Master's Thesis of Public Administration

Does the Flypaper Effect Exist in Developing Countries?

An Analysis of 2017-2019 Budget Data of Nepalese Local Governments

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Seoul National University

Global Public Administration Major

Ramesh Parajuli

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Academic Advisor Yunji, Kim

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Global Public Administration Major

Ramesh Parajuli

Confirming the master's thesis written by

Ramesh Parajuli

December 2022

Chair	**Mingyo Koo**
Vice-Chair	**Soo-young Lee**
Examiner	**Yunji Kim**

Abstract

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Ramesh Parajuli

Global Public Administration Major

The Graduate School of Public Administration

Seoul National University

The link between grants and expenditure is one of the most investigated phenomena in the public finance literature, with a general assumption that money behaves differently depending on its origin. Some of the phenomena studied are the flypaper effect, asymmetric impacts, the fiscal illusion theory, and crowding in and out effects. To determine whether the literature holds for developing countries with fragile democratic systems, particularly at sub-national levels, this research aimed to find out the presence of flypaper and asymmetric effects of different grants on the local expenditure of Nepal and their magnitude distribution across several areas. Using the consolidated financial reports published by the Financial Comptroller General Office Nepal (for the fiscal year 2017-2019) for 753 Nepalese local governments, the study uses fixed-effect models with a robust check to account for the presence of flypaper effects and asymmetric effects of grants in local expenditure in Nepal. The flypaper effect of total grants on local expenditure is found to be highest in the local levels of the Hilly region, which can be attributed to more demand for socio-economic activities subjected to their higher population and tough terrain to carry out developmental works. The equalization grants on local expenditure showed a hint of the reverse flypaper effect instead. The flypaper effect of conditional grants is significant and could be observed in many regions. The asymmetric effect was found to be significant in municipalities, the Terai region, Gandaki Province, and the local levels led by right-winged leadership.

Keywords: flypaper effect, asymmetric effect, fiscal illusion, fiscal federalism.

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Abbreviations

COVID	Corona Virus Disease
NNRFC	National Natural Resources and Fiscal Commission
TE	Total Local Expenditure
TG	Total Grants Received by each Local Level
TR	Total internal Revenue Generated inside the local level
TEG	Total Equalization Grants Received by each Local Level
TCG	Total Conditional Grants Received by each Local Level
TDI	Total Disposable Income
AE	Asymmetric Effects Coefficient
TEP	Total Local Expenditure Per Capita
TGP	Total Grants Received by each Local Level (Per Capita
TRP	Total internal Revenue Generated inside the local level Per Capita
TEGP	Total Equalization Grants Received by each Local Level Per Capita
TCGP	Total Conditional Grants Received by each Local Level Per Capita
TDIP	Total Disposable Income Per Capita
LM	Lagrange Multiplier
HDI	Human Development Index
IT	Information Technology
Eco	Economic
Viz.	Visualizing
etc.	Et cetera
FCGO	Financial Comptroller General Office
Metro	Metropolitan
Prob.	Probability
Chi2	χ^2 Test
OLS	Ordinary Least Square
FEM	Fixed Effects Model
REM	Random Effects Model

Chapter 1: Introduction

1.1. Background

One of the most researched marvels in the local public finance literature is the relationship between intergovernmental grants and public expenditure which is echoed by the common belief that money behaves differently depending on the sector in which it is created and the results are found to be mixed in more recent work (Baekgaard & Kjaergaard, 2016). Central and state governments have historically utilized the cash transfer to solve imbalances in fiscal capability across jurisdictions, adjust for externalities, or stimulate new projects to be undertaken. As a result, these transfers are unpredictable since the center/federation reduces them first when the economy slows down. From a financial standpoint, the beneficiary of intergovernmental help may utilize the funds to boost operational or capital expenses. Aid may also be utilized to lessen reliance on self-generated income, such as property taxes. When state subsidies decline from the perspective of an institutional framework, local institutional structures are found to influence local budgeting decisions. When state subsidies are cut, local authorities in various levels of government are compelled to abandon or maintain present grant programs for a variety of reasons.

The process of decentralization began with the transfer of authority, resources, and duties to local governments. The projected benefits include increased policy responsiveness to public preferences, improved decision-making accountability, and, eventually, a poverty reduction. However, there is frequently a mismatch between local governments' ability to raise money and their spending obligations (Lundqvist, 2013). This vertical gap is especially significant in poor nations, because local governments' taxing powers are sometimes insufficient to provide enough financial support for fundamental services like education and health care where central funds are critical to the success or failure of decentralization in these nations in this setting. After all, the grants from the federal government influence local government behavior and decision making and are as significant as the amount provided (Bahl, 2000).

The literature has looked into several impacts of “Fiscal Illusion” such as, the flypaper effect, asymmetric effects, and crowding in and out effects. These are the phenomena that have piqued the interest of public administration academics (Bahl, 2000; Bird & Smart, 2002). The link between intergovernmental grants and government spending has received a lot of attention. Public finance scholars have been particularly interested in the observed stimulatory effect of intergovernmental revenue on public spending when compared to an equivalent increase in the community's personal or private income – a phenomenon dubbed the flypaper effect or 'money sticks where it hits' by Arthur Okun in 1979. In essence, a rise in grants results in a greater increase in municipal spending than an increase in personal income. Many

assertions are made in the literature, but the aforementioned four are the most important ones about the influence of intergovernmental funds on local public spending (Gramlich, 1969; Gramlich, 1998; Oates, 1999; Rodden, 2002).

Municipal government expenditures are influenced by several factors such as financial resources, local needs, the demographics, politics, grants, etc. The consequence of this assumption is that individuals react to a jurisdiction's varying quality and degree of public services by relocating to locations that best meet their tastes, all other factors being equal. However, the local government's capacity to offer and maintain these public goods and services is contingent upon the availability of income to support the desired services (Tiebout, 1956).

1.2. The Significance and Purpose of Study

The literature on fiscal federalism has traditionally been created based on western highly developed countries. Some of the scholars have suggested fiscal federalism theory's assumptions do not apply to developing nations (Melo, 2002). The hypothesis developed in this study is to determine the economic impact of grants on local expenditure such as the flypaper effect, asymmetric effects, etc. as well as their distribution and degree across the country to determine whether the literature holds for developing countries like Nepal with fragile democratic systems, particularly at sub-national levels.

This dissertation investigates the link between state grants and local government expenditure, flypaper and asymmetric effects and their magnitude across the country and made the comparison between several units and classifications.

This dissertation will address unanswered issues raised by past research. Understanding the flypaper effect, as well as any differences in the effect of different federal grants, internal revenue, and the pattern of local expenditure, enables local governments to prepare more effectively for the fiscal impact of fluctuating federal grants. This is increasingly critical when states, and notably the federal government, cut local government grants-in-aid.

Furthermore, at the local level, there are two fundamental forms of government leadership: left-wing and right-wing political leadership. Scholars and managers in local government are interested in the form of government because they want to know if these two forms of governmental structures utilize resources differently. The majority of study on systems of governance is conducted to establish one form's superiority over another. The purpose of this research is to ascertain if there are any differences in the manner in which the two kinds of governments change their spending priorities in response to changing

fiscal grants. If there is a differential impact, it may explain why each type of government has diverse spending objectives and why they use distinct tactics for managing their fungible resources.

The purpose of this research is to get a better understanding of the variations, if any, between the flypaper impact of various forms of federal funds, their geographical and provincial distribution, kinds of local levels, and the political orientation of leadership at a local level. Understanding the disparities in their impacts will benefit administrators and political leaders in comprehending the complicated dynamics that intergovernmental assistance, geographic location, political orientation, and municipal type have on their budgets. Understanding how the flypaper effect might result in the reallocation of fungible resources to other priorities would enable these authorities to manage their budgets more effectively and lessen their susceptibility to state or federal funding cuts.

While property taxes are the most dependable source of income for municipalities, federal and state grants continue to be a significant. As a result, property taxes and intergovernmental income, particularly in larger metropolitan areas, forming a major part of the revenue and income at disposal (Bergvall, 2006). The grants strengthen a local level's ability to fulfill the demand for public services (Van de Walle, 2007).

So, to find out whether "Flypaper Effect Exist in Developing Countries?" could be answered by given research question followed by sub-research questions as follows:

1. What is the extent and distribution of fiscal illusion (i.e. flypaper and asymmetric effects of fiscal grants) in Nepal if present (at the local levels)?

Sub-research questions are listed as follows:

1. What is the trend of different financial variables (Total Grants, Total Revenue, Total Equalization Grants, Total Conditional Grants, Total Disposable Income, etc.)?
2. What is the trend of different financial variables per capita?
3. How correlated are different financial variables?
4. What is the distribution and magnitude of flypaper effects and asymmetric effects in local levels across provinces and different geographies (Mountain, Hills, Plain/Terai)?
5. What is the distribution and magnitude of flypaper effects and asymmetric effects in different local levels (metro, sub metro, municipal, rural municipal)?
6. What is the distribution and magnitude of flypaper effects and asymmetric effects between local levels with different political orientations?

Chapter 2: Literature Review and Conceptual Analysis

2.1. Federalism and Economic Impact

Currently, there are about two dozen federally organized states out of over 200 sovereign states. Around 2 billion people live in these countries (Voigt & Blume, 2010). The idea that federalism may have economic effects is based on a variety of theoretical traditions (Hayek, 1939; Oates, 2008; Olson, 1969; Tiebout, 1956). Several federal economies principally rely on transfers from federal or state to local governments. The knowledge of how and to what degree these intergovernmental grants are used is consequently critical for developing federal-related public policy and whether or if grants have the desired impact will, in the end, serve as powerful arguments for the appropriate amount of decentralization (Lundqvist, 2013). In developing countries, the fiscal transfer is a critical issue because around 60% of local government spending comes from these grants and the decentralization trend in these nations entails a vertical void, or a disbalance between the expenditure and revenue generating capacities of local governments (Caldeira & Rota-Graziosi, 2014).

Flypaper effect have been studied thoroughly in its theoretical aspect as well as its applied role in the public finance and economics works literature. Among these theories are a fiscal illusion, agenda-setting, the Leviathan theory, bureaucrats' budget-maximizing conduct, institutional structures, and erroneous statistical approaches. Fiscal illusion theory, states that the flypaper effect arises from citizens' failure to accurately evaluate the real cost of delivering public services when grants play major part of total disposable income of local governments. For example, if a local government receives grant, it can improve the quality of public services without increasing the local tax rates. This may result in the false sensation of reduction in the cost of public services delivery. Consequently, people demand more public services thus increasing the local expenditure (Gramlich, 1969).

The fiscal illusion theory mainly focuses on two aspects: firstly, politicians reacting to citizens/voters' demands, and the another highlights the political machinery attempting to increase the public sector (Gramlich, 1969). The first theory describes the flypaper effect as rational politicians reaction to the preferences of citizens/voters where the voters fail to accurately estimate the real cost of public services (Baekgaard & Kjaergaard, 2016).

The second theory argues that the flypaper effect arises not because voters are elusive, but because budget-maximizing politicians/bureaucrats strive to conceal the true costs of providing public services selectively make an environent where median voters/citizens feel that public services can be supplied at a lower average cost than the true price, consequently helping to grow the public sector by inducing people

to want more government services than they would if they had a correct understanding of the entire tax price (Baekgaard & Kjaergaard, 2016; Gramlich, 1969; Nesbit & Kreft, 2009; Oates, 1999). According to some scholars, an increase in community income, whether in the form of essentially unconditional grants or personal incomes, also has the same effect on recipient government expenditure, however, it is found that grants are far more stimulating (Gamkhar, 2000).

In 1836 US, a treasury excess redistribution may have been the first fiscal grants from the federal to state governments. Prior to 1900, however, the majority of federal support was in the form of land grants. Grants have taken on several forms over time. Individual award programs are being consolidated into bigger "blocks" with fewer restrictions attached. As a result, the necessity of examining the consequences of unconditional lump-sum aid has increased as a result of this development. As grants grew in importance, so did state and local expenditures. Cash transfers are predominantly a phenomenon of the twentieth century. Grants throughout this century have followed a pattern of modest beginnings, followed by significant expansion beginning in the 1950s (Wright, 1968).

State grants plays major role in bridging the gap in funding when it comes to delivering services in local levels thus federal grants cutbacks have an impact on municipal expenditures. They are useful to alleviate fiscal imbalances, i.e. horizontal and vertical gap in between inter-governments as well as intra-governments.

Local governments may anticipate regular increments in grants amount every year but in reality, they face reductions in grants during economic upheaval. In this context, local governments have varying fiscal policies every year for continuous delivery of public service.

The impact of intergovernmental public transfers on overall fiscal policy has grown in importance, particularly in countries where decentralization has recently been strengthened and has had significant macroeconomic consequences, including significant effects on subnational spending management and, as a result, overall fiscal management (Melo, 2002).

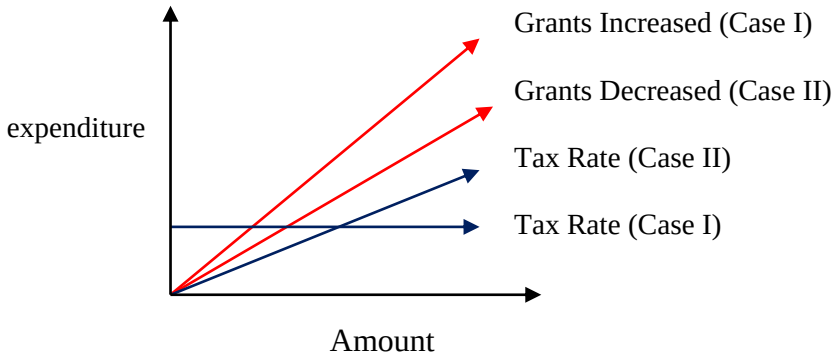
2.2. Flypaper and Asymmetric Effect

The "flypaper effect" refers to the stickiness of money. The analogy come from the “paper with sticky insecticides chemical” where more insects are attracted to the same paper where other insects came, stuck and died. Local levels increase local expenditures in response to an increase in grants than to similar increment in internal revenue resulting from an increase in citizen income which is known as Flypaper Effect (Baekgaard & Kjaergaard, 2016).

Gramlich's (1977) research on flypaper effects is the most celebrated, most cited article. The rise in expenditure due to rise in grants is upto 15 cents per dollar when compared to similar rise in local revenue and sometimes even reach upto 50 cents per grant dollar on local expenditure (Gramlich, 1977).

Similar to flypaper effect, examines the effect on local expenditure when grants are decreased or increased. Asymmetric effects hypothesis assumes that increases in local expenditure when grants are raised are higher than reduction in local expenditure when grants are lowered by the same amount (S. Gamkhar & W. Oates, 1996). If grant is raised, expenditure will be made on new programs/projects and also goes to raising funding for the running programs/projects leaving local tax revenues, savings, and debt levels unaffected. But, if a grant is decreased, the expenditure would not be lowered proportionally and the grant reduction will be compensated by rising own-source revenue by raising local tax rates which can be represented by given figure 2.1 below.

Figure 2. 1: Asymmetric Effects of Fiscal Grants



2.3. Intergovernmental Fiscal Relations Theory

According to this theory, fiscal intervention is in the form of grants from higher levels of government to lower-level in the federal system (Donahue & Joyce, 2001; Gramlich, 1969). Since, Nepal has practiced the decentralization process after the restoration of democracy, the clear separation of federal levels was achieved with a new constitution in 2015. In the historical backdrop of great political upheaval in the world such as World War, the Great Depression, the COVID pandemic, etc., scholars have argued that the importance of relationship among the federal units, grants and expenditures relations in dealing with public issues is to be discovered further for better public satisfaction. Because, scholars (Watson & Gold, 1997) have shown that the federalism enhances the responsiveness and efficiency of local government.

Wallace Oates pioneered the theoretical framework for analyzing intergovernmental grants, and he has made significant contributions to the fiscal federalism literature, where he uses the concept of the

"median voter's" voting behavior to describe the government's reaction to the voters. According to Oates, one dollar rise in grants, would have the same effect on local expenditure as to one dollar rise in local revenue. The “flypaper effect,” however, challenges Oates’s proposition which is explained by the premise of a fiscal illusion, which suggests that a misunderstanding of the real cost of public services by taxpayers/citizens leads to a greater level of local expenditure.

The federal government makes three categories of grants to state and municipal governments: category or conditional grants, block or equalization grants, and general revenue sharing grants. The first two grants often place limits on recipients' budgets since they are awarded for specified reasons. As a result, recipient countries may have little choice over how they are used. Categorical or Conditional grants are often tied to certain programs or projects and have very definite and limited purposes. As a consequence, they have a finite lifetime and expose municipal budgets to risk once financing is withdrawn. Additionally, the strings or protocols connected with securing category funds deter some local governments from pursuing them extensively, while others seek them enthusiastically. As a consequence, some localities are seen to be 'under-served,' while others are considered to be 'over-served' (Boadu, 2020). Unconditional grants are block or formula-based grants that are handed to recipient governments with no strings attached.

Conditional grants are monetary transfers from one level of government to another, either through competitive project awards or more general block grants, that impose restrictions on the recipient government's use of the transferred money. The criteria might be monetary or substantive.

Researchers have showed that the types of grants affect the local expenditure (Oates, 1999). Different researches have shown various results so far regarding the grants and local expenditure such as, federal grants causing a greater influence on local spending than state grants, conditional grants stimulating more spending than unconditional grants, matching grants having a more stimulative effect on government spending than lump-sum grants, etc. (Chaicharoen, 2013).

This research explores the theoretical assumptions and adds to a study of the effects of different forms of grants, effects of grants reduction, etc. on local expenditure. Furthermore, this dissertation uses a comparative study to examine theoretical assumptions in different geographies within a state, as well as different types of local levels (Metropolitan, Sub-Metropolitan, Municipality, and Rural Municipality) to better understand the policy outcomes of state grant declines and increments, which may differ due to differences in institutional arrangements.

According to Article 250 of the Nepalese Constitution, "The National Natural Resources and Fiscal Commission" (NNRFC) has been empowered to make just and equitable recommendations on the

management, allocation, and distribution of all available natural and fiscal resources in the state across all levels of government at the local, provincial, and federal levels.

The amount of minimum Equalization grants provided to local levels is primarily based on the population of a given local level. For example, the following table 2.1 consists of such grants for the fiscal year 2020/21. The minimum amount of equalization grants to a local level with a population less than or equal to 10 thousand is NRs. 25000000. The amount is increased by NRs. 25,00,000 per 10 thousand population increment up to 1,00,000 population. From there the amount is risen by NRs. 2,25,00,000 per 25,000 population increment, finally the big metros are provided with NRs. 11,25,00,000.

Table 2. 1: The amount of minimum Equalization grants provided to local levels for FY:2020/21

SN	Population	No. of local levels	Minimum (NRs.)	Total
1	<10000	46	25000000	1150000000
2	10000-20000	191	27500000	5252500000
3	20000-30000	206	30000000	6180000000
4	30000-40000	120	32500000	3900000000
5	40000-50000	73	35000000	2555000000
6	50000-60000	43	37500000	1612500000
7	60000-70000	26	40000000	1040000000
8	70000-80000	14	42500000	595000000
9	80000-90000	9	45000000	405000000
10	90000-100000	1	47500000	47500000
11	100000-115000	7	50000000	350000000
12	115000-140000	2	77500000	155000000
13	140000-150000	6	82500000	495000000
14	150000-200000	3	87500000	262500000
15	200000-300000	4	100000000	400000000
16	300000-500000	1	102500000	102500000
17	>500000	1	112500000	112500000
	Total	**753**		**24615000000**

Similarly, the formula-based equalization grants for the fiscal year 2020/21 have been recommended based on the following table 2.2 in detailed basis and structure. The major weight is given to expenditure need assessment of each local level with 70% weightage, which is generally based upon the historical expenditure track records. The status of Human Development Index (HDI) gets 10% weightage, while the status of infrastructure development (road density, access to electricity, IT, water, sanitation, etc.) gets 10% weightage, finally the status of revenue and eco-social inequality measure gets only 5% weightage each.

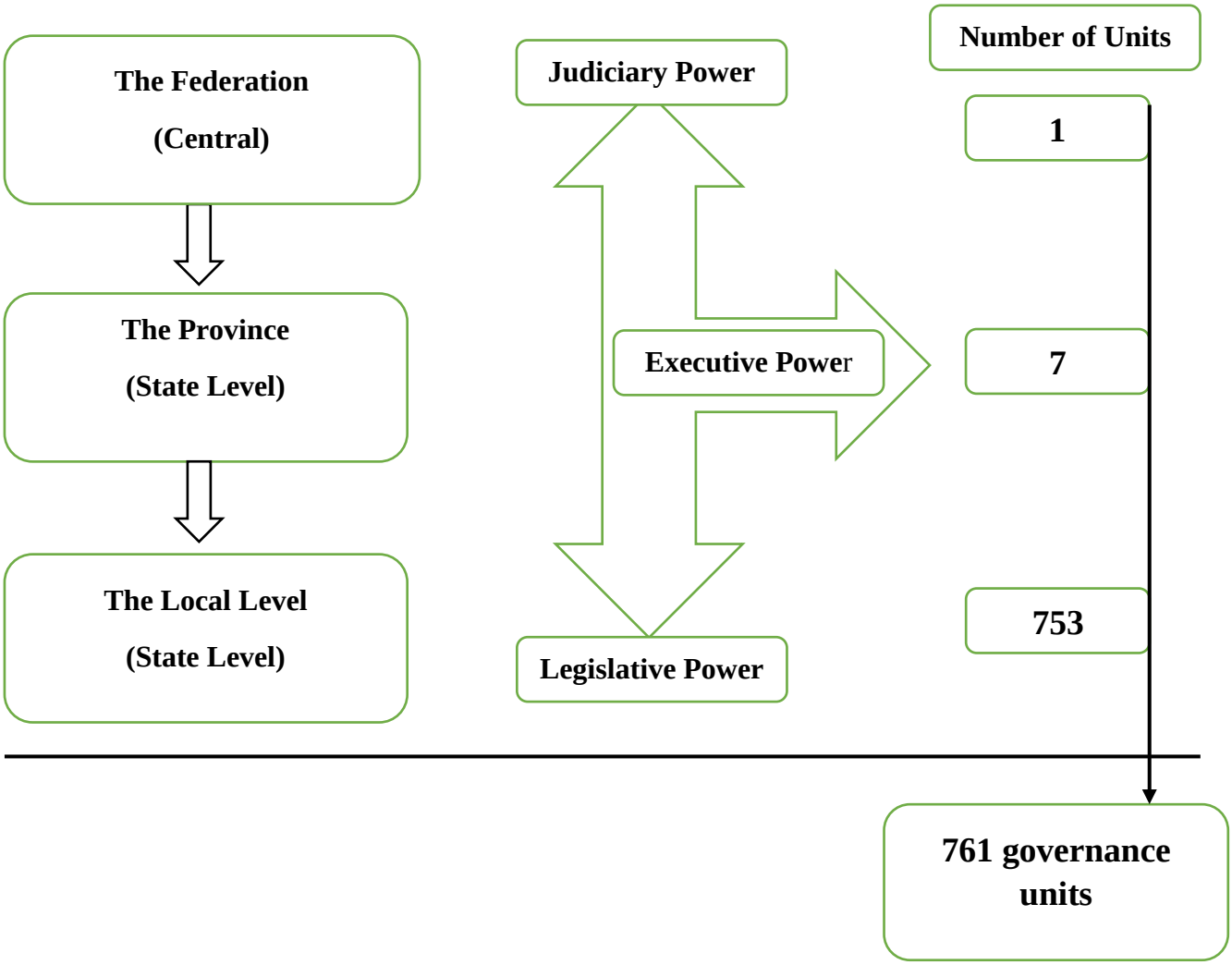
Table 2. 2: Formula-based equalization grants for the fiscal year 2020/21

SN	Base (Indicators)	Internal Structure (Sub-indicators' Weight %)	Structure (Weight %)
1.	Human Development Index (HDI)		10
2.	Eco-social Inequality		5
3.	Status of Infrastructure Development	Road Density – 60 Access to Electricity – 10 Access to IT – 10 Drinking-Water Access – 10 Sanitation Access - 10	10
4.	Status of Revenue		5
5.	Necessary Expenditure		70
	Total		**100**

While federal equalization to local levels is objectively based on several indicators, based on their respective weightage, federal conditional grants are typically subjective. They are provided to the local levels on the recommendation of NNRFC but are ought to be implemented in direct coordination with federal ministries and respective provinces. There are several bases designated for the determination of conditional grants, pursuant to section C article 251(1) of the constitution, article 16 of the National Natural Resources and Fiscal Commission Act, 2015, and article 9 of the Inter-Governmental Fiscal Management Act, 2015. Some of the bases defined are, the role designated by the constitution in appendix 5, 7, and 9, implementation of the national programs, policies, and activities, or execution of standards by respective provinces, multi-year projects, projects submitted to sub-nationals after the adoption of federalism, projects implemented under foreign aids, etc.

The preamble of the Nepalese constitution has dreamt of "Eliminating all forms of discrimination and oppression resulting from the feudalistic, autocratic, centralized, unitary system of governance of the state, practically steering Nepal's way to the adoption of a federal system of governance" since 2015. Article 56 of the constitution provisioned for the three levels of governance in Nepal, namely the Federation, the Province, and the Local Level. Each level enjoys judicial, executive, and legislative autonomy as shown in figure 1.1 below:

Figure 2. 2: Distribution of federal units in Nepal



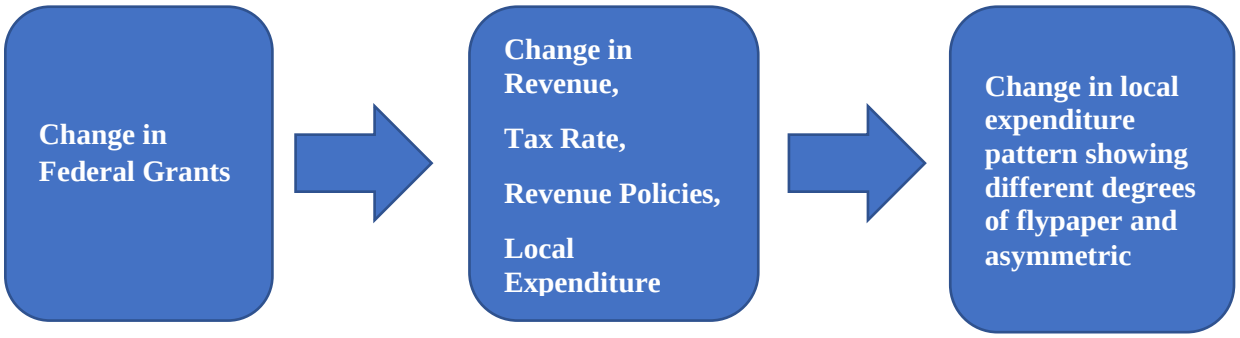
Fiscal incentives and restrictions influence how people spend their money. Local officials, for example, may react differently to grant reductions because they are under political and bureaucratic pressure to extend services that their people want, but they are also bound by the numerous institutions and norms that govern state-local budgetary interactions. The importance of grants should be considered in the context of local government policy response/choices. When income and expenditures fluctuate, the costs of public goods and services are expected to rise to fulfill local citizens' expectations, while revenue sources fall short. As a result, local governments may use fiscal techniques to maintain a balanced budget by stabilizing revenue and spending (Chaicharoen, 2013).

In this study, we add to a better understanding of how local governments in Nepal react in response to grants increment/reductions in local expenditure. Revenue diversification, the use of fund balances, and other revenue stabilization strategies are common policy responses in local governments (Carroll, 2010, 2003).

2.4. Theoretical Discussion

The loss of federal grants influences local governments' revenue strategies, revenue structures, and revenue policies. As a result, changes in revenues have an impact on local expenditures. This dissertation aims to provide a theoretical framework to explain the extent to which and how different forms of state grants, as well as the structure of local government, affect local expenditure and the provision of public services when federal grants are curtailed which is explained by given figure 2.2 below.

Figure 2. 3: Theory of the effects of federal grant reductions on local expenditures.



Effects of different federal grants on local expenditure across different geographies viz. Mountainous, Hills and Terai/Plains will be carried out. The basis for this control is subjected to special spatial distribution and demographic composition of local levels in Nepal. Mountainous regions usually have large sized local levels with small populations whereas Terai/Plains areas have very small sized local levels with dense populations. It means that the total grants, total expenditure, and the total disposable income per capita would be higher in mountainous regions, followed by Hills and Terai. The pressure for higher expenditure due to the socio-economic composition of mountainous regions would show a variable degree of flypaper as well as asymmetric effects.

Effects on local expenditure due to change in federal grants on different kinds of local levels (Metropolitan, Sub-metropolitan, Municipality, Rural Municipality) would be another choice of control. Cities with greater per capita incomes are likely to have more economic development activities. Naturally, metropolitan cities followed by sub-metro, municipalities and rural municipality will follow the trend. The wealthier cities' economic climate would lead to more local government expenditure.

Effects on local expenditure due to changes in different kinds of federal grants (Total Grants, Equalization Grants, Conditional Grants) would be another choice of control. It was found that the one type of grant (for example, matching grants, conditional) results in different (higher) spending levels than other kind of grants (general or equalization grants) (Fisher, 2007). Different researches have shown various results so far regarding the grants and local expenditure such as, federal grants vs state grants, conditional grants vs unconditional grants, matching grants vs block grants, etc. (Chaicharoen, 2013).

The last criteria for comparing local level expenditure patterns to federal grant reductions is a broad perspective of the political philosophy. The flypaper effect arises because politicians strive to conceal the true costs of public service delivery (Baekgaard & Kjaergaard, 2016; Gramlich, 1969; Nesbit & Kreft, 2009; Oates, 1999). Political and economic issues such as voter unemployment can impact local government expenditures, especially during budget cuts. Some parties will naturally be more fiscally conservative than the other. So, the demand for local service should be different for each party. Political ideologies often influence grant policies and financing. Conservative local levels' reaction would impose a higher economic burden on the social welfare system than liberal local governments' response would (Boadu, 2020). There are distinctly two different political parties in the Nepalese political scenario. The right-wing parties (consist of Nepali Congress, Rashtriya Prajatantra Party, TMLP, etc.), whereas left-wing parties (CPN UML, CPN MC, etc.) differ in political ideology. The right-wing parties are considered liberal and put a less economic burden on the social welfare system in contrast to left-wing parties in Nepal.

Chapter 3: Data and Methods

3.1. Data

This chapter examines the impact of change in federal grants on local expenditure in Nepal using data from 753 municipalities. The first part discusses the research methodology. The second part examines the measurement and variables, as well as the statistical methods and data sources. The third part discusses the panel regression analysis and the associated findings. The last part discusses the findings of this study's comparative analysis.

The municipality serves as the unit of analysis in this research. Local governments also have the authority to raise taxes and spend at their discretion. This research is also concerned with two forms of federal grants that affect local expenditure patterns: (1) Equalization Grants 2) Conditional Grants. Similar to federal block grants, federal equalization grant is often provided following a legislative formula to support operations within a wide functional area. Conditional grant which is similar to a categorical grant is often directed toward particular and clearly defined programs and is typically confined to expenditures on specified activities such as the construction of a wastewater treatment plant, construction of roads, health posts, etc.

The second criteria for comparing local level expenditure patter to federal grant is a broad perspective of the geographical location of local levels. The mountainous region of Nepal has lower population, almost no big cities, fewer employment opportunities, and fewer sources for revenue generation to hilly regions of Nepal. The same story repeats if we compare Hilly regions to Plain regions (Terai Region) of Nepal. Similarly, all seven different provinces are at a different level of economic development. The Bagmati Province is the most developed state, followed by Province 1, Gandaki Province, Lumbini Province, Madhesh Province, Sudur-Pashchim Province and Karnali Province.

The third criteria for comparison of local level expenditure to federal grant are the broad perspective of the kinds of local levels i.e. the big and highly developed Metropolitan, followed by Sub-Metropolitan, Municipality, and Rural Municipality.

The last criteria for comparing local level expenditure patterns to federal grant reductions is a broad perspective of the political philosophy. Political ideologies often influence grant policies and financing. Conservative local governments would prioritize social welfare system than liberal governments (Boadu, 2020). There are distinctly two different political parties in the Nepalese political scenario. The right-wing parties (consist of Nepali Congress, *Rashtriya Prajatantra Party*, TMLP, etc.), whereas left-wing parties

(CPN UML, CPN MC, etc.) differ in political ideology. The right-wing parties are considered liberal and put a less economic burden on the social welfare system in contrast to left-wing parties in Nepal.

3.2. Methodology

The purpose of this research is to create a panel data model to investigate the influence of federal grants on local expenditure. Panel data analysis usually are carried out with longitudinal data including observations of units across time (Greene, 2008; Kennedy, 2008). They are suitable to account for unobservable, non-quantifiable, and unobserved economic variables, such as national policy, federal rules, and intergovernmental contracts that change over time (Chaicharoen, 2013). Additionally, it increases variability by integrating variation between units and variation across time, alleviating multicollinearity issues and resulting in a more efficient estimate. The following fixed effects model will be used for this purpose:

$$\boldsymbol{Y_{it} = \alpha + \Sigma \beta_k X_{kit} + u_i + \varepsilon_{it}}$$

Where,

i= indexes municipal "i"

t= "t" indexes year "t" (FY:2016/17, 2017/18, etc.)

X_{kit} = is the value of the kth explanatory variable for municipality i in year t (as discussed above)

α = an intercept which is common for all local levels

β_k = is the coefficient for the K_{th} regressor

ε_{it} =is a randomly distributed error term

u_i=captures unmeasurable or unobservable exogenous factors of a specific municipality.

Reductions in federal grants are predicted to alter local expenditure patterns, as stated in the theoretical discussion above. This research, then, focuses primarily on the shift in municipal expenditure as a result of the variation in federal grants and municipal income controlled by local policymakers.

Asymmetric effect of grants will be calculated using the following formula (S. Gamkhar & W. E. Oates, 1996):

D (G_{it} -G_{it-1}) with D = 1 if (G_{it} – G_{it-1}) < 0 ad D = 0 in the other case. This variable can be added to above model as follows:

$$E_{it} = \alpha + \beta_1 G_{it} + \beta_2 D\,(G_{it} - G_{it-1}) + \beta_3 Y_{it} + \sum \beta_i (X_{it})$$

The marginal effect of grant increases is equal to β_1, whereas the effect of the decrease in grants is equal to $(\beta_1+\beta_2)$. The grant thus has an **asymmetric effect** when the coefficient of the decrease in the grant variable is different from 0 (Gamkhar, 2000).

3.3. Study Variables and Data Source

The study will use a large panel made up of all local levels from 2017 to 2019, from 753 local levels over three years, which gives around 25000 observations. The other financial data will be extracted from annual consolidated financial reports published by Financial Comptroller General Office, Nepal (FCGO) available online. The population data as a socio-economic characteristic will be collected from the general population census which serves as the demands of median voters/citizens preferences (Acosta, 2010; Brooks & Phillips, 2008; Cardenas & Sharma, 2011; Constantino C. Mendes, 2006; Mehiriz & Marceau, 2014; Nesbit & Kreft, 2009).

The total local expenditures made at a local level in a given year is the primary dependent variable of the research. The effects of different types of federal grants on local expenditure to measure the extent and distribution of flypaper effects will be carried out. Similarly, the effect of a decrease in grants on local expenditure will also be carried out to measure the extent and distribution of asymmetric effects.

Different types of federal grants (viz. total grants, conditional grants, equalization grants, etc.) are the fundamental independent variables. Similarly, the magnitude and distribution of flypaper effects and asymmetric effects of federal grants by geographical location (Mountain, Hills, Terai/Plain), by kinds of local governments (Metropolitan, Sub-metropolitan, Municipality, Rural Municipality) and by 7 provinces will be carried out.

Total internal revenue, and population will be used as control variables to show how things changed with these parameters. As discussed theoretically earlier, the study model focuses on two major types of local government: left-winged leadership and right-winged leadership. The right-wing parties are considered liberal and put a less economic burden on the social welfare system in contrast to left-wing parties in Nepal. Apart from these, the different variables for provincial and geographical locations will also be used as control variables to show the magnitude and distribution of flypaper and asymmetric effects across the regions and types of local levels.

Table 3. 1: Study's Variables and Data Sources

Variables	Description	Data Sources
Total Expenditures	Total expenditures made by each local level	Consolidated Financial Reports Published by FCGO
Total Grants	Total grants received by local levels from federation and provinces	Consolidated Financial Reports Published by FCGO
Internal Revenue	Internal Income (Including Revenue Sharing)	Consolidated Financial Reports Published by FCGO
Federal Equalization Grants	Total Amount of equalization grants received by local levels from the federation	Consolidated Financial Reports Published by FCGO
Federal Conditional Grants	Total Amount of conditional grants received by local levels from the federation	Consolidated Financial Reports Published by FCGO
Total Disposable Income	Internal Income + Total Grants	Consolidated Financial Reports Published by FCGO
Population	Population	CBS Nepal Preliminary Census Report 2021

Chapter 4: Results

The study used a large panel made up of all local levels from 2017 to 2019, from 753 local levels over three years, with 11 different variables (total local expenditure, total grants received by local levels, total internal revenue of local levels, total federal conditional and equalization grants received by local levels, population size, total disposable income, leadership political orientation, geographical location of local levels, provincial location and types of local levels) which gives around 25000 observations. The financial data were collected from consolidated financial reports published by Financial Comptroller General Office (FCGO) every year online. Socio-demographic data, that is, population, were collected from the general population census, the last one being held in 2021. The data related to political leadership, the types of local levels and provincial/geographical locations were collected from the Election Commission of Nepal online and Ministry of Federal Affairs and General Administration Reports available online respectively.

4.1. Trends of Various Financial Variables

The trends of different variables (viz. total Local Expenditure, Grants Received, Equalization Grants Received, Conditional Grants Received, Internal Income, and Disposable Income) per capita are studied. The per capita value would provide more sense while comparing across different regions. Because Nepal is a highly heterogenous country and the geography and demography of local levels vary significantly even within a short distance. The general trends of various financial variables depict similar patterns over the years.

The capacity to make an expenditure per capita though rising, is very much lower than what is received as a grant or generated from internal revenues. The financial variables per capita showed steeper growth from the year 2017 to 2018 as compared to 2018-2019. This can be explained as federalism was recently adopted in 2015.

Similarly, the average expenditure per capita also differs across different kinds of local levels (Metro, Sub-metro, Municipality and Rural municipality). The rural municipality has the highest average expenditure per capita than a municipality, which in turn has a higher ratio to sub-metropolitan, which again has a higher ratio to metropolitan. This may be due to the lower population in rural municipalities compared to metros, sub metros and municipals.

Figure 4. 1: Trends of Different Variables (average per capita)

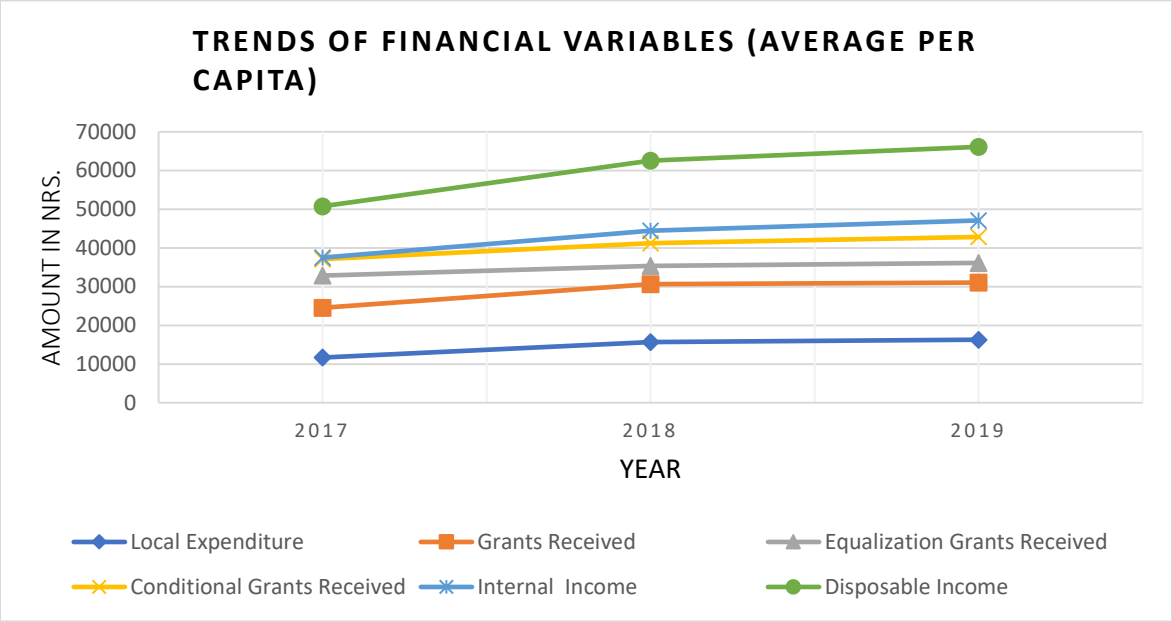
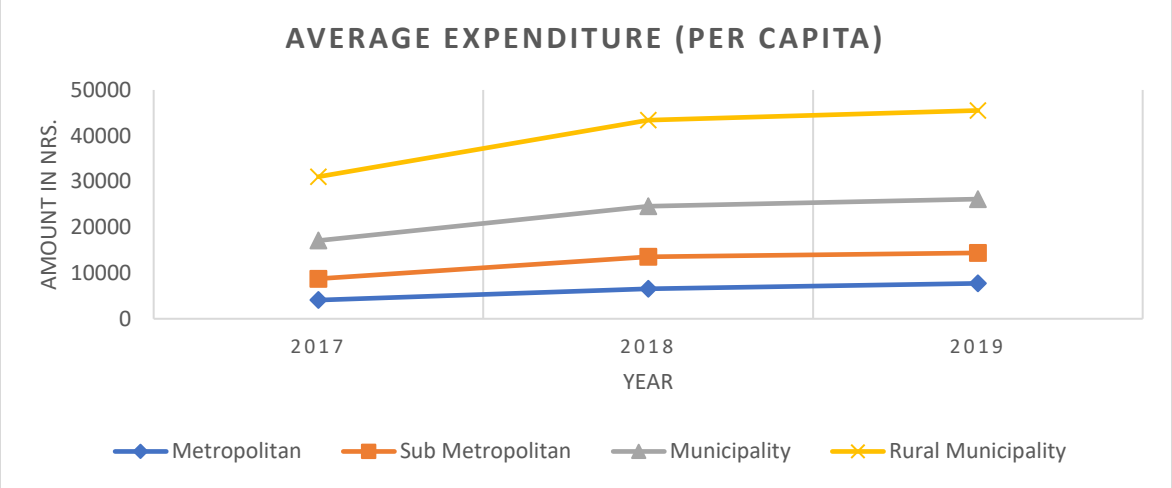
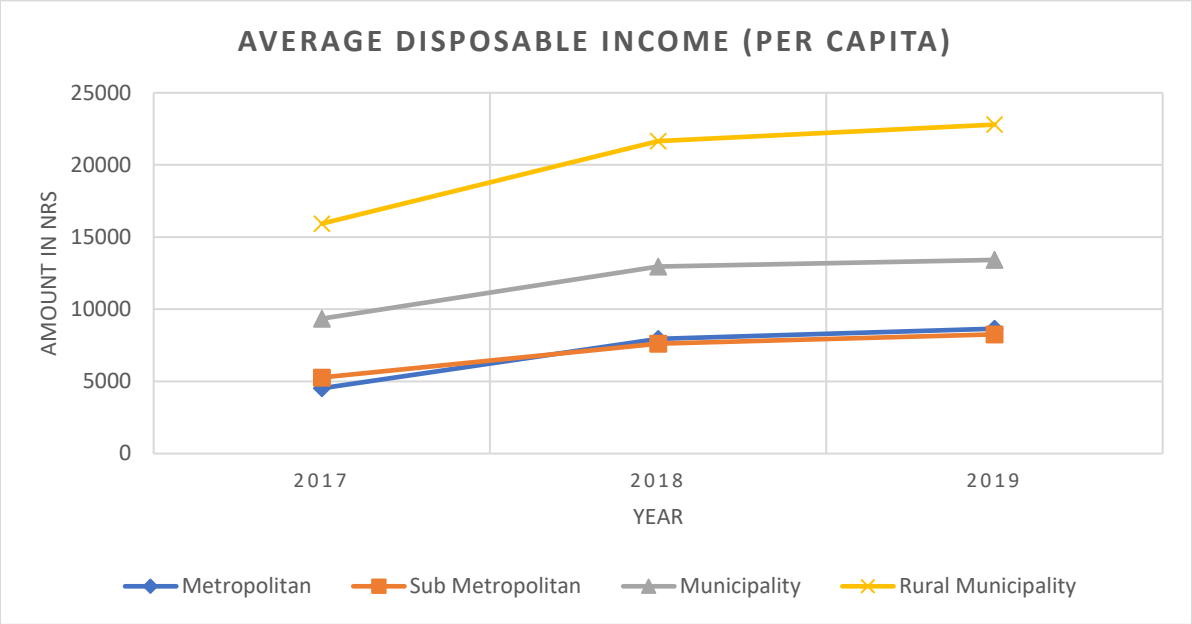


Figure 4. 2: Trends of Average Expenditure Per Capita Across Different Local Levels



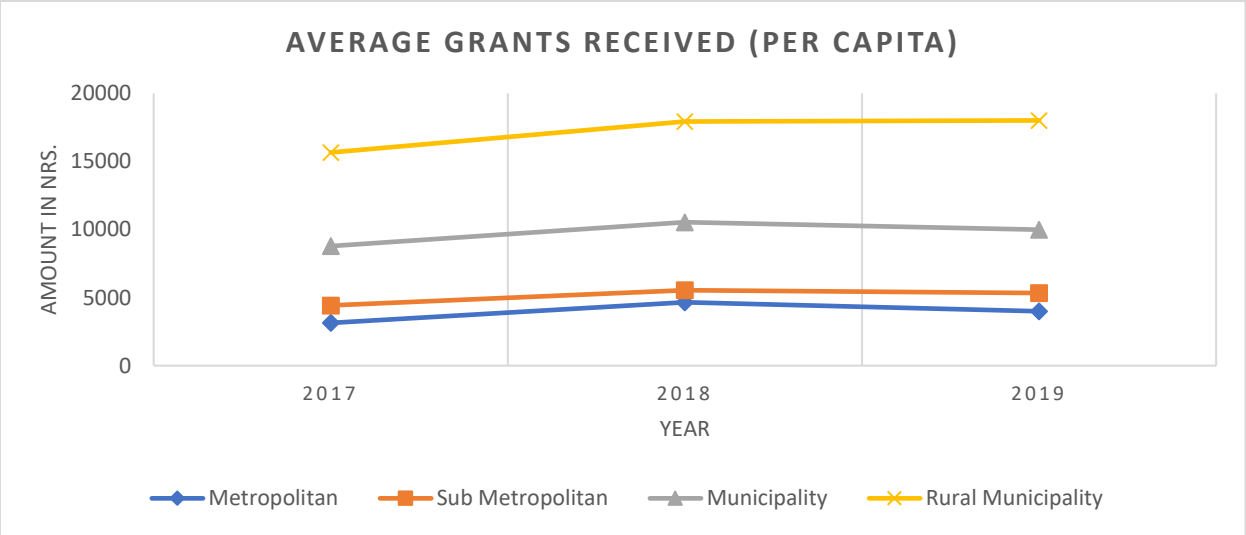
Similarly, the trends of average disposable income per capita also followed the similar trend as above. The rural municipality has a higher ratio followed by municipals, sub metros, and metros which again can be subjected to a lower population in rural municipalities.

Figure 4. 3: Average Disposable Income (per capita) of different local levels.



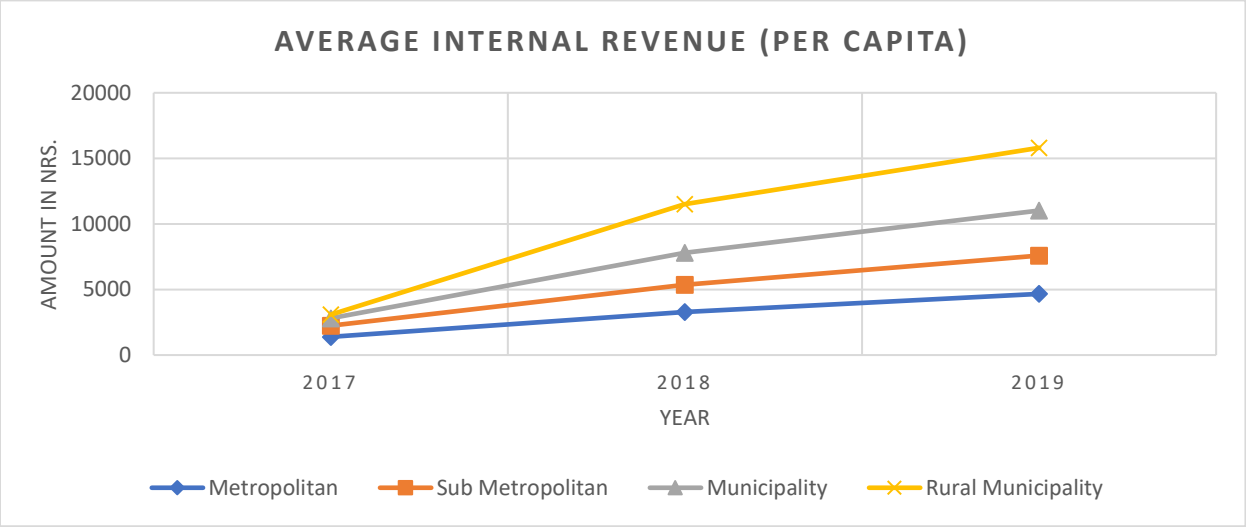
The average grants received per capita is highest again in the rural municipality, followed by the municipality, sub metros and metros, which again can be justified with the lower population size of rural municipals compared to big metro cities.

Figure 4. 4: Average Grants Received (per capita)



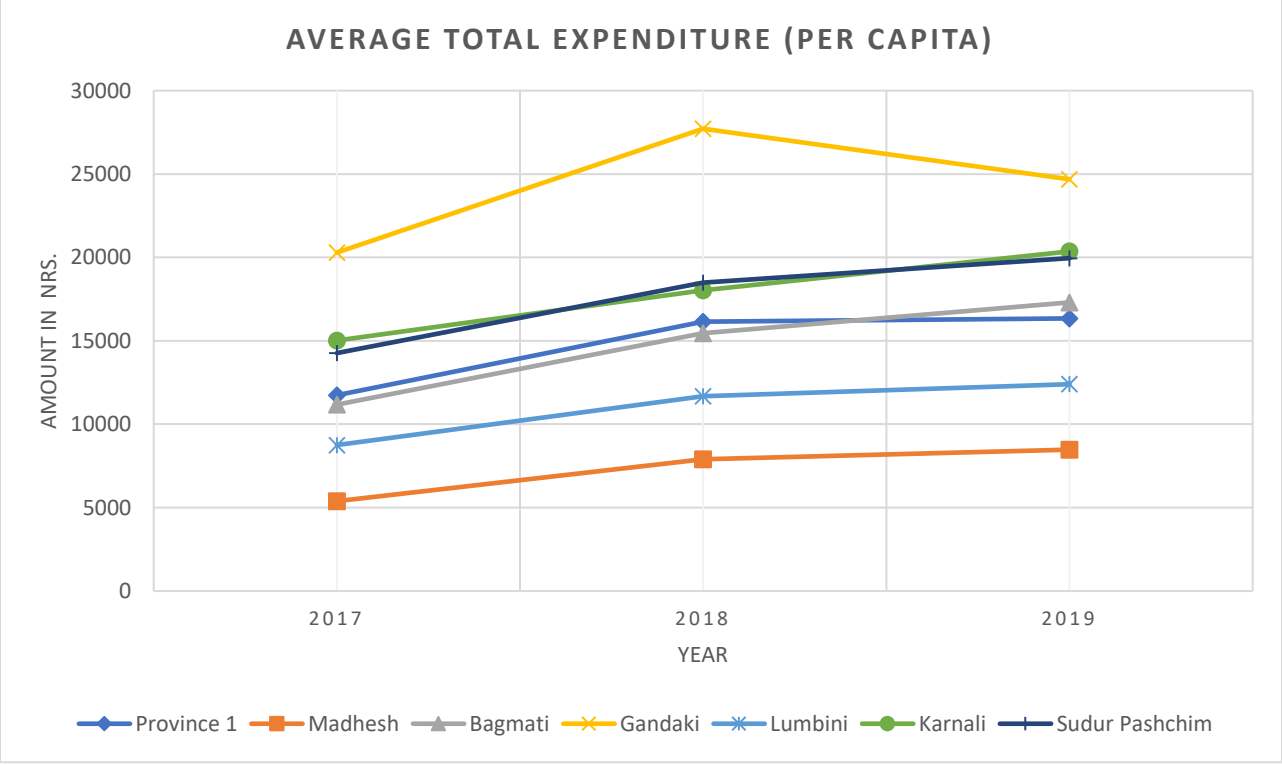
The average internal revenue per capita generated is highest in the rural municipality, followed by the municipality, sub metros and metros.

Figure 4. 5: Average Internal Revenue Generated (per capita)



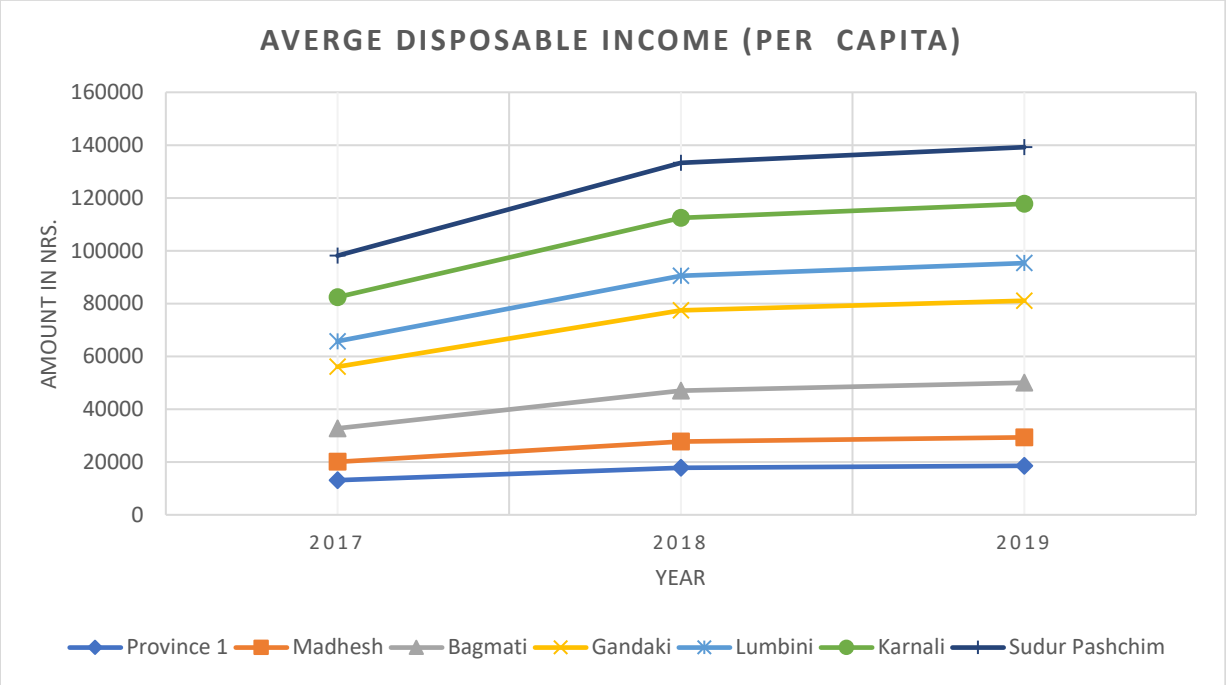
The average total expenditure per capita is highest in Gandaki province however it shows a reduction in such grants from the year 2018 to 2019. Karnali and Sudur-Pashchim provinces share similar trends. Similarly, Bagmati and Province 1 followed similar trends. Lumbini province followed by Madhesh province has the lowest ratio of average total expenditure per capita.

Figure 4. 6: Average Expenditure Per Capita (Different Provinces)



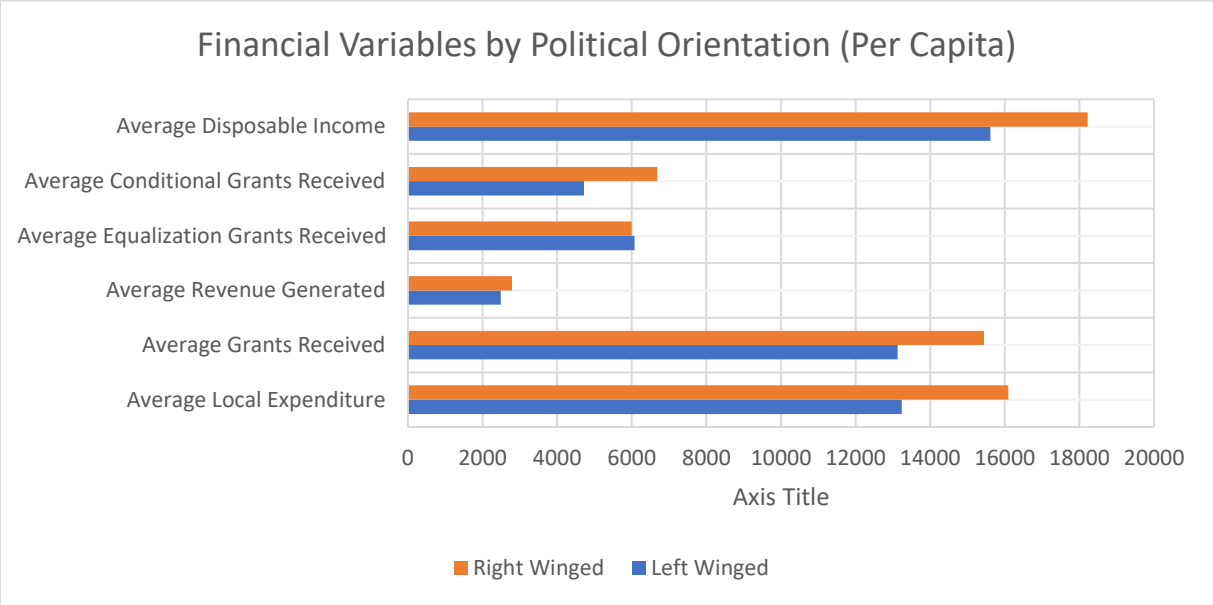
The average total disposable income per capita is highest in Sudur-Pashchim province followed by similar trends in Karnali, Lumbini, Gandaki, and Bagmati provinces. Province 1 has the lowest such ratio of average total disposable income per capita followed by Madhesh Province.

Figure 4. 7: Average Disposable Income (Provincial Distribution)



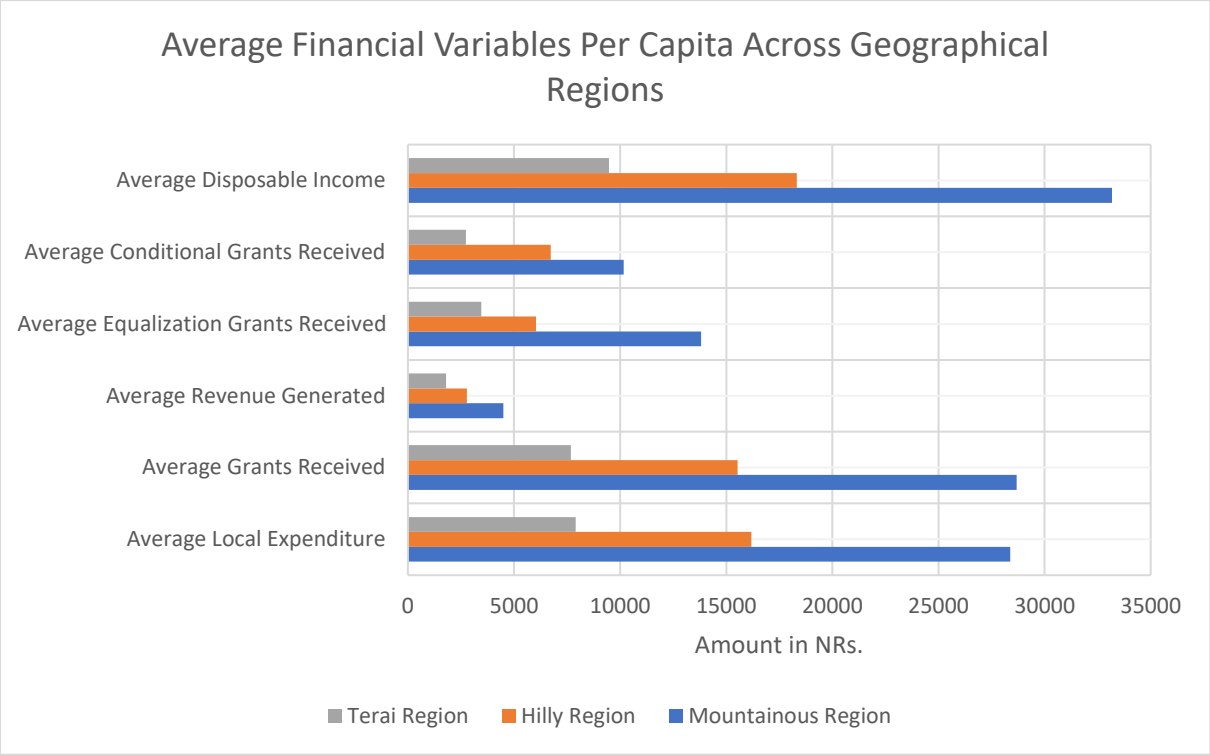
The average financial variables per capita by political orientation showed interesting trends. Almost all the local levels led by right-winged political leadership show a higher ratio compared to the local levels led by left-winged political leadership except for the average grants received per capita where the trend is reversed.

Figure 4. 8: Average Financial Variables by Political Orientation (Per Capita)



The average financial variables per capita by geographical region showed interesting trends. The trend is homogenous, i.e., such ratio is highest in local levels of the mountainous region followed by the hilly region which again is followed by the Terai region. This can be attributed to the lower population size in the mountainous region followed by hill and plain areas respectively.

Figure 4. 9: Average financial variables by geographical region (per capita)



4.2. Descriptive Statistics for Dependent and Independent Variables

Given the period (2017-2019), the summary of the descriptive statistics as tabulated below shows that the average population of a local level is approximately 70,000, while the median population is around 50,000. The average local expenditure is around NRs. 422 million per year, while median expenditure is around NRs. 361 million. The average local revenue is approx. NRs. 57 million, with median revenue at NRs. 37 million approx. The average grants received by each local level is around NRs. 418 million, while median grants received are at around NRs. 375 million. The average equalization and conditional grants received by each local level per year are around NRs. 260 million and 132 million respectively, while median such grants are at NRs. 238 and NRs. 121 million respectively. The average disposable income for the local level has the highest average value i.e. NRs. 475 million. It means on average 88% of total disposable income comes from grants while 12% comes from internal revenue. Out of total local

expenditure, the share of grants is almost 99% while the revenue is only 1%. So, there would be a marked effect of grants on local expenditure.

Table 4. 1: Descriptive Statistics for Dependent and Independent Variables

	Mean	**Standard Error**	**Median**	**Standard Deviation**
Population	68112.18147	4618.278172	50144	74324.15327
Total Expenditure	422252854.2	21821919.58	361261785.2	351190559.5
Total Revenue	57216246.4	11035886.55	13423292.66	177605785.7
Total Grants	418514734.7	13280448.93	375444000	213728598.6
Total Equalization Grants	260890610	7508195.609	238943000	120832972.9
Total Conditional Grants	132989065.6	4840588.461	121298000	77901898.78
Total Disposable Income	475730981.1	22931006.51	405663894.2	369039624.5

4.3. Scope of the Data and Limitations

The data could only be fetched for 3 years in contrast to the anticipated 5 years during the initial phase of the research. Similarly, the data for matching grants and non-matching grants could not be collected, which would have helped to show the degree of flypaper and asymmetric effects in a more vivid way, as the earlier research has shown the immense effects of such grants on local expenditure. Additionally, demographic factors such as the proportion of the population under the age of eighteen and the percentage of the population aged sixty-five and above affect municipal spending. Although both age groups have a varied impact on municipal expenditure, both are predicted to have a favorable effect on spending. Essentially, these factors are predicted to result in a rise in public spending (Boadu, 2020). Other variables, such as the proportion of the population with an educational degree of a certain level, the poverty rate, unemployment, and race, are predicted to affect municipal expenditure. So, the data for those variables could not be collected which should be understood as the limitations of the data collection.

Table 4. 2: The code of different financial variables and their description

Items' Code	Description
TE	Total Local Expenditure
TG	Total Grants Received by each Local Level
TR	Total internal Revenue Generated inside the local level
TEG	Total Equalization Grants Received by each Local Level
TCG	Total Conditional Grants Received by each Local Level
TDI	Total Disposable Income
AE	Asymmetric Effects Coefficient
TEP	Total Local Expenditure Per Capita
TGP	Total Grants Received by each Local Level (Per Capita
TRP	Total internal Revenue Generated inside the local level Per Capita
TEGP	Total Equalization Grants Received by each Local Level Per Capita
TCGP	Total Conditional Grants Received by each Local Level Per Capita
TDIP	Total Disposable Income Per Capita
AE	Asymmetric Effects Coefficient

4.4. Why Fixed Effects Panel Regression Model was chosen?

Initially, to find the effect of different types of grants (exact amount) on local expenditure (exact amount) (flypaper effects), a linear regression model was carried out. The variable "Total Grants" was omitted because of collinearity. The higher R^2 and adjusted R^2 values suggested that the data includes a wide range of required variables to analyze the dependent variable total local expenditure fully, however, Breusch-Pagan/Cook-Weisberg Test for heteroskedasticity showed the presence of heteroskedasticity problem (χ^2 (1) = 8189.91, Prob > χ2 = 0.0000).

Table 4. 3: Different Regression Models and the Result

Model	R^2	Adjusted R^2	Prob > χ^2	No. of Obs.
Linear Regression (Exact Amount)	0.9398	0.9377	0.0000	2235
Linear Regression (Per Capita)	0.9267	0.9266	0.0000	2236
Linear Regression (Log Per Capita)	0.8263	0.8259	0.0000	2237

However, to account for unobservable, non-quantifiable, and unobserved economic variables, such as national policy, federal rules, and intergovernmental contracts that change over time (Chaicharoen, 2013) and additionally, to increase the variability by integrating variation between units and variation across time, alleviating multicollinearity issues and resulting in a more efficient estimate, panel data analysis was deemed suitable.

Similarly, the effect of different types of grants (per capita) on local expenditure (per capita) was run as the standard deviation for the exact figure was very high. The results again followed the similar pattern as above, i.e., higher R^2 and adjusted R^2 values with the presence of heteroskedasticity problem (χ^2 (1) = 94985.54, Prob > χ2 = 0.0000).

In addition, logging variables consider the skewness (right or left) of the variables' distributions and approximate their error terms to those of a normal distribution (Boadu, 2020), and to adjust for the normality of distribution, the logarithmic value of variables per capita was chosen. The results this time showed lower R^2 and adjusted R^2 values with the presence of heteroskedasticity problem (χ^2 (1) = 115.95, Prob > χ2 = 0.0000).

Breusch–Godfrey LM test for autocorrelation was carried out to investigate the presence of autocorrelation with the linear regression model. The results showed that there is no serial autocorrelation problem with the model as shown in table.

Table 4. 4: Breusch–Godfrey LM test for autocorrelation for linear regression model.

Number of gaps in sample = 24

Breusch-Godfrey LM test for autocorrelation

lags(*p*)	chi2	df	Prob > chi2
1	4.914	1	0.0266

H0: no serial correlation

4.5. Panel Data Analysis

The panel data is prone to problems like serial correlation and heteroskedasticity. The heteroskedasticity of the data is revealed by the Breusch-Pagan/Cook-Weisberg test, which demonstrates that the error variance is not constant. The command *'hettest'* in "Stata" (a software for data science and statistics) is used to perform this test. But in the presence of heteroskedasticity, the OLS estimation is no longer the best linear unbiased estimator in the (Wooldridge, 2009). Initially, Wooldridge Test for

autocorrelation in panel data was carried out which showed the absence of such autocorrelation in the panel data (F value = 59.779, Prob > F = 0.0000, H_0 = No first order autocorrelation). So, we proceed with the panel data analysis finally. The results from both the models (Fixed and Random Effects) showed lower R^2 (within) value as compared to R^2 (between and overall) value. The higher overall R^2 value suggested that the chosen model better fits the data. The independent variable "Total Disposable Income" (TDI) was omitted because of collinearity.

Table 4. 5: Different Panel Data Analysis Model and their Results

Model	**R^2 value (within)**	**R^2 value (between)**	**R^2 value (overall)**	**Probability > χ^2**	**No. of Obs.**
Panel Regression (Random Effects)	0.8365	0.9713	0.9398	0.0000	2235
Panel Regression (Fixed Effects)	0.8399	0.9680	0.9377	0.0000	2235

Fixed Effects Model (FEM) vs Random Effects Model (REM)

So, to find the best fitted model between Fixed Effects Model (FEM) and Random Effects Model (REM), Hausman Test was carried out. The results (χ^2 = 77.08, Probability > χ^2 = 0.0000, the probability value (α<0.05) means that the Null Hypothesis is rejected, i.e., the alternative hypothesis that the fixed effects model is a better fitted model is accepted as confirmed by Hausman Test.

i.e., Fixed Effects Model (FEM) > Random Effects Model (REM)

Pooled OLS vs Random Effects Model (REM)

It has been discussed earlier that in the presence of heteroskedasticity, the OLS estimation is no longer the best linear unbiased estimator, however, Breusch and Pagan Lagrangian Multiplier Test was carried out to find the better fitted model in between OLS vs REM. The results (χ^2 = 2.39, Probability > χ^2 = 0.0609) confirmed that the Pooled OLS is a better fitted model.

i.e., Pooled OLS > Random Effects Model (REM)

So, the final order follows as shown:

FEM > REM

Pooled OLS > REM

From all the results above, it has been established that the Fixed Effects Model is better fitted model for our data than Random Effects Model. Multicollinearity, serial correlation, and heteroscedasticity concerns may exist in the data and suggested models. Heteroskedasticity and serial correlation may be addressed using regression techniques such as generalized least squares estimation and the imposition of robust standard errors. Additionally, significant multicollinearity may be eliminated by excluding the erroneous variables (Boadu, 2020). So, the total disposable income was removed from our analysis.

Similarly, pooled OLS is used when new data is collected for each unit of time in contrast to fixed effects or random effects, which are used to observe the same sample of persons, nations, states, cities, etc. in the data (Boadu, 2020). So, subject to the same sample of each local level for three consecutive years, we proceed to carry out the Fixed Effects Model (FEM) for the rest of the analysis. However, Modified Wald Test was carried out to check for the group-wise heteroskedasticity in Fixed Effects Model levying robust standard errors (Boadu, 2020). The results as shown in the table 4.7 suggests that there is a group-wise heteroskedasticity problem with the model. So, the final model should be chosen with robust check.

Table 4. 6: Modified Wald Test for Group-wise Heteroskedasticity in Fixed Effect Regression Model

$H_0: \sigma_i^2 = \sigma^2$ for all i	
X^2 (753)	1.2e+33
Prob > χ^2	0.0000

Similar analyses were carried out to establish the best fitted model to measure the asymmetric effects of decrease in grants on the local expenditure. The results followed similar pattern, thus confirming the Fixed Effects Panel Regression Model with Robust Check as the best fitted model for our data.

4.6. Flypaper Effects and Asymmetric Effects

It was found from the correlation matrix that out of all the financial variables considered for the research, total local expenditure was highly correlated with total disposable income followed by total grants. Similarly, total revenue is highly correlated with total disposable income, i.e. local levels with the greater capability of generating income would end up with higher total disposable income. In addition, total grants formed the major part of total disposable income. Moreover, the total equalization grant is correlated with the size of the population. It means, that the bigger local levels by population have a probability of getting higher such grants. However, the total conditional grant is correlated heavily with total grants, which means conditional grants constitute the major portion of total grants received by each local level. Almost all the

financial variables have shown the strongest correlation with local expenditure. This implies that the grants have a significant effect on local expenditure.

Table 4. 7: Summary table of Correlation between different financial variables

	Total Expenditure	**Population**	**Total Revenue**	**Total Grants**	**Total Equalization Grants**	**Total Conditional Grants**	**Total Disposable Income**
Total Expenditure	1						
Population	0.8195	1					
Total Revenue	0.8784	0.7288	1				
Total Grants	0.8969	0.8070	0.6789	1			
Total Equalization Grants	0.5274	0.7711	0.3616	0.6364	1		
Total Conditional Grants	0.8158	0.7337	0.6356	0.8717	0.4750	1	
Total Disposable Income	0.9676	0.8344	0.9288	0.9027	0.5332	0.8125	1

The symmetric flypaper effect states that increases in state grants lead to increases in local government expenditures, and decreases in state grants lead to decreases in local government expenditures. These two hypotheses of the symmetric flypaper effect also permit us to observe the stickiness of receiving state grants in municipal governments. The results show that there is evidence of flypaper effects of grants on local level expenditure in Nepal. There is a statistically significant relationship between total expenditure with total grants and total conditional grants. The total grant increment of NRs. 79 results in the increment of NRs. 100 ($p<0.01$) in the total local expenditure, i.e., an increase of NRs 1.0 as in grants results in the increment of NRs. 1.26 in local expenditure. Similarly, an increase in NRs. 76 in conditional grants results in the increment of NRs.100 ($p<0.01$) in the total local expenditure, i.e. an increase of NRs 1.0 in conditional grants results in the increment of NRs. 1.31 in local expenditure, which is an evidence of the presence of flypaper effects. In addition, equalization grant doesn't have a significant relationship with local expenditure in Nepal. So, there is no flypaper effect of equalization grants on local expenditure.

Table 4. 8: Effects on Total Local Expenditure

Independent Variable	Coefficient	Robust Standard Error
Total Grants	0.789***	0.181
Total Equalization Grants	-0.233	0.591
Total Conditional Grants	0.762***	0.280
Decrease in Total Grants (dummy)	0.042	0.089
Total Revenue	0.327*	0.162
Constant	-3103050	9.15e+07
Observations	1504	
F-value	7.77	
p-value	0.0000	
R-square Within	0.1974	
R-square Between	0.9309	
R-square Overall	0.9026	
Rho	0.646	
Sigma_u	1.223e+08	
Sigma_e	90506489	
No. of Groups	753	

Source: Authors' analysis of Consolidated Financial Reports published by Financial Comptroller General Office, Nepal from the FY: 2017-2019.

Note: *p<0.1, **p<0.05 ***p<0.01 Values reported are coefficients of model. N= 753 municipalities.

Flypaper effects are absent in metropolitan governments unlike in sub metros, municipalities, and rural municipalities. In the municipality, only the total grants received showed the flypaper effect on local expenditure, i.e., an increment of NRs. 1 in total grants results in the increment of NRs. 1.09 ($p<0.01$) in local expenditure. While in rural municipalities, total grants don't cause a flypaper effect but conditional grants do. An increment of NRs. 1 in conditional grants in rural municipalities results in the increment of NRs. 2.13 in local expenditure ($p<0.1$) which is a significant flypaper effect. This can be explained by the heavy dependency of grants on expenditure on those respective local governments.

The flypaper effect is significant only at local levels in Hilly regions. An increment of NRs. 1 in total grants results in the increment of NRs. 1.20 ($p<0.01$) in local expenditure at local levels in Hilly regions. There is a definite reduction in total local expenditure with an increment in equalization grants in local levels of mountainous regions, which is an interesting phenomenon, i.e., an increase of NRs. 1 in equalization grants results in the reduction of local expenditure by NRs. 2.12. This is a reverse flypaper effect.

Table 4. 9: Effects on Total Local Expenditure across different kinds of local levels.

Independent Variable	Metropolitan		Sub-Metropolitan		Municipality		Rural Municipality	
	Coefficient	Robust Standard Error	Coefficient	Robust Standard Error	Coefficient	Robust Standard Error	Coefficient	Robust Standard Error
Total Grants	-24.71	5.264	2.547**	0.918	0.907***	0.123	0.270	0.173
Total Equalization Grants	-3.001	2.220	-4.592*	2.467	-0.370	1.173	0.296	0.734
Total Conditional Grants	24.931	13.159	-2.404**	0.917	0.797**	0.385	0.472*	0.265
Decrease in Total Grants (dummy)	-26.348	25.657	1.468	0.862	0.133*	0.069	-0.108	0.288
Total Revenue	1.572	1.217	1.117***	0.960	0.273	0.167	0.304***	0.096
Constant	3.00e+10	3.72e+10	5.71e+08	8.82e+08	-3.81e+07	1.32e+08	1.22e+08**	5.52e+07
Observations	12		22		554		916	
F-value	70.97		37.05		13.25		8.81	
p-value	0.0001		0.0000		0.0000		0.0000	
R-square Within	0.7609		0.8882		0.2239		0.1005	
R-square Between	0.7876		0.4730		0.7855		0.7612	
R-square Overall	0.7284		0.5276		0.7030		0.6317	
Rho	0.995		0.887		0.442		0.490	
Sigma_u	1.141e+10		2.340e+08		83551485		54933702	
Sigma_e	7.850e+08		83598535		93831785		55996187	
No. of Groups	6		11		277		459	

Source: Authors' analysis of Consolidated Financial Reports published by Financial Comptroller General Office, Nepal from the FY: 2017-2019.

Note: *p<0.1, **p<0.05 ***p<0.01 Values reported are coefficients of model. N= 753 municipalities.

Table 4. 10: Effects on Total Local Expenditure across different geographical regions.

Independent Variable	Mountainous Region		Hilly Region		Terai/Plain Region	
	Coefficient	**Robust Standard Error**	**Coefficient**	**Robust Standard Error**	**Coefficient**	**Robust Standard Error**
Total Grants	0.206	0.218	0.831***	0.306	1.115***	0.167
Total Equalization Grants	-3.819*	2.087	0.173	1.559	-0.359***	0.616
Total Conditional Grants	1.388*	0.762	0.528	0.512	0.176	0.454
Decrease in Total Grants (dummy)	0.672	0.639	0.178	0.067	0.627*	0.348
Total Revenue	1.363***	0.386	0.149	0.155	0.488**	0.235
Constant	3.38e+08**	1.52e+08	-1257313	1.76e+08	-4.99e+07	1.12e+08
Observations	196		722		586	
F-value	4.75		5.42		14.51	
p-value	0.0006		0.0001		0.0000	
R-square Within	0.3801		0.2153		0.2866	
R-square Between	0.1068		0.9163		0.9282	
R-square Overall	0.1706		0.8972		0.8868	
Rho	0.671		0.843		0.418	
Sigma_u	1.092e+08		2.039e+08		75970562	
Sigma_e	76474166		87918436		89582073	
No. of Groups	98		362		293	

Source: Authors' analysis of Consolidated Financial Reports published by Financial Comptroller General Office, Nepal from the FY: 2017-2019.

Note: *p<0.1, **p<0.05 ***p<0.01 Values reported are coefficients of model. N= 753 municipalities.

Only left-winged political leadership at the local level's government experienced the presence of flypaper effects. An increment of NRs. 1 in total grants results in the increment of local expenditure by NRs. 1.03 ($p<0.01$). An interesting phenomenon is observed in the increment of equalization grants in right-winged led local level governments. An increment of NRs. 1 in equalization grants results in the reduction in local expenditure by NRs. 1.23 ($p<0.1$), which again is a reverse flypaper effect.

The result shows the presence of the flypaper effect of total grants on local expenditure only in Lumbini Province. While other provinces do not show such an effect. Similarly, conditional grants showed such effect in Karnali Province only. An increment of NRs.1 in total grants in Lumbini Province results in the increment in local expenditures by NRs. 1.12 ($p<0.01$). In addition, the increment of NRs. 1 in conditional grants in Sudur-Pashchim Province results in the increment in local expenditure by NRs. 1.18 ($p<0.01$).

Table 4. 11: Effects on Total Local Expenditure by Political Orientation.

Independent Variable	Left Winged Local Leadership		Right Winged Local Leadership	
	Coefficient	Robust Standard Error	Coefficient	Robust Standard Error
Total Grants	0.967***	0.277	0.401	0.275
Total Equalization Grants	-0.404	1.400	-0.808*	0.447
Total Conditional Grants	1.033**	0.409	0.134	0.300
Decrease in Total Grants (dummy)	0.136	0.444	0.141*	0.760
Total Revenue	0.117	0.156	0.783***	0.199
Constant	-6.53e+07	1.46e+08	2.37e+08*	1.33e+08
Observations	817		687	
F-value	7.48		17.13	
p-value	0.0000		0.0000	
R-square Within	0.2560		0.3045	
R-square Between	0.8744		0.8438	
R-square Overall	0.8571		0.7869	
Rho	0.801		0.677	
Sigma_u	1.814e+08		1.172e+08	
Sigma_e	90492181		80983600	
No. of Groups	409		345	

Source: Authors' analysis of Consolidated Financial Reports published by Financial Comptroller General Office, Nepal from the FY: 2017-2019.

Note: *p<0.1, **p<0.05 ***p<0.01 Values reported are coefficients of model. N= 753 municipalities.

Table 4. 12: Effects on Total Local Expenditure by Provinces.

	Province 1		Madhesh Province		Bagmati Province		Gandaki Province	
	Coefficient	**Robust Standard Error**	**Coefficient**	**Robust Standard Error**	**Coefficient**	**Robust Standard Error**	**Coefficient**	**Robust Standard Error**
Total Grants	0.223	0.184	0.875	0.537	0.224	0.317	0.239	0.651
Total Equalization Grants	0.336	0.401	-2.265	2.597	-5.372	4.085	5.098***	1.330
Total Conditional Grants	-0.331	0.206	0.133	1.012	3.155***	0.939	-1.817	1.241
Decrease in Total Grants (dummy)	0.014	0.355	0.177	0.741	0.084	0.064	-1.710***	0.581
Total Revenue	0.93*	0.158	0.839***	0.212	0.183	0.206	0.612	0.383
Constant	3.27e+08***	7.41e+07	2.23e+08	2.78e+08	5.89e+08	4.69e+08	7.13e+07	2.00e+08
Observations	274		272		238		169	
F-value	11.79		6.33		5.67		84.45	
p-value	0.0000		0.0000		0.0001		0.0000	
R-square Within	0.1845		0.4546		0.2035		0.7165	
R-square Between	0.9125		0.7447		0.2488		0.7108	
R-square Overall	0.8542		0.6776		0.2466		0.7026	
Rho	0.923		0.612		0.955		0.946	
Sigma_u	1.832e+08		1.085e+08		6.125e+08		2.615e+08	
Sigma_e	53029124		86486870		1.329e+08		62542982	
No. of Groups	137		136		119		85	

Source: Authors' analysis of Consolidated Financial Reports published by Financial Comptroller General Office, Nepal from the FY: 2017-2019.

Note: *p<0.1, **p<0.05 ***p<0.01 Values reported are coefficients of model. N= 753 municipalities.

Table 4. 13: Effects on Total Local Expenditure by Provinces.

	Lumbini Province		Karnali Province		Sudur-Pashchim Province	
	Coefficient	**Robust Standard Error**	**Coefficient**	**Robust Standard Error**	**Coefficient**	**Robust Standard Error**
Total Grants	0.890***	0.211	1.089***	0.256	1.328***	0.281
Total Equalization Grants	-0.803	1.820	-0.863	2.365	-1.996*	1.072
Total Conditional Grants	0.603	0.663	0.560	0.734	0.856***	0.325
Decrease in Total Grants (dummy)	-0.558	0.685	0.937	0.592	0.620	0.499
Total Revenue	0.483*	0.291	-0.167	0.173	0.013	0.186
Constant	3.91e+07	1.6e+08	-6296586	1.77e+08	5562945	1.19e+08
Observations	218		157		176	
F-value	6.79		4.22		11.71	
p-value	0.0000		0.0019		0.0000	
R-square Within	0.2706		0.0875		0.4214	
R-square Between	0.9004		0.7983		0.7731	
R-square Overall	0.8419		0.6987		0.7572	
Rho	0.408		0.391		0.799	
Sigma_u	69859123		62587849		82851923	
Sigma_e	84107660		78124894		41568593	
No. of Groups	109		79		88	

Source: Authors' analysis of Consolidated Financial Reports published by Financial Comptroller General Office, Nepal from the FY: 2017-2019.

Note: *p<0.1, **p<0.05 ***p<0.01 Values reported are coefficients of model. N= 753 municipalities.

The presence of significant asymmetric coefficients in municipalities (0.13, $p<0.1$), Terai (0.63, $p<0.1$), right-winged leadership (0.14, $p<0.1$), and Gandaki Province (-1.71, $p<0.01$) is strong evidence of asymmetric effects. Because, usually the decrease in total grants should be followed by a decrease in total local expenditure proportionally. But, a decrease of NRs. 1 in total grants results in the increment in local expenditure by NRs. 7.69 in municipals, NRs. 1.59 in Terai and NRs. 7.14 in those local levels with right-winged political leadership. Whereas, Gandaki Province experiences a decrease in NRs. 0.58 in local expenditure with the decrease of NRs. 1 in total grants. The varying degree and direction of change in local expenditure with the reduction of total grants received by each local level is strong evidence of the presence of asymmetric effects.

Chapter 5: Conclusion

This dissertation looked into some of the most pressing issues in public administration and policy. The research on the flypaper effect continues to attract interest in these domains. This research has consequences for substantial gifts to public organizations. Similar to grants, they may have the effect of creating a flypaper impact on recipients' budgets, allowing them to pursue goals not intended by the donor.

The flypaper effect has been demonstrated in previous empirical investigations for all sorts of grants, including matching, non-matching, conditional, unconditional, block, and unrestricted awards. This research investigated that the federal grants have a distinct flypaper effect depending on geography, the types of local levels, political orientation, and the spatial location of the local government by province inside a territory of the same nation. A similar process was carried out to investigate the asymmetric effect of grants on local expenditure. Similarly, the decrease in total grants is linked to an increase in total expenditures showing the evidence of varying degrees and directions of asymmetric effects of grants on local expenditure. The population size of the local levels shows collinearity with total local expenditure and was omitted for the panel regression model analysis, which might be due to the allocation of equalization grants based mathematically on population size.

This study looks at the effects of total grants and grant decreases on local government expenditure (flypaper, and asymmetric effects). It also examines the size and distribution of the stickiness of such grants to see how they are distributed across local levels with different political orientations of local leadership, as well as their geographical and provincial distribution to various types of local levels.

This work contributes by analyzing 753 local levels from 2017 to 2019 based on a fixed-effects panel regression model with a robust check, which investigated the effects of different fiscal grant variables across the nation on local expenditure behaviors fluctuating over time and units.

Results depict that the local levels with less population and the local levels situated in the mountainous region have the highest grants received per capita, expenditure per capita, and highest total income at disposal. Previous studies that have correlated the flypaper effects and asymmetric effects as the consequence of similar economic pressures has been challenged now with this research. The governments that show significant flypaper effects may sometimes don’t show any trace of asymmetric effects and vice-versa. So, it could be concluded that these effects are the consequence of change in different financial and economic variables across the nations or even with a region for that matter.

Since grants make up almost all the local expenditure at a local level (99%), there would be an anticipation of a change in the spending pattern of the local expenditure if grants are reduced or increased.

This dissertation addressed unanswered issues raised by past research. Understanding the flypaper effect, as well as any differences in the effect of different federal grants, internal revenue, and the pattern of local expenditure, enables local governments to prepare more effectively during economic turmoil. This is increasingly critical when states, and notably the federal government, cut local government grants-in-aid. Amusing for policy enthusiasts, entrepreneurs, and scholars, the finding that the local governments with a left-winged leadership are more prone to make a higher local expenditure even in the time of grant cutbacks could become a hot topic for policy debate in Nepal as they put more pressure on socio-economic activities and usually strive to conceal the true cost of public service delivery.

Newer projects and programs are funded and sometimes the cost of running projects is manipulated when federal grants are raised, leaving local tax revenues, savings, and debt levels unaffected. But the local expenditure would take a toll when federal grants are reduced with a constant local expenditure pattern, which is compensated by raising tax rates and tax scopes.

The inclusion of more socio-economic variables like the population below 18 and above 65, the literacy level, the average per capita, and the tax generated revenue, would make interesting research. Similarly, a comparison study could be done on the effects of federal vs state grants on the local expenditure in developing countries like Nepal. Moreover, the effects of change in grants on capital expenditure and recurrent expenditure can be studied to ascertain if the reduction in grants affects infrastructure development or social development more.

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국문초록

개발도상국에서의 플라이 페이퍼 효과 및 영향에 대한 연구

네팔 지방정부의 2017~2019년도 예산 자료 분석

Ramesh Parajuli

서울대학교 행정대학원

글로벌행정전공

보조금과 지출 사이의 연결은 공공 재정 문헌에서 가장 많이 조사되는 현상 중 하나이며, 일반적으로 자금은 출처에 따라 다른 양상을 보인다고 가정한다. 연구된 현상들 중 일부는 플라이페이퍼 효과, 비대칭 영향, 재정 착시 이론, 크라우드 인 아웃 효과이다. 이 연구는 특히 하위 국가 수준에서 취약한 민주주의 시스템을 가진 개발도상국에 대한 문헌의 보유 여부를 결정하기 위해, 네팔의 지방 지출과 여러 지역에 걸친 그들의 규모 분포에 대한 다양한 보조금의 비대칭적 영향과 플라이페이퍼의 존재를 알아내는 것을 목표로 했다.

본 연구는 753개의 네팔 지방 정부에 대해 Financial Controller General Office(2017-2019 회계연도)가 발표한 통합 재무 보고서를 사용하여 네팔의 지방 지출에서 보조금의 비대칭 효과와 플라이페이퍼 효과의 존재를 설명하기 위해 강력한 점검과 함께 고정 효과 모델을 사용한다. 총 보조금이 지역 지출에 미치는 파급 효과는 힐리 지역의 지역 수준에서 가장 높은 것으로 나타났으며, 이는 개발 작업을 수행하기 위해 더 높은 인구와 험난한 지형에 노출되는 사회-경제 활동에 대한 더 많은 수요로 인한 것으로 볼 수 있다. 지방 지출에 대한 균등화 보조금은 대신 역 플라이페이퍼 효과의 힌트를 보여주었다. 조건부 보조금의 날치기 효과는 상당하며 많은 지역에서 관찰될 수 있다. 비대칭 효과는 지방자치단체와 데라이 지역, 간다키 지방, 우익 지도부가 주도하는 지역 차원에서 상당한 것으로 나타났다.

주요 키워드: 플라이페이퍼 효과, 비대칭 효과, 재정 착시, 재정 연방주의

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