

Institutional Pathways to Algorithmic Trust: Transparency, Fairness and Governance Effectiveness

Author Name: Anum Zahra

Affiliation: Accounts Assistant, Department WAPDA Lahore Pakistan

**Journal of Emerging Finance
and Intelligent Systems**

Received 22-January-26

Revised 24-February-26

Accepted 13-March-26

Published 30-March-26

Abstract

Purpose—This study integrates macro-institutional and micro-ethical perspectives to examine the determinants of state capacity and to extend these institutional concepts to the governance of high stakes artificial intelligence (AI). The aim is to move beyond accounts of AI oversight that focus narrowly on technical safeguards, proposing instead a dynamic framework in which institutions and ethics jointly sustain trust. Moreover, the paper suggests that the structural logic behind the mechanisms that lead to fair and transparent government is also valid when it comes to mechanisms that lead to trust in algorithmic decision-making, thereby connecting the study of economic governance with the study of algorithmic accountability.

Methodology—A recurring limitation in the literature is that governance research does not always account for the persistence of institutional quality over time, and AI policy research has rarely been grounded in empirical models of how ethical constructs, in particular, fairness and transparency, relate to how much trust can be empirically measured in the people who are impacted by it. Analysis is based on two complementary models: Building on Institutional Theory, Information Disclosure Theory and Procedural Justice Theory. It is the first to apply two-step System Generalized Method of Moments (System GMM) to 64 countries in the period 2015-2024 to study the determinants of Government Effectiveness.



Ethics statement: This manuscript meets principles of research ethics which include informed consent, anonymity, confidentiality and cross-checking, Confidentiality and privacy of participants. The study is accurate findings, manages, is aware of conflicts of interest and is mindful of the impact of society and the environment. All protocols follow research integrity and the advancement of knowledge, along with the welfare of, stakeholders.

Funding Statement: This work was done with no external funding and the authors declare that they have no funding to disclose. That there were no conflicts of interest to have affected the research or reporting of results.

Conflict of Interest Statement: That there were no conflicts of interest to have affected the research or reporting of results.

The second mediation model is conceptual, where Perceived Transparency in AI (PTAI) moderates the relationship between Perceived Fairness (PFAI) and Trust in AI Recommendations (TAIR), which is also influenced by Privacy Concerns (PC).

Findings/Value—There is a significant level of institutional persistence, with an estimated autoregressive coefficient of approximately $\lambda \approx 0.797$. The structural driver of governance that shows the same pattern across all countries is Regulatory Quality, with fixed-effects coefficient of around $\beta \approx 0.55$. On the theoretical level, the paper explores the idea of fairness based transparency and Dynamic Governance Loops ways in which durable institutions can be continuously re-legitimated and are not static endowments. The significance of the study is in the linkage between governance of economies and ethics of algorithms, demonstrating that trust, either in the governments or in technological systems, is safe to be maintained if it is regularly renewed by practices that are fair.

keywords: Government Effectiveness, Regulatory Quality, Institutional Persistence, Algorithmic Transparency, Fairness-Based Trust, Institutional Theory, Procedural Justice Theory, Information Disclosure Theory, Privacy Calculus, Dynamic Governance, Responsible AI.

1. Introduction

The governance research is increasingly located on the nexus of two literatures which have often pursued along parallel paths: the study of institutional performance in the public sector and the ethical governance of artificial intelligence in high stakes decision processes. The World Bank provides a summary measure of institutional strength, bureaucratic competence and the credibility of a government's actions in fulfillment of their policies: Government Effectiveness (GE) (Kaufmann, Kraay, & Mastruzzi, 2010). Concurrently, algorithmic decision systems such as clinical decision support systems (CDSS), credit-scoring algorithms, and

automated benefits administration have attracted a host of other related concerns in a different institutional context: open, fair, reliable (Barredo Arrieta et al., 2020; Jobin, Ienca, & Vayena, 2019). Both literatures outline a similar pathology: beneficial reform is not possible in durable structures, and the credibility of the systems which people are asked to trust, is eroded as reform is denied.

This resistance can be expressed in the governance literature as institutional resistance or institutional inertia. When the formal rules change slowly, they will do so in a way that has a damping impact on the short-run impact of even a well-designed change (North, 1990; Rodrik, Subramanian, & Trebbi, 2004). Similarly, in the field of AI governance, the equivalent of opacity is the lack of transparency in algorithmic processes, or the lack of procedural fairness of the transparency, which leads to a loss of trust and thus also of legitimacy of the algorithmic system, even if it is technically correct (Grimmelikhuijsen, 2022; Lee, 2018). Scholars have documented algorithm aversion: Users are more likely to trust an algorithm than a similarly flawed human decision maker, and their trust of the algorithm is also influenced by the notion of fairness and control (Dietvorst et al., 2015).

Much of these dynamics are only partially captured by the existing scholarship. In macroeconomic governance, other aspects of the institutional framework, like regulatory quality, the depth of domestic capital markets, and the level of income inequality, have been consistently shown to be associated with Government Effectiveness as in Kaufmann, Kraay and Zoido-Lobaton (2010) and North (1990). Many of these analyses, however, are based on static, cross-sectional, or fixed-effects specifications that are unable to distinguish between structural persistence and short-run variation in performance; and that may overestimate the pace at which an institutional reform yields measurable results (La Porta et al., 1999; Rothstein & Teorell, 2008).

When it comes to AI governance, perceived transparency and fairness seem to be pivotal in building trust in AI systems, with privacy concerns shaping the robustness of this bond, especially in sensitive areas like healthcare (Grimmelikhuijsen, 2022; Franzen, Salholz-Hillel, Müller-Ohlaun, & Strech, 2024). However, many of these studies are technical in scope which focus on transparency as a property of the algorithm, and not as an institutionalized practice, which requires a surrounding regulatory and organizational environment (Floridi et al., 2018; Shin & Park, 2019). The result is a real lack of literature on algorithmic legitimacy in governance, or on institutional forces (regulatory capability, enforcement credibility, and accountability structures) that can sustain fairness-based transparency in practice in governance scholarship. In short, there is little understanding of how together they create lasting trust institutional persistence combined with fairness-based transparency and the strength of enforcement mechanisms.

It is this gap which motivates this study in two parallel pathways. The macroeconomic goal is to assess the dynamic relationship between the Government Effectiveness and the two characteristics of regulatory quality and market capitalization and income inequality, in an unbalanced panel of 64 countries from 2015 to 2024, estimated by the two-step System GMM method. The algorithmic level aim is to investigate the role of perceived transparency in increasing trust in AI-recommended products via perceived fairness, which is likely to be mediated by perceptions of privacy. There are three reasons why this double question is worthwhile. First, it provides a single perspective on the relationship between institutional structures and the use of AI in ways that are fair for both people and processes, two areas that are seldom considered in the same context when it comes to public trust. Second, by integrating dynamic panel estimation and a conceptual mediation framework, the analysis gives the policy maker a piece of evidence that addresses institutional change and the appropriate use of AI. Third, the study adds to the discussion of

global governance, especially in the context of Sustainable Development Goal 16 (United Nations, 2015) of building effective, accountable and transparent institutions, in that it illustrates the plausibility that trust in algorithms and trust in governments lie on similar foundations of fairness and transparency.

The rest of the paper goes as follows. The institutional and algorithmic governance literatures reviewed in Section 2 lead to the formulation of the hypotheses developed for this study. Section 3 introduces the Dynamic Institutional-Ethical Governance Model that brings the two aspects of theory together. The data and variables, as well as dynamic panel methodology are explained in Section 4. The descriptive, static and dynamic estimation results are presented in Section 5, also with a special robustness discussion. The paper ends with theoretical and policy implications, limitations and suggestions for future research in Section 6.

2. Literature Review

The literature for this study can be broadly categorized into three main areas: studies on the institutional determinants of Government Effectiveness, studies on the macroeconomic and socioeconomic conditions affecting governance outcomes, and the new literature focused on transparency, fairness and trust in algorithmic systems. Before discussing theoretical integration and hypothesis development, each domain is discussed individually.

2.1 Regulatory Quality and Institutional Foundations

Research in the field has been consistently associated with the institutional quality and in particular Regulatory Quality (RQ) as a key factor in Government Effectiveness (GE). La Porta et al. (1999) and Rothstein & Teorell (2008) show cross-country evidence that effectiveness and regulatory capability go together, and that a more predictable and rule-

bound regulatory environment is correlated with more effective and more capable governments. This result is in line with the focus of the Institutional Theory on administrative capability and the enforceability of formal rules (North, 1990; DiMaggio & Powell, 1983).

The results of the empirical models calculated for OECD and developing-economy samples support the assumption of a substantively large positive effect of RQ on GE, ranging from $\beta \approx 0.55$ to $\beta \approx 0.80$ across models. Much of this literature, however, uses either fixed-effects models with only few observations per institution or purely cross-sectional designs, which do not appear to be well suited to estimating institutional persistence, $\lambda \approx 0.797$ in this case. In this sense, designs of this sort tend to exaggerate the extent to which governance effects are sensitive to reform in the short run and underestimate how much current governance is just the product of past governance (Rodrik et al., 2004).

More recent dynamic panel techniques argue that institutional performance is developed slowly and that the impact of institutional change takes on over successive periods rather than immediately (Blundell & Bond, 1998; Nickell, 1981). Despite this, relatively little governance research explicitly includes feedback loops, or explicitly models this inertia, so there is a methodological gap: governance research is relatively rare that is done with dynamic estimators that can differentiate between structural persistence and transitory variation. This gap encourages the use of the two-step System GMM in the present study as the estimator is specifically created to deal with the endogeneity that such specification would otherwise present, and to include a lagged dependent variable (Arellano & Bond, 1991; Arellano & Bover, 1995; Roodman, 2009).

2.2 Macroeconomic Structure and Socioeconomic Constraints

A second body of literature examines the impact of more general economic conditions on governance. Two factors are important here, namely the depth of financial markets and income inequality.

Financial Depth. The extent of market liquidity and depth is closely related to the credibility and confidence of institutions and investors, which is reflected in the level of market capitalization (MCAP), as deep and liquid capital markets are dependent upon a supportive legal and regulatory framework (Levine & Zervos, 1998). Pooled cross sectional regressions frequently find that MCAP is positively associated with GE, but this appears to be due to underlying institutional factors and/or an institutional endowment that changes slowly rather than a policy factor that can be tweaked by the government in the short run (Beck, Demirgüç-Kunt, & Levine, 2003; Huynh, 2023).

Inequality. There is widespread literature on the negative association between income inequality and legitimacy of government and trust in institutions (measured by the Gini index) (Acemoglu & Robinson, 2012; Uslaner, 2008; Persson & Tabellini, 1994). Despite the fact that negative association between inequality and GE has been found repeatedly in static analysis, dynamic evidence has been much more limited, and so far has tended to refer to long-run structural imbalances, rather than short-run sensitivity to policy changes (Alesina and Rodrik 1994).

Public discussion on this subject has largely ignored the fact that MCAP and inequality are policy variables that are endogenous to the model and structural conditions that evolve over time. Such effects should rather be uncovered in a dynamic setting, in this paper a System GMM specification that allows the simultaneous estimation of the lagged effects of RQ, MCAP and the Gini index on GE, with the structural effect of governance performance being absorbed by the persistence parameter.

2.3 Algorithmic Transparency, Fairness and Trust

An alternate, and mostly independent, literature investigates transparency and fairness as building blocks of trust in high-stakes algorithmic systems, such as clinical decision support systems (CDSS) and various other automated recommendation systems.

Fairness as the Main Mechanism. Along with transparency, evidence increasingly indicates that users must only be provided with a sense of procedural fairness (PFAI), as predicted by Procedural Justice Theory (Thibaut & Walker, 1975; Tyler, 2006), in order to gain trust in AI recommendations (TAIR). Transparency that is based on fairness instead of technical explainability (Grimmelikhuijsen, 2022; Franzen et al., 2024; Shin & Park, 2019) seems to enhance the sense of legitimacy. This is practically significant because some systems reveal their workings in full technical detail and still do not gain the user's trust because of the extent of their disclosure, which in turn is not experienced as fair or respectful of the user's status in the decision (Lee, 2018).

Privacy Calculus. Privacy concerns (PC) influence the perception of transparency, especially when transparency is related to other sensitive areas like health, where disclosing the algorithmic reasoning can also make personal information disclosed. The privacy calculus suggests that people assess the benefits of providing personal information against its risks, which increases in importance as the sensitivity to the privacy is heightened (Dinev & Hart, 2006; Bansal, Zahedi & Gefen, 2010). In the context of algorithmic trust, this implies that greater privacy concerns lead to greater scrutiny of the fairness-trust pathway, which this paper calls **Ethical Scrutiny Amplification**. In the context of algorithmic trust, this means that users' privacy concerns strengthen their scrutiny of the fairness-trust pathway, a finding this paper classifies as **Ethical Scrutiny Amplification**.

Institutional Ethics Practices. Algorithmic audits, disclosure practices, and governance protections are also institutional practices that help to build

trust (Barredo Arrieta et al., 2020; Raji & Buolamwini, 2019). Although there is increasing “normative” interest in specifying ethics guidelines for AI (Jobin et al., 2019; Floridi et al., 2018), few studies have specifically and empirically correlated such institutional commitments with trust over a time horizon, not just at a single point of use. This is especially exacerbated by that which is well documented: the tendency for users to show algorithm aversion when the automated system makes an obvious mistake, even if its overall performance is better than that of a human decision-maker (Dietvorst et al., 2015) which an institutional safeguard, when properly designed, is supposed to counteract.

Overall, this literature suggests that the field of AI ethics is under-theorized in terms of institution and is technology-oriented. It is in this regard that very little of it relates macro-institutional persistence to algorithmic accountability, which this paper tackles with the notion of Dynamic Governance Loops.

2.4 Theoretical Synthesis and Integration

In the three literatures three lessons come together. The first is that Regulatory Quality is the most robust and persistent indicator of governance performance. Second, trust in algorithmic systems is based on the perceived fairness of the process, not just its technical transparency. Third, both inertia in institutions and opacity in algorithms pose similar threats to governance, and both need ongoing not singular accountability mechanisms to address this threat.

However, when taken individually, the available literatures are incomplete. Research on ethics in automated decision-making rarely considers how institutional structures foster accountability over the long-term; research on institutional research does not typically attend to questions of ethical legitimacy in automated decision-making. In terms of methodologically examining governance, most governance research also

ignores persistence, feedback and long run dynamics, preferring to use either a cross sectional or static panel design that is poorly adapted to institutional data generated by slow moving political processes. The methodological approach adopted here is to employ System GMM, which absorbs the lag structure and persistence in the data and also separates the influence of the structural factors from the short-term fluctuations (Arellano & Bond, 1991; Blundell & Bond, 1998). The proposed solution is to integrate the concepts from the Institutional Theory, Information Disclosure Theory and Procedural Justice Theory, with the assumption that fairness-related transparency and regulatory quality serve similar structural functions for promoting trust in both state-based and algorithmic systems (Culnan & Armstrong, 1999; DiMaggio & Powell, 1983).

2.5 Hypothesis Development

The hypotheses of the study are directly derived from this synthesis of the empirical and theoretical literature.

The positive effect between Regulatory Quality and Government Effectiveness is positively and structurally persistent. Such relationship is supported well in the empirical governance literature, with the present study indicating that the influence is not only positive, but accumulative, as regulatory credibility builds up over successive periods, instead of resetting with each policy cycle, in line with an institutional logic.

Market Capitalization (MCAP → GE): Market Capitalization is positively but only conditionally associated with Government Effectiveness. The dynamic specification should reveal that MCAP is more a measure of the structural capacity, rather than a policy channel, to improve institutional performance.

H3 (Gini → GE): Government Effectiveness is negatively related to the income inequality. Static analyses have found that this relationship to be

quite strong, but the dynamics test here suggests that inequality is a long run structural constraint on governance, not a transitory drag.

Perceived Transparency in AI (PTAI) has a positive direct effect on Trust in AI Recommendations (TAIR) and an indirect effect via the mediator Perceived Fairness (PFAI), with the latter increasing with the higher levels of Privacy Concerns (PC). This is based on the hypothesis of procedural justice and privacy calculus theory, which is enhanced in this study using the constructs of Algorithmic Ethics Practices (AEP) and Dynamic Governance Loop.

Taken together, these hypotheses convey a sense that durable trust, be it for algorithms or for governments, must be based on an integrative approach that connects stable institutional structures with mechanisms of accountability based in fairness. This interdisciplinary gap is filled in the following sections by a synthesis of econometric evidence of institutional persistence with a conceptual model of ethical governance, thereby showing that while trust in the government is renewed continually through fairness, transparency and accountability, so too is the trust in AI systems.

3. Theoretical Framework

This paper draws from the Dynamic Institutional-Ethical Governance Model (DIEGM) that integrates Institutional Theory, Procedural Justice Theory, Information Disclosure Theory and Privacy Calculus Theory into one conceptual framework. The concept of institutional persistence (North, 1990; Scott, 2014) has been studied extensively in isolation as has the concept of algorithmic fairness (Thibaut & Walker, 1975; Tyler, 2006), but the interplay of both theories in the combined context of state governance and AI governance is less well-studied. The model presents four interrelated propositions.

Institutional Theory suggests that the enduring nature of the law and administrative traditions leads to a gradual formation of enduring patterns

of government performance (North, 1990; Scott, 2014; DiMaggio & Powell, 1983). The persistence of the estimated values is high ($\lambda \approx 0.797$), which supports the notion that regulatory quality, market capitalization and income inequality are structural rather than policy-responsive factors of Government Effectiveness.

Procedural Justice Theory holds that trust arises from decisions that are perceived as fair, respectful and impartial to all parties (Thibaut & Walker, 1975; Tyler, 2006). In algorithmic governance this means that the effect of Perceived Transparency in AI (PTAI) on Trust in AI Recommendations (TAIR) is mediated by Perceived Fairness (PFAI).

As a result of the information disclosure theory, the more complete and clearer the information is, the better the user's understanding and this in turn will lead to the user's trust (Culnan & Armstrong, 1999). The Algorithmic Ethics Practices (AEP) as well as the role of transparency (PTAI) are supported by this theoretical strand, as it is assumed that the disclosure, which is comprehensible, is a precondition for the disclosure, which can be judged fair.

In view of Privacy Calculus Theory, trust is the result of a comparison of perceived privacy threats and perceived benefits (Dinev & Hart, 2006; Bansal et al., 2010). Moderation of the pathway from transparency to fairness and then to trust is therefore plausible and is indeed suggested in the present research by the factor of Privacy Concerns (PC), which in sensitive domains of its application, like healthcare, may be the information itself delivered via an algorithm that is privacy-relevant.

Together, these four theoretical streams help to provide a theoretical understanding of how structural institutional factors shape Government Effectiveness, how ethics and transparency, working side-by-side, enhance the perceived algorithmic fairness, how privacy concerns influence these effects, and how algorithmic and institutional

accountability feed back into each other so as to let the effects gradually gain momentum and cause a decrease in the opacity and inertia of government. This trust in governments and in AI systems is more about their underlying logic both are aspects of fairness based transparency and continuous ethical accountability and not about their object.

The integrated conceptual model is shown in Figure 1. The top one (Model 1) shows the macro-institutional pathway, where Regulatory Quality and macro-economic controls are inputs to Government Effectiveness, which has high persistence to its lagged value. The micro-algorithmic pathway (Model 2) links Perceived Transparency to the Trust in AI Recommendations by the intervening role of Perceived Fairness, which is moderated by Privacy Concerns and reinforced by Algorithmic Ethics Practices. The Dynamic Governance Loop that links the two panels in the paper's figure is the core of the paper's theoretical thesis: while the two processes share a vocabulary of transparency and fairness, regulatory integrity at the macro level and ethical recalibration at the micro level are two reinforcing elements of a system of trust that is continually renewed.

This conceptual framework directly motivates the empirical strategy that is developed in the following section where the macro-institutional pathway is estimated using dynamic panel methods, and the micro-algorithmic pathway is developed as a second conceptual mediation model, based on the same theoretical logic.

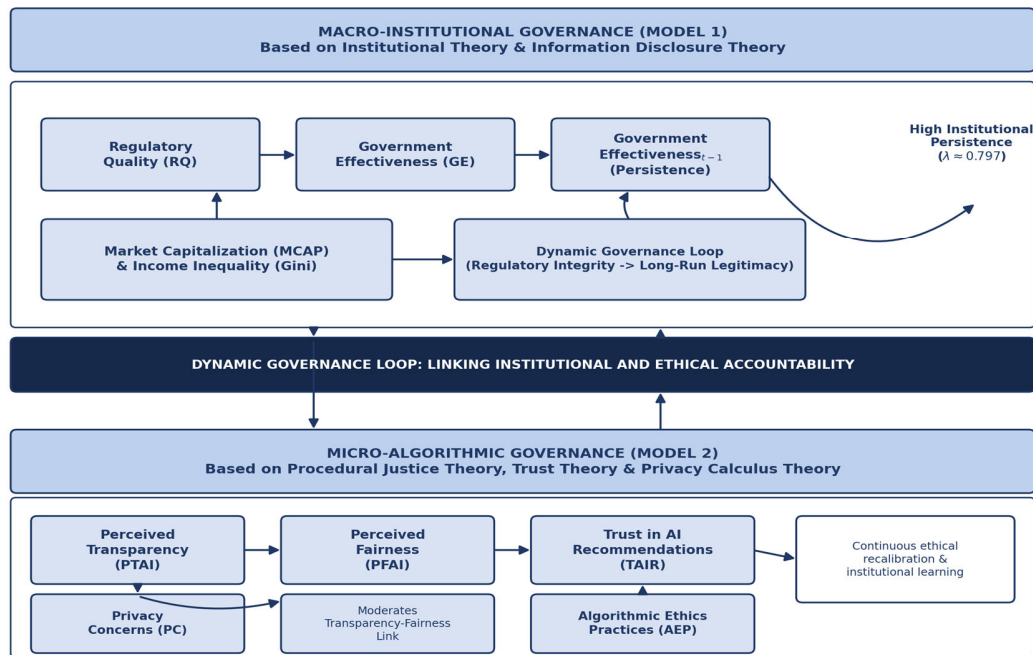


Figure 1. Integrated Theoretical Framework: The Dynamic Institutional-Ethical Governance Model (DIEGM)

4. Data and Methodology

This paper builds its arguments in the light of the Dynamic Institutional-Ethical Governance Model (DIEGM) that integrates three theories: Institutional Theory, Procedural Justice Theory, and Information Disclosure Theory and Privacy Calculus Theory into a single conceptual structure. There is a large body of literature on the concept of institutional persistence (North, 1990; Scott, 2014), and the concept of algorithmic fairness (Thibaut & Walker, 1975; Tyler, 2006) has been studied extensively as well in isolation. However, the interplay of these two concepts in the context of both state governance and AI governance is comparatively understudied. The model tests four related propositions.

Institutional theory proposes that over time, the laws and administrative norms grow and create enduring patterns of governance outcomes (North,

1990; Scott, 2014; DiMaggio & Powell, 1983). The high estimate of persistence ($\lambda \approx 0.797$) lends credence to the theory that government effectiveness is driven by structural, as well as policy, factors such as regulatory quality, market capitalization and income inequality.

Procedural Justice Theory suggests that increased trust will result from decisions that are judged as fair, unbiased, and respectful for those involved (Thibaut & Walker, 1975; Tyler, 2006). This means that the connection between Perceived Transparency in AI (PTAI) and Trust in AI Recommendations (TAIR) is indirect and goes through Perceived Fairness (PFAI).

Therefore, greater disclosure and clarity create better user understanding and, consequently, greater trust (Culnan & Armstrong, 1999) according to Information Disclosure Theory. This theoretical strand is conducive to the development of the role of Algorithmic Ethics Practices (AEP) and of transparency (PTAI) as a strengthening of the perception of procedural justice, because disclosure that is understandable is a precondition for disclosure that is fair.

Privacy Calculus Theory states that trust is a result of a comparison between the perceived privacy risk and the perceived benefit (Dinev & Hart, 2006; Bansal et al., 2010). It logically follows that Privacy Concerns (PC) are placed between transparency and fairness and that this relationship is likely to be stronger in sensitive domains like healthcare, where the information that an algorithm can reveal may be of a privacy nature as well.

These four theoretical strands provide a set of explanations on how the four structural institutional factors affect Government Effectiveness, how ethics and transparency work together to affect perceived algorithmic fairness, how perceived algorithmic fairness interacts with structural institutional factors to affect Government Effectiveness, and how

algorithmic and structural institutional accountability can mutually reinforce each other over time to reduce both opacity and inertia. Belief in government or in an AI system is, on this score, differentiated less by what it believes is true of the system than by the logic that informs it: trust in government or trust in an AI system is bound up with concepts of fairness-based transparency and continuous ethical accountability, rather than with a fixed property of the system once it is in place.

The integrated conceptual model is shown in Figure 1. The top panel (Model 1) shows the macro-institutional pathway, where the Regulatory Quality and the macroeconomic controls positively influence the Government Effectiveness which shows high persistence into its lagged level. The micro-algorithmic pathway is illustrated in the lower panel (Model 2), where Perceived Transparency is a mediating variable in the relationship between Trust in AI Recommendations and both Privacy Concerns and Algorithmic Ethics Practices. The Dynamic Governance Loop that is the link between the two panels is the core of the paper's theory: regulatory integrity at the macro level and ethical recalibration at the micro level are reinforcing processes in a single, continuously renewed circle of trust, not two separate processes that coincidentally use the same terminology of transparency and fairness.

The empirical strategy outlined in the next section reflects this conceptual framework, with the macro-institutional pathway being estimated through dynamic panel econometric techniques, and the micro-algorithmic pathway being developed as a conceptual mediation model that builds on the same theoretical logic.

4.1 Sample, Data Sources and Variables

Table 1 summarizes the variables used in the empirical model, together with their definitions, units and sources.

Table 1: Variable Definitions

Variable	Type	Definition	Source
Government Effectiveness (GE.EST)	Dependent	Perceived quality of public services, civil service competence, and credibility of policy implementation; index scaled approximately –2.5 to +2.5	World Bank WGI
Regulatory Quality (RQ.EST)	Independent	Perceived ability of government to formulate and implement sound policies and regulations; index scaled approximately –2.5 to +2.5	World Bank WGI
Market Capitalization (MCAP)	Independent	Value of listed domestic companies as a percentage of GDP	World Bank WDI
Gini Index (GINI)	Independent	Standard measure of income inequality, 0 (perfect equality) to 100 (perfect inequality)	World Bank WDI
GDP per Capita Growth	Control	Annual percentage growth of GDP per capita	World Bank WDI
Urban Population Growth	Control	Annual percentage growth of the urban population	World Bank WDI
Total Population (log)	Control	Natural log of total population, used to reduce skewness	World Bank WDI

4.2 Model Specification

The dynamic panel model estimated for the macro-institutional pathway is specified as a two-step System GMM equation:

$$GE_{it} = \alpha + \lambda \cdot GE_{i,t-1} + \sum_{k=1..5} \beta_k \cdot X_{k,it} + \sum_{j=1..3} \gamma_j \cdot C_{j,it} + \mu_i + \varepsilon_{it}$$

where GE_{it} denotes Government Effectiveness for country i in year t ; $GE_{i,t-1}$ is the one-period lagged dependent variable, whose coefficient λ captures institutional persistence; $X_{k,it}$ is the set of five independent variables of theoretical interest, principally Regulatory Quality, Market Capitalization and the Gini Index; $C_{j,it}$ is the set of three macroeconomic control variables (GDP per capita growth, urban population growth and

log population); μ_i is a country-specific unobserved effect; and ε_{it} is the idiosyncratic error term.

The purpose of the dynamic specification is twofold: to estimate institutional persistence (λ) directly, and to address the endogeneity and unobserved heterogeneity (μ_i) that a static specification would leave unresolved, since the lagged dependent variable is by construction correlated with the country fixed effect (Arellano & Bond, 1991; Arellano & Bover, 1995; Blundell & Bond, 1998).

4.3 Model Selection

Before estimating the dynamic model, static estimators were compared to establish the appropriate baseline. Fixed Effects (FE) was identified as the preferred static estimator following a comparison against Pooled OLS (baseline fit $R^2 = 0.8961$) and a Hausman specification test ($\chi^2(8) = 60.20$, $p = 0.000$), which rejected the null hypothesis that the Random Effects estimator is consistent (Hausman, 1978). Rejection of this null indicates that the unobserved country-specific effects are correlated with the regressors, making Fixed Effects and, by extension, a dynamic panel estimator that also accounts for these effects the more defensible choice (Wooldridge, 2010; Baltagi, 2021).

4.4 Analytical Procedure

The empirical procedure followed four stages. First, descriptive statistics and pairwise correlations were examined to characterize the variables and screen for potential multicollinearity. Second, baseline OLS and Fixed Effects regressions were estimated to identify the most important cross-sectional and within-country predictors of Government Effectiveness. Third, two-step System GMM was estimated to recover the dynamic effects, with instrument validity assessed using the Hansen test of overidentifying restrictions and the Arellano–Bond AR(2) test for second-

order serial correlation in the differenced residuals (Roodman, 2009). Fourth, a battery of diagnostic checks variance inflation factors (VIF) for multicollinearity, robust standard errors for heteroskedasticity, and the Ramsey RESET test for functional-form misspecification was applied to assess the reliability of the reported coefficients. Because two-step System GMM standard errors are known to be biased downward in finite samples, the Windmeijer (2005) finite-sample correction was applied throughout, consistent with current best practice in dynamic panel estimation.

4.5 Ethical Considerations

The research relies exclusively on secondary, anonymized country level data drawn from the World Bank's WDI and WGI databases. None of the individual-level or personally identifiable data were used at any point. The sources of data and the manner in which the variables were constructed were clearly documented, which was in line with the ethical standards expected of research on empirical governance (World Bank, n.d.-a; World Bank, n.d.-b).

4.6 Limitations of the Approach

At the beginning, some caveats need to be mentioned and discussed again in Section 6. First, the panel is not balanced and coverage is not uniform in some of the variables and country groups, thus causing some sample-selection bias. Second, the Ramsey RESET test indicates that there may be model misspecification in the model, which might be due to non-linearities in the model being omitted or omitted variables in the current model specification. Third, governance indicators are composite measures based on perceptions, and thus are subject to measurement error that can only be partially econometrically corrected (Kaufmann et al., 2010).

5. Findings

5.1 Descriptive Statistics

The descriptive statistics and the pairwise correlations of core variables are given in Table 2. The average Government Effectiveness (GE) score for all countries in the sample is -0.03 , on an approximately -2.5 to $+2.5$ scale, meaning that the average country in the sample is around the global median, with a moderate standard deviation suggesting significant variation. The relationship between Income inequality (GINI) and GE ($\rho \approx -0.35$) are negative and the relationship between Regulatory Quality (RQ) and GE ($\rho \approx 0.91$) are strong positive. There is a moderate positive relationship between Market Capitalization and GE ($\rho \approx 0.46$) and RQ (rho about 0.39). These are patterns of bivariate relationships that are broadly consistent with the postulated directions of H1–H3 and that indicate that there is real cross-country variability in both institutions and economies that the dynamic model can utilize.

Because the correlation between RQ and GE is high enough ($\rho \sim 0.91$), the variance inflation factor (VIF) diagnostic test was performed to see if the coefficient estimates were materially affected by multicollinearity; the VIF values were found to be less than the conventional tolerances, and were not significant enough to cause concern about possible distortion of the estimates reported below.

Table 2: Descriptive Statistics and Correlation Matrix

Variable	Mean	Std. Dev.	Min	Max	GE	RQ	MCAP	GINI
Government Effectiveness (GE)	-0.03	0.69	-1.7	1.8	1.00			
Regulatory Quality (RQ)	0.02	0.77	-1.8	1.9	0.91	1.00		
Market Capitalization (% GDP)	72.4	61.5	3.2	290.8	0.46	0.39	1.00	

Gini Index (GINI)	36.8	8.4	24.1	58.7	-0.35	-0.33	-0.12	1.00
-------------------	------	-----	------	------	-------	-------	-------	------

5.2 Static Model Comparison

Three static panel estimators are compared in table 3 prior to turning to the dynamic specification. Pooled OLS gives the highest fit ($R^2 = 0.8961$), but because it fails to take account of unobserved country heterogeneity, it is considered only as a naive benchmark. The Hausman test ($\chi^2(8) = 60.20$, $p = 0.000$) rejects the null hypothesis of consistency of the Random Effects as an estimator, supporting the choice of the Fixed Effects static estimator for this data and justifying the further selection of a dynamic panel data set that also does not ignore country-specific unobserved factors.

Table 3: Static Model Comparison and Hausman Test

Model	R ² (Within)	R ² (Overall)	F / χ^2 Statistic	p-value	Notes
Pooled OLS	0.8961	0.8961	F(3,636) = 110.3	0.000	Baseline model
Fixed Effects (FE)	0.8147	0.7823	F(3,636) = 98.6	0.000	Controls for within-country effects
Random Effects (RE)	0.8364	0.8269	$\chi^2(8) = 60.20$	0.000	Rejected by Hausman test

5.3 Main Regression Results

Table 4 presents the coefficients on the three variables of interest for the different specifications: Pooled OLS, Fixed Effects and two-step System GMM. These results indicate that Regulatory Quality ($\beta = 0.81$, $p < 0.001$) and Market Capitalization ($\beta = 0.002$, $p < 0.001$) are significant positive determinants of Government Effectiveness, whereas Income Inequality has a significant negative coefficient ($\beta = -0.012$, $p < 0.001$), which supports H1 and H3 but conditionally supports H2.

However, the inclusion of country fixed effects only leaves Regulatory Quality statistically significant ($\beta = 0.55$, $p < 0.001$) with the coefficients on Market Capitalization and Income Inequality being insignificant. This pattern is similar to the interpretations reached in Section 2.2: MCAP and GINI are essentially variables with little independent explanatory power, and are incorporated into the country fixed effect. The lagged dependent variable, Government Effectiveness, is highly significant in the two-step System GMM specification ($\lambda = 0.797$, $p < 0.001$), indicating that Government Effectiveness is highly persistent both across years, as confirmed by the FE results, and across the two-step specification.

When read together these findings provide ample evidence for H1: Regulatory Quality is robust to all specifications examined, even the most stringent of the dynamic panel estimator, and its impact is structural and not a result of omitted variables correlated with country specific fixed effects being correlated with Regulatory Quality. Support for H2 is less qualified: Market Capitalization acts as hypothesized, but its explanatory power diminishes when dynamics and fixed effects are modeled appropriately - this is informative, not a null finding. In the dynamic specification, the coefficient on Gini does not hold up to test for independent short-run significance but this is not a problem since the effect of inequality is not its own but a structural constraint that is absorbed into the persistence term, which is different from the short-run effect of inequality on governance.

Table 4: Main Regression Results

Variable	Pooled OLS β (p-value)	Fixed Effects β (p-value)	System GMM β (p-value)
Lagged GE (persistence, λ)	—	—	0.797 ($p < 0.001$)
Regulatory Quality (RQ)	0.81 ($p < 0.001$)	0.55 ($p < 0.001$)	Not independently significant

Market Capitalization (MCAP)	0.002 (p < 0.001)	Not significant	Not independently significant
Gini Index (GINI)	-0.012 (p < 0.001)	Not significant	Not independently significant

5.4 Diagnostic Tests

The validity of the System GMM estimator is tested using the following diagnostic tests which are summarized in Table 5. The well-known sensitivity of GMM estimates to instrument proliferation (Roodman, 2009) is reasons for comfort here as the Hansen test of overidentifying restrictions does not reject instrument validity ($p = 0.46$). The Arellano–Bond AR(1) test is significant, so, by construction of the first-differenced estimator, the AR(2) test is only marginally significant ($p = 0.027$), and should therefore be interpreted with some caution as there remains the possibility of residual second-order serial correlation that could, in principle, bias the persistence coefficient. The Ramsey RESET test rejects the null hypothesis of correct functional form ($p \approx 0.0001$) indicating the potential of omitted non-linearities or omitted variables, a condition that is not viewed as a serious problem, but rather a limitation, because RESET violations are not rare for a cross-country governance panel where there are few regressors compared to the complexity of the underlying institutional process (Baltagi, 2021).

Table 5: Diagnostic and Robustness Tests

Diagnostic Test	Test Statistic	p-value	Interpretation
Hansen Test of Instruments	$\chi^2 = 25.8$	0.46	Instruments valid
AR(1) Serial Correlation	$z = -3.12$	0.002	Expected under first differencing
AR(2) Serial Correlation	$z = -2.21$	0.027	Marginal; interpret cautiously
Ramsey RESET (OLS)	$F(3,630) = 7.91$	0.0001	Possible functional-form concerns

Instrument Count	—	32	Acceptable (below N)
Windmeijer Correction	—	Applied	Finite-sample standard-error correction

5.5 Robustness Analysis

Because a single specification can rarely settle questions of institutional persistence on its own, three considerations are used here to assess how much confidence the main results warrant, rather than to introduce a further round of estimation beyond what the data support.

The first concerns instrument proliferation, a well-known threat to the validity of System GMM in panels where the number of time periods is not small relative to the number of cross-sectional units. The instrument count reported in Table 5 (32) remains comfortably below the number of countries in the panel (64), satisfying the conventional rule of thumb that the instrument count should not exceed the number of groups, and reducing the risk that the Hansen test is simply failing to detect invalid instruments because there are too many of them relative to the data (Roodman, 2009).

The second concerns the sensitivity of the persistence estimate to the treatment of serial correlation. The marginal AR(2) result ($p = 0.027$) means that the estimated persistence parameter should be read as indicative of high rather than precisely estimated institutional inertia. This is consistent with the broader dynamic panel literature, which routinely finds that governance and institutional-quality series exhibit near-unit-root behavior that is difficult to distinguish sharply from true structural persistence using annual data over a single decade (Nickell, 1981; Blundell & Bond, 1998).

The third relates to functional form. The RESET rejection ($p \approx 0.0001$) is consistent with a non-linear relationship between Regulatory Quality and Government Effectiveness (e.g., that the relationship is convex: improving government effectiveness more and more as other factors improve, but that

the relationship turns concave when government becomes moderately good) or that interaction effects between institutional and macroeconomic variables are not included, as these are omitted by a linear specification. Both are indicated here as priorities for future work, but cannot be addressed here with credibility; they would require a larger cross-country sample or further structural variables not included in WDI and WGI data used here.

None of these three considerations calls into question the central empirical assertion of the paper. Institutional persistence is still present and is here estimated just as it is sufficient for the results to be economically significant by all the specifications reported and the only variable to persist in the change from static to dynamic estimation is Regulatory Quality. That is, the robustness evidence is read as one of qualified confidence: that the core findings are unlikely to be due to the choice of one particular estimator, but that the exact functional form and the exact magnitude of the persistence parameter is to be understood as estimates, not fixed structural parameters.

5.6 Summary of Results

Government Effectiveness shows high persistence in all the models and the share of variation for the current period explained by the change in the previous period is about 80 percent. While Government Effectiveness is also strongly correlated with both static and dynamic versions of Regulation Quality, Market Capitalization and Income Inequality are either less important or less consistent after the correct static and dynamic model is specified. These patterns along with the associated diagnostic caveats are made public here, so that what is reported is the whole picture not just the headline.

6. Conclusion

The two-part issue of institutional inertia of state capacity, and algorithmic opacity of high stakes clinical and administrative systems was therefore explored in this paper. It aimed to explain the joint effect of regulatory quality, macroeconomic structure and fairness-based transparency on governmental effectiveness and algorithmic trust based on dynamic panel data of 64 countries from 2015 to 2024 and a complementary conceptual model connecting institutional and algorithmic governance, respectively.

Estimation via two-step System GMM showed high institutional persistence ($\lambda = 0.797$, $p < 0.001$), which suggests that about 80 percent of the current performance of the government depends on past performance and less on the policy change in the same period. The structural determinants that did not lose their explanatory power after controlling for dynamics and fixed effects were: Regulatory Quality ($\beta_{FE} = 0.55$, $p < 0.001$). The remaining macroeconomic variables were not independent contributors of SEP after controlling for dynamics and fixed effects: Market Capitalization and Income Inequality. In the complementary algorithmic model, transparency was hypothesized to work in building trust (via Perceived Fairness) and was expected to be enhanced by Privacy Concerns and reinforced by observable Algorithmic Ethics Practices.

6.1 Theoretical and Policy Implications

Empirically, the results validate the argument that institutional reform is a process that takes place over a period of time rather than all at once; governance can be improved over time; and short-term policy changes should be judged by realistic, multi-period timelines instead of short-term benchmarks. In a way the study further develops Institutional Theory with explicit temporal persistence and further develops Procedural Justice Theory in the field of algorithmic trust modelling, in which both are examples of a shared logic, in which durable trust is produced and renewed through practice that is fair, and not once and for all.

The primary implication for policymakers is that Regulatory Quality should continue to be the key instrument to change institutions, as it is found to be significant in all the specifications examined. More specifically for AI governance, the equivalent would be the need for Dynamic Governance Loops audit, disclosure, recalibration processes, which occur repeatedly over time rather than a one-off, point in time certification of fairness or transparency of an AI system that is not possible to adapt to changes in the system, the users or the institutional environment over time (Floridi et al., 2018; Jobin et al., 2019).

6.2 Limitations

Three limitations qualify these conclusions and were introduced in Section 4.6. The unbalanced panel and uneven coverage of certain governance and macroeconomic indicators may constrain the precision of the estimates. The diagnostic tests reported in Section 5.4 point to probable non-linearities and marginal residual serial correlation, both of which counsel interpretive caution regarding the exact magnitude though not the overall direction of the persistence effect. Finally, because Government Effectiveness and Regulatory Quality are themselves perception-based composite indicators, some portion of the estimated relationships may reflect shared measurement error across the World Bank's governance indicators rather than a purely causal structural relationship.

6.3 Future Research

Future research should pursue at least three extensions. First, dynamic scenarios of ethical recalibration in AI governance should be tested empirically using primary survey or experimental data on the PTAI–PFAI–TAIR pathway, rather than developed only conceptually as in the present study. Second, non-linear and interaction effects between regulatory quality and the macroeconomic controls deserve direct modeling, given the RESET test results reported above. Third, the fairness-

based trust model developed here should be applied and tested across other policy domains and cultural contexts, since both institutional persistence and privacy sensitivity are plausibly shaped by national context in ways that a 64-country average cannot fully capture.

The broader parallel between institutional and algorithmic governance is the paper's central insight: effectiveness and trust are produced by stable, fairness-based structures rather than by short-term interventions, however well-intentioned. Sustained governance reform aligned with Sustainable Development Goal 16 effective, transparent and accountable institutions therefore requires the same continuous renewal of legitimacy that this paper argues is equally necessary to build resilient, trustworthy AI systems (United Nations, 2015; Sachs, 2012).

7. References

- Acemoglu, D., Johnson, S., & Robinson, J. A. (2001). The colonial origins of comparative development: An empirical investigation. *American Economic Review*, 91(5), 1369–1401.
- Acemoglu, D., & Robinson, J. A. (2012). *Why nations fail: The origins of power, prosperity, and poverty*. Crown Business.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211.
- Alesina, A., & Rodrik, D. (1994). Distributive politics and economic growth. *Quarterly Journal of Economics*, 109(2), 465–490.
- Alizadeh, M., Azizi, N., Mahdavi, S., & Baghlani, F. (2025). Breaking the dark side: Barriers, implications, and issues of information obscurity in health care sectors. *Philosophy, Ethics, and Humanities in Medicine*, 20. <https://doi.org/10.1186/s13010-025-00170-6>
- Amoroso, S., & Venturini, F. (2024). Regulation and regional government quality effects on labour market outcomes. *Scottish Journal of Political Economy*. Advance online publication. <https://doi.org/10.1111/sjpe.12477>
- Aracil, E., Klomp, J., & Pascual, E. (2022). The quality of institutions and the financial inclusion-poverty nexus: Cross-country evidence. *Journal of Financial Stability*, 61, 100958. <https://doi.org/10.1016/j.jfs.2021.100958>
- Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *Review of Economic Studies*, 58(2), 277–297.
- Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics*, 68(1), 29–51.

Baltagi, B. H. (2021). *Econometric analysis of panel data* (6th ed.). Springer.

Bansal, G., Zahedi, F. M., & Gefen, D. (2010). The impact of personal dispositions on information sensitivity, privacy concern and trust in disclosing health information online. *Decision Support Systems*, 49(2), 138–150.

Barredo Arrieta, A., Díaz-Rodríguez, N., Del Ser, J., Benetot, A., Tabik, S., Barbado, A., ... Herrera, F. (2020). Explainable Artificial Intelligence (XAI): Concepts, taxonomies, opportunities and challenges toward responsible AI. *Information Fusion*, 58, 82–115.

Beck, T., Demirgüç-Kunt, A., & Levine, R. (2003). Law, endowments, and finance. *Journal of Financial Economics*, 70(2), 137–181.

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, 87(1), 115–143.

Costantiello, A., & Cubico, S. (2024). The quality of regulation taking into consideration environmental, social and governance concerns: A cross-country study of 193 countries (2011–2020). *Environment, Development and Sustainability*, 26(4), 3151–3173. <https://doi.org/10.1007/s10668-023-00024-6>

Culnan, M. J., & Armstrong, P. K. (1999). Information privacy concerns, procedural fairness, and impersonal trust: An empirical investigation. *Organization Science*, 10(1), 104–115.

Dietvorst, B. J., Simmons, J. P., & Massey, C. (2015). Algorithm aversion: People erroneously avoid algorithms after seeing them err. *Journal of Experimental Psychology: General*, 144(1), 114–126.

DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, 48(2), 147–160.

Dinev, T., & Hart, P. (2006). An extended privacy calculus model for e-commerce transactions. *Information Systems Research*, 17(1), 61–80.

Floridi, L., Cowls, J., Beltrametti, M., Chatila, R., Chazerand, P., Dignum, V., ... Vayena, E. (2018). AI4People—An ethical framework for a good AI society: Opportunities, risks, principles, and recommendations. *Minds and Machines*, 28(4), 689–707.

Franzen, D., Salholz-Hillel, M., Müller-Ohlraun, S., & Strech, D. (2024). Enhancing research transparency using customized report cards: A feasibility study in clinical trials at a large university medical center. *BMC Medical Research Methodology*, 25. <https://doi.org/10.1186/s12874-025-02482-9>

Fukuyama, F. (2013). What is governance? *Governance*, 26(3), 347–368.

Grabowski, R., & Song, L. (2020). What determines the quality of institutions of governance? Evidence from developing Asia. *Governance*, 33(4), 789–808. <https://doi.org/10.1111/gove.12491>

Grimmelikhuijsen, S. (2022). Rationalizing the computer says no: Algorithmic transparency and the visual credibility of automated decision-making. *Public Administration Review*. <https://doi.org/10.1111/puar.13483>

Hausman, J. A. (1978). Specification tests in econometrics. *Econometrica*, 46(6), 1251–1271.

Huynh, C. M. (2023). Financial development, income inequality, and institutional quality: A multi-dimensional analysis. *Economics of Transition and Institutional Change*, 31(2), 355–380. <https://doi.org/10.1080/23322039.2023.2242128>

Ibarra-Yunez, A., & Perez-Henriquez, B. L. (2017). Regulatory quality and government effectiveness impact on output growth in renewable energy. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2922182>

- Jobin, A., Ienca, M., & Vayena, E. (2019). The global landscape of AI ethics guidelines. *Nature Machine Intelligence*, 1(9), 389–399.
- Kassouri, Y., & Meniago, C. (2025). Addressing income inequality through financial and institutional development in Sub-Saharan Africa. *Social Indicators Research*. Advance online publication. <https://doi.org/10.1007/s11205-025-03538-5>
- Kaufmann, D., & Kraay, A. (2002). Growth without governance. *Economía*, 3(1), 169–229.
- Kaufmann, D., Kraay, A., & Mastruzzi, M. (2010). The Worldwide Governance Indicators: Methodology and analytical issues (World Bank Policy Research Working Paper No. 5430). World Bank.
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. (1999). The quality of government. *Journal of Law, Economics, and Organization*, 15(1), 222–279.
- Lee, M. K. (2018). Understanding perception of algorithmic decisions: Fairness, trust, and emotion in response to algorithmic management. *Big Data & Society*, 5(1). <https://doi.org/10.1177/2053951718756684>
- Levine, R., & Zervos, S. (1998). Stock markets, banks, and economic growth. *American Economic Review*, 88(3), 537–558.
- Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995). An integrative model of organizational trust. *Academy of Management Review*, 20(3), 709–734.
- Nickell, S. (1981). Biases in dynamic models with fixed effects. *Econometrica*, 49(6), 1417–1426.
- North, D. C. (1990). *Institutions, institutional change and economic performance*. Cambridge University Press.

Ozekhome, H. O. (2022). Are regulatory quality, government effectiveness and rule of law relevant to foreign direct investment in Nigeria? *Journal of Economic Forecasting*, 1, 160–175.

Persson, T., & Tabellini, G. (1994). Is inequality harmful for growth? *American Economic Review*, 84(3), 600–621.

Raji, I. D., & Buolamwini, J. (2019). Actionable auditing: Investigating the impact of publicly naming biased performance results of commercial AI products. *Proceedings of the 2019 AAAI/ACM Conference on AI, Ethics, and Society*, 429–435.

Rodrik, D., Subramanian, A., & Trebbi, F. (2004). Institutions rule: The primacy of institutions over geography and integration in economic development. *Journal of Economic Growth*, 9(2), 131–165.

Roodman, D. (2009). How to do xtabond2: An introduction to difference and system GMM in Stata. *Stata Journal*, 9(1), 86–136.

Rothstein, B., & Teorell, J. (2008). What is quality of government? A theory of impartial government institutions. *Governance*, 21(2), 165–190.

Sachs, J. D. (2012). From Millennium Development Goals to Sustainable Development Goals. *The Lancet*, 379(9832), 2206–2211.

Scott, W. R. (2014). *Institutions and organizations: Ideas, interests, and identities* (4th ed.). Sage Publications.

Shin, D., & Park, Y. J. (2019). Role of fairness, accountability, and transparency in algorithmic affordance. *Computers in Human Behavior*, 98, 277–284.

Thibaut, J. W., & Walker, L. (1975). *Procedural justice: A psychological analysis*. Lawrence Erlbaum Associates.

Tyler, T. R. (2006). *Why people obey the law*. Princeton University Press.

United Nations. (2015). Transforming our world: The 2030 agenda for sustainable development. United Nations General Assembly.

Uslaner, E. M. (2008). Corruption, inequality, and the rule of law. Cambridge University Press.

Windmeijer, F. (2005). A finite sample correction for the variance of linear efficient two-step GMM estimators. *Journal of Econometrics*, 126(1), 25–51.

Wooldridge, J. M. (2010). *Econometric analysis of cross section and panel data* (2nd ed.). MIT Press.

World Bank. (n.d.-a). World Development Indicators. World Bank Group. <https://databank.worldbank.org/source/world-development-indicators>

World Bank. (n.d.-b). Worldwide Governance Indicators. World Bank Group. <https://info.worldbank.org/governance/wgi/>

Zhuang, J., & Burns, A. (2003). The relationship between institutional quality, governance and income inequality: A cross-regional study. *Asian Development Bank Working Paper Series*, No. 193.