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Relationship between Governance and Economic Growth

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Abstract

Governance and economic growth are interconnected with each other. A sound understanding of good governance and economic growth plays a critical role in solving the existing debatable issues of whether economic growth drives good governance or good governance drives economic growth. The study employed the co-integration test and Granger causality test to examine the relationship between governance indicators, developed by the World Bank, through the government efficiency index (GEI) and real gross domestic product using time series data for the period 2002–2022. The VECM results showed that there exists a long-run relationship between CIM and real GDP. Based on VECM test results, the study concluded that all the explanatory variables have a short-run relationship with economic growth at a 1 percent level of significance. The Granger causality test result indicates that causality runs from the government effective index as well as government expenditure to real GDP in the short run. The study recommended that governments or policymakers should widen their focus on integration between institutional factors and economic variables that affect economic growth.

Keywords*:* governance, real GDP, government efficiency index, corruption, market enhancing governance

Introduction

Economic growth refers to a sustained rise in the country's real per capita output. According to Kuznets, "Economic growth is a long-term rise in capacity to supply increasingly diverse economic goods to its population, this growing capacity is based on advancing technology and the institutional and ideological adjustments that it demands." Economic growth means more output and changes in technical and institutional arrangements (Herrick and Kindleberger, 1983).Economic growth is concerned with six major determinants, namely, natural resources, human resources,

capital formation, and technology, which are grouped under supply factors; the remaining two are demand-enhancing and efficiency factors.

The development of a country encompasses economic growth through higher productivity, political systems that represent as accurately as possible the preferences of its citizens, the extension of rights to all members of society, and the opportunity to get them. As institutions influence behavior and incentives in real life, they forge the success or failure of nations (Acemolglu and Robinson, 2012). This aptly summarizes why governance matters for growth.

Governance is a multi-faceted and broad concept that explains the power of a state that exercises to control and govern its economic, technological, social, and political endeavors for the benefit of its nations (WGI, 2014). Good governance is significant in public institutions to conduct and manage public affairs and resources to guarantee human rights free of abuse and corruption and with due regard for the rule of law (Orji et al., 2022). It is significant because it promises to deliver on the promise of human rights: civil, cultural, economic, political, and social rights. Good governance is thus a function of the installation of positive virtues of administration and the elimination of vices of functionalities. It makes government work effective, credible, and legitimate in the administrative system; it is citizen-friendly; and it values caring and people-sharing.

A sound understanding of good governance and economic growth plays a critical role in examining the relationship between governance indicators and economic growth. The answer to the question, “How can developing countries boost their economic growth rates by introducing and implementing good governance?” has occupied the minds of researchers for many years. With the declaration of the new constitution in Nepal in 2015, the question of good governance has become more significant than ever. In this scenario, it is necessary to understand how governance factors over the years have helped shape the Nepalese economy, and what steps can be taken to enhance its role in the growth of the economy. The economic analysis of the impact of governance on economic growth can help establish a relationship between these two highly interlinked areas of economy and development in a changed context based on the past as well as the present and guide a way toward the future.

Various studies by Han et al. (2014), Alam et al. (2014), Yokoyama (2011), and Kaufmann (1999) found a positive relationship between governance and economic growth, while Siyakia (2017), Sen (2014), and Pere (2015) found a negative relationship between governance and economic growth. Owing to the disparity in the results of research on the effect of governance on economic growth, this study contributes to enhancing previous studies on the relationship between governance and economic growth using six governance indicators, compiled by the World Bank (1992)

and empirically tested by Kaufmann and Kray (2015; Pere, 2015; Beyene, 2022; Singh, 2022, Hisham, 2023) in the context of the Nepalese economy using continuous time series data for the period ranging from 2002 to 2022. The study justifies the existence of short-run and long-run relationships among the examined variables by applying the Granger causality test. The study also aims to contribute to evidence-based policy discourse by encouraging policymakers to take governance variables into account while formulating economic policies and vice versa.

The rest of the paper is structured as follows. The review section makes a systematic review of the theoretical foundation and empirical literature. The methodology section presents the model specification and methods of analysis. Section 4 provides empirical results and discussion. The last section concludes the findings and offers policy implications.

Review of literature

Governance consists of the traditions and institutions by which authority in a country is exercised. This includes (a) the process by which governments are selected, monitored, and replaced (i.e., voice and accountability, and political instability and absence of violence); (b) the capacity of the government to effectively formulate and implement sound policies (i.e., government effectiveness and regularity quality); and (c) the respect of citizens and the state for the institutions that govern economic and social interactions among them, i.e., rule of law and control of corruption (Kaufmann et al., 2010). Governance may be classified as market-enhancing governance or growth-enhancing governance.

Institutional economics focuses on understanding the role of human-made institutions in shaping economic behavior. It is concerned with the social systems, or institutions, that constrain the use and exchange of resources (goods and services) and their consequences for economic performance (Coase, 1998). Institutions form the incentive structure of a society, and the political and economic institutions, in consequence, are the underlying determinants of economic performance (North 1993). Growth theorists argued that economic growth is mainly driven by innovative entrepreneurship (Schumpeter, 1911), technological change supported by exogenous factors (Solow, 1956), and endogenous factors (Romer, 1989). Hence, investment in human capital, innovation, and knowledge with well-governed institutions is considered to be a significant contributor to economic growth.

Theoretical review

The theoretical models associated with the interaction between governance and economic growth are discussed below.

Schumpeterian Growth Model

Schumpeter (1911) argued that economic growth is mainly driven by innovative entrepreneurship, which is influenced by the institutional environment. This model is centered on three core ideas for economic growth: (i) innovation is the primary source of technological progress; (ii) innovations are created by self-interested firms, entrepreneurs, and researchers who expect rewards through monopoly rents if their innovation is successfully implemented; and (iii) the monopoly rents are eventually dissipated when new processes and/or products introduced by the innovations become out-dated and are driven out of the market by new technologies. Discontinuous technological changes, thus lead to economic growth.

Schumpeter (1911) argued that developed financial systems play an intermediary role in fostering technological innovations and economic growth by providing basic services such as mobilization savings, monitoring managers, evaluating investment projects, managing and pooling risks, facilitating transactions, and then supporting productivity and growth-enhancing efforts through innovations.

Neo-Classical Growth Model

The neoclassical growth model, developed by Solow in 1956, stated that steady-state growth is determined by technological change, and can be achieved by endogenous variations in factor accumulation, including institutional efficiency and governance. Good governance is the prerequisite for the development of efficient financial institutions, technological change, and advancement. A well-developed financial sector channels resources to viable investment projects via financial intermediation, thereby promoting economic growth. Thus, countries with higher investment levels and capital levels per worker will enjoy higher levels of per capita output through the mobilization of savings, investment, technological change, and institutional quality.

Endogenous Growth Model

Endogenous growth theorists believed that economic growth could be generated through endogenous factors rather than exogenous factors such as changes in technology or population (Romer, 1989; Grossman and Helpman, 1990; Levine, 1991; Bencivenga and Smith, 1991). This model states that the function of a financial sector can effectively increase the rate of economic growth. By increasing the quality and probability of success of an innovation, these functions can positively affect the level and progress of technology available in the economy. Additionally, since technology plays such a pivotal role in new growth models, a well-governed financial system can substantially influence economic performance by mobilizing savings, banks, and equity markets to increase capital accumulation and again exert a positive impact on the equilibrium growth rate.

New Institutional Theory

This theory concentrates on the effect of the internal institutional environment on the process of reforms that they set out (Kara and Balid, 2019). The problem of developing countries achieving economic growth is not only related to setting plans and policies with the establishment of the physical structure of institutions but also to the extent of these countries 'ability to activate these policies, implement strategic plans, and properly carry out these institutions (Street, 2017).

Institutions form the incentive structure of a society, and the political and economic institutions, in consequence, are the underlying determinants of economic performance (North, 1993). The insights are techniques of endogenous growth models, which have revealed that there can be self-sustaining growth without exogenous technological progress and that the growth rate can be associated with preferences, technology, income distribution, and institutional arrangements. This has led to the recent revival of interest in the link between governance and growth (Pagano, 1993).

Empirical Review

Siddiqui & Ahmed (2009) analyzed the role of institutions in promoting economic growth and development using a GMM econometric model. Specifically, it attempted to test the impact of two dimensions of institutions on growth using a recently developed index of institutionalized social technologies and their sub-indices, namely risk-reducing technologies and rent-seeking technologies. The result suggested a strong causal link between institutional quality and economic performance and also confirmed conditional convergence as predicted in modern theories of growth.

Aisen&Veiga (2013) examined the effects of political instability on economic growth by using the system-GMM estimator for linear dynamic panel data models on a sample covering up to 169 countries and 5-year periods from 1960 to 2004. The study found that higher degrees of political instability were associated with lower growth rates of GDP per capita, and political instability adversely affected growth by lowering the rates of productivity growth and, to a smaller degree, physical and human capital accumulation. nd higher economic growth.

Emara & Jhonsa (2014) examined the impact of the improvement in the quality of governance on per capita income and the increase in per capita income on the quality of governance using two-stage least squares (2SLS) regression for cross-sectional observations of 22 countries in the MENA region for the year 2009 following Kaufman and Kraay (2002) methodology. The study found a positive, strong, statistically significant causation from quality of governance to per capita income and concluded that most MENA countries had achieved a relatively high but fragile standard of living for their citizens that was not based on firm governance.

Yerrabati & Hawkes (2015) studied the nexus between economic governance and economic growth by using the meta-synthesis of empirical evidence on governance and growth in South and East Asia Pacific countries based on 29 studies with 554 estimates from 1980–2012. The empirical results showed that, while corruption was significantly and negatively correlated with growth, government effectiveness and regulation were positively and significantly correlated. Therefore, the study concluded that overall governance was important for growth and could have policy implications.

Westræus (2016) investigated whether normative institutions such as good governance are causing economic growth in Botswana, Namibia, and South Africa by seeking congruence in the empirical evidence with institutional theory. The study used numeric data from the World Bank to assess and correlate gross domestic product per capita growth and governance levels. The study concluded that although normative good governance institutions lacked causality for economic growth, there might be other institutional arrangements that are prerequisites for growth.

Fawaz et al. (2021) examined the impact of governance on economic growth in developing countries using worldwide governance indicators with a fixed effect model for 1996–2018. The study found that the rule of law and control of corruption have positive effects on developing countries' per capita income.

Kesar, Bandi, Jena, and Yadav (2022) investigated the impact of governance index and gross capital formation on the economic growth of BRICS using annual data from 2002 to 2019. The study employed the fixed effect model, FMOLS, and DOLS models. The study found that the government index, gross capital formation, population, control of corruption, and governance effectiveness have a positive and significant impact on economic growth, whereas negative quality showed a significant and negative impact on growth.

Baysoy & Altog (2021) explored the spatial influences on the economic growth of 18 countries in the Middle East and North Africa between 1970 and 2014. The study concluded that the economic growth of neighboring countries with similar institutional characteristics is positively correlated.

Orji et al. (2022) analyzed the impact of the control of corruption on economic growth in Nigeria using multiple regression models and found that increasing the corruption control rate leads to increased growth rates by 0.54 percent with the constant of the other factors.

Singh (2022) examined the relationship between economic growth and six governance indicators by employing the panel cointegration technique for BRICS nations. The study found that governance promotes economic growth, and then there is a bidirectional relationship between governance and economic growth.

Bryene (2022) studied the impact of governance on growth in 22 African countries by examining the effects of each dimension of governance individually and then creating a composite index of governance. The findings revealed that the composite governance index positively impacted growth despite the negative impact of corruption and government efficiency separately.

Hisham (2023) investigated the impact of governance on economic growth, considering spatial dependence between countries, by employing spatial regression models in a sample of 116 countries worldwide in 2017. The study found that the influence of governance indicators on economic growth is statistically significant. The findings emphasized that promoting regional integration among the countries of the same region will enhance its economic growth.

Materials and Methods

Model specification

The methodology for this study took cues from that of Izilein and Mohammed (2017), who studied how democratic institutions and foreign direct investment affected economic growth in Nigeria from 1981 to 2015. This study employs the Johansen Cointegration and Ordinary Least Square approach in the estimation of the model. This study also obtains the residual and incorporates it into the model to ascertain the speed of adjustment it will take to equilibrate in the long run. For uniformity, all the source data in this study are logged to assume the same unit of measurement.

The model of this study is an offshoot of Solow's (1956) model of economic growth used in the works of Udah and Ayara (2014), who examined institutions, governance structure, and the economic performance nexus in Nigeria. According to the Solow model, output is a function of labor (L) and capital (K), with constant returns to scale. The rate of capital accumulation, in the long run, is higher than that in the short run, the marginal efficiency of capital approaches zero, and the growth rate is subsequently determined by technical progress and growth in the labor force.

$GDP = AK_i^{\alpha} L_i^{1-\alpha}$ …….(1)

Where GDP = real GDP, A = total factor productivity K = capital stock; L = labor; α = elasticity of capital to output. The model assumes that each productive unit will use the same level of capital and labor with the following aggregate production function:

$GDP = AK^{\alpha} L^{\beta}$ ……..(2)

In the study of Udah and Ayara (2014), they incorporate governance structure and institutions into equation two through their effects on total factor productivity (TFP) or technical efficiency on the premise of the role of institutions in increasing technical efficiency (David (1997)), which in turn affects the efficiency of investment. Thus, their

study assumes that TFP is a function of the quality of institutions and governance structure (corruption, government effectiveness, and rule of law). Thus

$A = Yt = \alpha o + \alpha 1Xt + \alpha 2CIM + \varepsilon_t$……..(3)

Combining equations 2 and 3, we get

$GDP = AK...ALFA^{\alpha}L^{\beta}, \ ,CIM^{\varphi}$ …….(4)

Where α, β, d, and φ are elasticity coefficients. From equation 4 an explicit estimation function is specified, ignoring labor and capital and taking the natural logs of both sides as follows:

$LogGDPt = \alpha o + \alpha 1Xt + \alpha 2CIM + \epsilon_t$ ……..(5)

Where Xt is a vector of explanatory variables including; voice and accountability (VACCOUNTR), Political stability and absence of violence (PSVIOLENCTR), governance effectiveness (GEFFECTR), regulatory quality (REGULATR), control of corruption (CORRUPTR), CIM = contract intensive money (CONTRINTR), and Et = stochastic error term with the usual normality assumptions

To achieve the objective of this study, which is to investigate the effect of governance quality on economic growth in Nepal for the period of 2002–2022, the model by Udah and Ayara (2014) in equation (5), will be adopted and modified. Thus, the implicit functional model of this study is stated below:

$RGDP = f\ (CIM, \mathrm{D}OINV, GOEXP, GEI)$…… (6)

The mathematical form of the model is as follows:

Where: RGDP = real gross domestic product, CIM = contract-intensive money proxy for institutional quality, DOINV = domestic investment proxy by gross fixed capital formation, GOEXP = government expenditure, and GEI = governance effective index proxy for good governance.

The mathematical form of the model is as follows:

$RGDP = \gamma o + \gamma 1CIM + \gamma 2DOINV + \gamma 3GOEXP + \gamma 4\mathrm{GE}I + \varepsilon$

Where: RGDP = real gross domestic product, CIM = contract-intensive money proxy for institutional quality, DOINV = domestic investment proxy by gross fixed capital formation, GOEXP = government expenditure, and GEI = governance effective index proxy for good governance.

Method of analysis

This study used modern time series techniques of analysis to analyze and estimate the relationship between the governance indicators and other selected macroeconomic variables. The techniques of time series analysis employed in this study include the unit root test, Johansen Cointegration techniques, ECM, and Granger causality. These techniques of analysis are explained in detail in the following section.

Unit root test

A unit root is a peculiarity of techniques that develop through time that can result in issues of statistical inferences, which involve models of time series. The unit root test is the official test used to check whether a time series variable is stationary or not. There are different forms of unit root tests, such as the Phillip-Perron (PP) test, the Dickey-Fuller Generalized Least Square (DF-GLS) test, and the test of Augmented Dickey-Fuller (ADF). Dickey and Fuller (1971, 1981) developed a technique to test for nonstationary formally based on the simplified AR (1) model, as shown in Equation 5.

$$Y_t = \phi Y_{t-1} + \varepsilon_t \dots\dots\dots (7)$$

The aim here is to test whether ϕ is equal to 7 (unit root or non-stationary). Henceforth, the null hypothesis H0: ϕ = 1 while the alternative hypothesis H1: ϕ < 1. However, by subtracting Yt – 1 on both sides of Equation (7),.

$$\Delta Y_t = (\phi - 1) Y_{t-1} + \varepsilon_t \dots\dots.. (8)$$

This can be written alternatively in the form of Equation (9).

$$\Delta Y_t = \beta Y_{t-1} + \varepsilon_t \dots\dots.. (9)$$

where β = (ϕ – 1) and Δ is the operator of the first difference. Therefore, the null hypothesis is now H0: β = 0 and the alternative hypothesis is H1: β < 0. When β = 0, then ϕ = 1, which means there is the presence of a unit root, which implies that the time series under investigation is non-stationary. Dickey and Fuller (1979) also suggested an alternate regression equation, which can be utilized for testing the existence of a unit root. This equation incorporates a constant within the random-walk process, as shown in Equation 8:

$$\Delta Y_t = \alpha_0 + \beta Y_{t-1} + \varepsilon_t \dots\dots.. (10)$$

Dickey and Fuller (1984) broaden the procedure of their test by proposing an augmented version to deal with serial correlation. The ADF test includes the lagged value of the dependent variable in the regression model to wipe out the autocorrelation. Therefore, this study used the test of ADF, The test was conducted by expanding Equation (v) through the addition of the lagged value of the dependent variable ΔYt, as shown in Equation (11):

$$\Delta Y_{t-1} = (Y_{t-1} - Y_{t-2}), \Delta Y_{t-2} = (Y_{t-2} - Y_{t-3}) \dots\dots\dots (11)$$

Co-integration test

Engle and Granger (1987) recommended that it is probable for a linear combination of integrated time series variables to become stationary and hence integrated in the same order. Therefore, the test of cointegration requires the order of integration of all the time series variables to be the same in the long run. The order of integration involves the number of times that the time series variable is required to be different before it

becomes stationary. Anon-stationary time series variable that turns out to be stationary after its difference n times is termed integrated of order n. A set of time series variables is said to be cointegrated, if the set of individual variables is integrated in a similar order, n. A set of time series variables integrated of the same order n is cointegrated if the linear combination of the time series variables is integrated of order less than n. Succinctly, cointegration analysis is a process of estimating the long-run parameters in a relationship with non-stationary variables (Brooks, 2008).

The notion of integration makes regression of variables that are integrated of order one I(1) potentially meaningful, it also serves as a pre-test conducted to evade spurious regression; it is one of the analyses used for estimating, testing, and specifying dynamic models, it is also significant for testing the validity of underlying economic theories (Seddighi, 2012).

Two forms of cointegration methods have been used by previous studies, which are: 1) the Johansen cointegration method; and 2) the Engle-Granger method of cointegration. This research utilized the Engle-Granger method because of its advantage over the methods. This technique is a method of maximum likelihood that determines the number of cointegrating vectors in a VAR of non-stationary time series with restrictions imposed, known as VECM. The estimation model of Johansen's method is shown in Equation (12):

$$Y_t = A_1 Y_{t-1} + \cdots \ldots + A_p Y_{t-p} + \beta X_t + \varepsilon_t \ldots \ldots . . (12)$$

where Yt is a non-stationary I(1) vector of the variables, Xt is a deterministic vector of the variables, and εt is an innovation vector, as indicated in Equation (13).

$$\Delta Y_t = \pi Y_{t-1} + \sum_{i=1}^{p-1} r_i \Delta Y_{t-1} + \beta X_t + \varepsilon_t \ldots \ldots . (13)$$

If εt is estimated as integrated of order zero I(0), the Yt and Xt variables are integrated of order one I(1). It will have the advantage of having information on both long-run and short-run.

Johansen (1991) proposed two distinct tests of cointegration under the Johansen method: the Trace (TR) test as well as the Maximum Eigenvalue Test (L-Max). The ratio of the likelihood statistic for the TR test is shown in Equation (12).

$$Tr = -T \sum_{i=r+1}^{p-2} (1 - \lambda i) \ldots \ldots \ldots (13)$$

The TR test is a kind of joint test that tests the null hypothesis of no cointegration (H0: r = 0), contrary to the alternative hypothesis that there is cointegration (H1: r >0). While the L-Max test is based on Equation (14),.

$$L-= -Tln(1 - \lambda_{r+1}) \ldots \ldots . . (14)$$

The test of the maximum eigenvalue conducts a test on each eigenvalue separately. It then tests the null hypothesis that the number of cointegrating vectors is equal to r contrary to the alternative hypothesis of r + 1 cointegrating vectors (Brooks, 2008).

Granger causality test

It is a convenient practical technique used for identifying the direction of the causal relationship between the variables, and therefore, it may also be used within the cointegration analysis when a theoretical framework is absent concerning the investigated variables. If, let's say, in a regression equation, independent variable Xt influences the explained variable Yt, indirectly this acknowledges that Xt variable causes Yt variable, which means that if variable Xt changes, it will induce variable Yt to change also. In simple terms, this is a concept of causality. Therefore, the following cases will be identified concerning the direction of causality:

i. When Yt does not cause Xt but Xt causes Yt, this case will be called a unidirectional causal relationship.

ii. ii. When Xt and Yt variables are determined jointly, this is a case of feedback or bilateral causality.

Since a theoretical model concerning the direction of the causal relationship is not known, several tests have been recommended to recognize this direction. The most prominent test is the one suggested by Granger (1986). This test is based on the proposition that “the future cannot cause the present or the past” and uses the VAR model concept. The Granger causality general specification test in a context of (X, Y) bivariate can be expressed in Equations [14] and [15]

$$Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \cdots \ldots \ldots + \alpha_i Y_{t-i} + \beta_1 X_{t-1} + \cdots \ldots \ldots + \beta X_{t-i} + \beta X_{t-i} + \varepsilon_t \ldots . (15)$$

$$X_t = \alpha_0 + \alpha_1 X_{t-1} + \cdots \ldots \ldots + \alpha_i X_{t-i} + \beta_1 Y_{t-1} + \cdots \ldots \ldots + \beta Y_{t-i} + \beta Y_{t-i} + \varepsilon_t \ldots . (16)$$

As indicated in Equations [15] and [16], the subscripts indicate periods, and εt is the error term. The constant growth rate of Y and X in Equations eighteen and seventeen is represented by the constant parameter α0, and hence, in these variables, the trends can be interpreted as general movements of the cointegration among X and Y that go through the process of unit root. We can derive from this analysis two different test hypotheses. The first hypothesis tests the null hypothesis that Y does not Granger causes X, as does the second hypothesis, which tests the null hypothesis that X does not Granger cause Y. If the first null hypothesis is rejected and the second fails to be rejected, it would be concluded that changes in Y Granger cause changes in X. Also, between the two variables, unidirectional causality will occur if one of the null hypotheses is rejected, bidirectional causality, on the other hand, is said to exist if both

of the null hypotheses are rejected, and no causality is found if both of the null hypotheses fail to be rejected.

The standard Wald F-statistic would be used to test the hypothesis concerning the significance or not of the Equation [15] and Equation [16] VAR model coefficients, as shown in equation [17].

$$F_c = \frac{\frac{SSR_r - SSR_u}{K}}{\frac{SSR_u}{(n-2k-1)}} \sim F(K, n-2k-1) \ldots . (17)$$

Where,

SSRu = unrestricted sum of square residuals.

SSRr = restricted sum of square residuals.

This kind of hypothesis in this test would be formulated as follows:

Hypothesis one

H0: X does not Granger causeY,that is, {α11, … ,α1k} = 0, if the critical value of F> Fc

H1: X does Granger cause Y, that is, {α11, … , α1k} ≠ 0, if the critical value of F < Fc

Hypothesis Two

H0: Y does not Granger cause X, that is, {β11, … , βk} = 0, if critical value of F > Fc

H1: Y does Granger cause X that is {β11, … , βk} ≠ 0, if the critical value of F < Fc

The selected variables GEI (good governance) and RGDP are denoted by “X” and “Y”, respectively. It is supposed to be noted that here in hypotheses one and two, the hypothesis has not been tested if we found that “X causes Y," but it has been instead tested if, according to the Granger type, “X causes Y”. This is because Granger causality test is just a simple statistical tool of analysis that is used for testing the causal relationship between the variables; it is not based on a particular theory of causation but rather on the capability of the equation to predict the dependent variable better. However, the test validity depends upon the VAR model order and on whether the variables are stationary (Seddighi, 2012).

However, the hypothesis of the Granger causality test of this study will be expressed as:

H0: Good governance does not Granger cause economic growth

H1: Good governance Granger causes growth.

The null hypothesis should be rejected if the F-test statistic is greater than the critical value of the estimate. This implies that money growth causes Inflation. However, the same test procedure applies to other variables of the study.

Results and discussion

This section presents the results of the unit root test, cointegration test, VECM, and Granger causality test, which serve as a foundation for facilitating informed decision-

making and deeper insights into the relationship between good governance indicators and real GDP in Nepal.

Unit root test results

Table 1Unit Root Test

Variables	Level	First Difference
LRGDP	1.358506	-5.580956***
LCIM	-1.576134	-4.413339***
LGOEXP	-0.278189	-3.471699**
LDOINV	-0.741434	-3.099488**
LEGI	1.492814	-7.080826***

Table 1. shows that LRGDP, LCIM, LNM1, LGOEXP, LNM2, LDOINV, and LEGI have unit root at a 1 percent level of significance in both intercepts with trend and without trend in the form of level data. So, the variables are not stationary at this level. However, all these variables are stationary at 1 percent and 5 percent levels of significance, with the first difference in intercept and without trend. It means all the variables are integrated into order 1, i.e. I(1). Hence, the variables can be used for the Engle-Granger cointegration test.

Engle-Granger cointegration test

The **Engle-Granger test** is a test for cointegration. It constructs residuals (errors) based on the static regression. The test uses the residuals to see if unit roots are present, using the Augmented Dickey-Fuller test or another, similar test. The residuals will be practically stationary if the time series is cointegrated.

The components of the vector xt are said to be cointegrated of order d, b, denoted

xt ~ CI(d,b), if

a- all components of xt are I (d)

b- b- there exists a vector b ($\neq 0$) so that m = b'xt ~ I (d~b), b > 0. The vector b is called the co-integrating vector

xt~I(1) ⇒a + b xt~ I(1)

Results of OLS

This study aims to understand how changes in these independent variables impact economic growth and to what extent. It fulfills the requirement of a co-integration test.

Table 2: Results of OLS

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LGOEXP	0.308431	0.090853	3.394832	0.0040
LEGI	0.000540	0.001992	0.271164	0.7900
LDOINV	-0.052796	0.095153	-0.554858	0.5872
LCIM	-0.057261	0.346280	-0.165361	0.8709

C	9.208345	0.420150	21.91678	0.0000
R-squared	0.991444	Durbin-Watson stat		0.923599
Adjusted R-squared	0.989162			
F-statistic	434.5305	Durbin-Watson stat		0.923599
Prob(F-statistic)	0.000000			

Table 5.3 shows the OLS estimate of the variables under study. This stage is necessary for performing the integration test. Table 5.4 shows the unit root test of the residual for cointegration.

Unit root test of residuals

Table.3 :Unit Root Test of Residuals

Null Hypothesis: D (RESID02) has a unit root				
Exogenous: Constant				
Lag Length: 0 (Automatic - based on SIC, maxlag=4)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-4.721702	0.0017
Test critical values:	1% level		-3.857386	
	5% level		-3.040391	
	10% level		-2.660551	
*MacKinnon (1996) one-sided p-values.				

Table.3 shows the unit root test for the residuals, required for the Eangle- Granger cointegration. The unit root test confirms that the variables are cointegrated in the long run. So this requires estimating VECEM to analyze the short-run relationship.

VECM test

Table.4:VECM Results

DLRGDP and DCIM				
Variable	Coefficient	Std. Error	t-value	P value
EC_{t-1}	-1.383082***	0.355657	-3.888811	0.0006
$DLRGDP_{t-1}$	0.313341	0.248486	1.261002	0.2177
$DLM1_{t-1}$	0.455069	0.333819	1.363221	0.1837
C	0.001090	0.006121	0.178104	0.8599
DLRGDP and DLDOINV				
EC_{t-1}	-1.781091***	0.408866	-4.356173	0.0002
$DLM1_{t-1}$	0.523677	0.298363	1.755169	0.0902
$DLRGDP_{t-1}$	-0.055536	0.075463	-0.735944	0.4679
C	0.000487	0.005745	0.084781	0.9330
DLRGDP and DLEGI				
EC_{t-1}	-0.806601***	0.223709	-3.605575	0.0013
$DLRGDP_{t-1}$	-0.124372	0.166137	-0.748612	0.4608
$DLM2_{t-1}$	-0.002595	0.001544	-1.680543	0.1048
C	0.001437	0.005518	0.260489	0.7965

DLRGDP and DLGOEXP				
EC_{t-1}	-1.820089***	0.420408	-4.329341	0.0002
$DLM2_{t-1}$	0.405914	0.310102	1.308970	0.2012
$DLRGDP_{t-1}$	-0.016373	0.083460	-0.196179	0.8459
C	0.000623	0.005344	0.116582	0.9080

Based on the results of VECM from Table 5.5, the error correction term in the RGDP equation is significant at a 1 percent level and has a negative sign, implying that there exists a long-run relationship running from CIM to RGDP. Its relative value (-1.383082) shows that, the rate of convergence to the equilibrium state per year. More clearly, the speed of adjustment of any disequilibrium toward long-run equilibrium is that about 45.5 percent of the disequilibrium in RGDP is adjusted each year. The degree-of-adjustment mechanism is quite powerful. The coefficient of error correction term with narrow money supply as a dependent variable is observed to be statistically significant at a 1 percent level, indicating that there exists a strong short-run relationship running from real GDP to narrow money supply.

Similarly, the error correction term of RGDP as a dependent variable was observed to be statistically significant with domestic investment (DOINV), at a 1 percent level of significance, implying the existence of short-run causality from domestic investment to real GDP.

Further, the ECM test shows that all the explanatory variables have a short-run relationship with economic growth at a 1 percent level of significance.

Granger causality test results

To determine the causal relationship between GDP and good governance, the Granger causality test is used in this instance. The test is conducted on the first differenced variables since it is determined that all of the variables are I (1). The following results relate to the relationships between the variables:

Table.5: Pair-wise Granger Causality

Dependent variable	Independent Variable	lags	F stat	Remarks
LRGDP	LCIM	1	0.32981	No Causality
LCIM	LRGDP	1	1.96554	No causality
LRGDP	LDOINV	1	1.30749	No causality
LDOINV	LRGDP	1	0.33567	No Causality
LRGDP	LEGI	1	0.47186	No Causality
LEGI	LRGDP	1	4.59809**	LEGI□LRGDP
LRGDP	LGOEXP	1	0.75774	No Causality
LGOEXP	LRGDP	1	1.36729**	LGOEXP□LRGDP

Source: Author's calculation using E-Views 10

***, ** rejection of null hypothesis at 1 percent and 5 percent levels of significance.

The Granger causality test result presented in Table 4.5 reveals that the government effectiveness index and government expenditure cause the real GDP, and that the null hypothesis of government effectiveness does not Granger because real GDP is rejected at the 5 percent level, but real GDP does not Granger cause the other explanatory variables. Therefore, this result indicates that causality runs from the government effectiveness index as well as government expenditure to real GDP in the short run. The result implies that government expenditure growth has valuable information for forecasting the value of economic growth in the short run. These findings resonate with previous studies, such as Singh (2022), Hisham (2023), and Han et al. (2014), which highlight the intricate relationships between good governance and economic growth in various economies.

Conclusion

A sound understanding of good governance and economic growth plays a critical role in examining the relationship between governance indicators and economic growth. The research thus aims to examine the relationship between governance indicators and economic growth in Nepal. Owing to the disparity in the results of research on the effect of governance on economic growth, this study contributes to enhancing previous studies on the relationship between governance and economic growth using six governance indicators (World Bank) in the context of the Nepalese economy. The study concentrates on the period from 2002 to 2022, using only six governance indicators developed by the World Bank and some control variables. The study employed a co-integration test to explore the existence of short-run and long-run relationships between governance indicators and real GDP. The study also used the Granger causality test to examine the causality running from governance indicators to real GDP and from real GDP to governance indicators.

The study concluded that the trend of governance indicators and GDP per capita growth rates is fluctuating. The VECM results indicated that a long-run relationship exists between CIM and RGDP. Similarly, a strong short-run relationship exists running from real GDP to a narrow money supply. The VECM test results showed that all the explanatory variables have a short-run relationship with economic growth at a 1 percent level of significance. The Granger causality test result indicates that casualties run from the government effectiveness index as well as government expenditure to real GDP in the short run. These findings imply that government expenditure growth provides valuable information for estimating the value of economic growth in the short run.

The study recommended that the government create a better environment for private sector business growth and strictly enforce those laws and regulations, which are closely associated with property rights and corruption control, by ensuring political

stability. The study further suggested that it is necessary to reinforce the cornerstones of democracy by increasing citizen's ability to join and participate in civic and social-political life without fear of discrimination or oppression.

The research provides a foundation for further exploration into the relationship between good governance and economic growth in different contexts. Researchers can build on and extend on these findings to investigate the combined effects of both market-enhancing and growth-enhancing governance indicators on economic growth by employing advanced econometric models, including cross-country comparisons. This can lead to more accurate predictions and policy recommendations.

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