Financial Intermediation and Economic Growth in Nepal

Khem Raj Subedi

Associate Professor, Tikapur Multiple Campus, Far Western University, Nepal

Corresponding Author's Email: khem7434@gmail.com

Abstract

This paper portrays the impact of financial intermediation especially domestic credit to the private sector and broad money supply on GDP growth in Nepal, using annual time series data spanning from 1974 to 2022. The main objectives of the paper are to examine the magnitude and direction of these financial intermediation variables in influencing economic growth of Nepal. The included time series data were a mix of stationary at level and after first difference. Hence, an Autoregressive Distributed Lag (ARDL) model was employed to provide robust framework for analyzing both long-term relationships and short-term fluctuations while maintaining flexibility in lag selection and handling endogeneity. The findings indicate a nuanced relationship between financial factors and GDP growth of Nepal. Specifically, the coefficient of domestic credit to the private sector is positive but statistically insignificant, this suggests that the flow of domestic credit may be either insufficient or inefficiently allocated to significantly contribute Nepalese economic growth. But, the broad money supply as a percentage of GDP shows a strong positive and statistically significant effect. This indicate that increased money supply supports business activities, improves liquidity, spur investments, and eventually fostering economic growth. Moreover, other control variables also display significant relationships with GDP growth of Nepal. Labor force participation and trade openness demonstrate substantial positive effects, while government expenditure shows a modest positive impact. Furthermore, private consumption expenditure emerged as a

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critical driver of growth, emphasizing the importance of household expenditure in stimulating demand and economic growth. Therefore, these results underscore the necessity of a stable money supply, increased labor force participation, enhanced private consumption, and greater trade openness for sustained economic growth in Nepal. The findings also shed light to explore potential area for policy improvement to strengthen domestic credit allocation to enhance its contribution to economic growth.

Keywords: Financial intermediation, domestic credit, broad money supply, economic growth

Introduction

The relationship between financial intermediation and economic growth has attracted significant attention among economists, especially with the emergence of endogenous economic growth theories (Popov, 2018; Romer, 1990). The main role of the intermediation such as financial markets and institutions in all economies is to improve the efficiency of capital allocation and encourage savings, mobilize savings, boost economic growth, leading to further capital formation, thereby manage the risks, and facilitate transactions (Seven & Yetkiner, 2016). Economists assign varying degree of importance to financial intermediation and its theoretical role is supported by empirical evidence too (Shittu, 2012; Chen, 2006; King & Levine, 1993). Domestic credit is an important indicator of the development of the banking sector as well as the financial development of a country. Domestic credit refers to financial resources provided to the private sector by the financial sector (Bui, 2020; Edward, 2018; Mishra et al., 2009). It involves providing resources to debtors, who repay or return them later, without immediate repayment. Moreover, domestic credit reflects the financial development of a country (Bui, 2019). Under financial intermediation system, the concept of domestic credit and broad money supply and their relationship with economic growth has been studied and analyzed by various economist and scholars over the years.

Empirical studies show that the relationship between domestic credit to the private sector and economic growth is multifaceted. In fact, studies show that private credit can have both positive and negative effects on economic growth. While some research suggests a linear negative relationship between private credit and economic growth, indicating that excessive private credit can harm growth (Botev, 2019; Ductor

& Grechyna, 2015), other studies demonstrate that an increase in private sector credit extension can predict economic growth positively (Andreas, 2018). Moreover, the expansion of credit to the private sector, broad money supply, along with external debt, has been found to enhance investment in infrastructure, a significant driver of GDP growth (Mehar, 2022; Obeng-Amponsah et al., 2019). Nevertheless, it serves as a fundamental drivers of economic activity, facilitating investment, consumption, and overall economic expansion. Hence, exploring the nexus between domestic credit and economic growth provides valuable insights into the functioning of financial system and their role in promoting economic growth (Ouyang & Li, 2018).

The impact of financial intermediation on economic growth rate has been a topic of considerable interest in the field of economics. Therefore, understanding the impact of financial intermediation on economic growth and development is crucial for policymakers and researchers as it sheds light on the dynamics of economic growth and financial stability. In this regard, several empirical studies have found the positive influence of domestic credit on economic growth. Wolde-Rufael (2009) revealed the positive causal relationship between domestic credit and economic growth in Kenya based on the annual time series data of 1966 to 2005. Schumpeter (1911) is regarded as the first economists that believed domestic credit plays an essential role in boosting economic growth through financing for investment and manufacturing. Hence, the impact of financial intermediation on GDP varies with institutional, market, and macroeconomic factors. This paper analyzes the effects of domestic credit and broad money supply on Nepal's GDP, aiming to enhance understanding of their interplay and inform policies to maximize benefits while mitigating risks in the Nepalese context. In this regard, this paper has considered the variables GDP growth rate as a dependent variable and net domestic credit to the private sector, and ratio of broad money to GDP as explanatory variables. Additionally, the variables such as total government expenditure, labour force participation rate, private consumption expenditure, and trade openness are included as the control variables.

Literature Review

Theoretical Perspectives

In economic literature, the impact of financial intermediation on economic growth has been widely studied with various theoretical frameworks that offer insights from different perspectives. McKinnon (1973) theory emphasized the crucial role of financial institutions in economic development, underscoring that liberalized financial markets are crucial for channeling credit funds into productive investments. Similarly, Shaw (1993) also argued that financial liberalization and development promote economic growth thereby fostering an environment where capital and credit can be allocated efficiently. Endogenous Growth theories as pioneered by Romer (1990) and Lucas (1988) underscore that credit expansion plays a role in capital accumulation, technological advancements, and skill development, that increase access to credit allows firms to boosting productivity and growth.

Moreover, financial Intermediation theory which is associated with Levine (1997), underscores the role of financial intermediaries such as banks, credit unions channeling savings into productive investments. The theory asserts that through the extension of domestic credit, financial intermediaries reduce information asymmetries, improve resource allocation, and facilitate risk-sharing. In this regard, Levine (1997) reviewed theoretical and empirical literature and emphasized the importance of strong financial systems and regulatory frameworks in maximizing these growth benefits. Furthermore, the monetary theory suggests that interest rates significantly affect domestic credit availability and cost that influence borrowing and investment decisions (Bernanke, 1993).

Empirical Review

The financial intermediation systems play crucial role in shaping economic cycle and growth thereby fueling economic expansions and also the potential risks associated with excessive credit creation, leading to financial crisis (Minsky & Whalen, 1996). In other words, a rapidly increased domestic credit contributes to enhance the economic development of an economy (Bayoumi & Melander, 2008).

Gerschenkron (2015) examined the role of financial intermediation systems in promoting industrialization and economic development in different countries and argued that countries with less developed financial systems could utilize domestic credit to overcome structural obstacles and accelerate their economic growth. Hence, the positive relationship between domestic credit and economic growth has been explored by studies around the world (Thierry et al., 2016). Nevertheless, some studies argued that domestic credit is not always positively correlated with economic growth. It can even exert negative impact on economic growth (Pagano & Pica, 2012; Levine, 2005; Cournede & Denk, 2015).

Timsina and Pradhan (2016) analyzed the impact of commercial bank lending on Nepal's economic growth for the period 1996-2015. Their study results showed positive effects, suggesting policymakers should focus on formal sector financing, modern banking, efficient financial markets, infrastructure, and interest-sensitive investment environments to boost bank lending.

Anyanwu et al. (2017) study reveals that commercial banks' lending significantly impacts Nigeria's economic development from 1986 to 2015, but not industrial production. It suggests the Central Bank should improve credit flow to other sectors and reduce inflation.

Ibrahim and Alagidede (2018) found the positive nexus between financial intermediation systems and the economic growth in 29 economies in the Sub-Saharan African region based on the data of 1980-2014 period. In addition, the positive correlation between domestic credit and economic growth was also confirmed by Wang et al. (2019) with their analysis conducted in China from 2007 to 2016.

Botev and Jawadi (2019) explored the positive effect of domestic credit on economic growth based on the investigation of 100 countries for 1990-2012 with trade openness positively affecting growth and inflation negatively. Begum and Aziz (2019) analyzed the impact of domestic credit to private sector on Bangladesh's real GDP from 1983-2017. Their study found a negative and statistically significant relationship

between real GDP and domestic credit to private sector (PRC), but an insignificant relationship between public credit (PUC) and GDP.

Pham and Nguyen (2020) investigated the Granger causality between domestic credit and GDP in Vietnam from 2004 to 2017, using the autoregressive distributed lag (ARDL) model. Their study results showed a two-way relationship, with credit expansion negatively impacting long-term economic growth. The study suggests recommendations to overcome bank credit supply channel limitations.

Abdullah and El-Rasheed (2021) investigated the asymmetric effect of domestic credit on Malaysian economic growth from 1980-2019 using asymmetric ARDL methodology. Their results showed a significant asymmetric effect, with long-run cointegration between domestic credit and growth. The study suggests Malaysian policymakers should enhance credit policies for efficient and flexible growth.

The study of Ho and Saadaoui (2022) examined credit-to-GDP ratio threshold variable and found significant effect of bank credit on economic growth. They argued that the empirical investigations should consider beneficiary credit, structural features, and regional heterogeneity to determine threshold effects and formulate policy recommendations.

Asmarani and Ningsih (2022) study examined the financial sector's impact on economic growth in five ASEAN countries, focusing on capital accumulation and technological innovation. It found that domestic credit has a greater positive effect than the stock market, with both factors significantly contributing to economic growth.

Afonso and Blanco-Arana (2022) argued that the 2007-09 global financial crisis highlighted the inefficient use of domestic credit, affecting economic growth and highlighting the need for further empirical analysis on the correlation between domestic credit and economic growth.

Rusydiana and Ikhwan (2024) analyzed panel data to explore the link between bank credit and economic growth in OIC countries. The study found that bank credit

positively impacts growth but highlighted the importance of country-specific factors like financial development, regulatory quality, and economic stability, emphasizing the role of broader economic and institutional environments in determining its effectiveness.

Zeynalova (2024) highlighted the banking sector's significant role in stimulating economic growth in Azerbaijan, primarily through credit allocation and financial stability, influenced by macroeconomic factors and sector-specific dynamics. They stated that increased credit volume has been linked to short-run economic growth, particularly in the non-oil sector, where loans positively influence GDP growth.

Several previous studies have shown both positive and negative impacts of domestic credit on economic growth. However, there are limitations in the existing literature, such as a focus on global, regional, or country-specific contexts, a lack of broader monetary indicators, and a lack of nuanced relationships and methodological advances. Moreover, a holistic view integrating factors like labor force participation, private consumption expenditure, trade openness, and government spending is underexplored in Nepalese context. In this paper, the author aims to contribute to the existing literature by providing this study aims to address these gaps by using an updated dataset and an ARDL model to examine the combined effects of domestic credit, broad money supply, and other financial intermediation variables on GDP growth of Nepal. Therefore, the pertinent research questions of the paper are: What is the magnitude and direction of the impact of domestic credit to the private sector on the GDP growth rate? And what is the magnitude and direction of the impact of broad money supply on the GDP growth rate?

Methods and Procedures

Research Design

This study has adopted a quantitative research design to analyze the relationship between GDP as a dependent variable, whereas the Net Domestic Credit(NDC)

and broad money supply as a per cent of GDP(M_2/GDP) as independent variables. Additionally, total government expenditure, labour force participation rate, private consumption expenditure and trade openness as control variables.

Variables, Data and Their Sources

The study used secondary annual time series data spanning 49 years, from 1974 to 2022, encompassing the aforementioned variables. Secondary sources include World Development Indicator publish by World Bank. Similarly, GDP size has been used as a proxy of economic growth. Since, the included variables in the model are found to be stationary at level and after first difference. This is the condition required for employing Autoregressive Distributive Lag Model (ARDL).

Table 1

Variables, Data and Their Sources

Variables	Nature	Definition	Sources
GDP_t	Dependent Variable	GDP Size	World Bank
NDC_t	Independent Variable	Net Domestic Credit to private sector	World Bank
$M2/GDP_t$	Independent Variable	Ratio of broad money to GDP	World Bank
TGE_t	Control Variable	Total government expenditure	World Bank
LFR_t	Control Variable	Labour force participation rate	World Bank
PCE_t	Control Variable	Private consumption expenditure	World Bank
TO_t	Control Variable	Trade openness	World Bank

Model Specification

Therefore, the econometric model ARDL can be expressed as follows:

$$GDP_t = f(NDC_t, M_2/GDP_t, TGE_t, LFR_t, PCE_t, TO_t) + \varepsilon_t \qquad \text{....... (1)}$$

The equation above can be written in log transformation as:

$$\ln RGDP_t = \beta_0 + \beta_1 \ln NDC_t + \beta_2 \ln M_2/GDP_t + \ln \beta_3 TGE_t + \beta_4 \ln LFR_t + \beta_5 \ln PCE_t + \beta_6 \ln TO_t + \varepsilon_t \qquad \text{....... (2)}$$

Where,

In the equation (2), ln and β_0 denotes natural logarithm and intercept term, $\beta_1,\ldots$ and β_6 are the slope coefficient of the respective variables, and ε_t implies error term.

$\ln GDP_t$ = GDP for time 't'.

$\ln NDC_t$ = Net Domestic Credit for time 't'.

$\ln M_2/GDP_t$ = Broad Money Supply to GDP for time 't'.

$\ln TGE_t$ = Total Government Expenditure for time 't'.

$\ln LFR_t$ = Labour Force Participation Rate for time 't'.

$\ln PCE_t$ = Private Consumption expenditure for time 't'.

$\ln TO_t$ = Trade Openess(Import+Export) for time 't'.

ε_t = The random error term.

Choice of ARDL Model

The ARDL model is appropriate for understanding the nuanced relationships between financial intermediation variables such as domestic credit, broad money supply and its impact on GDP growth in Nepal, particularly in the presence of potentially mixed order integration i.e. I(0), I(1) and a small dataset. Likewise, this choice ensures robust and meaningful insights into the long-run and short-run dynamics of the variables included for analysis. The general form of an ARDL (p, q) model is:

$$Y_t = \alpha_0 + \sum_{i=1}^{p} \beta_i Y_{t-i} + \sum_{j=0}^{q} \gamma_i X_{t-j} + \varepsilon_t \qquad \text{....... (3)}$$

In above equation(3), Y_t is the outcome variable, X_{t-j} denotes explanatory, α, β and γ are coefficients, p and q are the lag orders, and ε_t is the error term.

Lag Length Selection

The estimation of the ARDL model should be carried out based on the number of lags suggested by the information criteria suggested. Generally, Akaike Information

Criterion (AIC), the Schwartz Bayesian Criteria (SBC) or Hannan-Quinn Criterion (HQC) can be used in order to choose the lag order. However, the AIC criterion has been used in this study to select the optimum lag in the ARDL model.

F-Bound Test for Long-Run Relationship

F- bound test is essential for examining long-run relationship of the variables included in the model. Hence, to test if the variables have a long-run relationship, the F-test was performed based on the following Pesaran, Shin and Smith (2001) generalized form of applied ARDL model is given in equation 4.

$$\Delta \ln Y_t = \mu + \sum_{t=0}^{p} \omega_i \, \Delta \ln Y_{t-i} + \sum_{t=0}^{q} \phi_i \Delta \ln X_{t-i} + \sum_{t=0}^{r} \pi_i \, \Delta \ln Z_{t-i} + \lambda_1 \ln Y_{t-1} + \lambda_2 \ln X_{t-1} + \lambda_3 \ln Z_{t-1} + v_t \qquad ....(4)$$

In the equation (4) Δ denotes first difference operator, μ is the intercept term, v is the usual white nooise and scripts p,q,r denote chosen lag of the first difference variables. The remaining coefficients describe short-run and long-run relationships. The coefficients $\lambda_1, \lambda_2 \, and \lambda_3$ correspond to the long-run relationship while the short-run effects are captured by the coefficients for the first difference variables i.e. ω, ϕ and π. Thus, equation (4) differs from standard distributed lag models in that it includes a linear combination of the lagged level of all variables, normally referred to as an error correction term. The ARDL model given in equation (4) integrates the short-run dynamics with the long run equilibrium without losing any information for the long run.

Testing for Short-run Coefficients for Error Correction Model

In the ARDL approach to co-integration the lagged error correction term is generated out of the long-run coefficients to replace a linear combination of the lagged variables, and the model is re-estimated at the optimum lags selected by using model selection criterion (Bahamani & Ardalani, 2006). Hence the short- run error correction version of model can be specified as the follows:

$$\Delta \ln Yt = \mu + \sum_{t=0}^{p} \omega_i \, \Delta \ln Y_{t-i} + \sum_{t=0}^{q} \phi_i \Delta \ln X_{t-i} + \sum_{t=0}^{r} \pi_i \, \Delta \ln Z_{t-i} + \gamma ECM_{t-1} \qquad .... (5)$$

In equation (5) ECM is the error correction mechanism term obtained as residual from

the estimation of the long run co-integrating equation (5); ω_i, Φ_i, and π_i, are the short run dynamic coefficients of the model's convergence to equilibrium, and γ is the error correction term that determines the speed of adjustment from short run to long run i.e. towards equilibrium.

Diagnostics Tests

Diagnostic test such as Ramsey Regression Equation Specification Error Test (RESET) test is a general specification test for the linear regression model, LM Test for Serial Correlation, Test for Heteroscedasticity, J-B test for the normality of the residuals and CUSUM and CUSUMSQ test for the stability were conducted and reported.

Results and Discussion

Empirical Results

The estimated result presented in Tables 1,2,3,4,5,7, and 8 present results of data analysis. The analysis results are given and discussed subsequently.

Descriptive Statistics

These descriptive statistics provide a foundation for understanding the spread, central tendency, and distribution of each variable, which is essential for further econometric analysis. The dataset consists of four variables: mean, median, range, standard deviation(SD), skewness, and kurtosis. The mean represents the average value for each variable, while the median shows the central tendency. The range indicates the span and potential outliers. Standard deviation indicates the degree of variability or spread in each variable. Skewness measures the asymmetry of the distribution, with most variables close to zero, suggesting fairly symmetrical distributions. Kurtosis measures the "tailedness" of the distribution, with most having kurtosis below 3, indicating flatter distributions. The dataset is complete for each variable across 49 observations, with all variables having 49 observations (Table 2).

Table 2

Descriptive Statistics

Parameters	lnGDP Growth	lnNDCt	lnM2/ GDPt	lnTGEt	lnLFRt	lnTOt	lnPCEt
Mean	26.32	3.09	3.78	24.77	20.99	3.67	26.33
Median	26.43	3.17	3.80	24.81	21.15	3.76	26.41
Maximum	29.23	4.64	4.79	27.99	24.84	4.16	29.25
Minimum	23.27	1.29	2.57	21.14	16.84	2.77	23.43
SD	1.82	0.92	0.58	2.00	2.37	0.28	1.82
Skewness	-0.07	-0.13	-0.08	-0.06	-0.06	-0.77	-0.06
Kurtosis	1.79	1.94	2.12	1.96	1.85	3.56	1.79
Observations	49	49	49	49	49	49	49

Note: This table demonstrates the descriptive statistics result as for the variables computed by the author based on the data of respective variables from 1974-2022.

It is evident that the means and medians are close, indicating relatively symmetrical distributions across variables. Variables like lnLFRt and lnTGEt have higher variability, suggesting larger fluctuations over the observations, while lnTOt has low variability. Most variables show nearly symmetrical distributions with a slight left skew, except for lnTOt, which has a moderate left skew and a slightly peaked distribution (Table 2).

Table 3

ADF Test Results

Variables	ADF statistics	P-value	Critical values at			Remarks
			1 percent	5 percent	10 percent	
$lnGDP_t$	-2.1042	0.5301	-3.788	-3.012	-2.646	
$\Delta lnGDP_t$	-5.8420	0.0000	-3.753	-2.998	-2.639	I(1)
$lnNDC_t$	-4.0464	0.0136	-3.809	-3.021	-2.650	I(0)

$\Delta \ln NDC_t$	-5.7197	0.0001	-4.553	-3.674	-3.277	
$\ln M_2/GDP_t$	-5.7858	0.0001	-3.711	-2.981	-2.629	I(0)
$\Delta \ln M_2/GDP_t$	-4.4980	0.000	-3.752	-2.998	-2.638	I(1)
$\ln TGE_t$	-2.3419	0.4041	-3.711	-2.981	-2.629	
$\Delta \ln TGE_t$	-5.0485	0.0008	-3.724	-2.986	-2.632	I(1)
$\ln LFP_t$	-2.1591	0.5005	-3.769	-3.004	-2.642	
$\Delta \ln LFP_t$	-2.1591	0.5005	-3.788	-3.012	-2.646	I(1)
$\ln PCE_t$	-0.0335	0.9505	-3.5744	-2.9237	-2.5999	
$\Delta \ln Con_t$	-4.3140	0.0013	-3.5811	-2.9266	-2.6014	I(1)
$\ln TO_t$	-3.6212	0.0088	-3.574	-2.923	-2.599	I(0)
$\Delta \ln TO_t$	-6.2769	0.0000	-3.5777	-2.925	-2.600	I(1)

Note: This table demonstrates the Augmented Dickey Fuller test result as computed by the author based on the data of respective variables from 1974-2022.

Table 3 above shows the Augmented Dickey-Fuller (ADF) test is result. The result clearly shows that some variables are stationary are at level and some are stationary after first difference. used to check for the presence of a unit root in a time series sample. The variables NDC_t, M2/GDP and TO are stationary at level and others are stationary at first difference. Hence, it can be concluded that the variables included in the model are stationary at level I(0) and at first difference I(1) both. Therefore, ARDL model of integration can be employed to estimate the coefficients.

Lag length Selection

Optimal lag selection is very crucial and quite sensitive in case of time series analysis. Thus, an appropriate criterion for the selection of lag is very important. The result obtained from the lag selection criteria is presented in the table 4 below. The result shows that optimal lag length is 1.

Table 4

Optimum lag selection on the basis of AIC criterion

Lag	LogL	LR	FPE	AIC	SC	HQ
0	126.2275	NA	3.15E-09	-5.38789	-5.18715	-5.31306
1	370.1977	422.8816*	1.88e-13*	-15.11990*	-13.91546*	-14.67089*
2	390.8089	31.14583	2.39E-13	-14.9248	-12.7167	-14.1017

Note: This table demonstrates the test result as computed by the author based on the data of respective variables from 1974-2022.

F-Bound testing

The ARDL bounds test is a statistical method used to determine the long-run relationship between variables in a model. The null hypothesis for the test is "no long-run relationship exists." If the F-statistic lies in between lower bound and upper bound, it indicates an inconclusive result. If it is below the lower bound, it means no relationship. If the F-statistic is above the critical upper bound, then it suggests a significant long-run relationship between the variables. Evidently the F-statistic of 86.901 is above the upper bound at all significance levels (1 %, 5 %, and 10 %). Since 86.901 > 3.99 (the highest critical value for I(1) at 1percent), we can reject the null hypothesis at the 1percent level and conclude that there exists a statistically significant long-run relationship between the outcome variable and the predictors included in the ARDL model(Table 4).

Table 4

F-Bound Test Result

Null Hypothesis: No long-run Relationship Exists		
Test Statistics	Values	K(Explanatory Variables
F-Statistics	86.901	6
	Critical Value Bonds	
Significance	I(0) Bonds	I(1) Bonds

10 percent	1.99	2.94
5 percent	2.55	3.28
1 percent	2.88	3.99

Note: This Table shows F-bound test for cointegration result as computed by author based on the data used for the variables spanning from 1974-2022.

Financial Intermediation and Economic Growth

The first stage of the ARDL co-integration method examines the relationship between GDP growth (dependent variable) and explanatory variables, including net domestic credit to the private sector (NDCt), ratio of broad money to GDP (M2/GDP), total government expenditure (TGE), labor force participation rate (LFR), private consumption expenditure (PCE), and trade openness (TO), using annual data from 1974 to 2022 (49 observations). The results reveal that lagged GDP growth positively impacts current GDP growth, while net domestic credit to the private sector shows a small positive effect. The short-run and lagged impacts of broad money supply, government expenditure, labor force participation, private consumption, and trade openness vary in magnitude and direction. The model's R-squared and adjusted R-squared values indicate a good fit, though overfitting cannot be ruled out. The Durbin-Watson statistic suggests minimal autocorrelation, indicating no significant serial correlation in residuals (Table 5).

Table 5

Estimated ARDL Regression Result

Dependent Variable: GDP Growth				
Selected Model: ARDL(1, 0, 1, 1, 1, 1, 1)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
$lnGDP_t(-1)$	0.310***	0.070	4.432	0.00
$lnNDC_t$	0.007	0.028	0.253	0.80
$lnM2/GDP_t$	0.248***	0.053	4.712	0.00

lnM2/GDP$_t$ (-1)	0.151**	0.062	2.431	0.02
lnTGE$_t$	0.042	0.040	1.057	0.29
lnTGEt(-1)	0.090**	0.040	2.258	0.03
ln LFRt	0.212***	0.070	3.020	0.00
lnLFR$_t$(-1)	0.207***	0.071	2.916	0.00
lnPCE$_t$	0.111**	0.052	2.130	0.04
lnPCE$_t$ (-1)	0.538***	0.080	6.749	0.00
lnTOt	0.122 ***	0.033	3.671	0.00
lnTOt(-1)	-0.062**	0.028	-2.226	0.03
R-squared	0.999			
Adjusted R-squared	0.999			
D-W Statistics	1.722			

Note: This tables demonstrates estimated long run coefficients using the ARDL approach as computed by author based on the data used for the variables spanning 1974-2022 and the symbols *** ' ** and *indicates the significance of coefficients at 1 percent 5 percent and 10 percent level.

Estimated Long Run Coefficients

The ARDL model uses long-run coefficients to represent the equilibrium relationship between the dependent variable and each independent variable. The coefficients for GDP growth are based on the ARDL estimation. The coefficients for net domestic credit, money supply to GDP ratio, total government expenditure, labor force rate, private consumption expenditure, total trade(import-export), and intercept term are all positive and statistically significant.

Table 6

Estimated Long Run Coefficients using the ARDL Approach

Dependent Variable: GDP growth
Selected Model: ARDL(1, 0, 1, 1, 1, 1, 1)

Variables	Coefficient	Std. Error	t-Statistic	Prob.
$lnNDC_t$	0.00573	0.029	0.197	0.84
$lnM2/GDP_t$	0.36443***	0.061	5.963	0.00
$lnTGE_t$	0.00043**	0.033	2.107	0.04
$ln\ LFR_t$	0.3295***	0.0744	4.4275	0.00
$lnPCE_t$	0.6717***	0.0647	10.3736	0.00
$lnTO_t$	0.0683***	0.1666	4.1009	0.00
Intercept	2.9054***	0.6879	4.2234	0.00

Note: This tables demonstrates estimated long run coefficients using the ARDL approach as computed by author based on the data used for the variables and the symbols *** ' ** and *indicates the significance of coefficients at 1 percent 5 percent and 10 percent level.

The result shows that net domestic credit has an almost negligible impact on GDP growth in this model. An increase in the money supply relative to GDP by 1percent is associated with a 0.36 percent increase in GDP growth. Government expenditure has a minimal impact on GDP growth, and a larger labor force has a substantial and favorable effect on long-term economic growth. Moreover, private consumption expenditure is a key driver of long-term economic growth, and 1 per cent increase in trade openness (TO) leads to a 0.068 percent increase in GDP growth in the long run. The intercept term reflects the baseline level of GDP growth when all independent variables are at zero. In summary, private consumption expenditure(PCE) and total trade(TR) are strongly linked to GDP growth, total government expenditure (TGE) positively contributes, while broad money supply to GDP ratio (M2/GDP) weakly constrains growth. Moreover, net domestic credit to the private sector (NDC) and labor participation rate (LFR) do not significantly impact GDP growth in Nepal according to this model.

Error Correction Representation for the Selected ARDL Model

This error correction model (ECM) provides insights into both the short-run dynamics and the speed of adjustment to long-run equilibrium for GDP growth, with an ARDL(1, 0, 1, 1, 1, 1, 1) model as the selected specification.

Table 7

Error Correction Representation Model

Dependent Variable: GDP Growth				
Selected Model: ARDL(1, 0, 1, 1, 1, 1, 1)				
Variables	Coefficient	Std. Error	t-Statistic	Prob.
C	0.044**	0.018	2.468	0.018
$\Delta \ln NDC_t$	0.021	0.042	0.500	0.620
$\Delta \ln M2/GDPt$	0.597***	0.074	8.055	0.000
$\Delta \ln TGEt$	0.015	0.070	0.219	0.828
$\Delta \ln LFRt$	0.543***	0.109	4.986	0.000
$\Delta \ln PCEt$	0.142	0.086	1.643	0.108
$\Delta \ln TOt$	0.075	0.051	1.471	0.149
ECT(-1)	-0.814**	0.378	-2.155	0.037
R-squared	0.734			
Adjusted R-squared	0.686			
D-W Statistics	2.432			

Note: This tables demonstrates estimated short-run coefficients using the ECM approach as computed by author based on the data for the variable spanning 1974-2022 of Nepal and the symbols *** ' ** and *indicates the significance of coefficients at 1 percent 5 percent and 10 percent level.

The constant term (0.044) is significant at a 5percent level (p = 0.018), meaning it contributes to GDP growth in the short run. The coefficient of Net Domestic Credit (0.021) is not statistically significant (p = 0.620), suggesting that short-term changes

in net domestic credit do not have a significant immediate effect on GDP growth. The coefficient for changes in M2/GDP (0.597) is highly significant ($p < 0.01$) with a high t-statistic (8.055). This indicates that short-run increases in the money supply relative to GDP have a significant positive impact on GDP growth. The coefficient for Total Government Expenditure (0.015) is insignificant ($p = 0.828$), suggesting that short-term changes in government expenditure do not significantly impact GDP growth in the immediate term.

The coefficient Labor Force Participation Rate (0.543) is significant at a 1percent level ($p < 0.01$), indicating that short-run changes in the labor force rate positively impact GDP growth. The coefficient for the variable private consumption expenditure (0.142) is not statistically significant at a 10percent level ($p = 0.108$), implying that short-term fluctuations in private consumption have a limited immediate effect on GDP growth. The coefficient for trade openness (TOt) (0.075) is also not statistically significant ($p = 0.149$), suggesting that changes in total trade do not have an immediate significant effect on GDP growth in the short run. Moreover, the error correction term (ECT-1) is negative (-0.814) and statistically significant ($p < 0.05$). This term is crucial as it denotes the speed of adjustment towards the long-run equilibrium after a short-term shock. The coefficient of -0.814 implies that approximately 81.4 percent of any disequilibrium in GDP growth is corrected in the following period. Therefore, this relatively high speed of adjustment suggests that the system returns to its long-run equilibrium fairly quickly after a deviation. Regarding short-run model fit, R-squared and Adjusted R-squared values are 0.734 and 0.686. These values indicate that the model explains about 73.4 percent of the variation in GDP growth in the short run, with an adjusted R-squared of 68.6percent. In conclusion, this is a good fit model that captures a substantial amount of the short-term dynamics of GDP growth. Finally, Durbin-Watson Statistic is 2.432 which is close to 2, suggesting no strong evidence of autocorrelation in the residuals This is desirable for the reliability of the model.

In the short run, increases in the money supply relative to GDP (M2/GDP) and the labor force rate (LFR) significantly boost GDP growth. The error correction term's significance and size indicate that, when GDP deviates from its long-run equilibrium, it corrects rapidly. However, other variables like net domestic credit (NDC), government expenditure (TGE), private consumption expenditure (PCE), and trade openness (TO) appear to have limited immediate impact on GDP growth, as their short-run effects are not statistically significant.

Diagnostic Test of the ARDL Model

Table 8 demonstrates diagnostic test result such as the RESET (Regression Specification Error Test) is used to check for specification errors in a regression model, the Breusch-Godfrey serial correlation LM Test is used to detect the presence of serial correlation (autocorrelation) in the residuals of a regression model, the Breusch-Pagan-Godfrey test is used to detect heteroskedasticity in the residuals of a regression model and Jacque-Berra Test for normality test result.

Table 8

RESET Test Result

RESET Test Result **:**Omitted Variables: Square of Fitted Values			
	Value	df	Probability
t-statistic	1.401521	35	0.1699
F-statistic	1.964261	(1, 35)	0.1699
Breusch-Godfrey Serial Correlation LM Test Result			
F-statistic	0.435349	Prob. F(2,37)	0.6506
Obs*R-squared	1.198528	Prob. Chi-Square(2)	0.5492
Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	1.009954	Prob. F(9,38)	0.4608
Obs*R-squared	12.34593	Prob. Chi-Square(12)	0.4183
Normality Test Result			
Jarque-Bera statistic	0.8844	p-value	0.6426

Note: This tables demonstrates diagnostic test result as computed by author based on the data for the variable spanning 1974 -2022 of Nepal.

The diagnostic tests confirm the adequacy of the ARDL model. The t-statistic (1.4015) with a p-value of 0.1699 suggests no specification error, as the null hypothesis of no omitted variables or incorrect functional form cannot be rejected. The serial correlation LM test shows an F-statistic of 0.4353 with a p-value of 0.6506, indicating no significant serial correlation in the residuals. Similarly, the heteroscedasticity test (F-statistic: 1.0099, p-value: 0.4608) confirms no significant heteroscedasticity, meaning residual variance remains constant. The Jarque-Bera test for normality yields a statistic of 0.8844 with a p-value of 0.6426, showing that the residuals are approximately normally distributed. These results demonstrate that the model is free from issues of specification error, serial correlation, heteroscedasticity, and non-normality, supporting its reliability for analysis (Table 8).

Stability Test Result

The cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) plots remain within the 5 percent significance level bounds throughout the period 1974–2022, indicating no significant deviations or instability in the residuals or their variance. This stability confirms the absence of volatility or variance instability in the ARDL model, ensuring its reliability over the sample period (Figure 2).

Figure 2

CUSUM Sum and SUSUM Sum of Square Recursive Residuals
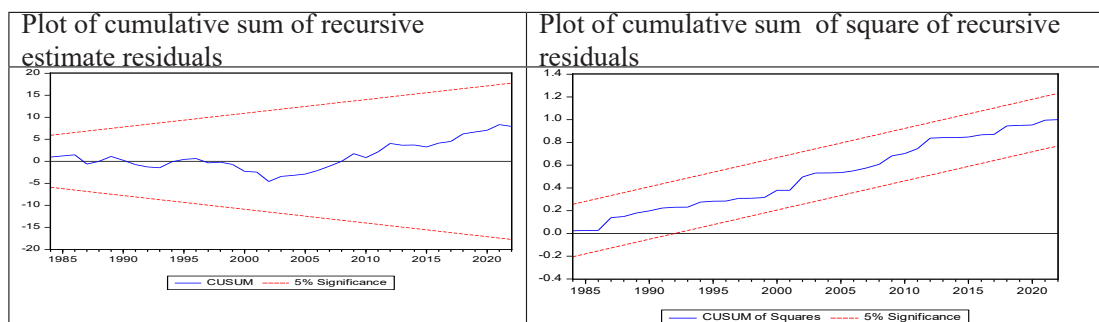
Discussion

The main aims of the study were to examine the magnitude and direction of the impact of domestic credit to the private sector on the GDP growth rate, and assess the magnitude and direction of the impact of broad money supply on the GDP growth rate in the context of Nepalese economy. In this regard, the ARDL model reveals significant insights into the relationships between GDP growth and key financial intermediation as net domestic credit to private sector and broad money supply to GDP ratio including various financial and economic factors as a control variable. Notably, the model indicates that several variables have a significant long-term impact on GDP growth in Nepal. Firstly, the coefficient of domestic credit is positive (0.00573), but it is not statistically significant ($p = 0.84$). This suggests that, in the long run, domestic credit to the private sector may not have a meaningful direct impact on GDP growth in Nepalese economy. This insignificance may suggest that the domestic credit flow is either insufficient in volume or inefficiently allocated, limiting its impact on economic growth. This result is conflicting than several previous studies. Another, coefficient for broad money supply as a share of GDP is 0.36443 and is highly significant ($p = 0.00$). Here, the positive and statistically significant result may imply that an increase in the money supply ratio has a strong positive impact on GDP growth. In other words, broad money supply can enhance liquidity in the economy, supporting business activities and investments, which, in turn, contribute to economic growth. This result is consistent with the several earlier studies such as Timsina and Pradhan (2016), Anyanwu et al. (2017), Botev and Jawadi (2019), Abdullah and El-Rasheed (2021), Ho and Saadaoui (2022) and Rusydiana and Ikhwan (2024). But, the result contrast with the findings of Aziz (2019). Moreover, government expenditure has a small yet statistically significant positive impact on GDP growth (coefficient: 0.00043, $p = 0.04$), likely driven by social spending, infrastructure development, and economic activities that stimulate demand. Labor force participation rate (LFR) has a highly significant positive coefficient (coefficient: 0.3295, $p = 0.00$), indicating its critical role in boosting productivity and economic growth. Private consumption expenditure (PCE) emerges as the strongest

driver, with the largest positive coefficient (coefficient: 0.672, p = 0.00), underscoring household spending's key role in stimulating demand, supporting businesses, and driving growth through the multiplier effect. Trade openness also has a significant positive impact (coefficient: 0.0683, p = 0.00), highlighting the benefits of access to larger markets and enhanced competitiveness. In conclusion, broad money supply, PCE, LFR, and trade openness are pivotal for Nepal's growth, while the insignificant impact of domestic credit suggests a need for improved financial intermediation and credit allocation.

Conclusion

The study examined the impact of financial intermediation in terms of domestic credit to the private sector and broad money supply on GDP growth in Nepal. The ARDL model revealed that financial and economic factors have significant long-term effects on GDP growth. Notably, the domestic credit coefficient was positive but statistically insignificant, suggesting that domestic credit flow may be either inadequate or inefficiently allocated to drive meaningful economic growth and the result is contrary to prior studies. In contrast, the broad money supply was highly significant and positively associated with GDP growth, indicating that an increased money supply supports liquidity, and investment, thereby paving way for economic growth. In addition, government expenditure, private consumption, labor force participation, and trade openness emerged as key growth drivers. In conclusion, this study emphasizes the crucial roles of broad money supply, labor force participation, private consumption, and trade openness in to sustain economic growth. However, the limited impact of domestic credit indicates a need for policy improvement in financial intermediation to increase its effectiveness in fostering economic growth of Nepal.

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