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Devolution and economic resilience in Nepal

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ABSTRACT

This article examines the impact of three key components of devolution —government expenditure, internal revenue, and both conditional and unconditional transfers— on the economic resilience of Nepal's local governments during and after the Covid-19 pandemic. Bridging the gap between the devolution and resilience literature, it focuses on Nepal, a country that embarked on an ambitious devolution journey, transitioning to a Federal Democratic Republic following the monarchy's overthrow in 2008. This transition was institutionalised through the 2015 constitution, which established a three-tier system of government. The analysis reveals that, following fiscal devolution in 2017/18, local government expenditures and intergovernmental transfers significantly enhanced the resilience of rural and semi-urban municipalities. However, internal revenue collection has played a limited role in this process. In a country with low local-level capacity, conditional transfers —primarily allocated for infrastructure and services— have been crucial for local economic resilience, whereas unconditional transfers have not demonstrated the same impact. The findings suggest that greater investment, rather than autonomy, has been the primary driver of subnational economic resilience in Nepal.

1. Introduction

Devolution to subnational governments has become a global trend in recent decades. Decentralised systems are praised for bringing governance closer to the people, with proponents arguing that it enhances participation, transparency, and accountability. It is also believed to offer economic benefits such as more efficient production and a better allocation of public goods and resources (Oates, 1972; Tiebout, 1956). However, devolution has its critics. Prud'homme (1995), for example, questioned the assumption that closer proximity to the people leads to more efficient public service delivery, noting that it may overlook the potential efficiency gains from centralised provision. Other concerns include the risk of increased corruption, unfunded mandates, growing inequalities, coordination failures in intergovernmental fiscal relations, and increased loan dependence under devolved governance (de Mello, 2000; Fan et al., 2009; Prud'homme, 1995; Rodríguez-Pose & Bwire, 2004; Rodríguez-Pose & Gill, 2003). Thus, the effects of devolution vary significantly depending on a country's specific context and the degree of decentralisation (Thießen, 2003).

This article focuses on the debate around devolution, with particular attention to Nepal. Over the past two decades, Nepal transitioned from a unitary monarchy to a federal democratic republic with one central, seven provincial, and 753 local-level autonomous governments. This shift towards political, administrative, and fiscal federalism has been a complex process. The civil war, which began in 1996 with a rebellion led by the Communist Party of Nepal (Maoist), aimed to achieve more inclusive governance and the expansion of federalism (Dhungel & Gonzalez, 2020). After the monarchy was overthrown in 2008, a Federal Democratic Republic was established. Devolution was institutionalised through the 2015 constitution, followed by the first subnational elections in 2017 and the initiation of structured fiscal transfers from the fiscal year 2017/18.

Within this context, this paper examines the effectiveness of Nepal's nascent federalism, particularly in terms of building economic resilience against shocks like the Covid-19 pandemic. It analyses fiscal devolution through government expenditure, internal and divisible revenue, and fiscal transfers (both conditional and unconditional) to identify which components have been most important in generating resilience. In the absence of subnational GDP data, nightlight data from NASA is used to measure economic activity, offering insights into the informal sector, which is often overlooked by official GDP figures (Henderson et al., 2012).

The article makes three key contributions to the literature. First, it bridges two previously separate fields: devolution and economic

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resilience, by exploring the relationship between subnational finance and local capacity to absorb shocks. Second, it expands the analysis to include pre-crisis regional resilience factors, such as infrastructure and human capital, and their impact on short-term economic outcomes after Covid-19. Third, by focusing on Nepal, where federalism is relatively new, it provides targeted analysis and policy recommendations for designing fiscal devolution in developing and emerging countries. Due to limited post-devolution and post-crisis data in Nepal, a long-term study on the impact of fiscal devolution on growth or recovery is not feasible. Instead, this paper focuses on how regional resilience in Nepal relates to pre-crisis conditions and patterns of fiscal devolution.

The findings indicate that fiscal devolution has significantly contributed to the economic resilience of Nepal's municipalities, especially in rural and semi-urban settings. While subnational expenditure is positively associated with resilience, internal revenue (including divisible revenue) has had less impact. This challenges much of the literature advocating for greater fiscal autonomy. Instead, intergovernmental fiscal transfers, particularly conditional transfers aimed at investment, have been crucial in building resilience. Unconditional transfers (Fiscal Equalisation Grants), which promote autonomy, appear, in contrast, disconnected from local economic resilience. This suggests that investment in neglected municipalities has been more important for resilience than autonomy.

The article is structured as follows: Section 2 reviews global devolution theories and practices, contextualising them within Nepal's experience. Section 3 discusses economic resilience theories alongside devolution and the Covid-19 scenario in Nepal. Section 4 outlines the methodology, including data, models, and research limitations. Section 5 presents the results and empirical findings. Finally, the conclusion offers policy implications and suggestions for future research.

2. Nepal in the context of a global drive towards devolution

Although devolution has been widely adopted by countries across the globe, the outcomes have been highly varied. The scholarly literature presents inconsistent evidence regarding the relationship between devolution —particularly fiscal devolution— and economic growth. These differences are largely attributed to variations in devolution designs and methodological approaches (Martínez-Vázquez et al., 2017; Martínez-Vázquez & McNab, 2003). To fully understand devolution, especially within the context of institutionalising federalism in Nepal, we have first to examine how devolution affects the economy from three distinct perspectives: devolution in developing countries, the direction of devolution (top-down vs bottom-up), and the financing mechanisms for subnational governments.

First, the impact of devolution is shaped by a country's level of development (Prud'homme, 1995) and the quality of its institutions (Muringani et al., 2021; Singh et al., 2024; Yahya Khan et al., 2021; Rodríguez-Pose & Muštra, 2022). In developing countries, fiscal devolution can lead to increased spending on short-term current expenditures at the expense of long-term capital investments, potentially hindering economic growth. The capacity of subnational governments to raise revenue and make expenditure decisions is often constrained by central governments, limiting their ability to invest in local development (Davoodi & Zou, 1998). As a result, the success of devolution as a tool for resilient local economies depends on the regions' ability to effectively utilise the resources allocated to them. In Nepal, where subnational governments have relatively weak capacity, extensive fiscal autonomy may, in fact, be counterproductive.

Empirical studies on fiscal devolution in developing countries have produced mixed results. Some research suggests a negative correlation between devolution and economic indicators (Davoodi & Zou, 1998; Lessmann, 2012; Rodden, 2002; Zhang & Zou, 1998), while other studies point to positive effects (Iimi, 2005; Lin & Liu, 2000; Neyapti, 2010; Qiao et al., 2008; Singh et al., 2024), and some find no significant impact at all (Woller & Phillips, 1998). However, the literature consistently emphasises the importance of high-quality governance and strong institutions as prerequisites for successful devolution outcomes (Kalirajan and Otsuka, 2012).

The second key factor is the direction of devolution, whether top-down or bottom-up. Research by Rodríguez-Pose & Krøijer, 2009 supports Prud'homme's (1995) observation that fiscal devolution can lead to higher current expenditure at the expense of capital investment, negatively affecting economic growth. This is more evident in countries with top-down devolution models, such as India and Mexico. In Mexico, for example, weak institutional and monitoring capacities have led to political opportunism, with states that offer more electoral support receiving greater financial resources (Hernández-Trillo and Jarillo-Rabling, 2008). By contrast, in countries with more bottom-up devolution, such as Spain, subnational governments may gain greater legitimacy, leading to increased efficiency and better economic outcomes.

In Nepal, the devolution of power and resources was driven by demands for federalism from communities historically marginalised under the unitary monarchy. Despite political instability at the central and provincial levels, local governments have demonstrated stability and legitimacy by completing their full terms. However, as a developing country with fragile institutions at the subnational level, Nepal faces challenges such as fiscal indiscipline and corruption, illustrating the complex dynamics of devolution in such contexts (Shrestha, 2019).

The third perspective concerns the responsibilities and financing of subnational governments. Studies such as those by Rodríguez-Pose & Krøijer, 2009 in Central and Eastern Europe suggest that subnational governments with their own sources of revenue are better able to meet local demands and promote economic efficiency than those dependent on intergovernmental transfers. Dabla-Norris (2006) also highlights that 'revenue autonomy' is key to effective devolution. However, in slower-reforming and developing countries, weak administrative capacities and central government control over local tax bases often limit access to autonomous revenue. While necessary, transfers can create dependency, limit expenditure decentralisation, and hinder self-sustained economic growth (Freinkman & Plekhanov, 2009; Mogues & Benin, 2012; Wu & Wang, 2013).

In Nepal, the devolution process transferred significant responsibilities, including education, healthcare, and agriculture, to provincial and local governments. Despite these responsibilities requiring substantial expenditure, subnational revenue autonomy remains limited. Local governments collect a mere 15 percent of total government revenues, while they are responsible for 36 percent of expenditures (ADB, 2022). This fiscal imbalance requires large transfers from central to local and provincial governments. An analysis of expenditure patterns reveals that subnational governments often underuse available resources, indicating a capacity gap in fully leveraging devolved finances (Fig. 1A).

The predominance of conditional transfers, which are earmarked for infrastructure and services, over unconditional ones (Fig. 1B), restricts the control of subnational governments over economic decision-making (Devkota, 2020). This reflects the frequent issue of 'unfunded mandates,' where central governments devolve responsibilities without providing adequate financial resources for their effective implementation (Rodríguez-Pose & Vidal-Bover, 2024). As a result, the principle of autonomy —where subnational governments are better positioned to make informed economic investments— has not been fully realised in practice in Nepal. This highlights the complex interaction between the design of devolution, institutional capacity, and economic outcomes.

Federalism in Nepal must be viewed through the lens of a developing country, where there is a strong blend of bottom-up demand for devolution and top-down control of fiscal resources. While much of the literature on devolution focuses on traditional indicators like growth and inequality, the post-crisis resilience of local governments —particularly in the face of economic shocks— remains underexplored. This paper aims to address that gap by examining how the financial structures of devolved subnational governments in Nepal influence their

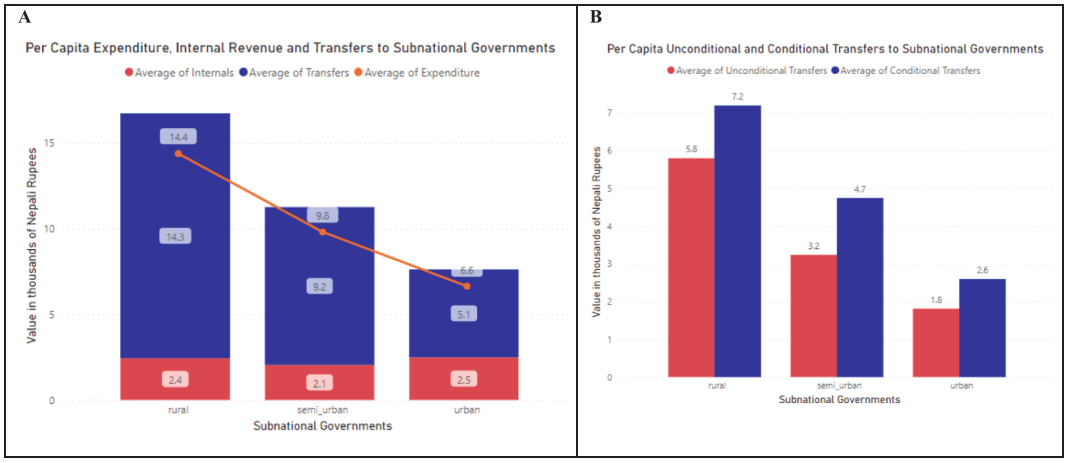


Fig. 1. A: Average (FY 2017/18, 2018/19 and 2019/20) per capita transfers and expenditure in urban (metros and sub-metros), semi-urban (municipalities), and rural municipalities of Nepal Fig. 1**B:** Average (FY 2017/18, 2018/19 and 2019/20) unconditional and conditional per capita transfers in urban (metros and sub-metros), semi-urban (municipalities), and rural municipalities of Nepal **Source:** Authors' calculation based on data derived from various government websites.

ability to adapt to economic shocks. The relationship between devolution and economic resilience, much like devolution's correlation with growth, has yet to be conclusively established. This study investigates this correlation within the Nepalese context.

3. Weaving devolution and economic resilience in the context of Covid-19

In January 2020, Nepal recorded its first case of COVID-19, signalling the start of the pandemic in South Asia (NDTV, 2020). As cases surged globally, the Nepalese government introduced strict measures, including closing international borders and enforcing nationwide lockdowns. The first lockdown lasted from March to August 2020, followed by a second from April to June 2021. These periods brought the shutdown of public spaces such as cinemas, gyms, and swimming pools, and restrictions on public gatherings and festivals. By the end of 2021, Nepal had reported over 800,000 cases and more than 11,000 deaths from COVID-19 (Mathieu et al., 2020), plunging the nation into one of its most severe public health and economic crises (Fig. 2).

The economic impact on Nepal was profound, with significant disruptions across all sectors, including tourism, manufacturing, and trade. In line with a 3.3 percent decline in the global economy in 2020, Nepal's economic growth contracted by 2.12 percent, marking the country's steepest recession in the past two decades (Ministry of Finance., 2021). This economic downturn even surpassed the impact of the devastating 2015 earthquake (Fig. 2). The agriculture sector, which employs more than 70 percent of Nepal's population, was severely affected, particularly in relation to perishable goods and poultry (Joshi et al., 2021). The tourism sector, a major employer across the country, also experienced a sharp decline as the government cancelled all trekking, travel, and tourism activities (Yamei, 2020). This was particularly damaging as Nepal had planned to launch its 'Visit Nepal 2020′ campaign to boost international tourism. The campaign had to be abandoned, affecting stakeholders nationwide. Despite these challenges, however, the remittance sector demonstrated unexpected resilience, remaining stable throughout the pandemic (Rasul et al., 2021).

A detailed analysis of the economic performance of local governments in Nepal reveals that historical economic performance (Fig. 3A), post-fiscal devolution growth (Fig. 3B), and the economic shock experienced (Fig. 3C) have varied significantly across municipalities (note the north–south divide referring to Fig. 3E[1]). The Terai region and some clusters in the Hilly region are the most developed parts of the country. In contrast, most of the Mountainous and Hilly regions remain less developed. However, the Hilly region demonstrated much greater resilience during the COVID-19 pandemic. As a primary measure of regional resilience, this paper adopts the framework proposed by Martin (2012), focusing on resistance, or the ability of a regional economy to withstand shocks and disruptions. The analysis is constrained by limited post-COVID-19 data and time, making it premature to focus on recovery, re-orientation, or renewal. Therefore, the analysis concentrates on understanding the varying levels of resistance across Nepalese local governments in response to the COVID-19 disruption.

The differences in resilience observed among Nepal's local governments can be attributed to several factors. Martin (2012: 42) emphasises the importance of interactions between four economic subsystems: a) the structural and business subsystem; b) the labour market subsystem; c) the financial subsystem; and d) the governance subsystem. Integrating all four dimensions into a single analytical model poses considerable challenges and can yield ambiguous results. Consequently, previous studies (Fingleton et al., 2012; Lee, 2014; and Crescenzi et al., 2016) have selectively focused on specific dimensions, such as human capital, skills, employment, industrial mix, and macroeconomic conditions, to assess regional resilience.

Building on these insights, we identify three sets of preconditions that may have influenced Nepal's regional resistance to the economic shock of COVID-19: a) differences in devolution and subnational finance; b) regional resistance preconditions, including human capital and infrastructure; and c) geographical features. These factors include local government expenditure and its composition (as discussed in Section 2 and detailed in the methodology), pre-crisis development levels (including population density, human capital conditions, political affiliation, and infrastructure) (Crescenzi and Rodríguez-Pose, 2009, 2011), and Nepal's unique geographical challenges, such as its landlocked nature, uneven terrain, and trade reliance on India, especially for municipalities at the southern border.

This research contributes by examining the connection between devolution and regional economic resilience in Nepal. The focus is on the financial and governance subsystems, with human capital included as part of the labour market subsystem. The absence of industrial mix data at the municipal level limits the inclusion of the structural and

[1] Nepal has three distinct geographical regions: in the north is the Mountainous Region (3000m to 8848m), in the middle is the Hilly Region (600m to 3000m), and in the south is the Terai (less than 300m).

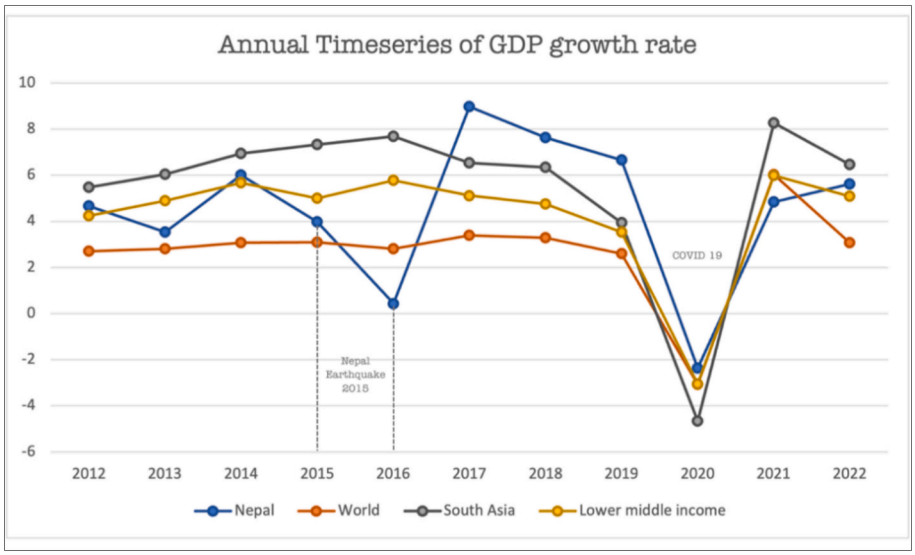


Fig. 2. GDP growth in Nepal, the world, South Asia and Lower Middle-Income countries **Source:** DataBank, World Development Indicators, The World Bank.

business subsystems in this analysis. Nevertheless, this study lays the groundwork for future research to explore devolution and subnational finance not only as drivers of growth and innovation but also as key elements in strengthening economic resilience against shocks.

4. Methodology

The analysis covers Nepal's 753 local governments, which are categorised into 6 metropolitan cities, 11 sub-metropolitan cities, 276 municipalities, and 460 rural municipalities (Fig. 4). For analytical purposes, we reclassify metropolitan and sub-metropolitan areas as 'Urban municipalities,' municipalities as 'Semi-urban municipalities,' and rural municipalities as 'Rural municipalities.' Although the 'Urban' category consists of only 17 observations, it serves as the reference category in the regression analyses.

Based on the theoretical framework and literature review, we develop three models, which are detailed in the model section below. These models are derived from the following base model:

$$\ln\Delta\, Y_{r,t_{post-pre}} = \alpha + \beta_1 Y_{r,t_{(2014-2018)}} + \beta_2 \mathrm{FD}_{r,\, t_{2018-2020}} + \beta_3\, RR_{r,t} + \beta_4 GC_{r,t} + \mathscr{E}_{r,t} \quad (1)$$

where,

- $\Delta\, Y_{r,t_{post-pre}}$ is the absolute change in economic activities in region (municipalities) r during the 16 months of complete and partial lockdowns during COVID-19;
- $Y_{r,t_{(2014-2018)}}$ denotes the five-year average value for Y between 2014 and 2018, which is used as the baseline period;
- $\mathrm{FD}_{r,\, t_{2018-2020}}$ is a set of *indicators of fiscal devolution* between 2018 and 2020;
- $RR_{r,t}$ represents a set of *regional resistance factors* as controls including population, human capital, infrastructure, and political affiliation;
- $GC_{r,t}$ is a set of *geographical controls* including land area, ruggedness, and a dummy of whether or not the local government shares a border with India; and
- $\mathscr{E}_{r,t}$ is the error term.

The analysis uses heteroskedasticity-consistent ordinary least squares (OLS) regressions to estimate the model. Due to data limitations, we do not draw causal interpretations but instead identify correlations between the independent and dependent variables. The primary coefficient of interest, β_2, measures the correlation between fiscal devolution indicators and regional resistance. Meanwhile, β_3 and β_4 capture the effects of regional resistance factors and geographical characteristics, respectively, providing insights into their specific impacts within the broader analysis.

4.1. Data

4.1.1. Change in levels of development (Dependent Variable)

In this study, the key dependent variable is the change in development levels across Nepal. Due to the lack of statistical data, this change is measured using satellite nightlight data. The change in development is calculated by the difference in the natural logarithm of the average sum of nightlight values between the 16-month COVID-19 period (March 2020 to June 2021) and the 12 months preceding COVID-19 (January 2019 to December 2019). These changes reflect the extent to which local governments contracted or experienced minimal growth during the pandemic, operationalising the concept of regional resistance as defined by Martin (2012).

$ln\Delta NL_{r,t_{post-pre}}$ = ln (Avg. Nightlight $_{\text{March 2020 to June 2021}}$) – ln (Avg. Nightlight $_{\text{January 2019 to December 2019}}$).

The nightlight data used in this analysis are sourced from the Earth Observation Group (EOG), which uses the Visible Infrared Imaging Radiometer Suite (VIIRS) Day/Night Band (DNB) aboard the Joint Polar Satellite System (JPSS). The latest version of this dataset —designed to exclude data impacted by sunlight, moonlight, and cloud cover— has been employed in this analysis (Elvidge et al., 2013). The relevant nightlight data for Nepal's 753 local governments were extracted using the official shapefile for these jurisdictions.

Nightlight values serve as effective proxies for measuring economic activity, particularly at the local level, as demonstrated by numerous studies covering a wide range of countries (Henderson et al., 2012; Mellander et al., 2015). These studies, which include research conducted in Ethiopia (Crescenzi and Limodio, 2021), Kenya and Rwanda (Bundervoet et al., 2015), the Middle East (Stokes & Román, 2022), and South Asia (Beyer et al., 2018), highlight the validity of nightlight data as an alternative to unavailable GDP data. Additionally, nightlight data capture aspects of the 'informal' or 'grey' economy often missed by official GDP measures (Bhandari & Roychowdhury, 2011; Prakash et al., 2019; Bundervoet et al., 2015). In response to shocks, nightlight data have been employed in various studies, such as Tveit et al. (2022), who examined the 2015 earthquake's economic impact in Nepal, and Dasgupta (2022), who assessed post-COVID-19 recovery in India. These examples support the appropriateness of nightlight data for this

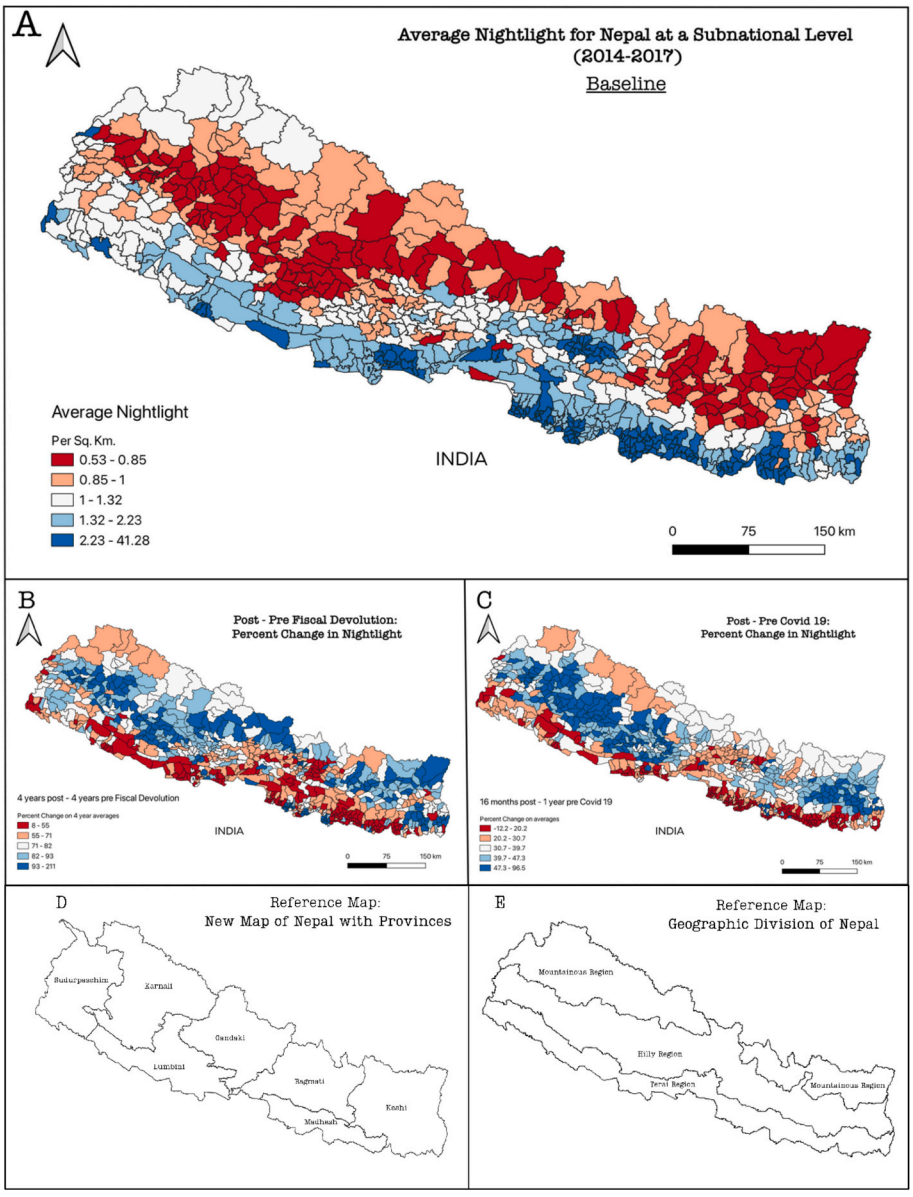
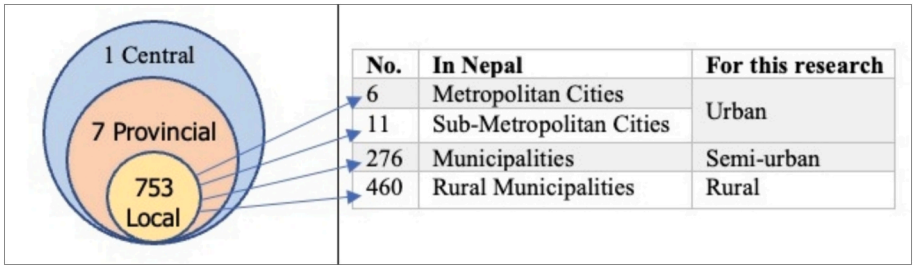


Fig. 3. **A:** Levels of economic development across local governments in Nepal prior to devolution (2014–2017). Fig. 3**B:** Changes in economic development following devolution, calculated as the average difference between the periods 2018–2021 and 2014–2017. Fig. 3**C:** Variations in economic development post-Covid-19, measured as the difference between the 2019 average and the 16-month average during Covid-19 lockdowns (March 2020–June 2021). Fig. 3**D:** Map showing the provinces of Nepal as depicted in the updated national map released in 2020. Fig. 3**E:** Map illustrating the geographical divisions of Nepal. .
Source: Nightlight data from the Earth Observation Group (EOG). Detailed information is provided in Section 4.1.1. Note: Although the updated map of Nepal (Fig. 3D) was released in 2020, this study uses the earlier map due to the reliance on data predating 2020



No.	In Nepal	For this research
6	Metropolitan Cities	Urban
11	Sub-Metropolitan Cities	
276	Municipalities	Semi-urban
460	Rural Municipalities	Rural

Fig. 4. Central, Provincial and Local Government Tiers in Nepal and their categorisation in the analysis.

research, particularly in the case of a developing country with significant informal economic activity and subnational regional diversity.

Furthermore, empirical evidence confirms a strong correlation between nightlight data (both sum and mean values) and Nepal's GDP at the national (Fig. 5A) (r = 0.9204) and provincial levels (Fig. 5B) (r = 0.8199). This finding reinforces the reliability of nightlight data as a reliable proxy for economic activity in this study. Fig. 5C illustrates the evolution of nightlights from January 2019 to October 2021, with notable declines, as could be expected, during COVID-19 lockdown periods.

4.1.2. *Fiscal devolution indicators (Main independent Variables)*

Compiling fiscal devolution data for Nepal is challenging, as information is often scattered and disorganised. This dataset required considerable effort to collect, translate, and code data from various government websites. Data on expenditures, internal revenues, and intergovernmental fiscal transfers were obtained from the Financial Comptroller General Office of Nepal (FCGO), while information on conditional and unconditional transfers from the central government to local governments was sourced from the Ministry of Finance's website. Similarly, transfers from provincial governments to local governments were gathered from the websites of all seven provincial governments, often involving the provincial Ministry of Finance, the Auditor General's Office, and the Ministry of Economic Affairs. Most data were in PDF format and had to be translated into English before integration into the dataset.

For this analysis, three regression models were constructed, each incorporating different combinations of the following five fiscal devolution indicators:

1. **Subnational Expenditures per capita (Exp)**: This indicator measures the average per capita expenditure by local governments for the fiscal years 2017/18, 2018/19, and 2019/20. According to Martínez-Vázquez and McNab (2003), local government expenditures are more effective for stimulating subnational economic growth due to their alignment with local needs. This variable is central to the first set of regressions.
2. **Subnational Internal Revenues per capita (IR)**: This includes 'own source revenue,' representing the average tax collected per capita by local governments for the fiscal years 2017/18, 2018/19, and 2019/20, combined with 'divisible revenue,' which refers to revenue raised at the local, provincial, or federal level but distributed among different levels of government. Revenue collected at the provincial or local level is divided through a straightforward

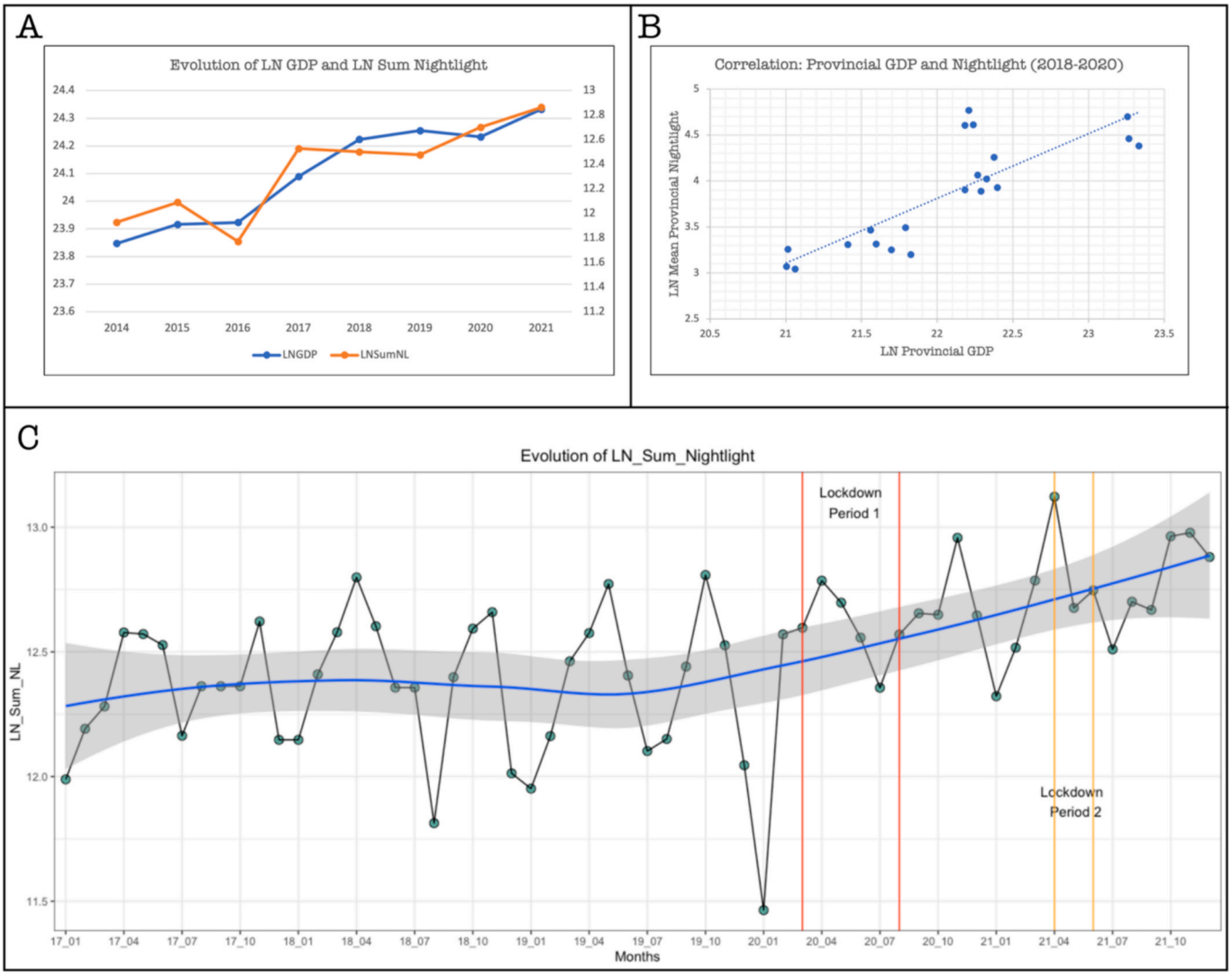


Fig. 5. A: Correlation between GDP and sum nightlight at the national level (r = 0.92). Fig. 5**B:** Correlation between provincial GDP and provincial mean nightlight (r = 0. 82). Fig. 5**C:** Monthly evolution of nightlight from January 2017 to October 2021.).
Source: Nightlight data from Earth Observation Group (EOG); Nepal Economic Survey (2017-2021)

mechanism: the government that collects the revenue retains 60 % and transfers the remaining 40 % to the other level of government. In contrast, revenue collected at the federal level follows a different distribution model. Here, 70 % is retained by the central government, with 15 % allocated to provincial governments and the remaining 15 % distributed to local governments. The amounts received by local governments are determined based on various indicators, including population, land area, human development metrics, and infrastructure, similar to the allocation criteria for unconditional grants. While a separate analysis of internal revenues and divisible revenues would be ideal, available government data only report combined figures under the heading of Internal Revenue up until the financial year 2018/19. Scholars like Dabla-Norris (2006) and Rodríguez-Pose and Krøijer (2009) argue that the capacity to collect local revenues fosters local government self-sufficiency, making this a key variable in the second set of regressions.

3. **Subnational Fiscal Transfers per capita (FT)**: This indicator represents the average per capita amount transferred from central and provincial governments to local governments for the fiscal years 2017/18, 2018/19, and 2019/20. As fiscal devolution often leads to a gap between internal revenue collection and expenditure responsibilities at the subnational level, fiscal transfers play a crucial role in bridging this gap and are a key focus in the second set of regressions.
4. **Unconditional Grants per capita (UG)**: Allocated as 'Fiscal Equalisation Grants,' these funds aim to address vertical and horizontal imbalances between different levels of government (Adhikari et al., 2020). The analysis focuses on per capita amounts transferred for the fiscal year 2019/20, as a new formula for fiscal transfers was implemented after this period. This variable is central to the third set of regressions.
5. **Conditional Grants per capita (CG)**: This indicator combines the per capita amounts for conditional, matching, and special grants for the fiscal year 2019/20. Conditional grants are earmarked for specific investments, such as infrastructure, education, and health (and their operation through, for example, salaries), and must be returned if unspent. Matching grants follow a cost-sharing model, where local governments contribute 30–70 percent of project funding, with the remainder provided by provincial or central governments. Special grants focus on social development projects aimed at improving conditions for marginalised groups, including ethnic minorities. For analytical purposes, these three types of grants are clustered together as 'Conditional Grants'.

By integrating these fiscal devolution indicators, the analysis provides a nuanced understanding of how local government expenditures, revenues, and transfers influence the economic and governance capacities of municipalities in Nepal. This approach offers valuable insights into the impacts of fiscal devolution in developing countries, particularly regarding economic resilience and local government performance.

4.2. The model

Based on the theory and the base model (1), we estimate three different regression specifications. As a robustness check, we also employ 'province fixed effects' for each of the three models and report the results accordingly.

$$\ln\Delta NL_{r,t_{post-pre}} = \alpha + \beta_1 \ln \mathrm{Exp}_{r,\,t_{2018-2020}} + \beta_2 \ln NL_{r,t_{2014-2018}} + \beta_3 C_{r,t} + \mathscr{E}_{r,t} \tag{2}$$

$$\ln\Delta NL_{r,t_{\mathrm{post-pre}}} = \alpha + \beta_1 \ln IR_{r,\,t_{2018-2020}} + \beta_2 \ln FT_{r,\,t_{2018-2020}} + \beta_3 \ln NL_{r,t_{2014-2018}} + \beta_4 C_{r,t} + \mathscr{E}_{r,t} \tag{3}$$

$$\ln\Delta NL_{r,t_{\mathrm{post-pre}}} = \alpha + \beta_1 \ln IR_{r,\,t_{2018-2020}} + \beta_2 \ln UG_{r,\,t_{2020}} + \beta_3 \ln CG_{r,\,t_{2020}} + \beta_4 \ln NL_{r,t_{20214-2018}} + \beta_5 C_{r,t} + \mathscr{E}_{r,t} \tag{4}$$

Here, C represents a set of controls divided into regional resistance controls and geographical controls.

4.2.1. Regional resistance controls

i. **Population:** Population data were sourced from LandScan,[2] a global population database developed by the Oak Ridge National Laboratory (ORNL) of the US Department of Energy. LandScan provides high-resolution population distribution data (around 1 km at the equator) in a GIS raster format (ESRI Grid). Population figures were used to calculate per capita values for all five types of fiscal data discussed earlier. However, population was excluded from the models due to multicollinearity problems (VIF > 10) related to fiscal transfers[3] (VIF > 10), which could skew the model's results.

ii. **Human Capital:** Human capital has been widely acknowledged as critical for economic performance and resilience (Crescenzi, 2005). In this model, human capital is represented by the natural logarithm of 1 plus the per capita share of the population educated to at least a high school level. The constant of 1 ensures that logarithmic shares do not produce negative values. Due to the lack of education data for 2020, data from the 2021 census was used as the next best alternative.

iii. **Infrastructure:** Physical infrastructure, like human capital, is essential for economic growth and resilience. The road network data was sourced from Open Street Map, focusing on primary, secondary, tertiary, and trunk roads per capita within each municipality. Pathways suited only for walking or animal traffic, common in Nepal's mountainous regions, were excluded. The variable is calculated as the natural logarithm of 1 plus the per capita share of these roads to avoid negative values. This is consistent with the human capital calculation.

iv. **Political Affiliation:** Drawing from Bouvet and Dall'erba (2010), who found that political dynamics influence fund allocation, we included a political affiliation dummy variable. This variable is set to 1 if the local government leader belonged to the same party as the central government's ruling party (Unified Marxist-Leninist Communist Party of Nepal) at the onset of COVID-19. This dummy helps assess whether political alignment affects fiscal allocation and economic outcomes in Nepal's local governments.[4]

4.2.2. Geographical controls

i. **Ruggedness:** Ruggedness is quantified as the natural logarithm of the standard deviation of elevation within each local government area. Nepal's highly varied topography, with altitudes ranging from 60 m to 8,848 m, could significantly influence both development and resilience preconditions. This measure is consistent with previous research on Nepal (Fafchamps & Shilpi, 2005) and helps capture geographical constraints that may affect economic activities.

ii. **Dummy for Local Governments Sharing a Border with India:** Of Nepal's 753 local governments, 118 share a border with India. Given

[2] The data were sourced from Aid Data.

[3] On the formula used to decide the Fiscal Equalisation Grants to be transferred to local governments, population carries a 70% weight. This is potentially the cause of high correlation.

[4] The party leading the government changed to Nepali Congress in July of 2021 – shortly after the analysis period.

Nepal's reliance on India for trade, economic activity in these local governments could be positively influenced by proximity to the country's larger neighbour. To capture this potential influence, a dummy variable is included, coded as 1 for local governments bordering India.

Variance Inflation Factor (VIF) tests revealed multicollinearity issues with two variables: population and land area. Both were expected to show high multicollinearity since these factors are significant determinants in fiscal transfer formulas. Therefore, both variables were excluded from the regression analysis. However, per capita estimates used in the regressors capture the essence of population differences and provide robust standardisation among local governments of varying sizes.

5. Limitations

The analysis faces several limitations related to the estimation process, the measurement of fiscal indicators, and data quality in Nepal.

First, there are estimation limitations. Methodological challenges restrict the ability to establish causal relationships and fully assess the impact of fiscal devolution on economic resilience. Potential omitted variable bias may exist due to the exclusion of relevant factors. While using province-fixed effects in robustness checks mitigates endogeneity and regional heterogeneity issues (Rodríguez-Pose & Krøijer, 2009), it does not eliminate the possibility of reverse causality between resilience and fiscal devolution.

The second limitation concerns the measurement of fiscal devolution. The literature does not provide consensus on empirical metrics for fiscal devolution (Martínez-Vázquez et al., 2017). For example, subnational expenditures can be modelled in absolute terms, as a share of total government expenditure, or on a per capita basis. Correlations between fiscal devolution metrics and factors like population and land area further complicate this analysis. We have opted for per capita values of fiscal indicators and changes in nightlight data, as it also bypasses the need for land area and population controls.

Lastly, there are also data limitations: The use of proxies and geospatial data in this research stems from the unavailability of detailed local-level data in Nepal. Nightlight data was used as a proxy for economic activity, while population and road infrastructure data were derived from LandScan and Open Street Map. Though not ideal, these sources represent the best alternatives available.

6. Empirical results

The results of estimating models 2, 3, and 4 are presented in Tables 1, 2, and 3, respectively. As a robustness check, province-fixed effects were applied to each model, and the results are shown in Table 4. Overall, the signs and significance levels of the regressors remain consistent with and without the fixed effects, except for unconditional transfers in rural and semi-urban municipalities. In these cases, the coefficients were weakly negative without fixed effects and became insignificant when fixed effects were applied, indicating that unconditional grants have a negligible or negative effect on resilience in these areas, a finding further explored in the subsequent analysis.

Starting with the insights from Table 1, a significant and positive correlation emerges between local government expenditure and regional resilience, indicating that local governments with higher levels of government spending experienced stronger resilience during the COVID-19 pandemic. This relationship holds across different regression specifications, even though the correlation's magnitude decreases when regional resilience factors and geographical controls are added. Specifically, a 1 % increase in expenditure per capita is associated with a 0.15 % increase in economic activity in the absence of controls, but this effect drops to 0.03 % when all controls are included. The dummy variables for rural and semi-urban municipalities are negative but not statistically significant. This result suggests that, other things being equal, there is no notable difference in resilience between rural, semi-urban, and urban municipalities. The positive and significant association between local government expenditure and resilience underscores the importance of fiscal devolution for regional resilience, supporting Thießen's (2003) argument that consumer efficiency can be improved under subnational governments.

The analysis of control variables reveals several patterns. First, the

Table 1
Results of Regression Equation (1): Change in Nightlight during Covid-19, Expenditure per capita and pre-crisis conditions.

VARIABLES	(1.1) deltanl	(1.2) deltanl	(1.3) deltanl	(1.4) deltanl	(1.5) deltanl
Log Expenditure pc	0.155***	0.163***	0.0282***	0.0332***	−0.382***
	(0.0147)	(0.0137)	(0.0109)	(0.0128)	(0.0975)
Log Baseline NL		−0.0291***	−0.0414***	−0.0461***	−0.0468***
		(0.00755)	(0.00665)	(0.00750)	(0.00789)
Log Education pc			−0.265*	−0.364***	−0.403***
			(0.154)	(0.141)	(0.144)
Log Roads pc			−0.000127	−0.000606	−0.000986
			(0.00998)	(0.00978)	(0.00982)
Log Ruggedness			0.0437***	0.0454***	0.0457***
			(0.00332)	(0.00314)	(0.00316)
Rural				−0.0486	−3.707***
				(0.0298)	(0.862)
Semi Urban				−0.0412	−3.736***
				(0.0265)	(0.861)
Rural#Log Expenditure pc					0.416***
					(0.0972)
Semi Urban#Log Expenditure pc					0.420***
					(0.0973)
Same Party Leader			0.00106		
			(0.00981)		
Borders India			−0.0166		
			(0.0135)		
Constant	−1.231***	−1.149***	−0.0355	−0.0184	3.642***
	(0.136)	(0.136)	(0.0882)	(0.0928)	(0.863)
Observations	753	753	753	753	753
R-squared	0.206	0.223	0.408	0.408	0.412

Robust standard errors in parentheses.
*** p < 0.01, ** p < 0.05, * p < 0.1.

Table 2
Results of Regression Equation (2): Change in Nightlight during Covid-19, Internal Revenue and Transfers per capita and pre-crisis conditions.

VARIABLES	(2.1) deltanl	(2.2) deltanl	(2.3) deltanl	(2.4) deltanl	(2.5) deltanl
Log Internal pc	−0.0240*	−0.0138	−0.0186	−0.0162	−0.165***
	(0.0130)	(0.0133)	(0.0124)	(0.0123)	(0.0512)
Log Transfers pc	0.162***	0.159***	0.0341***	0.0362***	−0.237***
	(0.0130)	(0.0132)	(0.0118)	(0.0131)	(0.0580)
Log Baseline NL		−0.0169**	−0.0374***	−0.0420***	−0.0424***
		(0.00786)	(0.00660)	(0.00716)	(0.00742)
Log Education pc			−0.118	−0.200	−0.334*
			(0.181)	(0.168)	(0.181)
Log Roads pc			0.000484	0.000139	0.000191
			(0.0100)	(0.00991)	(0.0100)
Log Ruggedness			0.0443***	0.0463***	0.0458***
			(0.00315)	(0.00283)	(0.00304)
Rural				−0.0447	−3.553***
				(0.0287)	(0.768)
Semi Urban				−0.0397	−3.653***
				(0.0260)	(0.766)
Rural# Log Internal pc					0.140**
					(0.0544)
Semi Urban#Log Internal pc					0.168***
					(0.0518)
Rural#Log Transfers pc					0.282***
					(0.0591)
Semi Urban#Log Transfers pc					0.271***
					(0.0569)
Same Party Leader			0.00196		
			(0.00985)		
Borders India			−0.0186		
			(0.0136)		
Constant	−1.114***	−1.074***	0.0245	0.0428	3.541***
	(0.149)	(0.151)	(0.0850)	(0.0868)	(0.766)
Observations	753	753	753	753	753
R-squared	0.203	0.208	0.408	0.408	0.413

Robust standard errors in parentheses.
*** p < 0.01, ** p < 0.05, * p < 0.1.

coefficient for roads, used as a proxy for physical capital, is insignificant across all models. This diverges from much of the literature, which often reports a positive association between physical infrastructure and economic outcomes. The insignificance of this result could reflect the inadequate state of road infrastructure in Nepal, particularly in rural areas. Second, the coefficient for education, representing human capital, initially shows weak negative significance (−0.02) in Table 1 but becomes insignificant in Tables 2 and 3. This finding contrasts with the prevailing literature, where human capital is typically associated with positive economic performance. The weak educational infrastructure in Nepal, particularly in less developed municipalities, may help explain this unexpected result.

Additionally, the examination of local governments bordering India and those with mayors from the same political party as the ruling central government at the onset of COVID-19 suggests that these factors do not significantly impact resilience, as their coefficients remain insignificant across all tables. Ruggedness, however, appears to have a positive and significant effect in all models, indicating that municipalities located in hilly or mountainous regions, which are mostly rural or semi-urban, tend to show greater resilience. These findings suggest that the challenging geography of these municipalities may contribute to their stronger resistance to economic shocks.

The baseline nightlight data, used as a proxy for economic activity prior to the pandemic, consistently shows a negative and significant association with resilience across all tables. This suggests that local governments with higher levels of economic activity before the pandemic were less resilient to the economic shock of COVID-19. This pattern aligns with neoclassical growth theories, which might interpret the result as evidence of economic convergence, where less developed municipalities 'catch up' in times of disruption (Crescenzi et al., 2016).

To further investigate the varying impacts of government expenditure across rural, semi-urban, and urban municipalities, an interaction term was introduced in model 1.5. The results indicate that rural and semi-urban municipalities benefit more from fiscal devolution than urban municipalities, with semi-urban areas experiencing the greatest advantage. This demonstrates the essential role fiscal devolution plays in enhancing resilience in less urbanised municipalities, reflecting the political-economic dynamics of Nepal and supporting theoretical arguments from devolution proponents.

Turning to Table 2, which breaks down government expenditure into its main sources —internal revenues and intergovernmental fiscal transfers— the initial results in model 2.1 show a weak negative correlation between internal revenues and resilience, while fiscal transfers are positively and significantly associated with resilience at the 1 % significance level. Even after including various controls, the positive effect of fiscal transfers remains strong, though the magnitude of the coefficients decreases slightly. This pattern, where fiscal transfers (rather than internal revenues) drive resilience, presents a unique case in the context of Nepal, diverging from the expectations of much of the literature. Scholars like Dabla-Norris (2006) and Rodríguez-Pose and Krøijer (2009) argue for the importance of local revenue generation to promote self-sufficiency and autonomy at the subnational level. However, in Nepal, fiscal transfers appear to have had a more direct impact on economic resilience than internal revenue collection.

The interaction between local government types and their respective sources of revenue —internal revenues and fiscal transfers— provides insight into how each revenue source impacts different local governments. For urban and rural municipalities, the coefficients show a negative and significant relationship with resilience (−0.165 and −0.025, respectively), indicating that increases in internal revenue do not necessarily translate into greater resilience for these areas. By contrast, semi-urban municipalities show a slight but significant positive

Table 3
Results of Regression Equation (3): Change in Nightlight during Covid-19, Internal Revenue, Unconditional Transfers and Conditional Transfers per capita and pre-crisis conditions.

VARIABLES	(3.1) deltanl	(3.2) deltanl	(3.3) deltanl	(3.4) deltanl	(3.5) deltanl
Log Internal pc	0.0272**	0.0414***	0.0133	0.0143	−0.164***
	(0.0120)	(0.0121)	(0.0134)	(0.0134)	(0.0503)
Log Unconditional pc	−0.136***	−0.143***	−0.0951***	−0.0947***	0.0512
	(0.0161)	(0.0158)	(0.0165)	(0.0182)	(0.0644)
Log Conditional pc	0.257***	0.259***	0.132***	0.131***	−0.211***
	(0.0167)	(0.0163)	(0.0165)	(0.0166)	(0.0727)
Log Baseline NL		−0.0218***	−0.0368***	−0.0389***	−0.0389***
		(0.00722)	(0.00660)	(0.00726)	(0.00790)
Log Education pc			−0.177	−0.187	−0.303
			(0.187)	(0.175)	(0.188)
Log Roads pc			−0.0150	−0.0149	−0.0152
			(0.0104)	(0.0103)	(0.0106)
Log Ruggedness			0.0362***	0.0383***	0.0381***
			(0.00324)	(0.00290)	(0.00297)
Rural				−0.0158	−3.029***
				(0.0296)	(0.628)
Semi Urban				−0.0186	−3.054***
				(0.0260)	(0.629)
Rural#Log Internal pc					0.180***
					(0.0534)
Semi Urban#Log Internal pc					0.184***
					(0.0511)
Rural#Log Unconditional pc					−0.159**
					(0.0705)
Semi Urban#Log Unconditional pc					−0.116*
					(0.0694)
Rural#Log Conditional pc					0.358***
					(0.0746)
Semi Urban #Log Conditional pc					0.316***
					(0.0724)
Same Party Leader			−0.00147		
			(0.00952)		
Borders India			−0.0205		
			(0.0134)		
Constant	−1.081***	−1.033***	−0.202**	−0.184**	2.791***
	(0.103)	(0.106)	(0.0902)	(0.0919)	(0.627)
Observations	753	753	753	753	753
R-squared	0.317	0.325	0.440	0.438	0.444

Robust standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

correlation (+0.003), suggesting that a 1 % rise in internal revenue leads to a marginal increase in resilience. This outcome implies that while a strong pool of internal revenue does not universally enhance resilience, semi-urban municipalities may benefit slightly more than their urban and rural counterparts.

The scenario changes when it comes to fiscal transfers. Urban municipalities experience a negative impact (−0.237), while rural and semi-urban municipalities show a positive and significant correlation with resilience (+0.045 and + 0.034, respectively). This pattern highlights how important fiscal transfers are for resilience, particularly in Nepal's rural and semi-urban local governments.

Turning to Table 3, the analysis distinguishes between unconditional and conditional transfers to explore which type of expenditure is more closely connected with resilience. Unconditional transfers, which encompass fiscal equalisation grants aimed at addressing disparities among local governments, surprisingly show a negative correlation with resilience, although with a lesser magnitude. On the other hand, conditional transfers —grants designated for specific projects or activities— are positively and significantly correlated with resilience. Hence, they could have a greater potential impact compared to internal revenues and unconditional transfers. These findings remain consistent even after controlling for regional resilience factors, geographical controls, and rural and semi-urban dummy variables, which underscores the effectiveness of conditional transfers in enhancing regional resilience.

While internal revenue appeared mostly insignificant in the analysis of Table 2, it reports a slight positive significance in Table 3. Further exploration of the interaction terms helps clarify how fiscal devolution, through its varied mechanisms, influences resilience across urban, semi-urban, and rural local governments, revealing a nuanced landscape of fiscal policy impacts in Nepal. This suggests that, although internal revenue and resilience remain negatively correlated for urban municipalities, the relationship is marginally positive and significant for rural and semi-urban municipalities. Consequently, enhancing the capacity for internal revenue generation in rural and semi-urban municipalities may have helped in making less developed areas in the country more resilient.

Unconditional transfers, which are insignificant for urban municipalities, show a negative and significant coefficient for rural and semi-urban municipalities. Conditional transfers, on the other hand, exhibit a negative and significant relationship in urban municipalities, while having a markedly positive coefficient in rural and semi-urban municipalities. Specifically, a 1 % increase in conditional transfers is associated with a 0.14 % increase in economic activity for rural municipalities and a 0.10 % increase for semi-urban municipalities. Referring back to Table 1, it becomes clear that the expenditures by local governments, largely financed by conditional transfers earmarked for specific investments, boost regional resilience.

So, is devolution working in Nepal? The analysis of the three tables reveals a clear pattern: economic resilience in urban municipalities (metros and sub-metros) either shows a negative correlation or remains unaffected by fiscal devolution. Rural and semi-urban municipalities, by contrast, seem to benefit from it. At first glance, this suggests that

Table 4
Results of Robustness Test: Model 5 of all 3 Regressions (with Province Fixed Effects).

VARIABLES	(4.1) Fixed Effects	(4.2) Fixed Effects	(4.3) Fixed Effects
Log Expenditure pc	−0.531***		
	(0.0896)		
Log Internal pc		−0.206**	−0.224***
		(0.0655)	(0.0482)
Log Transfers pc		−0.309**	
		(0.108)	
Log Unconditional pc			0.0648
			(0.0786)
Log Conditional pc			−0.314**
			(0.0968)
Log Baseline NL	−0.0495**	−0.0501**	−0.0457**
	(0.0150)	(0.0138)	(0.0143)
Rural	−4.941***	−4.546**	−4.106***
	(0.876)	(1.376)	(0.985)
Semi Urban	−4.827***	−4.471**	−4.129***
	(0.748)	(1.261)	(0.928)
Rural#Log Expenditure pc	0.557***		
	(0.0954)		
Semi Urban#Log Expenditure pc	0.546***		
	(0.0824)		
Rural#Log Internal pc		0.211**	0.254**
		(0.0823)	(0.0706)
Semi Urban#Log Internal pc		0.227***	0.249***
		(0.0550)	(0.0420)
Rural#Log Transfers p		0.335**	
		(0.114)	
Semi Urban#Log Transfers pc		0.315**	
		(0.113)	
Rural# Log Unconditional pc			−0.139
			(0.113)
Semi Urban#Log Unconditional pc			−0.0679
			(0.0823)
Rural#Log Conditional pc			0.402***
			(0.105)
Semi Urban#Log Conditional pc			0.342**
			(0.0936)
Constant	4.957***	4.535**	4.008***
	(0.845)	(1.362)	(0.975)
Observations	753	753	753
R-squared	0.489	0.489	0.499
Province FE	YES	YES	YES
Education, Roads and Ruggedness Controls	YES	YES	YES

Robust standard errors in parentheses.
*** p < 0.01, ** p < 0.05, * p < 0.1.

devolution is indeed supporting the development of less developed local governments. However, a more nuanced interpretation is necessary before drawing definitive conclusions.

The key factor driving this positive outcome appears to be conditional transfers, which are essentially earmarked investments in infrastructure and services such as education and healthcare, including current expenditures like salaries. These transfers come with specific conditions attached by higher-level governments, based on defined outputs. While the expenditures are executed at the local level, the conditions, planning, and deadlines are often determined or approved by central or provincial authorities.

True devolution, however, involves more than just the allocation of expenditure responsibilities. It requires the transfer of decision-making powers to subnational governments and the ability to act independently at the local level. The fact that unconditional transfers —which provide local governments with full autonomy over resource allocation— are negatively correlated with economic growth suggests that many local governments in Nepal may lack the capacity to effectively invest these resources. This aligns with Prud'homme's (1995) argument that decentralisation does not automatically lead to better outcomes, as local governments may not always possess the necessary capabilities to allocate funds efficiently towards projects that enhance resilience.

Thus, while devolution theoretically aims to empower local governance, its impact in Nepal depends heavily on the capacity of local governments to use their autonomy in a way that fosters economic resilience and development. The findings imply that Nepal's local governments, particularly rural and semi-urban municipalities, benefit more from conditional transfers that come with guidance and earmarked purposes rather than from unconditional transfers that grant full autonomy. This highlights the importance of building local institutional capacity to ensure that devolution can fully achieve its intended objectives.

7. Conclusion

The primary aim of this article has been to explore the significance of fiscal devolution in Nepal, particularly in relation to how it influences the resilience of local governments during major economic shocks, such as the Covid-19 pandemic. By merging two distinct fields (devolution and regional resilience), we have analysed the economic impact of the pandemic through the lens of fiscal devolution. This analysis, supported by data on economic activity from nightlight imagery and fiscal devolution information from Nepalese government sources, offers a comprehensive view of the interaction between fiscal policy and regional stability.

Our findings demonstrate that fiscal devolution has been instrumental in enhancing the resilience of Nepal's local governments. Specifically, it has benefited rural and semi-urban municipalities more than their urban counterparts. This pattern suggests that the devolution policies implemented in Nepal have been particularly effective to increase economic resilience in less developed areas, aligning with the broader goals of Nepal's devolution strategy. The intent behind Nepal's devolution was to improve the conditions of historically marginalised regions, promoting equitable resource distribution and empowering local governance (Adhikari et al., 2020). The observed resilience in rural and semi-urban municipalities indicates that, to a large extent, devolution has succeeded in this regard.

However, this conclusion becomes nuanced, particularly when considering the specific elements of fiscal devolution. While internal revenue generation, including divisible revenues, has been somewhat effective in supporting rural and semi-urban municipalities, it has not universally enhanced resilience across Nepal. This finding contrasts with much of the existing literature, which often stresses the importance of fiscal autonomy and the ability of subnational governments to generate their own revenue as a cornerstone of effective devolution (e.g., Dabla-Norris, 2006; Rodríguez-Pose & Krøijer, 2009). Instead, our study identifies transfers, particularly conditional transfers, as the key driver of resilience in less developed areas of the country. Targeted investments in infrastructure, education, and healthcare have enabled these areas to better withstand and recover from the significant economic shocks caused by the pandemic. Conversely, unconditional grants, which aim to promote fiscal independence and autonomy, have shown a negative correlation with resilience. Hence, the critical factor for success is not autonomy itself, but the strategic direction of investment.

These findings carry important policy implications. First, there is a clear need to prioritise infrastructure and development investments in rural and semi-urban municipalities as part of Nepal's federalism agenda. Historically, these areas have been underfunded. Addressing this gap is thus essential to building their economic resilience. Furthermore, as federalism continues to expand, there is an urgent need to enhance the administrative and fiscal capacity of local governments. This would allow them to better leverage internal and divisible revenues, as well as unconditional grants, thereby maximising the potential of devolved governance to contribute to economic resilience and regional development.

In conclusion, while fiscal devolution is central to shaping the economic vitality of Nepal's local governments, its success depends on a

nuanced understanding and effective implementation of its components. Federalism should not be viewed simply as a mechanism for redistributing fiscal resources, but rather as a strategic tool for investing in physical and institutional infrastructure, as well as building the capacity of local governments. Therefore, the answer to whether fiscal devolution matters in Nepal is yes, but with the crucial caveat that its benefits are most pronounced when devolution is accompanied by targeted investments and capacity-building efforts at the subnational level.

Looking ahead, the continued legitimisation and expansion of fiscal devolution in Nepal, alongside the challenges of growing subnational expenditures outpacing revenue growth World Bank (2023), call for a sustained and strategic approach to policy development and research. Future studies should focus on using longitudinal data to provide stronger causal insights into the effects of devolution on subnational economic growth. Additionally, examining the structural and business ecosystems that underpin regional resilience —including the sectoral composition of local economies— could offer valuable insights into how devolution influences economic performance. Since local government capacity appears to be a key determinant of resilience, future research could also explore 'institutional capacities' or 'quality of government' as important variables. As data infrastructure and institutional governance at the subnational level improve, access to more detailed data will enable more nuanced analyses. Lastly, the unexpected findings regarding the limited impact of internal revenues and unconditional grants on resilience highlight the need for further research to understand the underlying dynamics and potential strategies to improve the efficacy of fiscal devolution. In sum, our research not only highlights the importance of federalism in Nepal but also lays the groundwork for future research and policy interventions aimed at realising the full potential of fiscal devolution in fostering regional development and resilience.

CRediT authorship contribution statement

Raj Kharel: Writing – review & editing, Writing – original draft, Formal analysis, Data curation, Conceptualization. **Andrés Rodríguez-Pose:** Writing – review & editing, Writing – original draft, Supervision, Formal analysis, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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APPENDIX

Appendix 1A: Trendline in Nightlight after controlling for seasonality (2014 – 2021).

Appendix 1B: Breakdown of original Nightlight values into observed, trend, seasonal and random component (2014 – 2021).

Data availability

Data will be made available on request.

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