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Econometric Analysis on Tertiary Sector by Gross Fixed Capital Formation, Enrollment in Higher Education and Remittance Inflow in Nepal

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Abstract

This paper tries to explore the impact of tertiary sector by gross fixed capital formation and enrollment in higher education and remittance inflow in Nepal. Analytical and descriptive methods are used to examine the data in the paper. In analytical research, the dependent and control variables are evaluated using the OLS method; in descriptive research, the mean and standard deviation is used. The study examined the variables affecting GDP and evaluated the data using E-Views software.

With an R-squared value of 0.991391, the model's independent variables can explain 99.14% of the variation in the tertiary sector's GDP. The R-squared value is now 0.989669 after being corrected for the number of independent variables in the model. 1.178231 is the Durbin-Watson statistic. This statistic aids in identifying the presence or absence of residual autocorrelation. There is no first-order autocorrelation if the number is close to 2. The standard errors display the accuracy of the estimated coefficients. The coefficients' statistical significance is shown by the probabilities (p-values) connected to the t-statistics. A statistically significant coefficient is one with a p-value that is less than the significance level (for instance, 0.05).

Keywords: Tertiary sector, Gross Fixed Capital Formation, Enrollment in Higher Education, Remittance inflow

Introduction

Money returned home by migrant workers, known as remittances, has grown to be a substantial source of funding for developing nations. Around three times as much aid was sent to poor nations in 2011 by migrant workers than these nations got in ODA. Remittances have eclipsed foreign direct investment (FDI) in several nations. Remittance growth between 2009 and 2011 was 25.29%, while FDI growth was a pathetic 0.59% (Ratha, 2013), indicating that remittances would likely continue to be a significant source of income for developing nations. The literature is still divided, nevertheless, on how remittances affect economic expansion. In Nepal, a developing country where remittances are important to the economy, this study investigates the link between remittances and economic activity by examining the effects of remittances on economic growth and measuring the relationships between remittances and specific macroeconomic variables.

A small, landlocked nation in South Asia called Nepal with a GDP of about Rs. 53.81 Kharba. It is mostly an agricultural nation that relies on imports for basic necessities and has a substantial trade deficit with India. Despite being heavily dependent on agriculture, the nation's economy has only grown at a rate of 2-5% annually. Nepal achieved democracy in 2007 after a decade-long civil war, but political unrest hampered its impact on development

initiatives. The new federal system, which aims to advance women and underrepresented ethnic groups, will go into force in 2015. However, the employment outlook is remains bleak due to a shortage of job possibilities and an increase in the number of people looking for work abroad.

In theory, a fixed asset should not be considered as an investment twice in the same year if it is purchased by one organization during that year and then sold to another organization during the same year; otherwise, the genuine growth of the fixed capital stock would be exaggerated. Only newly manufactured fixed assets, not used assets, should be included in the expenditure on Gross Domestic Product, of which GFCF is a component. No matter how long they have been in service, offensive weapons and their delivery systems were not included in the calculation of gross fixed capital formation (GFCF). This was done because military weapons are used to destroy people and property, which is not a production that adds value (Kanu, Ozurumba, and Anyanwu 2014).

The endogenous growth theories of Lucas (1988) and Romer (1986) sparked interest in the relationship between education and economic growth. Education-related advances in human capital lead to faster economic growth (Romer, 1990). For developed economies, studies on the connection between education and economic growth are most common. Studies that focus especially on developing economies are rare, nevertheless. The aim of this study is to identify these educational characteristics that support Nepal's economic growth.

There aren't many studies that look at how remittances effect economic growth, despite the fact that they make up a sizeable amount of GDP in the economies of developing countries. Additionally, past studies frequently focused on a specific country or region of the world, which produced contradictory conclusions questioning whether remittances genuinely drive economic growth.

Bichaka Fayissa and Christian Nsiah (Fayissa and Nsiah 2004) examined 36 African countries to evaluate the influence of remittances on economic growth in Africa and found that changes in remittances have a significant and positive impact on the growth rate of GDP per capita. Meyer and Shera (2013) found that worker remittances were favorably and significantly contributing to economic growth in the Southeastern Balkan Area. On the other side, Lopez, Molina, and Bussolo (2007) found that remittances increased the value of the local currency in small open economies, and Khan and Islam (2013) observed that remittances tend to produce inflationary pressure in the domestic economy. Remittances also can't guarantee long-term economic growth or deal with structural economic problems like a changeable political environment, according to Matuzeviciute and Butkus (2016). However, the study did note that remittance effects might vary and that countries with remittance-to-GDP ratios higher than 11% were overly reliant on them, which affected their own long-term growth.

Emerging economies have profited from remittances, especially in the fields of health, education, and poverty eradication. Microstudies show that migrant remittances have improved the standard of life for migrant households in Nepal and decreased poverty. However, there is still disagreement among studies regarding the overall impact of remittances on investment and economic growth. Remittances boost economic growth when

the financial sector is developed and educational levels are high, according to Cooray's (2012) research. According to Dahal (2014), remittances have a conflicted effect on Nepal's economic development, even though they do aid in productivity, human capital accumulation, and financial development.

Remittances appeared to have minimal long-term influence, however Uprety (2017) found that they were negatively correlated with per capita GDP in the short run. This study aims to more thoroughly analyze the effects of remittances by taking into account other aspects, such as the importance of governance quality in explaining the effects of remittances on economic growth.

Objective

The objective of the study is to analyze gross fixed capital formation, enrollment in higher education and remittance status and contribution to GDP in Nepal

Literature Review

The study came to the conclusion that the following frameworks should be created and implemented in order to evaluate the relationship between the variables remittance inflow, Tertiary Sector (TS), Gross Fixed Capital Formation (GFCF), and Enrollment in higher education (EnrlH) of Nepal. It made use of secondary yearly time series data from the exam assignment spanning the years 2060/61 to 2078/79. This was carried out after reading the chapter on the review of the literature and taking into account established theory.

Dependent variable

Tertiary Sector (TS): The tertiary sector, commonly referred to as the service sector, is an important component of the economy that focuses more on offering services than it does on creating products or mining raw resources. It includes a broad range of companies and pursuits that attend to the requirements and tastes of people and organizations. Intangible interactions and outputs define the tertiary sector.

Independent Variables

Remittance Inflow (RI): The term "remittance inflow" describes the amount of money that people, frequently migrants, send home after working abroad. Many households in underdeveloped nations rely heavily on these payments, which are often supplied to help their families, acquaintances, or relatives. Both the sending and receiving countries may experience major economic and social effects as a result of remittance inflows.

Gross Fixed Capital Formation (GFCF): Gross Fixed Capital Formation (GFCF) is the total amount of investments made over a given time period in the acquisition or production of fixed assets within an economy. Fixed assets, usually referred to as capital assets are physical assets with a long lifespan that are frequently employed in manufacturing operations. The volume of investment and capital formation in an economy is largely determined by GFCF.

Enrollment in higher Education (EnrlH): The number of students currently enrolled and actively pursuing higher education at post-secondary institutions, including universities, colleges, and vocational schools, is referred to as enrollment. It is an important metric for measuring a nation's degree of human capital development and educational attainment.

Method

In order to examine the relationship between Nepal's remittance inflow (RI) (the dependent variable), tertiary sectors (TS), gross fixed capital formation (GFCF), and enrollment in higher education (EnrlH) (the independent variables), the entire study period, from 2060/61 to 2078/79, was employed. E-Views software is employed to evaluate and compare the models.

Tools and Method of Data Analysis

The data in the paper were examined using analytical and descriptive techniques. While the dependent and control variables will be assessed using the OLS method in analytical research, the mean and standard deviation will be employed in descriptive research. The study used E-Views software to evaluate the data and looked at the factors affecting GDP.

Model Specification

A simple model for the determinant of the gross domestic product becomes

TSGDP = F (RI, GFCF, EnrlH) ..... (i)

The OLS model that represents the model is presented in the equation as

$$LogTSGDP = a + b_1 \text{ Log RI} + b_2 \text{ Log GFCF} + b_3 \text{ LogEnrlH} + e \quad ..... \text{ (ii)}$$

Where; RI = Remittance Inflow

TSGDP = Tertiary Sectors Gross Domestic Product

GFCF=Gross Fixed Capital Formation

EnrlH= Enrollment in higher education

a = Constant

e = Error term

b_1, b_2, b_3 = constant parameter

L= Logarithm

Analysis of data and Presentation

Descriptive Statistics

The following table shows the findings of the descriptive statistics conducted before the inflowing time series analysis.

Table1

Statistical analyses of selected variables

Sample: 2060 2078
Included observations: 19

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.165504	0.288251	4.043358	0.0011
LOGRI	0.079975	0.112930	0.708187	0.4897
LOGGFCF	0.807495	0.102162	7.904031	0.0000
LOGENRLH	-0.063565	0.090785	-0.700171	0.4945

R-squared	0.991391	Mean dependent var	4.916670
Adjusted R-squared	0.989669	S.D. dependent var	0.336068
S.E. of regression	0.034158	Akaike info criterion	-3.730951
Sum squared resid	0.017502	Schwarz criterion	-3.532122
Log likelihood	39.44404	Hannan-Quinn criter.	-3.697301
F-statistic	575.7772	Durbin-Watson stat	1.178231
Prob(F-statistic)	0.000000		

Source: *Authors' calculation through E-views*

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Intercept C 1.165504 is the intercept coefficient. When all other independent variables are held constant at zero, this reflects the estimated GDP for the tertiary sector. With a t-statistic of 4.043358 and a p-value of 0.0011, it is statistically significant.

LOGRI: The log of remittance inflow (LOGRI) coefficient is 0.079975. However, as the t-statistic of 0.708187 and the high p-value of 0.4897 show, it is not statistically significant. This shows that the GDP of the tertiary sector is not much impacted by the log of remittance inflow.

LOGGFCF: The LOGGFCF coefficient is 0.807495. It measures the log of gross fixed capital formation. With a t-statistic of 7.904031 and a p-value of 0.0000, it is extremely statistically significant. This suggests that an increase in logGFCF is linked to a significant boost in the GDP of the tertiary sector.

The coefficient for the log of higher education enrollment (LOGENRLH) is -0.063565. Similar to LOGRI, it has a t-statistic of -0.700171 and a p-value of 0.4945, indicating that it is not statistically significant. This suggests that the log of higher education enrollment has little impact on the GDP of the tertiary sector. According to the R-squared value of 0.991391, the independent variables in the model can account for 99.14% of the variation in the GDP of the tertiary sector. The R-squared value has been adjusted for the number of independent variables in the model and is now 0.989669. The F-statistic is 575.7772, and the overall statistical significance of the regression model is indicated by the extraordinarily low p-value (0.000000) of the analysis. The Durbin-Watson statistic is 1.178231. This statistic aids in determining whether residual autocorrelation is present. If the number is close to 2, first-order autocorrelation is absent. The estimated coefficients' precision is shown by the standard errors.

The probabilities (p-values) linked to the t-statistics show the coefficients' statistical significance. A p-value less than the significance level (for example, 0.05) denotes a statistically significant coefficient. These model comparison standards are used to compare various models. Lower numbers denote models that fit the data better.

In terms of development models, you can infer from the data that spending on gross fixed capital formation is crucial for the expansion of the GDP of the tertiary sector. Remittance Inflow and Enrollment in Higher Education's lack of importance, on the other hand, raises the possibility that other factors may be at work in explaining the changes in Tertiary Sector GDP.

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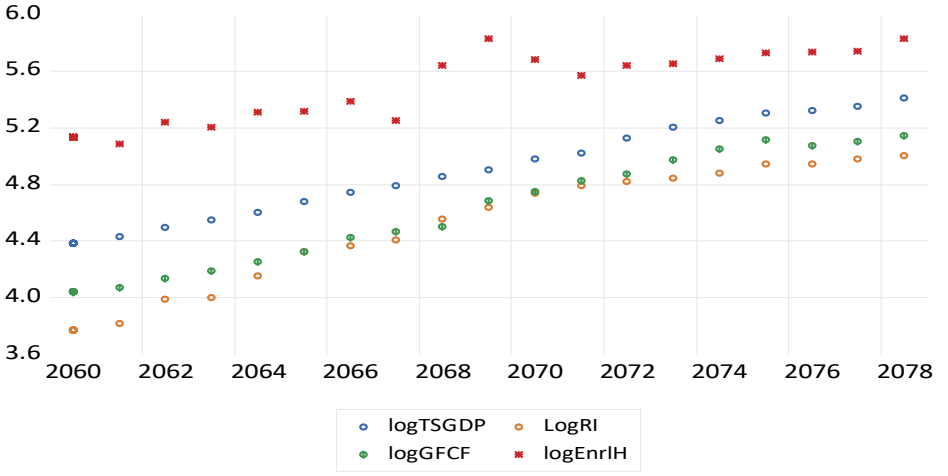
Table 2

Statistical analysis of selected variables

Sample: 2060 2078

	LOGTSGDP	LOGRI	LOGGFCF	LOGENRLH
Mean	4.916670	4.523914	4.631140	5.510170
Median	4.906329	4.638072	4.683110	5.641042
Maximum	5.411546	5.003162	5.147305	5.834159
Minimum	4.384640	3.767809	4.038147	5.085184
Std. Dev.	0.336068	0.414037	0.392137	0.251008
Skewness	-0.060815	-0.530061	-0.108952	-0.331260
Kurtosis	1.676198	1.905235	1.541204	1.586050
Jarque-Bera	1.399069	1.838541	1.722325	1.930231
Probability	0.496817	0.398810	0.422670	0.380939
Sum	93.41674	85.95437	87.99166	104.6932
Sum Sq. Dev.	2.032949	3.085682	2.767889	1.134093
Observations	19	19	19	19



Source: *Authors' calculation through E-views*

The statistics offered provide a description of the properties of the variables in my dataset. Now let's explain each statistic:

We may determine a variable's central tendency by looking at its mean (average) value. The mean LOGTSGDP, for instance, is about 4.92. When the data are sorted, the median represents the midway value. It can be used to evaluate the symmetry of the distribution and is a different way to estimate central tendency. The median LOGRI, for instance, is about 4.64. The maximum and minimum values of each variable show its range. For instance, LOGTSGDP is between 4.38 and 5.41. The standard deviation calculates how widely the data are spread out or dispersed from the mean. Greater variability is implied by larger standard deviations. For instance, LOGGFCF has a standard deviation of around 0.39. The distribution's asymmetry is measured by skewness. The distribution is said to be skewed to the left if the skewness is negative. For instance, the negative skewness of LOGRI is -0.53. Kurtosis calculates the distribution's tails.

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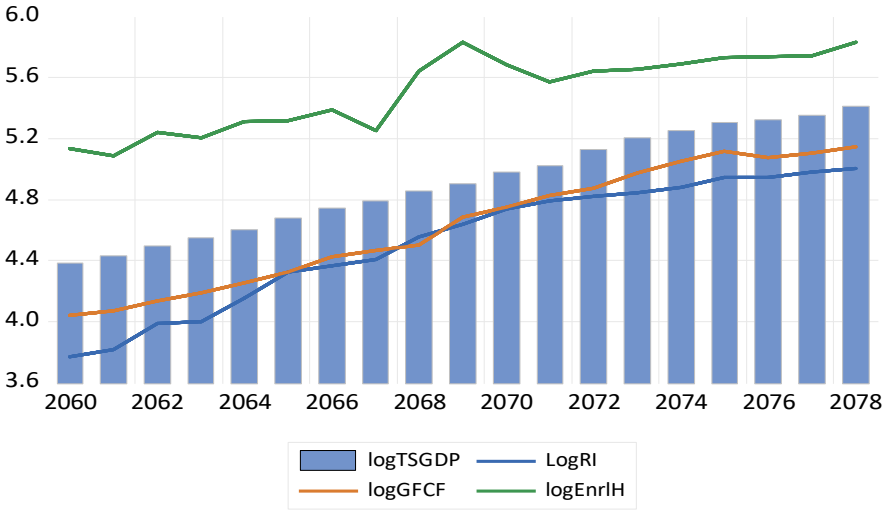
In order to determine whether the data has a normal distribution, the Jarque-Bera test is used. We can tell whether the data is normally distributed by looking at the test's probability (Probability). Lower probability indicates a deviation from normality. For example, LOGRI's Probability of 0.398810 shows that it may adhere to a normal distribution. These values give information on the variability around the mean and the total sum of the variable's values, respectively.

Table 1

Granger Causality Test

Sample: 2060 2078
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
LOGRI does not Granger Cause LOGTSGDP	17	1.81425	0.2049
LOGTSGDP does not Granger Cause LOGRI		0.93357	0.4199
LOGGFCF does not Granger Cause LOGTSGDP	17	0.80207	0.4710
LOGTSGDP does not Granger Cause LOGGFCF		2.64275	0.1119
LOGENRLH does not Granger Cause LOGTSGDP	17	0.35262	0.7099
LOGTSGDP does not Granger Cause LOGENRLH		2.11045	0.1639



Source: *Authors' calculation through E-views*

The Granger causality test's significance is quantified by the F-statistic, a test statistic. A stronger possibility of causality is indicated by a higher F-statistic. The F-statistic for each test is represented by the value in this column. The p-value connected to each Granger causality test is shown in this column. We can determine whether the null hypothesis can be rejected using the p-value. A low p-value (usually less than 0.05) indicates that we may rule out the null hypothesis and draw the conclusion that Granger causality is present.

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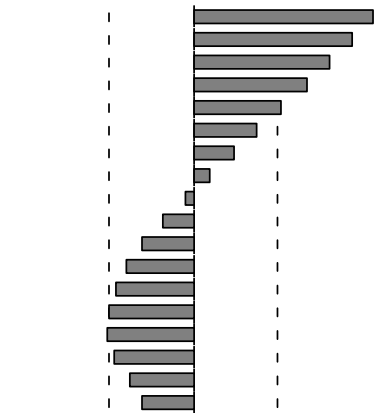
Table 3

Cross Correlation of LOGTSGDP and LOGRI

Sample: 2060 2078
Included observations: 19
Correlations are asymptotically consistent approximations



LOGTSGDP,LOGRI(-i)	LOGTSGDP,LOGRI(+i)	i	lag	lead
		0	0.9770	0.9770
		1	0.8650	0.8036
		2	0.7421	0.6265
		3	0.6192	0.4673
		4	0.4834	0.2892
		5	0.3483	0.1345
		6	0.2192	0.0071
		7	0.0897	-0.1120
		8	-0.0416	-0.2161
		9	-0.1669	-0.2899
		10	-0.2750	-0.3406
		11	-0.3638	-0.3672
		12	-0.4231	-0.3746
		13	-0.4518	-0.3702
		14	-0.4601	-0.3538
		15	-0.4269	-0.3174
		16	-0.3504	-0.2581
		17	-0.2708	-0.1903

Source: *Authors' calculation through E-views*

Above table and graph interpret the lag of 0 (i.e., when both series are aligned in time), the cross-correlation coefficient is 0.9770. This suggests a very strong positive linear relationship between "logtsgdp" and "logri" when they are at the same time point. As the lag increases (e.g., at lag 1, 2, 3, 4, 5, 6, 7), the cross-correlation values start to decrease. This indicates that the linear relationship between the two series becomes weaker as you move them apart in time. At a lag of 8 and beyond, the cross-correlation values become negative. This suggests a negative linear relationship between "logtsgdp" and "logri" at these lags. The values continue to decrease in magnitude as you move further into the future (positive leads), indicating a weakening linear relationship.

Conclusion

In conclusion, the study shows that Gross Fixed Capital Formation (LOGGFCF) significantly increases Tertiary Sector GDP, whereas Remittance Inflow (LOGRI) and Enrollment in Higher Education (LOGENRLH) do not. A sizable portion of the variation in the GDP of the tertiary sector is explained by the model. Be careful when interpreting these results, though, as certain variables' lack of significance could be caused by collinearity problems or other factors that weren't taken into consideration in the model.

In terms of development models, you can infer from the data that spending on gross fixed capital formation is crucial for the expansion of the GDP of the tertiary sector. Remittance Inflow and Enrollment in Higher Education's lack of importance, on the other hand, raises the possibility that other factors may be at work in explaining the changes in Tertiary Sector GDP.

These statistics shed light on each variable's distribution, variability, and central tendency. When conducting statistical analysis and analyzing the outcomes of regression or other modeling techniques, understanding these features will help you make wise decisions. To make inferences about the correlations between variables, it's crucial to take into account both these qualities and the findings of your regression study. This study aids planners, researchers in their further investigation of remittances and their effects on a nation's GDP, as well as the government in developing sensible economic policies. Future versions of this study could add more factors.

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