tested using Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) methods, which confirm that all variables are integrated of order one [I(1)]. The ARDL model is then estimated, and the bounds testing procedure confirms the presence of a statistically significant long-run cointegration relationship among the variables. Additional diagnostic tests, including the Breusch-Godfrey LM test for serial correlation and the CUSUM and CUSUMSQ tests for stability, confirm that the model is well specified and robust. The long-run coefficient estimations provide several noteworthy insights. First, control of corruption (COR) has a statistically significant and positive impact on government effectiveness. This finding aligns with a broad body of literature asserting that corruption undermines institutional trust, distorts resource allocation, and reduces administrative efficiency. By contrast, reducing corruption facilitates merit-based decision-making, strengthens rule compliance, and enhances policy credibility. Second, government expenditure (GOF) is also found to positively influence GOE. While excessive or misallocated spending can hinder efficiency, the findings here suggest that when spending is accompanied by transparency and strategic targeting—particularly in the context of digitization and infrastructure development—it can significantly improve the capacity of the state to deliver services.

Interestingly, voice and accountability (VOA) have a statistically significant negative effect on GOE. Although this result appears counterintuitive, it reflects a broader phenomenon observed in several developing countries, where participatory mechanisms exist in form but not in substance. In such settings, increased demands for transparency and participation may strain administrative systems, especially when institutional capacities are weak or fragmented. Moreover, in environments where civil society is politicized or regulatory mechanisms are inconsistent, accountability may be weaponized, contributing to inefficiency rather than institutional resilience. Surprisingly, the rule of law (ROL) does not exert a statistically significant influence on government effectiveness in the Indian context. This result challenges prevailing assumptions in the governance literature and suggests a disconnect between formal legal frameworks and their practical application. India's legal system has long been criticized for its slow pace, excessive case backlogs, and regional disparities in access to justice. While constitutional guarantees and legal procedures exist on paper, their uneven enforcement dilutes their impact on actual governance outcomes. This finding suggests that the ROL may be necessary, but not sufficient, to drive public sector performance in the absence of administrative reforms and judicial efficiency. To analyze short-term dynamics, the study employs an error correction model (ECM). The coefficient of the lagged error correction term is negative and statistically significant, confirming that the system converges toward long-run equilibrium following short-run deviations. Specifically, the adjustment speed suggests that approximately 93% of any disequilibrium is corrected within one year. This implies a moderately responsive governance system that, despite structural limitations, demonstrates some capacity to adapt to shocks and policy changes over time. The policy implications of these findings are substantial and multi-dimensional. First, sustained efforts to combat corruption should remain a top priority for policymakers. While recent reforms—such as the expansion of digital service delivery, e-governance initiatives, and biometric identification systems—have made notable progress, further steps are needed. These include enhancing institutional independence, protecting whistleblowers, and establishing robust public financial management systems. In addition, audit institutions and anti-corruption commissions must be equipped with adequate resources, autonomy, and legal authority to operate effectively. Second, fiscal policy reforms should move beyond budgetary expansion toward institutionalizing outcome-based budgeting, expenditure monitoring, and participatory planning. Investment in infrastructure, health, and education must be complemented by data-driven evaluations and social audits to ensure public funds generate intended results. Strategic alignment of fiscal decentralization with capacity-building at the local level can also enhance service delivery and citizen satisfaction. Third, the negative association between VOA and GOE should not be interpreted as a reason to restrict democratic participation. Rather, it should motivate policymakers to strengthen the institutional channels through which accountability is exercised. Citizen engagement must be constructive, informed, and embedded in institutional processes that promote dialogue, responsiveness, and efficiency. Civic education, local governance reform, and transparent grievance redress mechanisms can help transform accountability from a disruptive force into a driver of better performance. Fourth, the negligible effect of ROL on government effectiveness underscores the urgent need for legal and judicial reform. The judiciary must be modernized through digitization, performance benchmarking, and investment in legal infrastructure. Case tracking systems, time-bound hearings, and increased transparency in judicial appointments are necessary to ensure fairness and efficiency. Legal empowerment of marginalized communities and expanded access to legal aid can also ensure that the rule of law translates into real protections and recourse for all citizens. When compared with prior studies—such as Ramesh and Vinayagathasan (2023), which found that COR and ROL positively affected GOE in Sri Lanka, while VOA and GOF had negative effects—the results of the present study suggest important country-specific differences. The divergence regarding ROL and GOF may stem from India’s larger scale, deeper

administrative complexity, and variable regional enforcement capacity. These comparisons reinforce the importance of contextualized governance assessments and the limitations of generalizing across diverse political and institutional environments. Methodologically, the study demonstrates the value of the ARDL bounds testing approach in analyzing governance-related time-series data. Its ability to incorporate both stationary and non-stationary variables, detect cointegration, and model short-run fluctuations and long-run equilibrium makes it particularly useful for policy-focused empirical research in developing countries where data availability is limited. In conclusion, this research highlights the importance of aligning institutional reforms with administrative realities. While corruption control and efficient expenditure management emerge as robust determinants of government effectiveness, improvements in legal enforcement and participatory governance require systemic, long-term investments in institutional capacity. Effective governance cannot be achieved through isolated interventions or symbolic reforms. It requires an integrated strategy that brings together political will, civil society engagement, bureaucratic professionalism, and evidence-based policymaking. India's experience provides valuable lessons not only for domestic stakeholders but also for other emerging economies facing similar governance challenges. As India seeks to consolidate its developmental gains and enhance its global standing, reforms in governance quality, legal enforcement, and institutional accountability must remain central to its national agenda. The findings of this study can inform such efforts and contribute meaningfully to the broader discourse on state capacity, institutional quality, and public sector performance in the Global South. In conclusion, this study highlights that improving government effectiveness in India requires a multifaceted, systemic approach. Targeted anti-corruption policies and smarter public spending are critical, but so too are judicial efficiency and strategic accountability design. Reforms must be coordinated, context-specific, and sensitive to both institutional limitations and citizen expectations. The transition toward more effective governance in India will not be achieved through technocratic fixes alone; it will require political commitment, civil society engagement, and continuous institutional learning.