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A panel data analysis of the effect of state governance on the global competitiveness of BRICS nations

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Abstract

This research investigates the effect of state governance of BRICS nations on their global competitiveness and specific aspects of competitiveness factors, i.e., Knowledge, Technology, and Future Readiness, for the period of 2017-2021 using World Bank's World Governance Indicators (WGI) as the independent variable and IMD's World Competitiveness Ranking (WCR) as the dependent variable. The role of state governance emerged as an important source of global competitiveness and its factors for BRICS nations in the results which revealed certain specific crucial relationships. Overall, 37.68% variation in the WCR rankings of BRICS nations is determined by four key dimensions of WGI namely Government Effectiveness, Political Stability and Absence of Violence, Regulatory Quality, and Control of Corruption with the Control of Corruption being the most significant variable in the model. For the hypotheses relating the State Governance and specific factors of Knowledge, Technology, and Future Readiness, the highest contribution of 40.19% is revealed to be contributed by these four governance variables in Technology rankings, followed by 32.93% variation in Future Readiness and 27.03% in Knowledge. The results provide evidence for the role of the quality of governments and governance in securing global competitiveness by nations. The results are particularly useful for strategic state governance planning and implementations for BRICS nations to improve their competitive global rankings individually and collectively, particularly in the dimensions of control of corruption, government effectiveness, political stability, and absence of violence.

Keywords: BRICS, state governance, competitiveness, WGI, IMD competitiveness ranking

1. Introduction

An effective governance policy is always centered around balanced and equitable growth and advancement in political, economic, social, technological, legal, and environmental aspects. This progress is attributed directly to the enhanced standards of living and hence, consolidated welfare (Mazenda & Cheteni, 2021) ^[17]. Emerging economies focus more on reducing the gap between their haves and have-nots to act in the best interests of their people by tackling issues like unequal income distribution, and low growth alongside social factors like the degree of freedom people have to choose the kind of life they want to lead that is of value to them to live up to their highest potential. Thus, the governance policies need to be structured in a way to ensure sustainability over a longer period of time (Glass & Newig, 2019) ^[11]. Good governance ensures accountability, openness, responsiveness, rule of law, control over corruption, government effectiveness, stability, fairness and inclusiveness, empowerment, and broad-based participation. A constructive governance policy structure encourages richer and happier living conditions for the people (Kyriacou, 2019) ^[13]. The BRICS (Brazil-Russia-India-China-South Africa) countries have individual strong standings in their respective regions. The economies make concentrated efforts toward trade and investment (Duggan, Hooijmaaijers, Rewizorski, & Arapova, 2022) ^[7]. They have similarities in their prospects but dissimilarities in their policies. For example, China is a contemporary single-party-led economy that does not hold any direct elections at the national level whereas India is a parliamentary democratic secular republic in which the president of India is the head of state & first citizen of India and the prime minister of India is the head of government (Geddes, Wright, and Frantz, 2018; Öniş & Gençer, 2018) ^[11, 18]. Hence, they differ in ease of doing business, competitiveness, and international standing (Bontempo, 2022) ^[4].

Thus, this research is aimed towards analysing the relationship between state governance, and the role it is playing towards the competitiveness and well-being in the BRICS nations' economies. This is directly linked to well-being at the national level. Nations are concentrating efforts towards measuring whether, or to what degree, competitiveness makes people happy, thus contributing to a nation's well-being or what are the factors imperative for earning strategic competitiveness globally or at least in comparisons of the countries in direct interest. Aside from some countries going up and others going down, it becomes more important therefore to study competitiveness in depth. The study of competitiveness helps draw insights into how the world positions its economies concerning multiple variables, thus assuming their role in global trade, diplomacy, and the potential power it yields. With this openness and global integration directly linked to economic growth, it becomes significant to understand the bigger picture.

Hence, in this background, this research performs a panel data analysis to study the effect of state governance on BRICS nations' competitiveness and well-being by taking state governance (measured by 6 WGI parameters) as an independent variable and Competitiveness, Knowledge, Technology, and Future Readiness as the dependent variables for the period 2017-2021 to study these variables' inter-relationship and impacts. BRICS has proved to be an impressive consortium of five diverse countries each of which have proved their strength and strategic weight in their socio-economic development and in global economic and international scenario (Biernat-Uziel, 2023) [2]. The study provides deeper insights into the engagement of their common political and economic constructs in enhancing their global competitive strength.

2. Research review

Carcaba, Arrondo, and Gonzalez (2022) [6] investigated the impacts of effective local government management on people's Subjective Well-being (SWB). They identified four potential drivers of SWB (socio-demographic characteristics, material conditions, quality of life, and local governance) using a large survey of individual welfare conducted in Spain between 2013 and 2018. The material conditions had a substantial impact, although less so. Their findings suggested that effective government immediately had a favorable impact on each SWB level in terms of good governance. Accountability, as defined by transparency, did not have a major effect. They also found that corruption had a very substantial delayed influence on reported SWB but no immediate impact.

Bontempo (2022) [4] examined the relative weights of institutional governance and the business environment as they relate to competitiveness and what those factors mean for Brazil. Data on institutional governance, the business environment, and the competitiveness of 131 nations have been gathered by the authors. The method of partial least squares structural equations modelling was utilized to analyse the aforementioned influences. Results revealed that institutional governance quality significantly impacts a country's competitiveness. The effectiveness of institutional governance on a country's competitiveness is enhanced by the quality of the business environment (mediation effect). When compared to high-middle-income nations, Brazil had poor governance quality metrics, particularly in terms of

political stability, government effectiveness, and corruption control.

Mazenda and Cheteni (2021) [17] investigated in their study how much governance affects economic welfare in the BRICS nations. These nations are seen as emerging economic powerhouses with promising growth prospects but with varied governance structures and income distributions among their populations. The paper used static panel models (pooled ordinary least squares (OLS) and fixed effects (FEs) estimators) from 1996 to 2019 to examine the relationship of governance, as measured by the World Bank World Governance Indicators (WGI) (reduced income inequality), on economic welfare (Proxied from two channels): quantitative (output stock/economic growth) and qualitative (reduced income inequality). The results showed that the governance in BRICS has a variety of effects on economic welfare. In comparison to one-party regimes like China and Russia, democratic countries that uphold good governance ideals (such as South Africa and Brazil) have a negative impact on economic welfare along both channels. The results refuted the null hypothesis that sound government policy stimulates economic growth. The study concluded that strong governance is not a crucial component for the development of BRICS economies, particularly in countries with a wide range of incomes.

Marić, Rodić, Jelača, and Bjekić (2021) [14] in their study looked at economic growth as a potential source of competitiveness to ensure economic development. The variables Growth Rate and GDP Growth from the World Economic Outlook Database 2019 as well as the variables GCI, Delta GCI, and Delta Rank mentioned in The Global Competitiveness Report 2019 were utilized in the analysis. The findings supported the validity of earlier studies in the specified field. The various economic development levels shown within the designated countries' groupings revealed various frameworks for economic expansion and, consequently, global competitiveness.

Bil, Güdük, and Keskin (2018) [3] used the data on the global competitiveness index as the basis for a study that aimed to highlight the similarities and differences between national economies like Brazil, Russia, India, China, and South Africa, as well as Turkey (BRICS-T), and to define comparisons between them (2017–2018). A multidimensional scale has been utilized to analyze the data. The result concluded that Russia and Turkey are viewed as one group, whereas China and India produce another group together. Brazil and South Africa are the only members of their respective groups to be on their own.

In a study, Abu-Shanab (2016) [8] used the World Economic Forum's Worldwide Competitiveness Index (GCI) and the United Nations e-government readiness index (UN-EGRI) to measure global competitiveness. The UN-sub-dimensions EGRI and the GCI were estimated to be associated. Results showed a highly substantial association between the two indices as well as a significant link between every e-government sub-dimension and the GCI, which validated the assumptions of the study. Human capital and participation did not significantly predict the GCI, although the ICT infrastructure and the web index did.

In a study, Zaman (2015) [24] aimed to establish a connection between governance indicators and educational outcomes, particularly in light of universities' growing inter-nationalization. Three broad categories of governance indicators-Opolitical governance, economic governance, and

an institutional dimension of governance-as well as six educational factors-higher education spending, higher education enrolment, higher education spending per student, literacy rate, research and development spending, and economic growth differential-were used in the study to propose a framework for the internationalization of universities. For assessing potential relationships between governance variables and educational outcomes, the panel fixed effect model was used. The findings indicated that increasing educational outcomes were strongly influenced by governance metrics, which further helped in developing policies for the globalization of universities.

Ricardo, Buitrago, and Camargo (2021) ^[19]. The purpose of this essay is to show how institutions, institutional quality, and global competitiveness are related. The theoretical and empirical research on institutions, institutional quality, and global competitiveness are outlined in this overview. The most extensively studied contexts are country and firm, and the primary method of analysis is quantitative studies. The key findings show five widely studied theories, three emerging ideas, and two understudied theories. This review applies to developing theoretical methods and integrative analytical tools to present a future study agenda in understudied contexts like the industrial and individual levels. It also combines the knowledge of prior research.

Roy (2006) ^[20] explored Bangladesh's current state of governance in a global framework and assessed the various aspects of governance in economic development. The report of the study also attempted to draw attention to particular instances of poor governance in certain economic sectors. Overall, the evidence in the paper revealed that various aspects of governance, including political governance, institutional governance, and technological governance, were significantly and favourably related to the rise in per capita income, and Bangladesh's level of governance had remained low, as shown by a cross-country comparison between South Asian and East Asian nations.

In a study by Boța-Avram (2013) ^[5], the goal was to examine the connection between global competitiveness, as judged by the World Economic Forum, and governance indices created by the World Bank. The results demonstrated that the majority of governance clusters had a significant impact on global competitiveness. Further research revealed that while all six governance dimensions appeared to have the most negligible effect on countries from Africa, governance indicators for countries from Europe, South, and Central America, and Asia were influenced by factors such as government effectiveness, regulatory quality, rule of law, and control of corruption.

The research review shows that the research work is primarily focusing on global competitiveness and state governance separately and their inter-relationship has not been studied exhaustively. An economy's competitiveness usually refers to the characteristics and features of an economy that enable more effective use of inputs in production (Galgánková, 2020) ^[9]. The competitiveness of a nation as an economy, however, is not limited to Productivity and GDP only. The enterprises therein are to work within the economical-cultural-political-social framework, and it is the duty of the governments to provide an environment of institutions, policies, and efficient infrastructure to encourage sustainable value creation by the enterprises. Hence, state governance is widely recognized by international bodies as an important factor in an

economy's competitiveness at the global level. However, the role of state governance in ensuring a good competitiveness ranking has largely escaped the attention of the researchers. The present studies aim to fill this gap by analysing the effect of governance on BRICS nations' global competitiveness.

3. Research methodology

3.1 Objectives and Hypotheses

This research aims to examine the relationship between the state governance and competitiveness of the BRICS nations using the Worldwide Governance Indicators (WGI) and the IMD World Competitiveness Rankings (WCR). It also aims to investigate the effect of the state governance on the Overall Competitiveness and its factors i.e. Knowledge, Technology, and Future Readiness of the BRICS nations. The study tested the following hypotheses:

H₁: Overall Competitiveness of BRICS nations is significantly affected by the quality of the state governance

H₂: Knowledge in BRICS nations is significantly affected by the quality of the state governance

H₃: Technology in BRICS nations is significantly affected by the quality of the state governance

H₄: Future Readiness of BRICS nations is significantly affected by the quality of the state governance

3.2 Model

In this study, we employed a panel data regression model to estimate the impact of state governance on the global competitiveness of BRICS nations (Brazil, Russia, India, China, and South Africa). The data on World Governance Indicators has been collected from the World Bank Databank (2022) and the competitiveness ranking from the Institute of Management Development (IMD Yearbook, 2022) ^[15] for the period of 2017-2022. The period was limited to 5 years due to the unavailability of the data before and after the period selected. The following model was used to analyse the relationship between the governance indicators and competitiveness measured by four indicators (i.e., Overall Competitiveness, Knowledge, Technology, and Future Readiness) in the BRICS nations:

$$Y_{it} = a + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + u_{it} + \varepsilon_{it} \quad I=1, 2, 5 \text{ and } t=1, 2, 3, 5$$

Where *i* refers to the numbers of cross sections and *t* is the time period

Y_{it}, the dependent variable represents the four selected competitiveness indicators including Overall Competitiveness, Knowledge, Technology, and Future Readiness. The independent variables from *X₁* to *X₆* indicate six governance indicators, i.e., Government Effectiveness, Political Stability and Absence of Violence, Regulatory Quality, and Control of Corruption.

3.3 Variables

The relationship between and impact of state governance on the competitiveness of BRICS has been studied using the WGI for measuring the quality of state governance and the IMD World Competitiveness Ranking for proxying their global competitiveness.

WGI is used as a well-accepted indicator of the state governments due to its credibility and scope. Marino *et al.* (2016) ^[16] quoted WGI as the most popular indicator for

accurate measurements of effective governance and the ability to facilitate cross-nation comparisons. The indices measure the quality of state governance on six different dimensions. These dimensions include:

- **VA (Voice and Accountability):** Ability of a country’s people to participate in the selection of government, freedom of expression and association, and free media
- **PV (Political Stability and Absence of Violence):** Likelihood of political instability or political violence and terrorism
- **GE (Government Effectiveness):** Quality of public policy, implementation, and services, the credibility of government commitment to such policies, quality of civil services and its independence from the political pressures
- **RQ (Regulatory Quality):** Formulation and implementation of government policies and regulations to permit and promote private sector
- **RL (Rule of Law):** The extent of confidence in and abide by the rules of society concerning the quality of property rights, contract implementation, policing, courts, crime, and violence
- **CC (Control of Corruption):** the capture of the state and public power for private interests, including both petty and grand forms of corruption

The global competitiveness of a nation integrates the macro and micro-economic variables of competitiveness in a single ranking reflecting the ability of a nation to provide prosperity to its citizens by showing the productiveness of the country in converting its valuable resources (Wikipedia, 2019) ^[22]. Various factors may govern and accelerate this conversion process such as technology, education, capital, innovation, and so on, that have been the subject of existing investigations using the Global Competitiveness Index (GCI), World Competitiveness Ranking (WCR), and other indicators. The IMD World Competitiveness Ranking (WCR) is an annual ranking of 63 countries used worldwide as a reference point for these countries’ competitiveness since 1989. It uses extensive research for survey data and statistics for analysing and ranking countries based on the management of their competencies in achieving value creation in the long term. IMD’s WCR is preferred over GCI, another popular global competitive index issued by the World Bank, due to the availability of recent data and the vast 333 competitiveness criteria, using international, national, and regional sources, economic literature, and feedback from academics, the business community and government agencies, selected by IMD for the final rankings. Moreover, the IMD provides statistics on three different dimensions called factors (Knowledge, Technology, and Future Readiness) and nine sub-factors or dimensions (Talent, Training and Education, Scientific

Concentration, regulatory framework, capital, technological framework, adaptive attitudes, business agility, and IT integration) rankings, each one with its own category of further sub-factors, adding depth and breadth to the usage of the ranking data by the users. For the same purpose, this study examined the impact of state governance on the three factors of competitiveness as individual variables, i.e., Knowledge, Technology, and Future Readiness apart from the overall competitiveness of BRICS nations to get a complete scan of the relationships and effects.

3.4 Sample

BRICS nations have been selected as the sample for this inquiry. BRICS is an interesting combination of totally diverse economies holding approximately forty percent of the world population, mostly young, and is predicted to be global superpowers in the future if they can manage their competitive edge right. BRICS nations have shown a tremendous scope together for progress as a group (Azahaf and Schraad-Tischler, 2012; Biernat-Uziel, 2023) ^[1-2]. The period of 2017-2021 selected for the study reflects the most recent trends and is also feasible due to the availability of required data.

3.5 Method

This study employed the Panel Data Regression technique for investigating the effect of world governance indicators on competitiveness. To apply panel data on the dataset, we used three methods, namely Pooled Ordinary Least Square (OLS), Fixed Effects Model, and Random Effects Model. The results generated through Pooled Ordinary Least confirms that the data is not pool able, which paves the way for further analysis to choose between Fixed Effect Model and Random Effect Model. Also, as per (Gujarati, 2014) ^[12] pooled OLS method is not an appropriate method as it involves lumping different countries together at different points in time. Furthermore, the Fixed Effect method controls for omitted variable bias in the cross sections and provides efficient coefficients that are not biased (Yadav & Yadav, 2021) ^[23]. The Random Effect model allows the unobserved heterogeneity to behave randomly and assumes no correlation between unobserved heterogeneity and independent variables. Based on the Hausman test results, the Fixed Effect Model was preferred over the Random Effect Model. This implies that there is fixed time-invariant unobserved heterogeneity in the BRICS nations which gives us the direction to use the Panel Fixed Effect Model.

4. Results and Discussion

We examined the effect of state governance as an important factor in determining the competitiveness of BRICS nations. The results of the Fixed Effect Panel Data Analysis are reported in Tables one and two.

Table 1: Correlation coefficients

	Control of Corruption	Government Effectiveness	Political Stability & Absence	Regulatory Quality	Rule of Law	Voice & Accountability
Control of Corruption	1.0000	0.5242	0.3399	0.7854	0.9253	0.3710
Government Effectiveness		1.0000	0.2064	0.1076	0.3986	-0.4260
Political Stability & Absence of Violence			1.0000	0.3272	0.1023	-0.1584
Regulatory Quality				1.0000	0.7645	0.6876
Rule of Law					1.0000	0.4381
Voice & Accountability						1.0000

Source: Authors’ calculations

The analysis started with checking the multicollinearity between different dimensions of the independent variables i.e., WGI. Table 1 shows that there is multicollinearity between control of corruption and rule of law due to which

the rule of law dimension has been dropped from further analysis. The results of the panel fixed effect regression model have been presented in Table 2.

Table 2: Results of Panel Fixed Effect Regression Analysis

	Overall	Knowledge	Technology	Future readiness
Const	109.481	89.9952	96.3025	121.504
Government Effectiveness (GE)	-0.397155	-0.510990	-0.816212**	-0.219745
Political Stability and Absence of Violence (PV)	-0.352016	-0.378396**	-0.439938**	-0.311767
Regulatory Quality (RQ)	-0.230130	0.222035	0.292740	-0.489491
Control of Corruption (CC)	-0.543139*	-0.594020	-0.0854069	-0.826072**
R-square	0.376824	0.424941	0.667789	0.461357
Rho	0.312126	0.270381	-0.040191	0.329394
Years	2017-2021	2017-2021	2017-2021	2017-2021

Source: Authors' calculations

Note: ** indicates the level of significance at 5%, and * indicates the level of significance at 10%, based on robust standard errors.

The initial analysis included all six dimensions of WGI with respect to the four dependent variables related to competitiveness. Due to multicollinearity and insignificant results in the primary investigation, the rule of law and the voice and accountability dimension have been dropped in the final analysis. The final results show that overall competitiveness is significantly affected by control of corruption at a 10% level of significance. If corruption is controlled by 1% by BRICS nations their overall competitiveness ranking is improved by 0.5431% representing their significant association.

The knowledge index of BRICS nations is significantly related to political stability and absence of violence at a 5% level of significance. IMD knowledge index represents rankings on talent (including rankings primarily related to skills including international experience, educational assessment, foreign highly skilled personnel, digital/technological skills, management of cities, and the net flow of international students); training and education (including rankings on total public expenditure on education, employee training, pupil-teacher ratio in tertiary education, higher education achievement, graduates in science, women with degrees); and scientific concentration (Including per capita total R&D personnel, percentage total expenditure on R&D, scientific and technical employment, R&D productivity by publication, high-tech patent grants, and robots in education and R&D rankings). One percent increase in political stability and absence of violence leads to an improvement in the knowledge index by 0.3783%.

The technology of BRICS nations has been found very strongly and significantly related to government effectiveness ($p < 0.05$) followed by political stability and absence of violence ($p < 0.05$). The technology index of IMD is a compilation of rankings of the nations on three sub-factors i.e. regulatory framework (comprising enforcing contracts, immigration laws, intellectual property rights, starting a business, scientific research legislation, and development and application tech.), capital (including venture capital, funding for technological development, investment in telecommunications, IT & media stock market capitalization, country credit ratings, and banking and financial services), technological framework (consisting percentage high-tech exports, communication technology, internet bandwidth, mobile broadband subscribers, internet users, and wireless broadband). The results show that a one percent increase in government effectiveness among BRICS

is resulting in a 0.8162% improvement in the technology ranking of these nations. Similarly, there has been a 0.43% improvement in the technology rankings if the political stability and absence of violence dimension is improved.

The results reveal that the dimension of 'Future Readiness' of BRICS nations is significantly and very strongly affected by the control of corruption. 0.8260% ($p < 0.05$) upward movement in the future readiness ranking is influenced by a 1% increase in the control of corruption. Adaptive attitudes (includes rankings on Internet retailing, Smartphone possession, Tablet possession, E-Participation, and Attitudes toward globalization), Business agility (consisting of rankings of Knowledge transfer, Use of big data and analytics, Agility of companies, World robots distribution, Opportunities and threats, and Entrepreneurial fear of failure), and IT integration (integrating rankings on sub-factors such as Software piracy, Cyber security, Public-private partnerships, and E-Government) are the three sub-factors of Future Readiness dimension as reported by IMD (IMD Yearbook, 2022) ^[15].

The results of this study revealed certain crucial relationships concerning the hypotheses formulated. All the hypotheses have been proven true in the analysis. Overall, 37.68% variation in the WCR ranking of BRICS nations is determined by four key dimensions of WGI namely Government Effectiveness, Political Stability and Absence of Violence, Regulatory Quality, and Control of Corruption. This implies if the BRICS nations collectively control or improve these four factors, they can improve their ranking on overall competitiveness by 37.68% with the control of corruption being the most significant variable in the model. Similarly, the hypotheses relating to state governance and Knowledge, Technology, and Future Readiness have also proved true with the highest contribution of 40.19% made by four selected governance variables (Government Effectiveness, Political Stability and Absence of Violence, Regulatory Quality, and Control of Corruption) on technology followed by 32.93% variation in future readiness and 27.03% in knowledge. Technology is significantly affected by two governance indicators with a very significant coefficient of regression namely government effectiveness and political stability. In a nutshell, if BRICS nations improve their control of corruption, government effectiveness, and political stability & absence of violence. They can improve their rankings within a range of 37.67% to 66.76% on overall and individual competitiveness factors.

5. Conclusion

The present study has been undertaken to investigate the impact of state governance of BRICS nations on their global competitiveness for the period of 2017-2021. World Bank's WGI and IMD's WCR have been employed to test the hypotheses of the study. The results revealed significant relationships and impacts between the dependent and independent variables. The study highlighted the role of state governance as an important source of the global competitiveness of BRICS nations. The result reveals a significant explanatory power of key governance indicators namely control of corruption, government effectiveness, political stability, and absence of violence on dependent variables such as overall competitiveness, knowledge rankings, technology rankings, and future readiness rankings. This suggests that if the BRICS nations improve the specific governance dimensions, they can improve their global competitiveness as well as individual factors' rankings to a significant extent. The value of this study lies in its success to uncover state governance as an important source of an economy's global competitiveness apart from the conventional factors such as education, technology, and knowledge. The findings of this study can be used by the BRICS policymakers and regulators to make specific policies and strategies, individually and collectively, focusing on and improving the emergent significant governance dimensions in their respective economies, thereby leading to their competitive well-being. The data used in this study is confined to the most recent but a limited period of 5 years from 2017-2021. Enlarging the period in future research might result in providing a comprehensive picture related to the overall competitiveness of BRICS nations.

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