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Impact of Foreign Direct Investment (FDI) on Economic Development: Evidence from Nepal (1995-2020)

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Abstract

This article examines the connection between Foreign Direct Investment (FDI) and economic development of Nepal from 1995 to 2020. Utilizing econometric models, the article analyzes the impacts of FDI advents on various economic indicators are GDP, employment, and technological advancement. This paper concludes that FDI has a positive impact on economic growth, several structural, and policy-related barriers have impeded its full potential. The paper has been designed in both analytical and descriptive nature. Data from secondary sources, including the Ministry of Finance and Nepal Rastra Bank, have been used to measure the variables. The data were analyzed with E-views in order to be interpreted. The model's co-integration was validated using the Johansen Cointegration Test findings. There was no evidence of a long-term connection from the positive and insignificant VECM coefficient. Still, a causal short-term association was exposed between GDP and GFCF. There are three types of causality: one-way between GDP and FDI, two-way among GFCF and GDP, and GFCF and FDI, were all established by the Granger causality test. The outcomes display how statistically significant the model is over-all. Also, GFCF and GDP presented a strong association (p-value = 0.0334). GFCF explained 78.53% of GDP has no link between FDI and GDP.

Key Words: Unit Root Test, Time Series Analysis, Co-integration Test, VECM, and Granger Causality Test

1. Introduction

Economic growth is frequently attributed to foreign direct investment (FDI), especially in emerging nations. FDI brings capital, technology, management know-how, and can foster domestic industries through spillover effects. This study focuses on Nepal, a landlocked South Asian country with a diverse but predominantly agrarian economy. Despite its potential, Nepal has faced challenges in attracting substantial FDI inflows due to political instability, regulatory hurdles, and infrastructural deficits. FDI influences the rates of economic development in underdeveloped nations from the transfer of technology (Borensztein, Gregorio & Lee, 1998). The GDP growth rate was impacted by exports in both directions, whereas FDI inflows had a one-way influence (Hsiao, 2006).

Despite its ability to acquire capital, foreign direct investment has little effect on long-term growth (Neusser, 1991). The endogenous growth concept, which dates back to the 1980s, states that knowledge transfer and spillover from FDI and technological progress influence

the recipient country's growth (Fan, 2002). Foreign direct investment boost development rates over long run by ensuring capital accumulation and knowledge transfer within a free-trade framework. By attracting multinational corporations, Foreign Direct Investment (FDI) inflows can help in development (Lim, 2001). Nepal offers potential for foreign investment due to its diverse climates, cheaper human resources, biodiversity, and terrain. However, the country faces challenges such as poverty, unemployment, low living standards, and low economic growth rate, which hinder its potential for investment and development.

2. Literature Review

Economists have put forth a lot of ideas to explain foreign direct investment but none of them are able explain the real reasons behind it. Hymer clarified the presumption that a business chooses to expand overseas in order to benefit from specific attributes (monopolistic advantages) that its competitors in other foreign countries lack. The product markets are the best site to start searching for this flaw since it may manifest itself as product differentiation, brand name collusion, pricing collusion, or focused marketing initiatives. Second, it might be in the marketplaces for items like technology covered by patents, uneven access to the finance sector, and specialized managerial abilities. Thirdly, the presence of economies of scale—whether domestic or international—may be a sign of market failure. (Hood and Young 1979). Buckley and Casson have explained that there are situations when the best method to resolve an intellectual puzzle—in this example, justifying a company's foreign expansion—is to increase the degree of generality and include the puzzle into a more general issue. In this case, the broader issue is the company's rationale (Buckley and Casson, 2009)

According to the International Production Theory, companies can only take part in FDI if three conditions are satisfied. An organization must first have an ownership advantage factor, or comparative advantages over rival businesses. The benefits stem from having certain intangible assets, such access to raw materials, monopolistic power and business size, finance that is reasonable, or patent rights for a particular technology. Second, the firm should benefit from internalizing these benefits, or internalization factor (I), as opposed to selling or providing licenses to other businesses (Moosa, 2002). Prgkas (2015) analyzed the association between the variables of FDI stock and economic development of the Eurozone countries. This paper found that FDI and economic development are positively correlated and also a positive long run cointegrated association between FDI stock and economic growth (Pegkas, 2015).

FDI directly and indirectly impacts economic growth by increasing knowledge and gross fixed capital. Conventional paradigm suggests FDI complements domestic investments, but research shows knowledge spillovers and creative technological endeavors contribute positively (Silajdzic & Mehic, 2015). Hussain and Haque found a substantial relationship among trade, foreign direct investment, and GDP, with FDI in India boosting growth through positive spillover effects (Choi & Baek, 2017). Sakyi and Egyir utilized the GMM technique to evaluate the impact of commerce and FDI inflows on the economic development of their respective nations (Sakyi and Egyir 2017).

Zahonogo explained about the trade openness of Sub-Saharan African countries and found a substantial and positive correlation to economic development (Zahonogo, 2017). Sufian & Moise's found that GDP and openness positively influence foreign investment flow but corruption index, inflation, and government expenditure destructively impact it (Sufian and Moise's 2010). FDI enables home-based companies to purchase host companies' assets, managing production, manufacturing, and distribution. His studies in developing and industrialized nation show diverse conclusions (Abbas et al., 2011). Phuyal and Sunuwar's research suggests that Nepal should prioritize, the application of FDI in export oriented industry over domestic demand-oriented FDI to promote economic growth despite previous research showing little evidence of its significant impact (Phuyal and Sunuwar, 2018).

3. Problem Statement

Though it is small, Nepal has the potential to become one of South Asia's new FDI destinations. Nepal provides several advantages such as a steady demographic structure, rising economic indices, a prime location, and more investment-friendly laws. First of all, the percentage of people in Nepal who are economically active is 56%, and it is rising annually. Potential investors might be drawn in by the availability of inexpensive labor. Second, the increase in disposable income brought about by remittances has spurred economic growth and a change in consumer behavior that has given rise to new product markets. Third, World Bank in 2018 explored that Nepal has reached in 105^{th} position, second only to Bhutan in South Asia.

Previous research on FDI in Nepal is examined here. Numerous studies have examined the connection between GDP and inflows of foreign direct investment, both within and across nations. A nation's wealth, general well-being, and state of health may all be inferred from its GDP. The literature study shows foreign direct investment (FDI) impose minimal impact on Nepal's GDP despite extensive research on its challenges and potential future growth. The paper addresses knowledge gaps and issues.

What is the linkage among GDP, GFCF and FDI?

4. Objective

This paper's primary goal is to assess how FDI inflows impact Nepal's GDP growth rate. This paper also examines the relationship among GDP growth rates and gross fixed capital creation (GFCF) and trade openness. Investors and the government may want to take these facts into consideration. The following is the precise goal:

(i) To explore the link among GDP, GFCF, and FDI.

5. Material and Methods

The paper analyzes the long-term co-integration between FDI and economic development from 1995 to 2020, focusing on GDP and domestic investment. The econometric analysis employs an Autoregressive Distributed Lag (ARDL) model to inspect the long-term relationship between FDI and economic development. The Key variables include GDP growth rate, FDI, domestic investment, labor force, and trade.

Research Method

Descriptive and analytical research methods were used in this paper in a quantitative format. Quantifying the impact independent factors with dependent variable included measuring the variables using secondary data. Data collection and analysis were conducted by E-views statistics software.

Model Specification

Foreign direct investment has a large encouraging impact on the receiving countries welfare. In other words, the economy in which investment was made was the only one to fully benefit from it according to traditional economic theory. Solow looks at how higher investment and saving rates effect in long-term economic growth. In the near term, increased investment and saving quicken the rise of production and national income (Mukherjee, 2013).

$GDP_t = \beta_0 + \beta_1 t + \beta_2 GFC\ F_t + \beta_3 FDI_t$ (i)

where,

FDI = Foreign Direct Investment

GFCF = Gross Fixed Capital Formation

GDP = Gross Domestic Product

Table 1: Variables and Measurement

Variables	Variable	Measurement Scale
GDP	GDP	In Rs. Million
FDI	FDI	In Rs. Million
GFCF	GFCF	In Rs. Million

Data

Both secondary and time series data were employed in this paper. The Department of Industry, Nepal Rastra Bank (NRB), Ministry of Commerce and Supply, Central Bureau of Statistics (CBS), FNCCI are the secondary data sources.

Data Processing

Since this paper is based on secondary data so there is less data processing is required than for primary data. Here, the researcher will utilize tabulation, pie charts, other graphs, bar diagrams, and other visual aids as needed to make the material simpler and easier to hold.

Data Analysis and Presentation

E-views is used to examine time series data in order to meet the researcher's objectives.

Econometric Method

The time series approach is widely employed to foreign direct investment on the overall economy.

Stationary Test

Since most of time series econometric analytic procedures rely on the stationary nature of the time series variables.

$\Delta y_t = y_t - y_{t-1}$ (i)

to become stationary.

Stages in E-views

Quick/Series Statistics/Unit Root Test/ Series Name/Augmented Dickey Fuller Test is the concise summary of Augmented Dickey Fuller Test, is a statistical method used to analyze series data.

Auto-correlation

Auto-correlation is a signal with a delayed copy of itself with a function of delay. A mathematical tool used in signal processing, statistics, and time series analysis identify patterns, trends, and the periodicity of a signal or data set.

Steps in E-views: View" / "Residual Diagnostics" /"Serial Correlation LM Test.

Normality Test

A normality of data sets is tested to ensuring a normal distribution, crucial for many statistical methods. The Jarque-Bera test quantifies skewness and kurtosis of sample data conform to a normal distribution. If the p-value is less than 0.05 then data is not normally distributed.

Steps in E-views: View/Residual Diagnostics/Histogram-Normality.

Heteroskedasticity Test

Heteroskedasticity is used when the variance of errors in a regression model is not constant across observations, violating the classical linear regression model's assumption of homoscedasticity.

Steps in E-views: View/Residual Diagnostics/Heteroskedasticity Tests.

Co-integration Test

The Johansen Co-integration test is used to determine for more than two time series that are co-integrated.

Steps in E-views: /Quick/Group Statistics/Co-integration test intercept (no trend) in CE and Test.

Vector Error Correction Model (VECM)

The Vector Error Correction Model (VECM) is a VAR model planned for non-stationary time series.

Steps in E-views: Quick/Estimate VAR/Vector Error Correction.

Association in Long run and Short run

In (VECM), long-run and short-run dynamics are crucial for understanding how variables adjust over time to maintain equilibrium.

Long-Run Dynamics

The long-run dynamics in a VECM are captured by the cointegration relationships among the variables. These relationships indicate how the variables move together over time, despite short-term fluctuations, to maintain a long-term equilibrium. The key components for the long-run dynamics in a VECM are:

(a) Cointegrating Vector (β): Long-term equilibrium relationship among the variables.
(b) Error Correction Term (ECT): Deviation from equilibrium.

Short-Run Dynamics

The short-run dynamics are taken the changes in the variables and how they answer to deviations from equilibrium. The VECM comprises differenced terms of the variables. to model the key components for the short-run dynamics are:

(a) Differenced Terms (Δ): Represent the short-term changes in variables.
(b) Adjustment Coefficients: adjust to the long-run equilibrium after a deviation.

Steps in E-views: Run VECR/ View/Coefficient Diagnostics/Wald Test

Granger Causality Test

This test assesses if time series can predict another by assuming that past values of a variable X Granger-cause Y, if additional information given.

3. Econometric Results

Test for Unit Root

Whether stationary is present or not in data is tested by unit root test. This is further justified by the augmented Dickey Fuller Test (ADF-Test)

Table 2: ADF Test Results

Variables	Intercepts	Trend Intercepts	None
FDI	0.048477 (0.9547)	-1.746100 (0.6999)	0.851153 (0.8880)
GDP	4.589304 (1.0000)	-0.319972 (0.9852)	8.757020 (1.0000)
GFCF	2.081474 (0.9998)	-0.998045 (0.9263)	4.175184 (0.9999)

Table 3: Results of ADF Test for First Differenced Series

Variables	Intercepts	Trend Intercepts	None
ΔFDI	-4.974421* (0.0006)	-5.361314* (0.0012)	-4.742128* (0.0000)
ΔGDP	-2.145053 (0.2301)	-4.214526* (0.0159)	-1.334182 (0.1637)
ΔGFCF	-3.551180* (0.0152)	-4.243018* (0.0150)	-1.345817 (0.1602)

Co-integration Results

There is a chance that the model will contain many co-integrating vectors if there are more than two variables. This means that several equilibrium relationships might be formed by the variables in the model. All of the system's variables must be integrated in the same sequence according to the Johansen's technique. Co-integration between time series variables, such as FDI, GDP, and GFCF, ensures long-term relationships and closeness, as their integrations are of the same order.

Table 4: Results Co-integration Test

Hypothesized No. of CE(s)	**Eigen value**	**Trace Statistic**	**Critical Value 0.05**	**Prob.**
None	0.66554	40.68849	29.79707	0.0019
At most 1	0.324998	14.40309	15.49471	0.0725
At most 2	0.18705	4.97015	3.84147	0.0258

At the 0. 05 level of significance, both the maximum eigen statistics and the Rank test (Trace) confirm the presence of a single co-integrating equation. The following table shows normalized co-integrating coefficients:

Table 5: Co-integration Coefficients

Cointegrating Equations Log likelihood -795.0244

Normalized co-integration co-efficient		
GDP	GFCG	FDI
1	-0.329696	-112.2664
	0.44129	27.7044

Vector Error Correction Model

This model is generally used for a long-term association. At initial difference, the model automatically transforms the variables.

Table 6: D (GDP) = C $(1)^*$ (GDP (-1) – 0.3297^* GFCF (-1) – 112.2664^* FDI (-1) – 701826.7086 + C $(2)^*$ D (GDP (-1)) + C$(3)^*$ D (GFCF (-1) + C $(4)^*$ D (FDI (-1)) + C (5)

	Coefficient	Std. Error	T-Statistic	Prob.
C (1)	0.02363	0.03592	0.65794	0.5185
C (2)	0.23588	0.13227	1.78333	0.0905
C (3)	1.42444	0.17141	8.31000	0.0000
C (4)	3.38996	4.18186	0.81064	0.4276
C (5)	45169.90	20399	2.21428	0.0392

R-squired	0.87812	Mean Dependent Var.	150.341.1
Adjusted R- squired	0.852462	S.D. Dependent Var.	129.109.7
S.E. of Regression	49591.92	Akaike Info Criterion	24.64410
Sum Squared resid.	4.67E +10	Schwarz Criterion	24.88952
Log Likelihood	-290.7291	Hannan -Quinn Criter.	24.70921
F – Statistic	34.22299	Durbin- Watson stat	2.408678
Prob (F-Statistics)	0.0000000		

Long Run Connection

The error correction factor or, C (1), has a positive sign and is not statistically significant. There is no long-term connection between the independent and dependent variables.

Short Run Connection

Table 7: Wald Test: C (2) = 0 for the null hypothesis

Test Statistics	Value	Df	Probability
T-statistic	1.78333	19	0.0905
F-statistics	3.18026	1.19	0.0905
Chi-square	3.18026	1	0.0745

The probabilities' value of Chi-square > 5 %, so there is not at all short run.

Table 8: Wald Test: C (3) = 0 for the null hypothesis

Test Statistics	Value	Df	Probability
T-statistic	8.31000	19	0.00
F-statistics	69.05613	1.19	0.00
Chi-square	69.05613	1	0.00

Probabilistic value of Chi-square is less than 5 percent gives short run causality.

Table 9: Wald Test: Null hypothesis: C (4) = 0

Test Statistics	Value	Df	Probability
t-statistic	0.81064	19	0.4276
F-statistics	0.65713	1.19	0.4276
Chi-square	0.65713	1	0.4176

Model Diagnosis Test

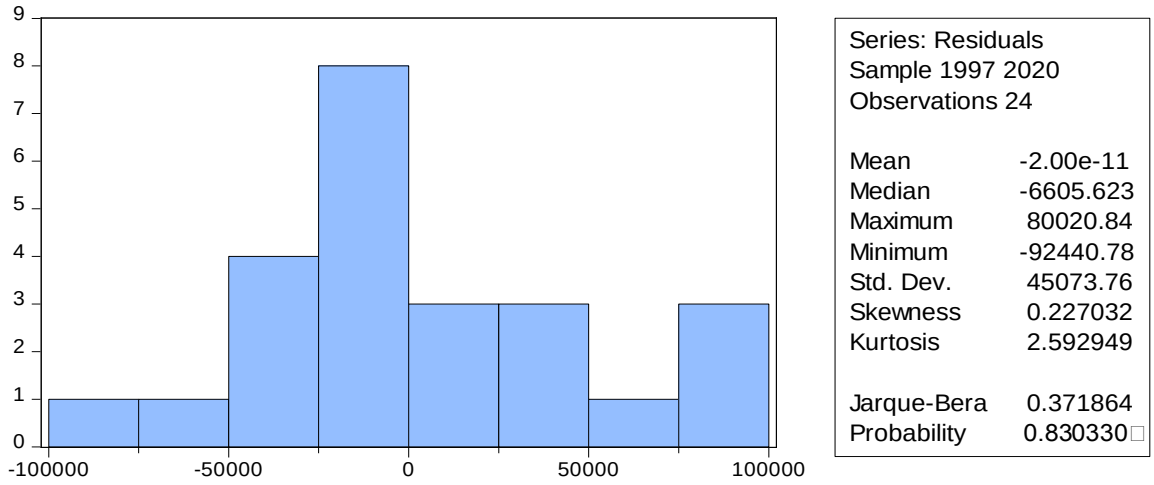
F-Test

∴ R^2 = 87.81 percent, and p value of F-statistic < 1 percent, so this model is best fitted best.

Normality Test

The Jarque-Bera test confirm normality in a model's variable distribution, as its results are presented as follows.

Figure 1: Jarque-Bera Test



The Jarque-Bera test confirms the null hypothesis with a probability value of 0.83033, indicating a normal distribution in the model's residuals.

Table 10. Heteroskedasticity Test

F-statistic	2.95905	Prob. F (6.17)	0.0363
Obs. R-square	12.2604	Prob. Chi-Square (6)	0.0564
Scaled Explained SS	6.12016	Prob. Chi-Square (6)	0.4099

The table 10 reveals the Breusch-Pagan-Godfrey heteroskedasticity test results, indicating model is homoscedastic as the null hypothesis of homoscedasticity is not rejected at a 5% significance level.

Table 11: Sequential Correlation Test

F-statistic	1.34793	Prob. F (1.18)	0.2610
Obs. R-square	1.67099	Prob. Chi-Square (1)	0.1961

The table 11 confirms autocorrelation in the model rejecting the null hypothesis due to larger F-statistic and Obs R-squared probability than 5% threshold.

Granger Causality Test

Granger Causality Test is crucial tool for identifying causal relationships between independent and dependent variables, aiding in policy-making by identifying sources of effects.

Table 12: Granger Causality Tests in Pair basis

Null Hypothesis	**Obs.**	**F-Statistics**	**Prob.**
GDP has no Granger causation in GFCF	24	40.0362	2E-07
GDP has no Granger causation GFCF		4.1821	0.0313
FDI has no Granger causation GDP	24	0.1666	0.8478
GDP has no Granger causation FDI		11.1223	0.0006
FDI has no Granger causation GFCF	24	3.9264	0.038
GFCF has no Granger causation FDI		10.1535	0.0010

The table 12 shows the pairwise granger causality between independent and dependent variables.

(a) Granger results in GFCF. This shows that there is a two-way link between GFCF and GDP.
(b) GDP Grants Reason for FDI. This indicates that there is a one-way linkage between FDI and GDP.
(c) GFCF and GFCF are Caused by FDI Granger Cause of Granger FDI This suggests that GFCF and FDI have a bidirectional connection. The idea is at odds with outcome. because FDI and GDP should positively relate to one.

6. Conclusion and Recommendation

Over the past 25 years, foreign direct investment has been crucial to the economic growth of Nepal. However, its impact has been positive, unlocking the full potential of FDI requires addressing structural and policy-related challenges. By implementing the recommended measures, Nepal can create a more conducive environment for FDI and thereby accelerate its economic growth.

The relationship between GDP and GFCF is bi-directional with GDP granger causing investment. However, the theory suggests a reciprocal link between FDI and GDP, contradicting the positive relationship between the two.

Policy Recommendations

To maximize the benefits of FDI, the following policy measures are recommended:

- **Enhancing Political Stability**: Establishing a stable political environment is crucial for attracting and retaining FDI.
- **Streamlining Regulatory Processes**: Simplifying bureaucratic procedures and ensuring policy consistency can make Nepal more attractive to foreign investors.
- **Investing in Infrastructure**: Improving infrastructure, particularly in transportation and energy, is essential for supporting FDI projects.
- **Strengthening Human Capital**: Investing in education and vocational training can enhance the absorptive capacity of the labor force, allowing them to better leverage the opportunities created by FDI.

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Appendix A

Variables in million

FY	GDP	GFCF	FDI
1995	248913	56081	388
1996	280513	60794	1621
1997	300845	65375	685
1998	342036	65269	578
1999	379488	73324	2326
2000	441519	89889	-33
2001	459442.8	98073	-2833
2002	492231.3	109181	961.4
2003	536749	117539	0
2004	589412	135532	136
2005	654084	153337	-469.7
2006	727827	178446	362.3
2007	815663	211039	293.9
2008	988272	264890	1829.2
2009	1192774	292730	2852
2010	1366954	373940	6437.1
2011	1527344	421840	9195.4
2012	1758380	482070	9081.9
2013	1949290	563760	3194.6
2014	22232530	667800	4383.6
2015	2423640	748690	5920.9
2016	2608180	940850	13503.9
2017	307140	1120860	17504.6
2018	3455950	1304900	13065.2
2019	3858930	1184860	19478.7
2020	3888700	1276860	19513

Source: MOF, Economic Surveys, and NRB