

Implementation of Fiscal Federalism in Nepal

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Abstract: The study aims to overview the Implementation of fiscal federalism in Nepal. Since fiscal federalism is new in Nepal, this study focuses on analyzing Nepal's fiscal federalism model and intergovernmental fiscal transfers. The study explores the challenges and solutions for Nepal's successful adoption of fiscal federalism, focusing on optimizing sustainable development, and governance, and facilitating accurate policy decisions. It explores the model's features, including division of fiscal responsibilities, intergovernmental fiscal transfers, and potential challenges such as capacity constraints, coordination issues, revenue mobilization difficulties, and intergovernmental conflicts. The study proposes solutions to address these challenges, such as strengthening institutional capacity, improving intergovernmental coordination, and promoting transparency and accountability in fiscal management and national government expenditures. It also evaluates the model's impact on poverty reduction, infrastructure development, social service delivery, and environmental sustainability, and explores opportunities to align fiscal decentralization with broader development goals. The study also evaluates the availability, quality, and accessibility of fiscal and economic data in Nepal, and explores opportunities to strengthen the evidence-based policy-making process. By closely examining the connections between grant categories and spending by the central government, this study illuminates the complex relationship that influences Nepal's fiscal policy.

Keywords: fiscal federalism, intergovernmental fiscal transfers, State and Local Budget and Expenditures, National Government Expenditures and Related Policies.

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I. INTRODUCTION

The form of government in which a country's area is divided into two or more levels of government, which may include local and provincial governments, is considered federalism. Along with the national government, the other levels of government also share the authority granted by the constitution. There are three types of federalism: political federalism, bureaucratic federalism, and fiscal federalism. In a federal system, fiscal federalism describes the financial ties between several levels of government (Akindele, 2009).

Due to its adaptability, the federal government system is adept at managing equitable income distribution, efficient resource allocation, and economic stability. However, federal engagement is necessary due to the differing incomes of states and localities. State and local governments can efficiently allocate resources, while the federal or central government is responsible for economic stabilization and income redistribution.

Fiscal federalism is greatly influenced by the historical developments that created the relationships between the multiple levels of government. Provinces and local governments receive federal funds through taxes, grants, and transfers, and national fiscal policies and financial decisions influence traditional intergovernmental interactions (Joumard & Kongsrud, 2003). The

federal government governs, finances, and redistributes funds to deliver goods and services.

Nepal, a bilingual, cosmopolitan country with diverse religions and ethnic groups, has adopted a fiscal federalism model since the 2015 Constitution. This change marks the end of six decades of slow fiscal decentralization policies. The new constitution aims to eliminate bias based on ethnicity, class, caste, language, gender, culture, religion, or region. Unitary and centralized states are prohibited under the new constitution. Due to natural resources and uneven revenue allocation, leaders, legislators, intellectuals, and the public must examine the distribution of financial (taxes and expenses) and functional links between the federal government, states, and local levels. The Federal Democratic Republic Constitution of Nepal 2072 has established the blueprint for fiscal federalism, but independent researchers' assessments of the model's advantages and disadvantages were inadequate. This study aims to objectively evaluate the benefits and drawbacks of Nepal's fiscal federalism model as laid out in the new constitution in 2015.

II. LITERATURE REVIEW

There are very few kinds of literature on the Implementation of Fiscal Federalism in Nepal. Fiscal federalism is the separation of governmental tasks and financial relationships between different government levels. It focuses on the division of functions, central revenue powers, province's revenue powers, and local-level and

provincial revenue powers. After a civil war in 1996, political parties worked to establish an agreement on the principles of the Constitution. In 2007, a federalism plan was approved, and in 2015 a new governing structure was established. Fiscal federalism in Nepal performs the nation's extractive and distributive functions and indirectly implements the state's symbolic, regulatory, and compliance roles. It ensures social fairness and economic prosperity, with public administration fulfilling state responsibilities. (Subedi, 2020; Bhurtel, 2019)

(Bahl et al., 2020) The "Implementing Federalism: The Case of Nepal" discusses the current federal system in Nepal, its early achievements and challenges, and lessons learned from its transition. The context and history of Nepal's transition are reviewed, and the new fiscal federalism is analyzed. The report highlights the ability of subnational governments to adapt to the new finance and expenditure delivery system. The federal government provides public goods, maintains standards, controls macroeconomic policies, and manages the intergovernmental fiscal system. The report also discusses the lessons other nations could learn from Nepal's experience establishing a federal system. The goal is to maintain strong local government autonomy with little direct supervision from the federal or provincial governments.

(Shrestha & Venaik, 2019) The "Fiscal Federalism in Nepal" magazine aims to address problems in the country's adoption of federalism by focusing on resource distribution and optimal allocation. Economists have divided the economy into private and public sectors, analyzing how agents act to maximize their objectives. In the private sector, economic agents are divided into producers and consumers, with research on how they optimize their behaviour to achieve maximum profits for producers and maximum utility for consumers. This study aims to promote swift and equitable federalism adoption in Nepal.

(Devkota, 2021) analyzed the constitution of Nepal, highlighting its decentralized operational responsibility and hierarchy of functional responsibility. The constitution assigns duties to sub-federal units but limits their ability to raise funds. The national government has broader authority to raise money through intergovernmental fiscal transfers. The constitution provides four funds to provincial and local governments: fiscal equalization award, conditional grant, special grant, and matching grant. These funds were provided post-federalism. Fiscal transfers address the vertical fiscal imbalance caused by centralised revenue-raising rights. However, determining the right standards for fiscal transfers is complex, and the fiscal transfer system requires addressing fiscal needs and being technically effective in political viability.

III. METHODOLOGY

The study explores the composition of fiscal transfers in Nepal using a combination of descriptive statistics and mixed-methods methodology. It analyzes data to identify patterns of fiscal federalism, examines the connections between grant categories and central government spending, and enhances the results with correlation analysis. The findings provide comprehensive interpretations of intergovernmental fiscal transfers in Nepal. The research used descriptive statistics and mixed methods to analyze fiscal transfers across different provinces. It found patterns in fiscal federalism dynamics and examined the connections between grant categories and central government spending. Correlation analysis improved the results by identifying the direction and intensity of

these interactions. The findings provide comprehensive interpretations of intergovernmental fiscal transfers in Nepal. Statistical tools are the mathematical techniques to represent and analyze data so that a proper interpretation of the data can be made to find the result, conclusion, and summary that the data wants to provide. Statistical tools provide a single value for a large volume of data, from which proper data evaluation can be done. Some statistical tools are mean, median, and standard deviation, which have been used in the study.

Mean

$$\text{Mean}(\bar{X}) = \sum X / N$$

Where $\sum X$ = Sum of all observation

N = Number of observations,

X = values of variables

Median

Median is a statistical tool that helps in the descriptive analysis of data. The value that divides the distribution into two equal parts is called the median. It's often used to describe the central tendency of a dataset, particularly when there are outliers that might skew the mean

The formula for the calculation of the median is

$$N + 1^{\text{th}}$$

$$\text{Median} = \text{value of } \left(\frac{\quad}{2} \right) \text{ items}$$

Where, N = number of observations

Standard Deviation

The standard deviation is a popular statistical tool to measure how much the data deviates from the mean value. Calculating the standard deviation lets us know the condition of outliers in the data.

The formula for the calculation is shown below.

$$\sigma = \sqrt{\frac{1}{n} \sum (x_i - \bar{x})^2}$$

Where σ = standard deviation

n = number of observations

x_i = values of variables

$\bar{x}$ = mean of a particular variable

Correlation Analysis

Correlation is a statistical method that is designed to measure the degree of association between two or more parameters. So, correlation helps measure the relationship between two or more variables.

The formula to calculate the correlation coefficient is shown below.

$$r = \frac{(n * \sum xy - \sum x * \sum y)}{(\sqrt{(n * \sum x^2 - (\sum x)^2)} * \sqrt{(n * \sum y^2 - (\sum y)^2)})}$$

Where n number of observations

x and y are two variables

If the correlation coefficient is close to +1 or -1, it suggests a strong linear relationship. If the coefficient is close to 0, it indicates a weak or no linear relationship.

Regression Analysis

In statistical modelling, regression analysis is a set of statistical processes for estimating the relationships between a dependent variable and one or more independent variables.

This study uses a dynamic model containing a log-linear time lag regression model. In the dynamical model, this study uses a dependent variable and types of grants as an independent variable.

$$\log y = \beta_0 + \beta_1 \log X_1 + \beta_2 \log X_2 + \beta_3 \log X_3 + \beta_4 \log X_4 + ei$$

where,

y= Dependent Variable

β_0 = Intercept of the Equation representing the value of Y when all the independent variables X1, X2, X3, X4 are zero.

$\log X_1$ = Fiscal Equalization grant

$\log X_2$ = conditional grant

$\log X_3$ = complementary grant

$\log X_4$ = special grant

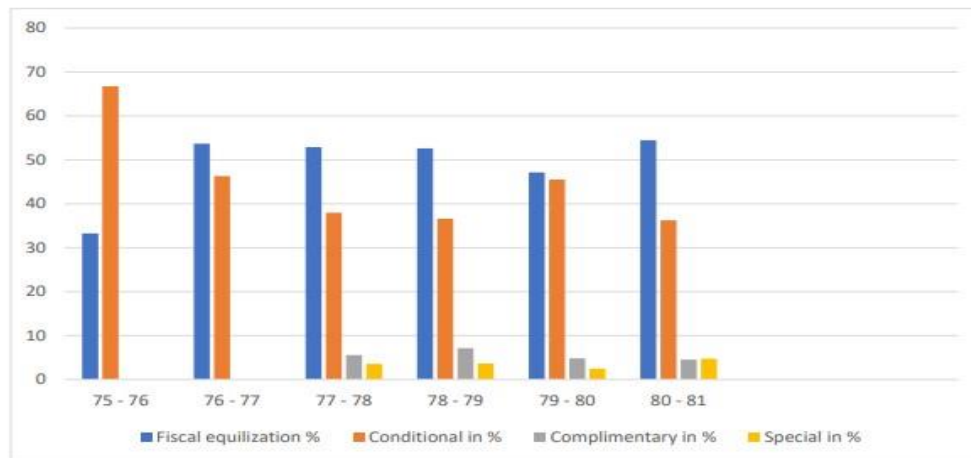
ei = error term

The major tool for hypothesis testing of the study is the p-value. The p-value, which indicates the strength of evidence against the null hypothesis, is used to reject the null hypothesis if it is less than the chosen significance level or to indicate insufficient evidence if it is greater than or equal to the significance level.

IV. DISCUSSION

Financial flows between layers of government are referred to as intergovernmental fiscal transfers. When a nation has a federal or decentralized form of government, these transfers usually take place between the federal government at the federal level and subnational units like states, provinces, or regions.

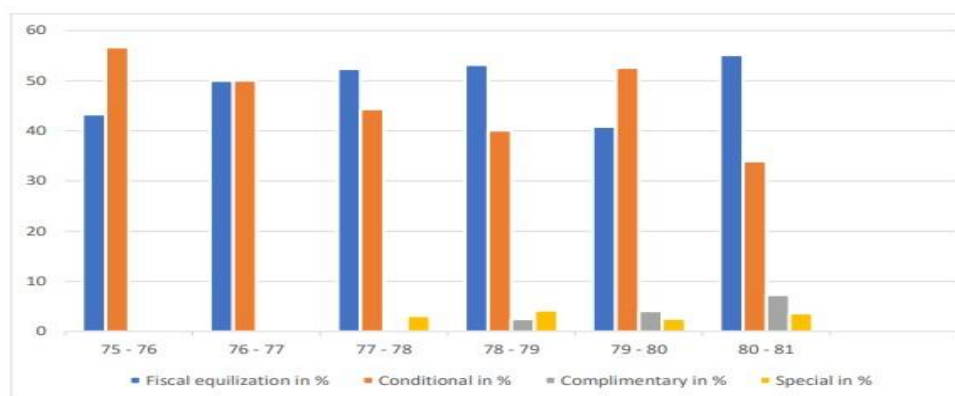
Figure 1. Intergovernmental Fiscal Transfer to Koshi Province



Source: Derivation of Author

The chart shows the intergovernmental fiscal transfer by the central government to Koshi Province. On the x-axis, the types of grants are shown and, on the y-axis, the grant's value in percentage is shown. The table ranges from 33.24 per cent to 54.50 per cent of the total funds over different fiscal years from 2075-76 to 2080- 81. Conditional Grants are funds provided by a higher level of government to a lower level with specific conditions attached. In the table, the percentage ranges from 36 percent to 66 percent. The percentage in the Complementary grant column ranges from zero to 7.15 percent. The percentage in the Special Grant column ranges from zero to 4.72 percent.

Figure 2. Intergovernmental Fiscal Transfer to Madhesh Province

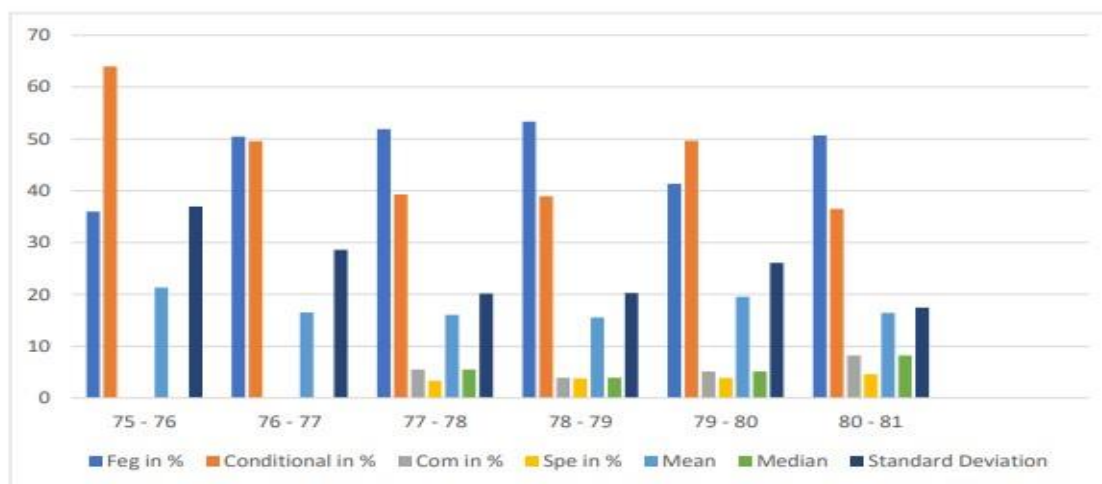


Source: Derivation of Author

Fiscal equalization grants represent the financial resources allocated to ensure equalization across different regions. The table ranges from 40.81 percent to 55.12 percent of the total funds over different fiscal years from 2075-76 to 2080-81. Conditional Grants are funds provided by a higher level of government to a lower level with specific conditions attached. In the table, the percentage ranges from 33.96 percent to 56.68 percent. The percentage in the Complementary grant column ranges from zero to 7.28 percent. The special Grant column ranges from zero to 4.23 percent.

There seems to be a shift over time in the composition, with fiscal equalization grants and complementary grants rising and conditional grants decreasing. The greater variability seen in the mean and standard deviation of the prior summary data can be attributed in part to the increase in complementary grants during the most recent fiscal year (80–81).

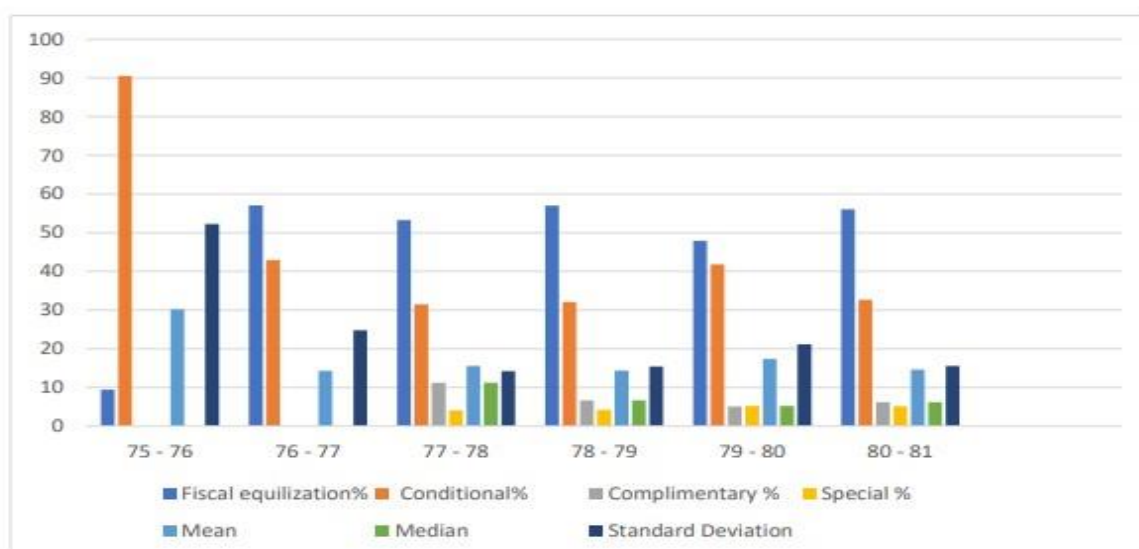
Figure 3 Intergovernmental Fiscal Transfer to Bagmati Province



Source: Derivation of Author

The fiscal equalization grant percentage ranges from 35.99 percent to 53.37 percent. The conditional grant percentage ranges from 36.48 percent to 64.01 percent. Complementary grant percentages range from zero to 8.22 percent. Special grant percentages range from zero to 4.62 percent. According to the analysis, conditional grants and fiscal equalization make up the majority of the total or 64.01 percent. There are no matching complementary or special grants.

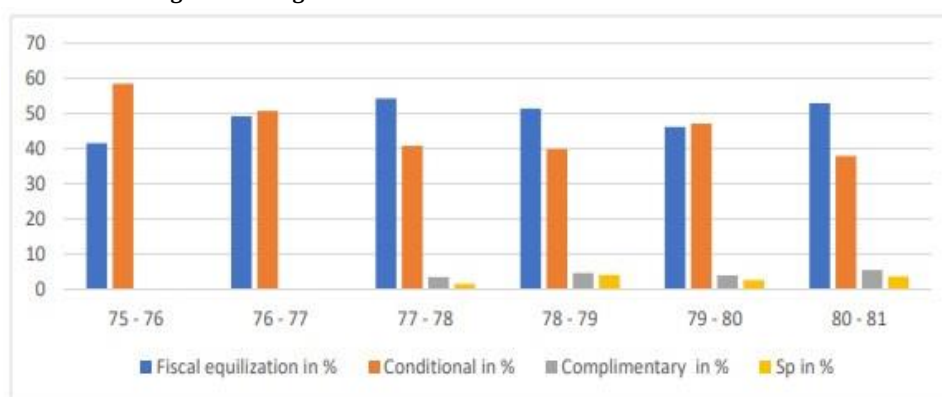
Figure 4 Intergovernmental Fiscal Transfer to Gandaki Province



Source: Derivation of Author

The fiscal equalization grant percentage ranges from 9.44 percent to 57.06 percent. Conditional grant percentage ranges from 31.50 percent to 90.56 percent. Complementary grant percentages range from zero to 11.22 percent. Special grant percentages range from zero to 5.20 percent. Gandaki Province's fiscal transfer data shows high variability in conditional grants, fiscal equalization grants, and complementary and special grants, with a shift towards fiscal equalization and asymmetric distribution.

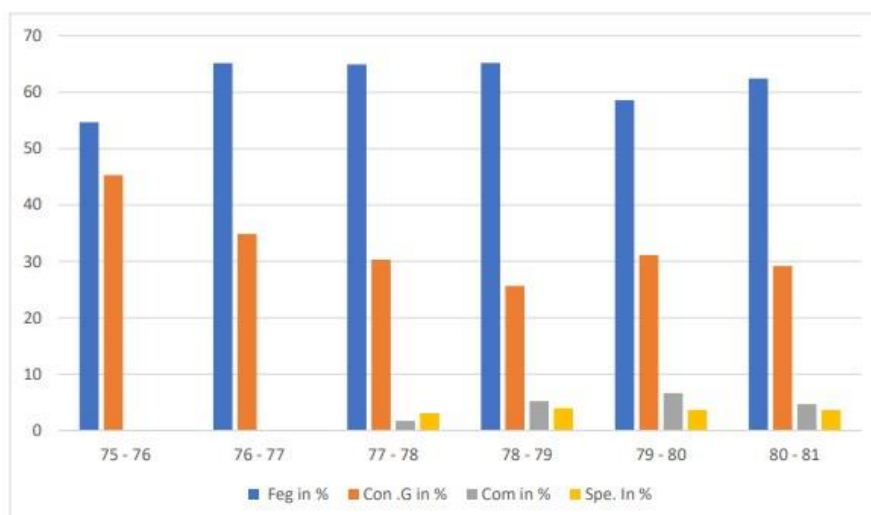
Figure 5 Intergovernmental Fiscal Transfer to Lumbini Province



Source: Derivation of Author

In Lumbini Province, the intergovernmental fiscal transfer composition exhibits variations over the fiscal years. In 2075-76, the majority of funding comes from conditional grants (58.47 percent), with a significant portion from fiscal equalization grants (41.53 percent). The absence of complementary or special funding indicates a focused allocation. The intergovernmental fiscal transfer composition in Lumbini Province varies over fiscal years, with 58.47 percent of funding coming from conditional grants and 41.53 percent from fiscal equalization grants. The absence of complementary or special grants suggests a focused allocation.

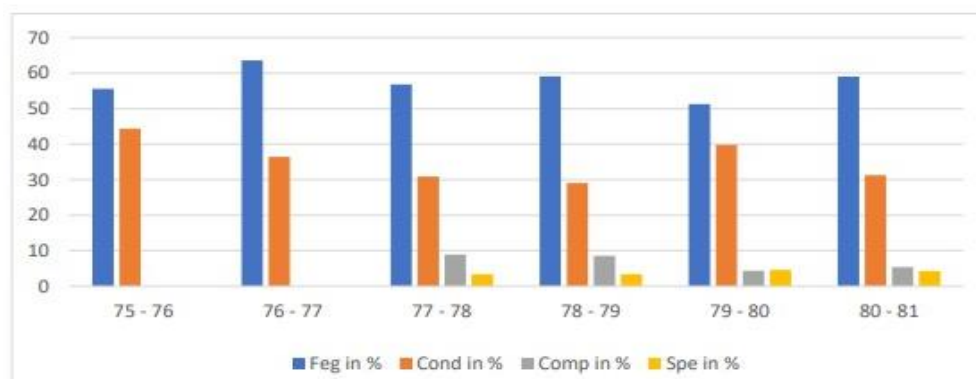
Figure 6. Intergovernmental Fiscal Transfer to Karnali Province



Source: Derivation of Author

The fiscal equalization grant proportion varies from year to year. It falls between 54.70 percent to 65.20 percent. Over time, the percentage of conditional grants has usually decreased, falling between 45.30 percent and 25.63 percent. According to the statistics, the percentage of complementary grants varies from zero to 6.64 percent. The Special grant percentage fluctuates from zero to 3.94 percent during the year.

Figure 7 Intergovernmental Fiscal Transfer to SudurPaschim Province



Source: Derivation of Author

The provincial government receives a fiscal equalization grant of 38.07 percent, while local levels receive a higher grant of 61.93 percent. Local levels also receive the highest conditional grant percentage (73.55 percent), while provinces receive a conditional grant of 26.45 percent.

Table 1: Descriptive Statistics of the Intergovernmental Fiscal Transfers from 2075/76 – 2080/81

Provinces	Mean	Median	Standard Deviation
Koshi	22.13	15.49	25.23
Madhesh	16.95	3.11	25.41
Bagmati	17.57	3.79	24.92
Gandaki	17.74	4.88	23.92
Lumbini	16.90	2.91	25.05
Karnali	12.72	3.27	17.34
Sudur Paschim	14.13	4.54	18.40

Source: Author's Calculation using Excel

unit: in Lakhs

Koshi Province

The mean of fiscal transfers in Koshi Province is 22.13 Lakhs, indicating an average of 22.13 Lakhs received during the specified period. The median, the middle value in the dataset, is 15.49 Lakhs, suggesting half of the transfers are below this value and half are above it. The standard deviation, which measures the degree of variation of values, is 25.23 units, indicating a relatively high degree of variability in fiscal transfers to Koshi Province. This indicates that fiscal transfers varied significantly over the period, with some notable deviations from the average. The mean provides an average value, while the median indicates the middle point of the distribution, suggesting some variability. The standard deviation highlights the extent of this variability, with Koshi Province showing significant fluctuations and notable deviations from the average.

Madhesh Province

The Madhesh Province received an average of 16.95 Lakhs of fiscal transfers during the specified period, indicating a central measure of the fiscal transfers' distribution. The median value of 3.11 Lakhs suggests a relatively low middle value, with half of the transfers below this value and half above, indicating a potentially skewed distribution. The standard deviation of 25.41 indicates substantial variability in fiscal transfers to Madhesh Province, with an average deviation of 25.41 units, indicating significant fluctuations or outliers. The mean provides an average value, indicating the typical number of fiscal transfers to Madhesh Province during the specified time frame. The low median value suggests a skewed distribution with some instances of very low fiscal transfers. The high standard deviation reflects considerable variability in fiscal transfers to Madhesh Province, potentially due to economic conditions, policy changes, or specific events affecting fiscal allocations.

Bagmati Province

The data shows that Bagmati Province received 17.57 Lakhs of fiscal transfers during the specified period, indicating a central measure of the fiscal transfers' distribution. The median value of 3.79 Lakhs suggests a relatively low middle value, with half of the transfers below this value and half above it, indicating a potentially skewed distribution. The standard deviation of 24.92 indicates substantial variability in fiscal transfers to Bagmati Province, with an average deviation of 24.92 units, indicating significant fluctuations or outliers. The low median value suggests a skewed distribution with some extremely low values, while the high standard deviation indicates considerable variability or dispersion in fiscal transfers to Bagmati Province, possibly due to factors such as economic conditions, policy changes, or specific events affecting fiscal allocations.

Gandaki Province

The fiscal transfers to Gandaki Province during the specified period were analyzed using a mean of 17.74 Lakhs, indicating a central measure of the distribution. The median value of 4.88 Lakhs suggests a higher middle value, with half of the transfers below this value and half above it. The standard deviation of 23.92 indicates variability in fiscal transfers, with an average deviation of 23.92 units, indicating outliers or fluctuations. The mean represents the typical number of fiscal transfers, while the higher median value suggests a higher middle value, potentially indicating a distribution with less skewness towards extremely low values. The standard deviation reflects the degree of variability or dispersion in fiscal transfers to Gandaki Province, with notable fluctuations in the amounts.

Lumbini Province

The study reveals that Lumbini Province received an average of 16.9 Lakhs of fiscal transfers during the specified period, indicating a central measure of the fiscal transfers' distribution. The median value of 2.91 Lakhs suggests a relatively low middle value, with half of the transfers below this value and half above it, indicating a potentially skewed distribution. The standard deviation of 25.05 indicates substantial variability in fiscal transfers to Lumbini Province, with an average deviation of 25.05 units, indicating significant fluctuations or outliers in the amounts. The low median value suggests a skewed distribution with some instances of very low transfers, while the high standard deviation indicates considerable variability or dispersion in fiscal transfers to Lumbini Province, potentially due to factors such as economic conditions, policy changes, or specific events affecting fiscal allocations.

Karnali Province

The data shows that Karnali Province received an average of 12.72 Lakhs of fiscal transfers during the specified period, indicating a central measure of fiscal transfers. The median value of 3.27 Lakhs suggests a relatively low middle value, with half of the transfers below this value and half above, indicating a potentially skewed distribution. The standard deviation of 17.34 indicates a degree of variability in fiscal transfers to Karnali Province, with an average deviation of 17.34 units, indicating fluctuations or outliers in the amounts. The low median value suggests some extremely low values in the dataset, potentially indicating a skewed distribution. The standard deviation reflects a degree of variability or dispersion in fiscal transfers to Karnali Province, with notable fluctuations in the amounts. The lower mean and median values suggest that Karnali Province received lower fiscal transfers compared to other provinces. The standard deviation suggests variability in fiscal transfer amounts, potentially influenced by economic conditions, government policies, or specific events impacting fiscal allocations.

Sudur Paschim Province

The statistical data for Sudur Paschim Province indicates that on average, the province received 14.13 Lakhs of fiscal transfers during the specified period. The median value of 4.54 Lakhs suggests that the middle value of fiscal transfers in Sudur Paschim Province is relatively higher compared to other provinces, with half of the transfers below this value and half above it. The standard deviation of 18.4 indicates a degree of variability in fiscal transfers, with an average deviation of 18.4 units, indicating fluctuations or outliers in the amounts. The mean provides an average value, indicating the typical number of fiscal transfers to Sudur Paschim Province during the specified time frame. The higher median value suggests a distribution with less skewness towards extremely low values, while the standard deviation reflects a degree of variability or dispersion in fiscal transfers to Sudur Paschim Province.

Regression Statistics by taking a Log-Linear Regression Model with the Budget of the Central Government and Grants Allocated

In this model, the budget of the central government is taken as the dependent variable and the types of grants are taken as an independent variable. On calculating the result,

$$\log y = -1.8784 + 0.5065\log X_1 + 0.9926\log X_2 + 0.1331\log X_3 - 0.1558\log X_4 + ei$$

where, ei = error term

Table 2: Log-Linear Regression Model with the Budget of Central Government and Grants Allocated

Variables/factors	Coefficient / Parameter	Standard error	t-statistics/ t-value	P-value
Constant(β_0)	-1.8784	0.1031	-18.2093	0.0349
Fiscal Equalization Grant = $\log(X_1)$	0.5065	0.0122	41.2023	0.0154
Conditional Grant = $\log(X_2)$	0.9926	0.0123	80.4761	0.0079
Complementary Grant = $\log(X_3)$	0.1331	0.0153	8.6789	0.0730
Special Grant = $\log(X_4)$	-0.1558	0.0146	-10.6224	0.0597
R Square/ Coefficient of determination	0.9999			
Standard Error of regression	0.0005			
F- statistics	9404.56			
Significance of F- statistics	0.0077			

Source: Author's Calculation using Excel

The R-squared value of 0.999986709 indicates that 99.997 percent of the variance in the dependent variable (budget) is determined by the independent variables (grants) in the model. This indicates that changes in the log-dependent variable, which is central government budgets, are explained by changes in these independent variables. The coefficients of fiscal equalization grants, conditional grants, complementary grants, and special grants are 0.50, 0.99, 0.13, and -0.15, indicating that for every one-unit increase in fiscal equalization, a conditional complementary, budget, the budget is expected to rise by 50 percent, 99 percent, and 13 percent, respectively, and decrease by 15percent in special grants.

Fiscal Equalization Grant:

The coefficient represents the estimated change in the dependent variable (budget) for a change in the independent variable of one unit in fiscal equalization grants. The p-value is very low (0.015), typically considered statistically significant. A t-statistic of 41.202 indicates a very high level of significance. For each unit increase in fiscal equalization grant, the estimated budget of the central government increases by approximately 0.51 units.

Conditional Grant:

It shows for every increment of one unit in a conditional grant, the estimated change in the budget is approximately 0.99 percent. A t-statistic of 80.48 is very high, indicating that the relationship between conditional grants and the central government's budget is likely statistically significant. The p-value is 0.007910254, which shows that the relationship between conditional grants and the central government's budget is statistically significant at the 0.05 significance level.

Complementary Grant:

In this case, for each one-unit increase in complementary grants, the estimated change in the budget is approximately 0.13 percent. A t-statistic value of 8.68 is relatively high, suggesting that the relationship between complementary grants and budget is likely statistically significant. The p-value is 0.073029707 which demonstrates the connection between complementary grants and the budget of the central government is statistically insignificant at the 0.05 significance level.

Special Grant:

The coefficient of -0.155 percent shows for a one-unit increase in Special Grant, the estimated change in the budget of the central government is approximately -0.16 units keeping other variables constant. The p-value is 0.059755691 which shows the relationship between special grants and the central government's budget is statistically insignificant at the 0.05 significance level. The results for the variable "Special Grant" suggest a negative relationship with the budget of the central government. The coefficient is not statistically significant at the 0.05 level, suggesting that Special Grant may not have a significant impact on the budget of the central government.

In summary, the regression model fits the data well and is very significant. With low p-values and high t-statistics, fiscal equalization grants and conditional grants show promise as reliable indicators of the central government budget. Special grants might not have a statistically significant effect on the budget, while complementary grants show relevance—albeit at a somewhat higher significance level. The fundamental factors influencing budget fluctuations can be better understood by policymakers with the help of these studies, which provide insightful information about the connections between various grant kinds and the central government budget.

The overall model is highly significant, as indicated by the low p-value in the ANOVA table. The adjusted R-squared value suggests that the model provides a good fit to the data. Fiscal equalization grants and Conditional grants appear to be statistically significant predictors of the budget of the central government., while Complementary and Special Grants show p-values slightly above 0.05, suggesting they may not according to statistics significant in this context due to fewer numbers of data.

The regression model accurately predicts the central government budget using fiscal equalization grants and conditional grants, with special grants not significantly affecting the budget. Complementary grants show relevance, though not statistically significant.

Correlation between the Budget of the Central Government and Grants Allocated

Correlation analysis is used to measure the strength and direction of a linear relationship between two quantitative variables. In the context of the budget of the central government and grants allocated, calculating the correlation provides valuable insights into the nature and degree of their association. It shows the linear relationship between the central government's budget and the grants allocated. It provides an initial assessment of their association, guiding further analyses and informing decision-making processes.

Table 3: Correlation Between the Budget of the Central Government and Grants Allocated

	Budget of the central government	Fiscal equalization grant	Conditional grant	Complementary grant	Special grant
Budget of the central government	1				
Fiscal equalization. grant	0.669749787	1			
Conditional grant	0.872851005	0.55730350	1		
Complementary grant	0.710861603	0.53520766	0.957127575	1	
Special grant	0.705833785	0.53324254	0.955177732	0.999954205	1

Source: Author's Calculation using Excel

The study reveals a strong linear positive interaction between the budget of the central government and total fiscal equalization grants, complementary grants, special grants, and total conditional grants. As the budget of the central government increases, complementary grant also

increases, and special grant also increases proportionally. A moderate negative linear relationship exists between the budget of the central government and total conditional grants, with total conditional grants decreasing as the budget of the central government increases and vice versa. The results suggest that the budget of the central government plays a crucial role in determining fiscal policy and ensuring fiscal stability.

Fiscal Equalization Grant:

The central government's budget and fiscal equalization grant have a moderately positive correlation (0.6697), with an increase in the budget indicating that a higher budget allows for more resources to be allocated to these grants. A moderately strong positive correlation between the central government's budget and fiscal equalization grants suggests that there is a tendency for increased budgets to be associated with higher allocations to fiscal equalization grants.

Conditional Grant:

The central government's budget shows a strong positive correlation with the allocation of conditional grants (0.8729), indicating that a larger budget allows for a substantial increase in these grants, indicating a more efficient allocation process.

Complementary Grant:

The central government's budget has a moderately positive correlation with the allocation of complementary grants (0.7109), suggesting that a higher budget may result in more resources being allocated to these grants.

Special Grant:

The central government's budget has a moderately positive correlation with special grants (0.7058), suggesting that an increase in the budget allows for more resources to be allocated to these grants.

In summary, this matrix provides insights into how the budget categories are correlated with each other. Positive values indicate a positive relationship, negative values indicate a negative relationship, and the magnitude of the correlation coefficient indicates the strength of the relationship. The study shows that a higher central government budget is linked to an increase in each grant type (fiscal equalization, conditional, complementary, and special), as larger budgets provide more financial capacity for the government to distribute funds across various grant programs.

4.4.3 Log-linear Regression analysis with the Expenditure of Central government and Grants Allocated

In this model, the expenditure of the central government is taken as the dependent variable and the types of grants are taken as an independent variable. On calculating the result,

$$\log y = -649.2993 + 104.1449\log X_1 + 10.3007\log X_2 + 85.7341\log X_3 - 89.5576\log X_4 + ei$$

where, ei = error term

Table 4: Log-linear Regression Analysis with the Expenditure of Central Government and Grants Allocated

Variables/factors	Coefficient / Parameter	Standard error	t-statistics/ t-value	P-value
Constant(β_0)	-649.2993	1107.8226	-0.5861	0.6625
Fiscal Equalization Grant = $\log(X_1)$	104.1449	182.7727	0.5698	0.6702
Conditional Grant = $\log(X_2)$	10.3007	17.2158	0.5983	0.6567
Complementary Grant = $\log(X_3)$	85.7341	113.8662	0.7529	0.5891
Special Grant = $\log(X_4)$	-89.5576	118.6914	-0.7545	0.5884
R Square/ Coefficient of determination	0.4413			
Standard Error of regression	4.8525			
F- statistics	0.1974			
Significance of F- statistics	0.9123			

Source: Author's Calculation using Excel

Regression Statistics:

The model's Multiple R-values of 0.664330162 indicate a moderate positive linear relationship between the independent variables and the dependent variable. The model explains approximately 66.4 percent of the dependent variable's variability, with 33.6 percent attributed to other

factors not included in the model. The correlation coefficient indicates the level and position of the linear connection between the predictors and the response variable. The regression model's R^2 value of 0.441334565 indicates that the independent variables describe 44.1 percent of the dependent variable's variability, while 55.9 percent is not included.

Intercept β_0 :

The estimated value of the dependent variable is -649.30 when all variables are zero. The t-statistic is -0.5861. A negative t-statistic for the intercept suggests that, if there were no relationship between the intercept and the dependent variable, you might observe a coefficient as extreme as -649.30 due to a random chance of about 0.586 standard deviations of the standard error. The p-value of 0.66 shows the relation between the expenditure of the central government and the grants allocated is insignificant

The intercept represents the estimated value of the dependent variable (Expenditure) when all independent variables are zero. The negative t-statistic and high p-value suggests that the intercept is not statistically significant.

Fiscal Equalization Grant

The value of coefficient (β_1) 104.14 per cent shows a modification of one unit in the "Fiscal Equalization Grant" is associated with an estimated change of 104.14 percent in the expenditure of the central government. With a p-value of 0.6703, there is no significant relation between fiscal equalization grants and the expenditure of the central government.

In summary, the results for the "Fiscal Equalization Grant" suggest a positive relationship with the dependent variable, but the t-statistic and p-value indicate that this relationship is not statistically significant at common significance levels.

Conditional Grant:

Keeping all other factors, the same, a one-unit variation in the conditional grant is associated with an estimated change of 10.30 percent in the dependent variable i.e., expenditure of the central government. With a p-value of 0.6567, there isn't strong evidence to suggest that the coefficient for "Conditional Grant" is notably distinct from zero.

In summary, the results for "Conditional Grant" suggest a positive relationship with the dependent variable i.e., expenditure of central government, but the t-statistic and p-value indicate that this relationship is not statistically significant at common significance levels.

Complementary Grant:

Assuming all other variables are held constant, a one-unit change in the "Complementary Grant" is associated with an estimated change of 85.73 percent in the dependent variable i.e., expenditure of the central government. The positive coefficient of 85.73 percent implies a positive relationship between the "Complementary Grant" variable and the dependent variable i.e., expenditure of the central government. With a p-value of 0.5891, there isn't strong evidence to suggest that the coefficient for "Complementary Grant" is significantly different from zero. It shows there isn't strong evidence in the data to suggest that the "Complementary Grant" variable has a significant impact on the dependent variable.

Special Grant:

It shows that a one-unit change in the "Special Grant" is associated with an estimated change of -89.56 percent in the dependent variable i.e., expenditure of the central government keeping other variables zero. The negative coefficient of -89.56 percent implies a negative relationship between the "Special Grant" variable and the dependent variable i.e., expenditure of the central government. With a p-value of 0.5885, there isn't strong evidence to suggest that the coefficient for "Special Grant" is slightly different from zero.

In summary, the results for "Special Grant" suggest a negative relationship with the dependent variable, but the t-statistic and p-value indicate that this relationship is not statistically significant at common significance levels because of less information about the variables. Fewer data results statistically insignificant relationship between dependent variables and independent variables.

In conclusion, the regression results point to possible connections between the different grant categories and the spending of the federal government. High p-values and non-significant t-statistics, on the other hand, signal that these associations may not be resilient or dependable at standard significance levels due to the lack of statistical significance in a few of these cases. To make meaningful inferences about how grant types affect central government expenditure, the analysis highlights how crucial it is to take coefficient significance into account.

The model shows a moderate positive linear relationship between the independent variables and the dependent variable, explaining 66.4 percent of the variable's variability. The correlation coefficient indicates the strength and direction of the linear relationship. The regression model's R^2 value of 0.441334565 shows that 44.1 percent of the variable's variability is explained by independent variables, while 55.9 percent is not included. The results seek to be insignificant due to fewer years of data.

4.4.4 Correlation between the Expenditure of Central government and Grants Allocated

Correlation analysis is used to quantify and understand the linear relationship between the expenditure of the central government and the grants allocated. It provides an initial assessment of their association, guiding further analyses and informing decision-making processes. Correlation analysis helps determine whether there's a consistent pattern between increases or decreases in central government expenditure and corresponding changes in the amount of grants allocated. A strong positive correlation might prompt a deeper examination of the factors driving increased government expenditure and grants allocation. A negative correlation might lead to an exploration of potential reasons for a decrease in grants despite increased government spending.

Table 5: Correlation between the Expenditure of Central Government and Grants Allocated

	Expenditure of Central Government	Fiscal Equalization Grant	Conditional Grant	Complementary Grant	Special Grant
Expenditure of Central Government	1				
Fiscal Equalization Grant	-0.27358548	1			
Conditional Grant	0.327554722	-0.63014533	1		
Complementary Grant	-0.30708335	0.75581731	-0.64485018	1	
Special Grant	-0.31109431	0.761140908	-0.64277314	0.999923054	1

Source: Author's Calculation using Excel

The correlation matrix is a statistical tool used to analyze the relationship between variables. It shows that each variable has a strong correlation with itself, which is always 1. This is because a variable perfectly correlates with itself. The correlation coefficients for expenditure, fiscal equalization grant, conditional grant, and complementary grant indicate the strength and direction of these relationships.

The correlation coefficients for expenditure, fiscal equalization grant, conditional grant, and complementary grant show varying degrees of strength and direction. The weak negative correlation between expenditure and total fiscal indicates a weak negative correlation, while the moderate negative correlation suggests a moderate negative correlation. The strong positive correlation between total fiscal and complementary grants indicates a strong positive correlation, while the moderate negative correlation between total fiscal and complementary grants suggests a moderate negative correlation.

The correlation matrix also shows that there is an extremely strong positive correlation between complementary and special grants, suggesting they move together almost identically. However, it is important to note that correlation does not imply causation, and other factors may influence the observed relationships.

The strong positive correlation between "Complementary" and "Special Grant" suggests that these two variables are highly related and tend to move together, possibly due to their nature or determination. The negative correlations between "Total Fiscal" and "Total Conditional" with "Expenditure" suggest that these grants may have some influence on central government expenditure but in opposite directions. Overall, the correlation matrix provides valuable insights into potential relationships between variables.

V. FINDINGS

The study examines the components of fiscal transfers among provinces, identifying unique trends and patterns. Fiscal equalization grants account for a large amount in Koshi Province, ranging from 33.24 percent to 54.50 percent. This allocation also

includes complementary grants, special grants, and variable conditional grants. The fiscal distribution of Madhesh Province is varied, with fiscal equalization grants falling between 40.81 percent and 55.12 percent.

The analysis shows that different provinces have different fiscal equalization and conditional grants. Provinces receive the lowest fiscal equalization grant percentage at 37.12 percent, while local levels receive the highest at 62.88 percent. Local levels also receive the highest conditional grant percentage at 63.50 percent, slightly surpassing the fiscal equalization grant.

Metropolitan cities, sub-metropolitan cities, municipalities, and rural municipalities also exhibit variations in mean values. In 2077/78, local levels continue to receive the highest fiscal equalization grant (62 percent) and conditional grant (81.59 percent), while provinces receive the lowest conditional grant percentage (18.41 percent). Complementary and special grants show varying proportions, with local levels receiving the highest percentages.

The regression analysis of the central government budget and various grant types revealed insightful findings. A strong positive linear relationship exists between the budget of the central government and fiscal equalization grants, complementary grants, special grants, and total conditional grants. A moderate negative linear relationship exists between the budget of the central government and total conditional grants, with total conditional grants decreasing as the budget of the central government increases and vice versa.

The study indicates that the central government's budget is a critical factor in determining fiscal policy and ensuring fiscal stability. Fiscal equalization grants and the budget, complementary grants, and special grants of the central government are found to be strongly positively correlated.

VI. CONCLUSIONS

The analysis of fiscal transfer compositions across different provinces reveals several key conclusions, including diversity in

fiscal allocation, temporal dynamics, the role of conditional grants, complementary and special grants, asymmetry and variability, and regional economic shifts. Provincial governments are increasingly relying on the government for support, and it is essential to grant national governments the authority to decide on tax bases and rates to ensure effective fiscal decentralization.

The 2015 Constitution includes several benefits regarding revenue allocation, economic rights, and natural resources, but some elements seem to conflict with international principles for fiscal federalism. The federal government is responsible for 90% of all tax collections, while local governments must collect additional taxes such as excise duties, VAT, corporate income tax, personal income tax, and customs charges.

To improve local government capabilities and build effective provincial governance procedures, the Support Programme for Local and Provincial Governance (2020-2023) suggests establishing provincial centres for good governance. This strategy calls for efficient coordination and communication between municipalities and provinces and should consider economic viability when establishing borders. To lessen inequality between states, the federal government should have complete authority over all royalties and revenues from the exploitation of natural resources.

To achieve efficient fiscal federalism, stakeholders at all levels of governance must engage in constant communication and collaboration, as well as have a deep understanding of Nepal's socioeconomic circumstances. By overcoming these obstacles with vision and creative solutions, Nepal can promote balanced regional development, responsive governance, and an enhanced standard of living for its population.

VII. PRACTICAL IMPLICATIONS

According to the study, fiscal federalism in Nepal may function more effectively if the fiscal transfer mechanism is made more transparent and accountable. This may be accomplished by strengthening subnational entities' ability to manage and use their budgetary resources efficiently and by implementing improved monitoring and evaluation systems. Accurate policy decisions may be aided by fiscal federalism, which may enhance sustainable development and governance.

Decision-makers and scholars can profit from the results by learning about the advantages, disadvantages, and possible policy implications of Nepal's fiscal federalism. This will facilitate future modifications to intergovernmental fiscal relations. Better and more efficient fiscal federalism can result from addressing issues like subnational entities' reliance on the federal government's budget as their main source of funding. Furthermore, giving subnational organizations assistance and training can improve their ability to manage and use financial resources properly.

Design/methodology/approach

The study uses descriptive statistics and mixed methods like regression analysis and correlation analysis to analyze fiscal transfers across provinces in Nepal. It identifies fiscal federalism dynamics and examines grant categories and central government spending. Correlation analysis helps identify the direction and intensity of interactions. Statistical figures like bar diagrams are used for data analysis.

Findings:

The study reveals that the central government's budget is the primary source of revenue for subnational entities, with grants being the main source of expenditure. The study also reveals that grants are these entities' main revenue source. The central government's budget is the primary source of revenue for subnational entities, and grants are the main source of expenditure. This highlights the significant role of the central government in the revenue generation and expenditure of subnational entities. The results highlight the importance of conditional grants and fiscal equalization awards as trustworthy indicators of the central government budget. Special grants show no statistically significant impact on the budget, however complimentary grants are relevant. Strong positive correlations between the central government budget and different grant kinds are found via correlation analyses, highlighting the budget's critical role in maintaining fiscal stability.

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Data Availability Statement:

This study takes data from the Ministry of Finance National and the Natural Resources Commission. Here in this study, both descriptive and analytical tools for the presentation of data are used. The data used in this study is available upon request.

Conflict of Interest:

I, the author, hereby declare that I have no conflict of interest.

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