

“Exploring the nexus between economic growth and economic performance in Nepal”

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EXPLORING THE NEXUS BETWEEN ECONOMIC GROWTH AND ECONOMIC PERFORMANCE IN NEPAL

Abstract

This study aims to explore the relationship between economic growth and performance in Nepal, identifying key drivers for growth. Studying the nexus between economic growth and economic performance in Nepal is crucial for understanding how these factors interact within the nation's specific context. Growth of gross domestic product (GDP) is represented as the primary indicator for evaluating economic performance, reflecting the overall well-being of a nation's economy. Economic performance encompasses a broader spectrum, including indicators such as employment rate, inflation, income distribution and overall economic stability. Using E-Views 10, a descriptive and analytical research approach has been applied to analyze time series secondary data from 1990–2021 using an econometric model. This study found that faster-growing economies typically experience increased jobs, higher investment, more exports, and often lower inflation. These relationships are part of a long-run equilibrium relationship. In the event of an economic shock disrupting this equilibrium, the economy tends to naturally return to the equilibrium over time. This study found that short-term causality running from lagged GDP, gross capital formation (GCF), exports, human development index (HDI), and employment ratio influence immediate GDP growth. These variables wield a short-term influence over GDP growth; for instance, a sudden surge in exports can prompt a temporary boost in economic growth. This indicates that there is a long-term sustained link between GDP growth and the independent variables rather than merely a short-term event.

Keywords

GDP, economic performance, econometric model, living standard, Nepalese economy

JEL Classification

E22, E24, E31, F14, O11

INTRODUCTION

Gross domestic product (GDP) growth significantly influences the economy, impacting employment, investment, inflation, and the trade balance. A robust GDP growth rate correlates with increased job opportunities, driven by expanding industries and service sectors that require a larger workforce. Conversely, slower GDP growth may lead to higher unemployment rates. Strong GDP growth signals a favorable business environment, attracting domestic and foreign capital, further boosting economic growth. Rapid GDP growth can lead to inflation, emphasizing the need to manage inflation for price stability and a favorable economic environment. Robust economic growth fosters increased production and exports, contributing to a positive trade balance. This relationship is to identify export potential, formulate trade policies, and enhance competitiveness for a balanced trade position.

GDP growth is complex, impacting various facets of the economy. Understanding its relationships with key variables empowers policymakers to devise strategies for sustainable and inclusive economic

growth. This study aims to quantify the relationship between economic growth and economic performance, identify key drivers, analyze distributional effects, formulate policy recommendations, explore specific factors in Nepal's development, examine the impact of structural changes and policy reforms, and identify challenges and opportunities for future economic growth.

1. LITERATURE REVIEW AND HYPOTHESIS

Nepal has shifted from an agrarian society to a growing service and manufacturing economy, presenting a host of challenges and opportunities. With concerns like unemployment, inflation fluctuations, and trade imbalances, understanding how these factors interrelate is crucial for policymakers and economists (Sharma et al., 2021). Nepal's pursuit of sustainable growth hinges on creating jobs, attracting investments, stabilizing inflation, and addressing trade issues, making this analysis essential for a more prosperous and equitable future.

Regarding the argument about financial liberalization, Shrestha and Chowdhury (2007) attributed the positive impact of welfare to increasing credit availability, fostering economic growth, and improving welfare through increased incomes. Gasper (2011) has developed a basic needs approach, which focuses on poverty, participation, and freedom, improving well-being through access to essential resources. Sharma et al., (2012) focused on sustainable, inclusive growth, employment opportunities, investment attraction, trade balance improvement, and living standards. It emphasizes attracting investments, reducing poverty, and fostering a favorable investment climate (Upadhyaya et al., 2023).

The report of WHO (2014) emphasized the government's role in balanced economic growth through job creation, investment, and trade, while the World Bank emphasizes inclusive and sustainable growth for long-term prosperity. Inclusive growth ensures benefits that are shared, preventing inequality and social unrest, while sustainable growth protects the environment and manages resources (Rahman, 2020).

GDP, income, income inequalities, energy consumption, and CO₂ emissions vary significantly across countries (Antonakakis et al., 2017).

Foreign direct investment in low-income countries increases degradation, while tourism negatively impacts high- and middle-income countries (Aller & Grechyna, 2021). Schwab and Sala-i-Martin (2017) argued that the private sector is also essential for balancing economic growth, and it is important to create an environment that is conducive to business growth.

Exports can help create jobs and boost economic growth. Estevadeordal (2017) remarked that it is important to promote exports and reduce imports. Imports can help lower prices for consumers and businesses (Barbier, 2005). However, the World Trade Organization (WTO) also argues that it is important to strike a balance between exports and imports as observed in the study by Pitaloka and Fatimah (2022), embrace international trade and possess diverse sets of natural resources.

That study provides some useful insights into the fact that GDP is a measure of the total output of the economy. Utama and Wardana's (2018) study highlighted that inflation arises from an imbalance between the supply and demand of commodities. When GDP is high, this means that the economy is healthy (Acaravci et al., 2009). The demand for goods and services may rise as a result, which may raise the share price of businesses that provide such goods and services.

The report of the NRB (2019) and Economic Survey (MOF, 2022) highlighted the macroeconomic and financial situation of Nepal in 2019 was mixed. GDP growth was strong, inflation was low, and the trade balance was in surplus. On the negative side, foreign exchange reserves were declining, and the banking sector was facing some challenges. NRB (2019) highlights the importance of balancing economic growth with sustainable development. Economic growth is essential for lifting people out of poverty and improving their lives. However, economic growth that is not sustainable can damage the environment and lead to social inequality.

In the study about the employment, Kühn (2019) argues that it is crucial for individual workers and the economy, contributing to growth and prosperity. Long (2019) has looked the sustainability about the present corporate environment in the context of the sustainable goals of United Nations 2030. Hickel (2019) argued that the Sustainable Development Goals (SDGs) were found contradictory, aiming for economic growth and environmental sustainability, as they require finite resource extraction and consumption.

The Fifteenth Periodic Plan of Nepal aims to promote robust GDP growth and address socio-economic challenges like unemployment, investment, trade balance, and living standards from 2019–2024. The plan emphasizes basic services, social inclusion, gender equality, and environmental sustainability (NPC, 2019). World Bank (2020) has emphasized the importance of sustained GDP growth in employment, investment, trade balance, and living standards. The Nepal Development Update provides policy measures and insights for addressing challenges and promoting economic development. Crabtree (2020) provides a useful overview of the capabilities approach and human security. Crabtree argues that these two concepts are complementary and can be used to promote sustainable development.

The study of West African Economic and Monetary Union (WAEMU), Thioune and Kane (2018) examined teenage employment and economic development of that states that can grow economically without juvenile employment. Results showed that domestic investment and current account balance greatly impact teen employment (Solanki et al., 2020). Domestic investments benefit greatly from money supply growth, whereas the growth and FDI were negatively correlated in econometrics.

In the study about the exchange rate, Cakrani (2014) stated that currency rates affect economic liberalization, direct competition, and integration. Real exchange rates affect GDP, inflation, and jobs. Actual exchange rate adjustments boost GDP and trade competitiveness. Exchange rates impact investment, capital accumulation, and growth. Currency rates impact Albania, whereas the short- and long-term development should be unaffected by real exchange rates.

The oil boom and subsequent oil sector decline caused massive economic shocks that required major reforms. Aliyeva (2022) said oil and oil products boosted the economy and satisfied most consumers. Creativity and anti-inflation goals of Azerbaijan's post-oil economy are examined. A dynamic and structural analysis of Azerbaijan's economic development during and after the oil boom examined the presence of economic regulation and anti-inflationary policies.

The linear and non-linear regression were used to analyze 160 countries and determine how the economic freedom index and internal branches (2015 economic growth and 2014 economic freedom index) affected any time failure for one year. Ahmed and Ibrahim (2019) led a growing group of insurers and governments concerned about economic freedom, its expansion and development, and economic freedom-promoting indicators and their establishment. Freedom and balance of economic freedom index boosted growth.

Lower unemployment and price stability challenge global central banks. Okafor et al. (2016) found that price stability can boost growth and reduce unemployment if the threshold is right. Money supply and exchange rate raise unemployment; inflation lowers it. Annual long-term unemployment exceeds inflation by 65%. Instead of monetary targeting, they propose output targeting through economic deepening for optimal inflation and low unemployment.

Bretton Woods supported unrestricted trade and John Maynard Keynes' three international economic goals: sustainable current account balances, international financial capital, and full employment without inflation. Subacchi and Vines (2023) discussed Keynesianism and Bretton Woods floating rates. Keynes' goals must be met differently in the global non-system than Bretton Woods. Non-system issues persist. Foreign investment in emerging markets and sovereign debt reconstruction are policy concerns.

In the study of foreign trade and economic growth, Upadhyaya et al. (2023) examined the capacity of foreign trade to substantially raise GDP via increased exports, heightened competition, and enhanced efficiency holds the key to bolstering eco-

economic growth and prosperity. Recognizing this transformation underscores the importance of shaping Nepal's economic policies and development strategies for achieving lasting sustainable growth. The high inflation rates were not conducive to economic growth that reduced production activities are caused by greater costs (Rudianto, 2022). Nam (2022) also argues that high inflation can lead to social unrest. When people's incomes do not keep up with inflation, they may become frustrated and angry.

The research gap underscores the need for further investigation into how Nepal can achieve balanced economic growth while addressing the complex interplay between employment, investment, inflation, trade balance, human development, environmental sustainability, and social well-being. Such research would provide valuable insights into policy formulation and decision-making processes to ensure that economic growth in Nepal is not only robust but also sustainable and inclusive.

H1: Balanced economic growth in Nepal, considering the interplay of employment, investment, inflation, and trade balance, positively correlates with improved human development, environmental sustainability, and social well-being.

H2: A complete approach to economic growth, which incorporates considerations of employment, investment, inflation, and trade balance, will lead to a reduction in social unrest and greater social interconnection in Nepal.

2. RESEARCH METHODOLOGY

To achieve the objective of harnessing robust GDP growth for various economic outcomes in Nepal, an econometric model can be developed. This model can capture the relationships and interactions between GDP growth, employment opportunities, investment, price stability, production, exports, trade balance, and living standards. The model includes variables such as: The variable of GDP growth rate represents the annual percentage change in Nepal's GDP, which serves as the main driver of economic outcomes. Employment

rate measures the percentage of the working-age population that is employed, reflecting the impact of GDP growth on job creation.

Investment inflows capture the level of domestic and foreign investments in Nepal, representing the degree to which robust GDP growth attracts investment. Inflation rate measures the annual percentage change in the general price level, reflecting the balance between economic expansion and price stability. Production output represents the level of output across various sectors of the economy, reflecting the impact of GDP growth on overall production. Export volume measures the quantity of goods and services exported by Nepal, reflecting the influence of GDP growth on export performance. Trade balance represents the difference between the value of exports and imports, reflecting the extent to which GDP growth helps achieve a positive trade balance. Living standards are measured using various indicators such as per capita income, access to basic services, poverty rates, and human development indices, reflecting the impact of GDP growth on the well-being of the population.

The functional relationships among the variables are mentioned here, where GDP is considered as the dependent variable, and employment (Emp), investment (Inv), inflation (Inf), exports, and the Human Development Index (HDI) are treated as independent variables. By using statistical techniques such as regression analysis, the model estimates the impact of these independent variables on the variation in GDP. This simplified model allows for a more focused examination of the key drivers of GDP growth and provides a framework to analyze the individual contributions and significance of each independent variable in explaining changes in the dependent variable.

$$GDP = f \left(\begin{matrix} CPI, EXP, GCF, \\ HDI, EMP_{15} \end{matrix} \right). \quad (1)$$

The equation implies that GDP is a function of variables such as employment (EMP), investment (GCF), inflation (CPI), exports (EXP), and the Human Development Index (HDI). It suggests that changes in employment levels, investment inflows, inflation rates, export performance, and human development can impact GDP growth. This

Table 1. Variables, their description and measurement

Source: Authors' elaboration.

Variable	Description	Measurement
LNGDP	Natural Log of Gross Domestic Product	Rupees in 10 million
LNEXPORT	Natural Log of Money Value of Export of Goods and Services.	Rupees in 10 million
LNCPPI	Natural Log of Amount of Consumer Price Index	Base Year: 2014/15 = 100
EMP_15	Employment-to-population ratio by age	Employment ratio of 15years plus age
HDI	Human Development Index	Ratio
LNGCF	Natural Log of Amount of Gross Capital Formation	Rupees in 10 million

equation provides a simplified representation of the interdependencies between these factors and their influence on the overall level of economic output as measured by GDP.

Dependent variables are GDP, CPI, GCF, Export, Employment ratio of 15 years, plus age and HDI are taken as independent variables.

$$LNGDP = \beta_0 + \beta_1 LNCPI + \beta_2 LNEXP + \beta_3 LNGCF + \beta_4 HDI + \beta_5 EMP_15. \quad (2)$$

This study incorporates two categories of variables, namely the independent variable and dependent variables. The variables, along with their descriptions and measurements are shown in Table 1.

2.1. Nature and sources of data analysis

The Nepalese Ministry of Finance, Nepal Rastra Bank, CBS, World Bank, and International Labor Organization databases provided the secondary time series data used in this study. The analysis focused on key macroeconomic indicators of Nepal's economic growth to investigate both immediate and long-term causal effects. In contrast to the complete maximum likelihood model (Johansen & Juselius, 1990) and residual-based method (Engle & Granger, 1987), the methodology used ordinary least squares (OLS) to estimate cointegration relationships and identify the proper lag order for the model.

By employing I (1) and I (0) models, which assess the long-term relationship between independent and dependent variables, the study found statistically significant results for all types of variables. The error correction model (ECM) was employed to integrate short- and long-term perspectives, considering the long-term data as well (Collier &

Goderis, 2012). The data for macroeconomic indicators and economic growth covered the period from 1990 to 2021.

To analyze the relationship between GDP, CPI, HDI, GCF, exports, and employment ratio, the researchers used 31 sets of time series secondary data. The researchers have used techniques like tabulations and graphs to simplify and facilitate understanding of the data, as per the study's specific requirements. The major objective of the study was to examine the linkage between GDP, CPI, HDI, GCF, EXP, and the EMP_15 ratio in the context of Nepal. E-views-10 has been used to analyze the time series data in order to meet these study goals.

2.2. Econometrical test

The following steps have been used to test for economic development in time series methods.

The stationary nature of the time series variables was assumed in time series econometric techniques. This enables the dynamic time series model to use common estimates and testing techniques. The analysis of each series' stationary characteristics is the initial stage in this approach.

The idea of a stationary series is essential to time series analysis. A stationary series is one in which the mean and variance, among other basic characteristics remain constant across time. The series that are not stationary are considered integrated of order one, represented as I (1), indicating the presence of unit roots. To make these non-stationary data stationary, they are modeled in first difference ($\Delta y_t = y_t - y_{t-1}$). By differencing the data, the non-stationary series were transformed into stationary series, allowing for the application of the chosen time series econometric techniques in subsequent analyses. For the unit root test;

$$\Delta y_t = \varphi^* y_{t-1} + \sum_{i=1}^{p-1} \varphi_i y_{t-i} + u_t \quad (3)$$

Constant and no trend model for unit root test:

$$\Delta y_t = \beta_0 + \varphi^* y_{t-1} + \sum_{i=1}^{p-1} \varphi_i y_{t-i} + u_t, \quad (4)$$

where Δy_t – value of variable at time period t , $\Delta y_t = y_t - y_{t-1}$, β_0 – constant term, t – linear time trend, u_t – error term.

The primary goal of this study was to test the null hypothesis and alternative hypothesis in the three models, where $H_0: \varphi^* = 0$ suggests the series contains a unit root, and $H_1: \varphi^* < 0$ indicates that the series is stationary. To test for the presence of a unit root, the researchers need to calculate the T statistic

$$\tau = \varphi^* / \sqrt{\text{var}(\varphi^*)}$$

and then compare it to the corresponding critical value at different significant levels.

Upon rejecting the null hypothesis, it was established that the series y_t , characterized by the presence of drift and trend, exhibited no unit root. The distinction between time series with unit root processes and stationary processes is commonly denoted by the terms “integrated to the order one” (I(1)) and “integrated to the order zero” (I(0)) respectively, forming the foundation of widely adopted terminology to classify time series based on their stationarity properties.

Regarding the examination of the relationship between a variable’s present value and its past values, researchers use the terms autocorrelation, delayed correlation or serial correlation. This could be due to omitting important variables or combinations of variables from the analysis. To check for autocorrelation, the Breusch-Godfrey Lagrange multiplier test was used in this analysis. This test helps to evaluate the presence of autocorrelation in a model’s residuals.

Normality tests were used to assess whether the data set was likely to be normally distributed, meaning if it has followed a standard bell-shaped curve. The normality of the data has been assessed

using the Jarque-Bera test in this investigation. The Jarque-Bera statistic evaluates the Skewness and Kurtosis of a sample to determine how well it matches a normal distribution. A result of 1 indicated that the null hypothesis was rejected, indicating that the data did not follow a normal distribution at the 5% significance level. If the number has 0, then the data followed the assumptions of a normal distribution.

The violation of the assumption of homoscedasticity could impact the validity of econometric analysis, particularly in linear regression modeling. The issue of heteroskedasticity arises because ordinary least squares (OLS) regression assumes that all residuals come from a population with a consistent variance. However, when heteroskedasticity is present, this assumption of constant variance is violated. As a result, the OLS regression estimates can become biased and inefficient, leading to less accurate and reliable predictions.

There is a risk of a “Spurious Regression” if the researchers try to estimate a result by regressing non-stationary variables X on non-stationary variables Y . A series was considered co-integrated if it contained at least two variables that were each non-stationary but whose linear combination was stationary. Non-stationary time series variables were analyzed for their correlation using this method. Many variables may move together over time, especially if they contain unit roots. Unit roots indicate that the variable may deviate from its equilibrium value temporarily but eventually converge to a long-run value due to certain underlying forces.

A cointegration test is undertaken to determine the long-run relationship between the variables. This test helps determine the nature and extent of the long-term connection between the variables. The Engle-Granger Residual based test and the Johansen cointegration test are two examples of cointegration tests, they were developed by Johansen and Juselius (1990) and Engle and Granger (1987), respectively. These tests support the analysis of the long-run relationships between the variables.

If there were more than two variables or a time series model can be considered, the Engle-Granger

Residual-based test was inappropriate. This was because in the case of a multivariate time series model, there could have been multiple co-integrating relationships. The Johansen Co-integration test, an alternative multivariate method of cointegration, was applied in such cases. The Johansen Cointegration test was performed because there were eight time series variables in this analysis.

The Johansen cointegration tests and estimations were conducted by imposing constraints on a vector autoregressive (VAR) model. If a set of n variables (where $n \geq 2$) were found to be non-stationary and integrated to order one (I (1)), this indicated the presence of cointegration among them. A vector autoregressive (VAR) model with k lags incorporating these variables could have been formulated as follows:

$$Y_t = \beta_1 Y_{t-1} + \beta_2 Y_{t-2} + \beta_3 Y_{t-3} + \dots + \beta_k Y_{t-k} + u_t, \quad (5)$$

where $Y_t = N \cdot 1$ column vector of dependent variables, which are $I(1)u_t = N \cdot 1$ column vector of error terms.

In contrast to the VECM (Vector Error Correction Model), which focuses on measuring the dynamic adjustments between the first differences of variables, the co-integration test examines the long-term relationships or links between the level series of variables. The study's primary goal is to determine the direction and strength of the correlation between the two-time series. When dealing with non-stationary series that are already known to be co-integrated, a Vector Error Correction (VEC) model was developed. This model provides valuable insights into the mechanism through which the variables adjust their short-term deviations, ultimately converging towards the long-term equilibrium relationship.

The VECM has used since the variables are linked in the long run. The Granger Causality Test can be applied to determine if there was a relationship between two variables. Variable x is considered a Granger cause of variable y if it can be used to predict values of y based on its previous values. To test for Granger causation, a common approach was regressed y on both its lagging values and the lagging values of x . In this method, the estimated

coefficients on the lag values of x were examined to test whether they were all jointly zero (meaning they have no significant impact on y). Rejecting the null hypothesis of all coefficients being zero indicated that x does have a causal effect on y . If the null hypothesis is rejected, x does indeed cause changes in y .

3. RESULTS

To assess the stationarity of the data, the unit root test was employed, specifically the Augmented Dickey-Fuller test, which helps to determine the presence of unit roots in the variables under examination.

Table 2. ADF test result on level series

Source: Results from data analysis.

Economic Variables	I (0) Level		I (1) Level	
	t-Stat.	Prob-Value	t-Stat.	Prob-Value
LNGDP	-0.8113	0.8019	-4.3677	0.0017*
LNCPI	-0.1402	0.9359	-3.9565	0.0063*
LNEXPORT	-0.2789	0.9165	-4.0516	0.0051*
LNGCF	-0.5080	0.8765	-6.3087	0.0000*
HDI	-1.8875	0.3335	-4.6498	0.0008*
EMP15	1.0904	0.9963	-3.3605	0.0218**

Note: * 1% level, ** 5% level.

As per Table 2, the ADF test results show that, at the 5% significance level: (i) Upon analysis, the null hypothesis of a unit root is accepted for all level series of the variables, indicating that these variables are non-stationary in their original form. (ii) The first difference of the variables, however, results in the null hypothesis of unit root being rejected, showing that the variables become stationary after one variation in the data. The series are integrated into order one since they are all stationary at the first difference, denoted by the notation I(1). This indicates a long-term connection between the series, or co-integration.

The lag length must be established before the co-integration test can be performed. Since most of the factors in the accompanying table favor using a latency of 1 for further testing that the lag has been used (see Table 3).

Table 3. Process of selecting lag order

Source: Results from data analysis.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	218.7683	–	4.40e–14	–13.7269	–13.4494	–13.6365
1	391.7716	267.8762*	6.69e–18*	–22.5659*	–20.6231*	–21.9326*

Note: * indicates lag order selected by the criterion.

Co-integration occurs between time series variables when two or more of them are integrated in the same sequence. There is a long-run relationship between GDP and CPI, GCF, exports, as per the employment ratio of people aged 15 and up, and HDI because these variables are all co-integrated. There may be multiple co-integrating relationships between the variables in question. Estimates for all co-integrating equations are provided, and test statistics for the total number of such equations are provided using the Johansen test. The outcome of the Johansen co-integration test is presented in Table 4.

The variables have been linked for some time; therefore, the vector error correction model can be applied. At this stage, calculations are based on data. The model does an instantaneous variable conversion after the initial differentiation. Therefore, we may estimate long-term correlation as:

Table 5. Vector error correction model

Source: Results from data analysis.

	Coeff.	Std. Error	t-Statistic	Prob.
C (1)	–0.2132	0.0917	–2.3257	0.0307
C (2)	0.6799	0.1219	5.5772	0.0000
C (3)	–0.6780	0.1191	–5.6907	0.0000
C (4)	–0.5548	0.1808	–3.0681	0.0061
C (5)	–0.2375	0.1107	–2.1458	0.0443
C (6)	0.2205	0.1116	1.977	0.0620
C (7)	–0.5616	0.3607	–1.5577	0.1352
C (8)	9.7088	3.0140	3.2212	0.0043
C (9)	0.1047	0.0496	2.1133	0.0473
C (10)	0.1621	0.0267	6.0776	0.0000
R-Square (R ²)	0.8144	Mean dependent var		0.1165
Adjusted R ²	0.7309	S.D. dependent var		0.0484
S.E. of regression	0.0251	Akaike info criterion		–4.2692
Sum squared resid	0.0126	Schwarz criterion		–3.8021
Log likelihood	74.0384	Hannan-Quinn criterion		–4.1198
F-statistic	9.7549	Durbin-Watson stat		2.0648
Prob (F-statistic)	0.0001			

Table 4. Results of the Johansen cointegration test

Source: Results from data analysis.

Series: LNGDP LNGCF LNEXP LNCPI HDI EMP_15				
Hypothesis		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.9028	169.4403	95.7537	0.0000
At most 1 *	0.8169	99.5016	69.8189	0.0000
At most 2 *	0.5776	48.5688	47.8561	0.0428
At most 3	0.3556	22.7120	29.7971	0.2605
At most 4	0.2714	9.52790	15.4947	0.3188
At most 5	0.0009	0.029221	3.8415	0.8642
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.9028	69.9387	40.0776	0.0000
At most 1 *	0.8169	50.9328	33.8768	0.0002
At most 2	0.5776	25.8568	27.5843	0.0818
At most 3	0.3556	13.1841	21.1316	0.4355
At most 4	0.2714	9.4987	14.2646	0.2470
At most 5	0.0009	0.0292	3.8415	0.8642

Max-eigenvalue test indicates 2 cointegrating eqn (s) at the 0.05 level

Note: * 0.05 level, ** p-values.

Source: Results from data analysis.

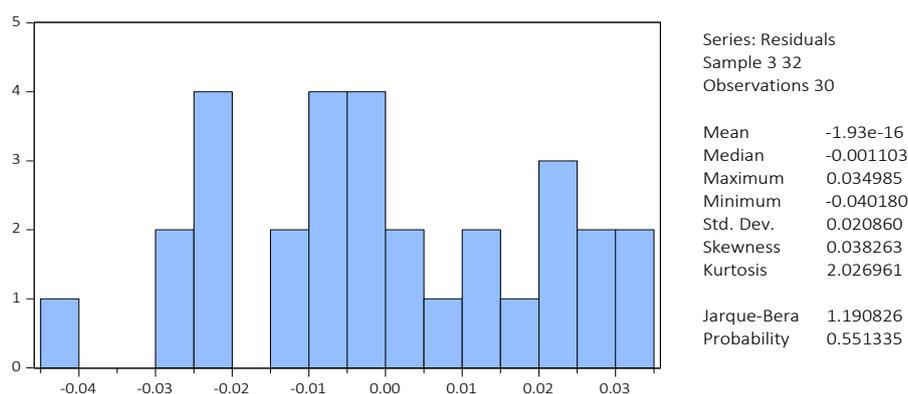


Figure 1. Jarque-Bera normality test

Table 5 displays the results of the Vector Error Correction Model, with the R-squared value indicating the degree of variability in the independent variables. It is a symbol of the model's ability to explain phenomena. With an R-squared value of 0.8145 (81.45%), this model is very close to being well-fit and free of spurious regression. VECM has a statistically significant negative coefficient. There is data that supports a causal link between economic expansion and these exogenous factors.

The result shows that the ECM coefficient has the predicted negative sign, ranges from 0 to 1, which was found statistically significant at the 5% level. The relevance of the error correction mechanism argues in favor of co-integration and shows that real GDP and the explanatory variables reach steady state equilibrium in the long term. According to the ECM, the long-run elasticity of the explanatory variables feeds back roughly 21.32 percent of the previous year's disequilibrium. The coefficient of the error correction term measures the speed at which the model's variables converge to their long-run equilibrium values, indicating the adjustment process between the level of real

output and changes in the explanatory variables. This suggests a relatively rapid rate of adaptation.

As per Table 6, there is no proof of a short-run causal relationship between the LNCPI and GDP, as the Chi-square probability value is more than 5%. However, there is short-run causation flowing from the lag of GDP, GCF (Gross Capital Formation), HDI (Human Development Index), exports, and employment ratio to GDP, and the probability value of R^2 is less than 5%.

The study model is statistically significant, with an R^2 of 81.45 and an F-statistic p-value of less than 1%. The F-statistic's P value is statistically significant at the 1% level. The Jarque-Bera test is used to check if the variables in the model have normal distributions. The significance of this test suggests that the variables have a normal distribution. The results of the examination are presented in Figure 1.

The probability obtained from the Jarque-Bera test is greater than the 5% significance level; hence the null hypothesis has been accepted. The model residual was found normally distrib-

Table 6. Wald test

Source: Results from data analysis.

Coefficient	Test Statistic	Value	df	Probability
C (3)	Chi-square	32.3846	1	0.0000*
C (4)	Chi-square	9.4132	1	0.0022*
C (5)	Chi-square	4.6044	1	0.0319*
C (6)	Chi-square	3.9078	1	0.0481*
C (7)	Chi-square	2.4234	1	0.1195
C (8)	Chi-square	10.3763	1	0.0013*
C (9)	Chi-square	4.4661	1	0.0346*
C (10)	Chi-square	36.9378	1	0.0000*

Note: * represents less than 0.05.

uted since the Jarque-Bera probability value is more than 5% (0.5513). Breusch-Pagan-Godfrey Heteroskedasticity is a problem in econometric regression analysis, and this test is meant to reveal it. The results of the tests are shown in Table 7.

Table 7. Heteroskedasticity test (Breusch-Pagan-Godfrey)

Source: Results from data analysis.

F-stat.	1.1899	Prob F (12,17)	0.3621
Obs* R ²	13.6950	Prob R ² (12)	0.3206
SS	3.1254	Prob R ² (12)	0.9946

Note: * represents the observed R-squared is larger than 5%.

Regarding the results of the Breusch-Pagan-Godfrey Heteroskedasticity test, Table 7 displays the findings. If the homoscedasticity null hypothesis is not rejected at a 5% significance level, this suggests the model does not exhibit heteroskedasticity. The data are deemed homoscedastic, meaning the variability of the residuals is constant across various values of the independent variables, if the p-value of the observed R-squared is larger than 5%.

To find serial correlation in the model, the Breusch-Godfrey LM test is applied the results of which are shown in Table 8.

Table 8. Breusch-Godfrey (Serial correlation LM test)

Source: Results from data analysis.

F-stat	0.7845	Prob F (1,19)	0.3868
Obs* R ²	1.1896	Prob R ² (1)	0.2754

Note: * represents F-statistic and an Obs R-squared probability over 5%.

If there is no serial correlation in the residuals, as the null hypothesis assumes, then the test is significant. The outcomes of the Breusch-Godfrey Serial Correlation LM Test have been shown in Table 8. With an F-statistic and an Obs R-squared probability over 5%, it has concluded that there is no serial connection. To ascertain whether or not an independent variable causes an observable outcome, the Granger Causality test can be used. Running the test is important for informing policy since it helps pinpoint the origin of influences. Table 9 shows a subset of the results from the Granger Causality test:

Table 9. Pairwise Granger causality tests

Source: Results from data analysis.

Null Hypothesis	Obs.	F-Stat.	Prob.
LNGCF no Granger Cause in LNGDP	31	3.9173	0.0577
LNGDP no Granger Cause in LNGCF		4.2788	0.0479
LNEXPORT no Granger Cause in LNGDP	31	0.8110	0.3755
LNGDP no Granger Cause in LNEXPORT		8.0055	0.0085
LNCPi no Granger Cause in LNGDP	31	0.0417	0.8397
LNGDP no Granger Cause in LNCPi		13.8294	0.0009
HDI no Granger Cause in LNGDP	31	0.0466	0.8306
LNGDP no Granger Cause in HDI		7.1660	0.0123
EMP15_ no Granger Cause in LNGDP	31	6.1743	0.0192
LNGDP no Granger Cause in EMP15_		12.3560	0.0015
LNEXPORT no Granger Cause in LNGCF	31	0.07645	0.7841
LNGCF no Granger Cause in LNEXPORT		4.2686	0.0482
LNCPi no Granger Cause in LNGCF	31	4.0998	0.0525
LNGCF no Granger Cause in LNCPi		12.7800	0.0013
HDI no Granger Cause in LNGCF	31	4.4729	0.0435
LNGCF has no Granger Cause in HDI		9.8539	0.0040
EMP15_ no Granger Cause in LNGCF	31	7.8770	0.0090
LNGCF no Granger Cause in EMP15_		13.9909	0.0008
LNCPi no Granger Cause in LNEXPORT	31	5.7551	0.0233
LNEXPORT not found Granger Cause in LNCPi		1.1891	0.2848
HDI no Granger Cause in LNEXPORT	31	6.7495	0.0148
LNEXPORT does not Granger Cause HDI		0.0215	0.8844
EMP15_ no Granger Cause in LNEXPORT	31	18.1064	0.0002
LNEXPORT no Granger Cause in EMP15_		9.8724	0.0039
HDI no Granger Cause in LNCPi	31	9.1701	0.0052
LNCPi no Granger Cause in HDI		0.2766	0.6031
EMP15_ no Granger Cause in LNCPi	31	7.6977	0.0097
LNCPi no Granger Cause in EMP15_		9.50340	0.0046
EMP15_ no Granger Cause in HDI	31	1.41475	0.2443
HDI no Granger Cause in EMP15_		14.0849	0.0008

Table 9 illustrates the Granger causality relationship between the dependent and independent variables within the model. The findings indicate that GDP has a unidirectional causal impact on GCF, exports, CPI, and HDI, while the employment ratio exhibits bidirectional causality with these same variables.

Hypothesis 1 reveals the presence of two cointegrating equations at the 0.05 significance level. This finding points to a sustained relationship among variables, encompassing economic growth, employment, investment, inflation, trade balance, human development, environmental sustainability, and social well-being. In essence, the data implies a lasting and positive association between balanced economic growth in Nepal and enhancements in human development, environmental sustainability, and social well-being. Consequently,

the hypothesis is substantiated by the empirical evidence presented in the cointegration test.

Hypothesis 2 indicates a sustained relationship or correlation among various economic factors, including economic growth, employment, investment, inflation, trade balance, as well as social variables like social unrest and social interconnection. In essence, the data implies a persistent and positive association between a holistic approach to economic growth, encompassing multiple economic dimensions, and a reduction in social unrest while fostering greater social interconnection in Nepal. Consequently, the hypothesis is substantiated by the empirical evidence presented in the cointegration test.

4. DISCUSSION

The results of this study show that the econometric model employed in the study has a good fit and is free from problems such as spurious regression, heteroskedasticity, and serial correlation, which enhances the reliability of the findings. Moreover, the presence of a significant Error Correction Mechanism (ECM) in the model suggests the existence of a long-term equilibrium relationship between GDP and the independent variables considered in the analysis. The ECM's indication that approximately 21.32% of the previous year's disequilibrium will be corrected in the following 4.69 years highlights the model's ability to capture the long-term dynamics of economic growth.

Furthermore, the study reveals the presence of short-term causality, indicating a dynamic relationship between lagged gross domestic product (GDP), gross capital formation (GCF), exports, human development index (HDI), and employment ratio with current GDP. This implies that the influence of these independent variables on GDP is not confined to the short term but extends over an extended period. This finding is particularly significant for policymakers, as it suggests that measures taken to promote economic growth can have a lasting impact on the economy.

The study underscores the long-term and short-term relationship between GDP and employment, investment, inflation rate and trade balance variables. The main result of the study is that the relationship between GDP and the independent variables is not only significant in the short term but also sustained over the long term. It's worth noting that these consistent findings align with the collective contributions from Shrestha and Chowdhury (2007), Sharma (2012), Utama, and Wardana (2018), NRB (2019), NPC (2019), World Bank (2020), the Economic Survey (2021/2022), and Nam (2022). These contributions, when examined as a whole, form a comprehensive mosaic that elucidates the multifaceted aspects influencing economic growth. In doing so, they become a vital resource for policymakers and researchers grappling with the intricate challenges of fostering economic development. Their collective insights offer a nuanced perspective on the dynamic interplay of factors in the realm of economic growth.

CONCLUSIONS

This study aims to examine the nexus between economic growth and economic performance in Nepal, identifying key drivers for growth. The conclusion indicate that faster-growing economies typically exhibit more jobs, higher investment, increased exports, and often lower inflation. These dynamics are part of a long-term equilibrium, implying that disruptions to this equilibrium will naturally revert over time. Additionally, short-term causality was observed from lagged GDP, GCF, exports, HDI, and employment ratio to GDP growth, suggesting their influence in the immediate term.

This study suggests that Nepal's GDP growth is intricately associated to factors like employment, investment, exports, inflation, and human development, providing policymakers with valuable information to design policies for sustainable economic growth. The overall findings of this study provide valuable insights into the factors that affect economic growth. Policymakers can use these findings to make wise decisions to promote economic growth and build a more prosperous economy for their citizens.

AUTHOR CONTRIBUTIONS

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