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The impact of macroeconomic determinants on the banking sector development in Nepal

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Abstract

Background: The concept of banking sector development is multi-dimensional, and it is difficult to establish a single description for it because it is an interconnected process that encompasses increases in the number and quality of financial services.

Objectives: The objective of the study is to examine the impact of macroeconomic determinants on banking sector development in Nepal.

Methods: The study applied the vector error correction model (VECM) approach technique with economic time series data ranging from 1995 to 2020. The study employed the VECM model to avoid the spurious regression problem in the construction of contemporary time series econometrics. The co-integration analysis is used in the study to determine the long-run equilibrium relationship between the macroeconomic variable and the banking sector development of the model. Banking sector development is measured by the arithmetic average of the normalized values of banking depth, banking efficiency, and banking stability.
Result: This study reveals that per capita GDP and remittances have a positive and significant impact on the banking sector development. Similarly, government expenditure and stock market capitalization have positive and statistically significant roles to explain banking sector development in Nepal. In addition, it demonstrates that trade openness and inflation have a marginally negative but insignificant impact on banking sector development.

Conclusion: There is a long-term equilibrium relationship between macroeconomic variables and banking sector development. Macroeconomic policies and institutional quality play an important role in the banking sector development.

Implications: For policymakers since it clarifies the significance of sound macroeconomic policies in the development of the banking industry while taking into account the quality of the existing institutional infrastructure.

Keywords: Banking sector development (Banking depth, efficiency, and stability); macroeconomic variables; VECM approach.

I. Introduction

The banking industry is one of the key economic foundations in any nation, which contributes significantly towards the growth, promotion, and development of financial and economic activities in the country. A number of factors, including profitability, growth, and lending behaviour (Tsaurai, 2018), influence the development and performance of the banking industry. According to Mhadhbi et al. (2020), the concept of the development of the banking sector is multifaceted, and it is difficult to establish a single description of this process since it is a connected process that incorporates enhancements to the quantity and quality of banking services. Macroeconomic policy, the mobilization of savings, the extension of credit, and risk management are a few of these dimensions. Therefore, the effectiveness with which a country's financial system performs these tasks serves as a gauge of the system's level of growth. The legislator must know the long-term and causal link between the macroeconomic policy, financial system, and economic growth in order to understand the function of monetary/fiscal policy and the banking system (Touny, 2014). The importance of this study arises from the banking industry's crucial contribution to economic growth and its role in supplying the capital required for investments, which made it important to conduct research into the factors influencing the development of the banking industry in Nepal.

A substantial number of theoretical and empirical research suggest that the development of banking institutions and markets is crucial for economic growth (such as Levine & Zerovs, 1998). Economists have long questioned the causal link between banking innovation and economic growth. Given that, macroeconomic policy is a key variable in the development of the banking industry; both theoretical and empirical studies have emphasized the significance of paying more attention to banking sector development. Aluko and Ajayi (2018) claim that through offering services like loans and effective capital allocation, the pace at which a host nation gains from FDI and remittance inflows accelerates with the expansion of the banking sector. The literature makes it abundantly evident that the beneficial part that the development of the banking industry plays in boosting economic growth is no longer a contentious matter. What macroeconomic factors influence the banking sector development in Nepal is still unknown. Therefore, the current study attempts to address this gap in the literature in the context of Nepal.

Studies have dealt with several aspects of the relations between macroeconomic variables and banking sector development at both theoretical and empirical levels. These factors might be a precondition for achieving sustainable banking sector development. Financial intermediaries channel the savings into productive investments (Dogga et al., 2017). However, Nepal is lagging behind in adequate capital accumulation on the one hand and productive investment on the other. In such a scenario, the role of financial intermediaries and financial markets cannot be overlooked. An efficient financial system accelerates capital accumulation and in turn, determines the long-term development of banking industry of the country. Therefore, this study is expected to contribute by examining the macroeconomic determinants that influenced the banking sector development in the context of Nepal. Finally, the study is expected to be fruitful for all concerned parties such as policymakers, government, depositors, investors, and other concerned stakeholders.

This study analyzes the impact of macroeconomic factors on banking sector development in Nepal. The research study seeks to explain the association of the banking sector development with the per capita GDP, inflation, remittances, trade openness, government expenditure, and stock market capitalization employed as proxy macroeconomic indicators. The analysis is based on the supposition that macroeconomic variables and the banking sector development are co-integration intertwined. The vector error correction model (VECM) bounds testing model is used to investigate the long-term relationship of co-integration between macroeconomic determinants and banking sector development.

II. Literature Review

According to the structure conduct performance (SCP) paradigm, market structure determines business behavior, which in turn determines performance. The qualities of the banking industry in which a firm works define the range of possibilities and restrictions that it faces. In some industries with more rivalry, businesses have few options and are subject to several restraints. The institutional approach focuses on the banking structure's deeper and more durable components. Instead of efficiency or effectiveness as the fundamental organizational goal, this method is based on the concept of legitimacy (Pagano, 1993). Financial markets and institutions emerge because of the expenses of getting information and conducting transactions. According to Levine & Zervos (1998) and Rodrik (1999), In a state-contingent claim framework without information or transaction costs, there is no need for a financial system that invests resources in project research, manager scrutiny, or arrangement design.

Total production produced by various economic sectors is measured in terms of per capita GDP. It is estimated without considering the deterioration and depletion of natural resources or deductions for the depreciation of fabricated assets. This is most frequently used as a proxy for economic growth. Yu and Gan (2010), Dogga et al. (2019), and Tsaurai (2018) concluded that GDP per capita is a positive & significant determinant of financial development in emerging countries. Remittances are monies sent from one country to another via financial institutions, allowing recipients to demand or have access to alternative financial services and goods (Bhattacharya et al., 2018). According to Herger et al. (2008), remittances help countries with underdeveloped banking sectors flourish by giving alternatives for financing investment and reducing liquidity restrictions. In emerging economies, remittances enhance the number of deposits and credit which have a positive and significant influence on banking sector development in developing countries (Raza et al., 2014). According to Nazir et al. (2018), findings are consistent across nations and indicate the need to improve institutional setups to increase remittance inflows, which will improve financial development.

The market value of a publicly traded company's shares outstanding at a certain point in time is known as stock market capitalization. The stock market capitalization metric is the GDP divided by the value of domestic equities that are listed on domestic exchanges. It shows marketability and liquidity by facilitating securities transactions. Rehman (2018) supported market capitalization as indicator of financial development. Stock market capitalization promotes the banking sector development in developing countries as documented by Elsherif (2015), and Filippidis & Katrakilidis (2014). Ayunku & Etale (2014) and Levine & Zervos (1998) concluded that market capitalization has positive and significant impact on financial development. Inflation refers to overall rise in cost of goods and services in the economy. The inclusion of inflation as a conditional variable may be especially important during the early stages of economic change when inflation is typically substantial. Fu et al. (2020) confirmed that there is a significant impact on the development of the banking industry in the USA, whereas Law et al. (2012) and Le et al. (2016) also concluded that there is negative significant relationship between inflation rate and banking sector development with 20 causations running in both directions.

The degree to which country's economy permits trade and capital to flow across its boundaries is known as trade openness. This metric measures how to open a country to foreign trade and is computed as the ratio of imports to exports as percentage of GDP. The results of studies on the relationship between trade openness and the development of the banking industry are varied. Fu et al. (2020) and Khalfaoui (2015) observed that trade openness has a negative and significant impact on financial development and is leading indicator of finance development. Luciano & Regis (2007) concluded that trade openness and financial development have positive, significant, and bidirectional causal relationships. Public

consumption, public investment, and transfer payments made up of income transfers (pension, social benefits) and capital transfers are all included in what is referred to as government expenditure (NRB, 2019). The government consumption, investment, and transfer payments are included in government expenditure. Milic and Solesa (2017) found that government expenditure has significant impact on the development of the banking industry in developed and developing countries. Dogga et al. (2017), Yu and Gan (2010), and Zheng et al. (2019) also found that government expenditure has significant impact on banking sector development and stock market development in emerging economies countries. Fu et al. (2020) observed that government expenditure has significant long-run effect on the growth of banking industry in developing countries except for lower-income countries.

In the Nepalese context, the causality issue has received considerable attention in recent years between macroeconomic policy and banking sector development. Nepal has gone through banking sector reform and structural adjustment programs since the early 2000s. Despite the efforts made to strengthen banking industry in Nepal, the real sector growth at the level expected is yet to realize. This particularly suggests the need for empirical studies on the Nepalese banking sector. Few research has been conducted to analyze macroeconomic factors that affect financial development in Nepal to date. Therefore, it needs rapid and continuous assessment for the speed of functioning for macroeconomic determinants that affect banking sector development.

III. Research Methodology

3.1 Description of data and variables

The research study was based on secondary data that was taken from Nepal Rastra Bank from 1995 to 2020 with data from Nepalese commercial banks and macroeconomic time series with Quarterly Economic Bulletin (2021). The secondary sources of data have been employed to understand the form of observe relation and to analyze the predictive power of macroeconomic factors in explaining the banking sector development in Nepal. For the formulation of the index, this study examined three factors of the growth of the banking sector: banking efficiency, banking depth, and banking stability were used to calculate the overall banking sector development (BSD). From both a theoretical and an empirical approach, the literature identified a number of variables that influence the banking sector development. Per capita GDP, inflation, remittances, market capitalization, government spending, and trade openness were included in the research as explanatory factors.

Table 1: Symbols, variables, and their proxies

Symbols	***Variables***	***Proxies***
BSD	Banking depth Banking stability Banking efficiency	Credit to private sector/GDP Total capital funds/Risk-weighted assets Net interest margin
Explanatory variables		
PCG	Economic growth	Per capita GDP (USD)
INF	Inflation	Annual Inflation Rate (Consumer Price Index, CPI)
REM	Remittance	Sum of currency transfers by migrant workers/GDP
SMC	Stock market capitalization	Share price times the number of shares outstanding in Nepal/GDP
GEP	Government policy	Government expenditure/GDP
TOP	Trade Openness	Trade (import plus export)/GDP

Sources: From World Bank indicator and literature review

3.2 Descriptive statistics for pre-estimation diagnostics

The characteristics of the banking sector development and macroeconomic factors over the research period were defined using descriptive statistics. As descriptive statistics, the study used the mean, median, standard deviation, skewness, kurtosis minimum, and maximum values associated with variables under investigation. Table 2 displays the time series data from 1995 to 2020 together with descriptive statistics for macroeconomic variables and banking sector development taken into consideration in this research.

Table 2. Descriptive statistics of macroeconomic variables and BSD, 1995-2020

	BSD (in %)	PCG (in USD)	INF (in %)	REM (% of GDP)	TOP (% of GDP)	GEP (% of GDP)	SMC (% of GDP)
Mean	27.40	495.83	6.89	17.53	37.64	18.34	26.99
Median	25.81	410.07	7.45	14.94	37.10	18.36	23.66
Minimum	17.04	216.94	2.48	9.09	33.59	8.68	4.53
Maximum	40.66	1038.87	11.24	29.52	43.82	36.81	83.89
Std. Dev.	7.30	268.91	2.75	7.34	2.98	8.51	22.63
Skewness	0.557	0.58	-0.23	0.422	0.67	0.66	0.92
Kurtosis	-0.67	-1.00	-1.19	-1.49	-0.56	-0.32	0.04

Sources: EViews 10 output result outcomes, (NRB Quarterly Economic Bulletin, 2021)

The descriptive statistics of macroeconomic variables are shown in Table 2 for the period 1995 to 2020. The table demonstrates that there are extreme values present throughout the variables under consideration because of the wide disparity between the minimum and maximum values. All variables' data are favorably skewed, except for inflation. None of the variables' kurtosis values are around three and none of them have a normally distributed distribution. This demonstrates that the data for the relevant variables are not normally distributed. Every data set was converted into natural logarithms and made stationarity before being used for the main data analysis, which ensured that the issue of data not being normally distributed as well as anomalous and extreme values was addressed.

Table 3. Correlation analysis with dependent and independent variables, 1995-2020

	lnBSD	lnPCG	lnINF	lnREM	lnTOP	lnGEP	lnLSMC
lnBSD	1						
lnPCG	0.928*	1					
lnINF	-0.171	-0.128	1				
lnREM	0.899*	0.631*	0.254	1			
lnTOP	-0.483**	-0.407**	-0.310	-0.389	1		
lnGEP	0.955*	0.609*	-0.109	-0.486**	-0.382	1	
lnSMC	0.573*	0.516*	-0.034	0.623*	-0.428**	0.648*	1
VIF	4.407	4.914	2.805	4.445	3.971	5.117	4.007

Source: Eviews 10 output result outcome, (NRB Quarterly Economic Bulletin, 2021)

Table 3 presents the correlation matrix for macroeconomic factors with banking sector development. The direction and strength of the association between various pairs of variables have been determined using

correlation analysis. It shows the correlation between the two variables as well as their interrelation. The bivariate Pearson correlation coefficient is used to describe the relationship between two variables. Per capita GDP, remittance, government expenditure, and market capitalization have positive relationship with development of the banking industry in Nepal. However, inflation and trade openness have a negative association with banking sector development.

Similarly, Table 3 utilizes the variance inflation factor (VIF) to display the association between the macroeconomic variables. The VIF results show that multicollinearity among the explanatory variables is not a problem. According to Stead (1996), the VIF values are less than six, which shows that explanatory variables in this study are not multicollinearity.

3.3 Model specification

The study examines the co-integrating link between macroeconomic determinants and banking sector development, by using the dynamic VAR/VEC model and Granger causality approach over the time spanning from 1995 to 22020. The annual time series data is derived from the Nepal Rastra Bank (Quarterly Economic Bulletin, 2021), which has been exposed to a pre-test of stationarity before the estimate method. The case for employing the VAR/VEC model, however, is dependent on the outcome of the cointegration test since VAR/VEC regards all variables in both dynamic and static models as a priori endogenous and, as a consequence, adjusts for interactions between endogenous and exogenous components. Exogenous variables might be added to the VAR/VEC model in some cases. Long- and short-term equilibrium connections, as well as co-integration variables, are widely investigated using the VECM model. If the variables in this research are cointegrated, the VECM equation is as follows:

$$\Delta lnBSD_t = \alpha_0 + \sum_{i=0}^{q} b_i \Delta lnBSD_{t-i} + \sum_{i=0}^{q} c_i \Delta lnPCG_{t-i} + \sum_{i=0}^{q} d_i \Delta lnINF_{t-i} + \sum_{i=0}^{q} e_i \Delta lnTOP_{t-i} + \sum_{i=0}^{q} f_i \Delta lnREM_{t-i} + \sum_{i=0}^{q} g_i \Delta lnGEP_{t-i} + \sum_{i=0}^{q} h_i \Delta lnSMC_{t-i} + \mu_1 lnBSD_{t-1} + \mu_2 lnPCG_{t-1} + \mu_3 lnINF_{t-1} + \mu_4 lnTOP_{t-1} + \mu_5 lnREM_{t-1} + \mu_6 lnGEP_{t-1} + +\mu_7 lnSMC_{t-1} + \varepsilon_t \dots\dots\dots (1)$$

Here, the dependent variable in this study is banking sector development (BSD), while explanatory variables are per capita GDP (PCG), inflation (INF), trade openness (TOP), remittances (REM), government spending (GEP), and market capitalization (SMC). All variables are also specified as before: the long-run coefficients are μ1, μ2, μ3, μ4, μ5, μ6, and μ7 the short-run coefficient dynamics are bj, cj, dj, ej, fj, gj, and hj and ε represented by the random disturbance term.

This study uses the Johansen cointegration test and a vector error correction model(VECM) to explore the long-term equilibrium and short-term dynamic link between macroeconomic variables and banking sector development in Nepal. Lastly, the short-run relationship between macroeconomic variables and banking sector development and speed of adjustment was assessed by using ECT of Equation 2.

$$\Delta lnBSD_t = \alpha_0 + \sum_{i=0}^{q} \delta_1 \Delta lnBSD_{t-i} + \sum_{i=0}^{q} \delta_2 \Delta lnPCG_{t-i} + \sum_{i=0}^{q} \delta_3 \Delta lnINF_{t-i} + \sum_{i=0}^{q} \delta_4 \Delta lnTOP_{t-i} + \sum_{i=0}^{q} \delta_5 \Delta lnREM_{t-i} + \sum_{i=0}^{q} \delta_6 \Delta lnGEP_{t-i} + \sum_{i=0}^{q} \delta_7 \Delta lnSMC_{t-i} + \delta_8 ECT_{vt} \dots \dots \dots (2)$$

Equations (2) were utilized to estimate the dynamic vector error correction model (VECM). The coefficients δ1, δ2, δ3, δ4, δ5, δ6, and δ7, indicate the model's short-run dynamics, whereas the coefficient δ8 depicts the divergence or convergence towards long-run equilibrium. A positive coefficient indicates divergence, whereas a negative value denotes convergence.

IV. Results And Discussion

4.1. The stationarity tests

Variable stationarity must be verified before running any test in time series analysis. The sequence of integration of all variables was determined in this study using unit root tests. For this study, the PP and ADF tests were employed in the research investigation. Table 4 displays the results of the ADF at the level and first difference as well as the Phillips and Person test.

Table 4: Unit root test for stationarity at variables

Variables	Level		First difference		Order of integration
	Augmented Dickey-Fuller	Philips-Person	Augmented Dickey-Fuller	Philips-Person	
lnBSD	-2.3341	-2.4637	-4.2339**	-4.2155**	I (1)
lnPCG	-2.6070	-2.5169	-4.1612**	-4.0528**	I (1)
lnINF	-2.7712	-2.6712	-6.7641**	-7.8143**	I (1)
lnTOP	-1.9496	-2.1369	-6.9819**	-5.9187**	I (1)
lnREM	-2.4405	-2.3405	-5.8025**	-5.8806**	I (1)
lnGEP	-2.0768	-2.3768	-4.7164**	-4.7237**	I (1)
lnSMC	-1.30786	-1.2494	-4.7411**	-4.7555**	I (1)

Note: * indicates rejection of the null hypothesis of non-stationary at 1 percent.

Source: Based on the EViews 10 output result, (NRB Quarterly Economic Bulletin, 2021).

The results of the ADF and PP tests are displayed in Table 4. The macroeconomic indicators and the development of the banking industry are not consistent in their level of statistics. However, every factor is the stationery in the first difference at a 1% level of significance. Table 4 shows the first level of difference, no variable has unit root issues and is stationary. Therefore, every variable is stationary at I (1).

4.2 Lags selection and determinations

The analysis follows the work of Kaleem et al. (2009), who advocated the lowest Schwarz information criterion SC/AIC/HQ value as the major issue in selecting the suitable lag order selection criteria. The reasoning for selecting the best lag will go a long way toward eliminating the multicollinearity problem. Table 5 shows the lag order selection statistics/criteria, with Lag 1 being selected as the best lag based on the AIC, SC, and HQ values.

Table 5: Optimal lag length test

Lag length	Akaike Information Criteria (AIC)	Schwarz information Criterion (SC)	Hannan-Quinn information criterion (HQ)
0	-2.752661	-2.406405	-2.704917
1	-11.94462*	-9.174572*	-11.56267*
2	-10.380801	-9.035791	-10.457817

Source: Based on the EViews 10 output result, (NRB Quarterly Economic Bulletin, 2021).

4.3 Co-integration test

The cointegration test will assess whether or not the variables in the model have long-run relationships. On that basis, when analyzing the level of cointegrating vectors, this test follows Johansen's technique. For the cointegration rank, the Johanson cointegration test uses two likelihood estimators: a maximum Eigenvalue test and a trace test. Table 6 shows the results of the Johansen approach's cointegration test.

Table 6: Results of Johansen's cointegration test

Trace statistics on Unrestricted Cointegration Rank Test				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.658580	49.39641	29.79707	0.0001
At most 1 *	0.584359	24.67965	15.49471	0.0016
At most 2	0.177243	4.748165	7.964106	0.1791
Max-Eigen statistics on Unrestricted Cointegration Rank Test				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.908241	54.93763	27.58434	0.0000
At most 1 *	0.658580	24.71676	19.13162	0.0150
At most 2	0.177243	4.748165	7.964106	0.1791

Max-eigenvalue test indicates two cointegrating eqn(s) at the 0.05 level.
* denotes rejection of the hypothesis at the 0.05 level

Source: Based on the Eviews 10 (VECM approach) output result outcome

Table 6 displays the results of Johanson cointegration test, which uses both Trace statistics and Eigenvalue to determine the number of cointegrating equations with a critical value of 5% (0.05). However, the outcome reveals that there are two cointegrating equations at a 5% level of significance under the Eigenvalue and Trace statistics, respectively. The cointegrating equations exist at most because the null hypothesis is rejected at a 5% level of significance, indicating the existence of long-run correlations among the system's variables.

4.4. Dynamic Causality Analysis Using the VECM

A Granger causality test is used to design relevant macroeconomic parameters for banking sector development after identifying the cointegration connection between variables. The study employed the vector error correction model (VECM) framework, as explained in the preceding

section, to achieve the goal since the variables are cointegrated. If the variables are integrated at I(1), the vector error correction method (VECM) is better suited for examining the causality between the series (Zheng et al., (2019). Therefore, the study used Engle and Granger's VECM Granger causality test to investigate the direction of causality between macroeconomic factors and banking sector development.

The Short-run causality test using the Vector Error Correction Model (VECM)

The dynamic causality test is used in this study to investigate the causality linkages among the variables resulting from the use of VECM. Table 7 and 8 shows the findings of dividing the direction of causality into short-term and long-term causal links.

Table 7: Estimated short-run coefficients by using the Vector Error Correction Model (VECM)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ECT(t-1)	-0.315781	0.184465	-4.368138	0.000
Δ lnPCG(-1)	-0.016350	0.160491	-0.882504	0.406
Δ lnINF(-1)	-0.018169	0.037161	-0.101872	0.855
Δ lnTOP(-1)	-0.141931	0.112841	-1.257837	0.074
Δ lnREM(-1)	0.845672	0.145873	5.483021	0.000
Δ lnGEP(-1)	0.285615	0.080230	3.559901	0.000
Δ lnSMC(-1)	0.257871	0.102551	2.514614	0.046
Constant	-2.524964	0.810765	--3.098325	0.0332
R^2 = 0.573446,	Adj. R^2 = 0.527043,		F-statistic = 75.8313 [0.000]	

Source: Based on the Eviews 10 (VECM approach) output result outcome

Table 7 shows the short-run causality of VECM. The short-run disequilibrium is implied to be corrected at a rate of 31.57 percent annually in the long run by the error correction term, ECT (t-1), which has a value of -0.3157 and is significant at 1 percent. This means that the macroeconomic factors taken into account corrected the divergence from the banking sector's long-term stability of development within a year by 31.57 percent the following year. The disparity in results between short-run stability and long-run stability helps to explain the instability of Nepal's financial system. Due to the system's information efficiency and the dominance of the liquid banking sector, the system is unable to respond to shocks quickly in the short term.

In the short term, per capita GDP has a negative and insignificant impact on banking sector development, but in the long run, this effect is positive and statistically significant, as shown in regression table 8. As a result, per capita GDP can improve economic activity and, as a consequence, banking growth. Furthermore, remittances have a positive and significant influence on banking sector development, therefore leveraging the banking sector development to raise remittances would help finance the economy. The short-run analysis reveals that a 1 percent rise in remittances causes a 0.845 percent boost in banking sector development, while a 1% increase in government expenditure causes a 0.285 percent increase in banking sector development. Similarly, a 1 percent increase in market capitalization leads to

a 0.275 percent increase in BSD, according to the statistics. However, a one percent rise in trade openness results in a 0.142 percent decrease in banking sector development.

The long-term causality test using the Vector Error Correction Model (VECM)

To assess the long-term impact of macroeconomic factors on the development of the banking sector, the long-run coefficients of the VECM model should be established after confirming the co-integration of the variables. As a result, in this work the long-run coefficients of the variables in the VECM technique were determined. The results of the long-term relationship between macroeconomic factors and the growth of the banking industry in Nepal are shown in Table 8.

Table 8: Estimated Long- run coefficients by using the VECM

Variable	Coefficient	Std. Error	t-Statistic	Prob.
dlnPCG(-1)	0.185068	0.130685	3.581438	0.000
dlnINF(-1)	-0.138760	0.046388	-1.165545	0.082
dlnTOP(-1)	-0.228619	0.141555	-0.889714	0.433
dlnREM(-1)	0.343776	0.191406	2.761239	0.020
dlnGEP(-1)	0.450797	0.138494	3.080237	0.001
dlnSMC(-1)	0.273321	0.098966	2.561772	0.037
Constant	0.108117	0.308812	3.506755	0.000
R^2 = 0.84125,	Adj. R^2 = 0.77534,	D-statistic = 1.9365,	F-statistic = 84.925 [0.000]	

Source: Based on the Eviews 10 (VECM approach) output result outcome

Table 8 indicates the long-run causality of VECM. The results of VECM demonstrate that market capitalization, remittances, government expenditure, and per capita GDP have significant and positive effects on banking sector development in Nepal. The findings demonstrate that the 1-period lag has beneficial and significant long-term effects. It means that the banking industry is anticipated to continue to expand with the rise in per capita GDP, remittances, public spending, and market capitalization. The long-run analysis reveals that a 1% increase in per capita GDP leads to an increase in banking development by 0.185% while a 1% increase in remittance triggers an increase in banking sector development by 0.343%. The results equally indicate that increasing stock market capitalization by 1% leads to an increase in BSD by 0.273%. The BSD went up by 0.450% in response to a 1% increase in government expenditure. Likewise, the beta coefficients for inflation and trade openness are observed to be negative, which shows that inflation rate and trade openness have a negative and insignificant impact on banking sector development. It implies that with the decrease in inflation and trade openness, the banking sector is likely to develop more. Therefore, there is a long-run relationship between macroeconomic variables and banking sector development.

In addition, the D/W value of 1.9365 indicates that there is no issue with autocorrelation. The adjusted R2 is 0.7753 and F-statistics of 84.925 (p=0.000) are shown in Table 8 indicating that at the 5% level of significance. Therefore, the overall model of this study is the best-fitted model. Finally, the dynamic causality of VECM reveals that Per capita GDP, remittances, government expenditure, and stock market

capitalization are statistically significant which indicates strong explanatory power to explain banking sector development in Nepal.

4.5. Diagnostic tests for Vector Error Correction Model (VECM)

The diagnostic tests employed in this study to evaluate the accuracy of the estimated VECM technique include model stability, serial correlation, normality, and heteroscedasticity. The resultant Vector Error Correction Model (VECM) was examined for serial correlation, heteroscedasticity, normalcy, and stability using the Breusch-Godfrey (BG) serial correlation LM test, Breusch-Pagan-Godfrey (BPG) heteroscedasticity test, normality test, and recursive CUSUM test. The findings of heteroscedasticity and serial correlation are shown in Table 9, while the results of normality, the CUSUM test, and model stability are shown in Figures 1, 2, and 3, respectively.

Table 9: Diagnostic tests for Vector Error Correction Model (VECM)

	F-version		Breusch-Godfrey LM-version	
	Statistics	P-Value	Statistics	P-Value.
A: Serial Correlation	F (1,18) = 0.7271	0.4057	χ^2 (1) = 1.025	0.3112
B: Functional Form	F (1,20) = 0.5872	0.455	χ^2 (1) = 0.697	0.451
C: Normality	N/A		χ^2 (2) = 3.424	0.209
D: Heteroscedasticity	F (2,18) = 1.0682	0.4169	χ^2 (2) = 6.5646	0.3630

Source: Based on the Eviews 10 (VECM approach) output result outcome

Table 9 demonstrates that the estimated vector error correction model (VECM) approach is devoid of serial correlation and heteroskedasticity since the p-value of F-statistics and ChiSquare for the LM test revealed that both are larger than 0.05. The Jarque-Bera statistics are also used to assess the approach's residual terms' normality.

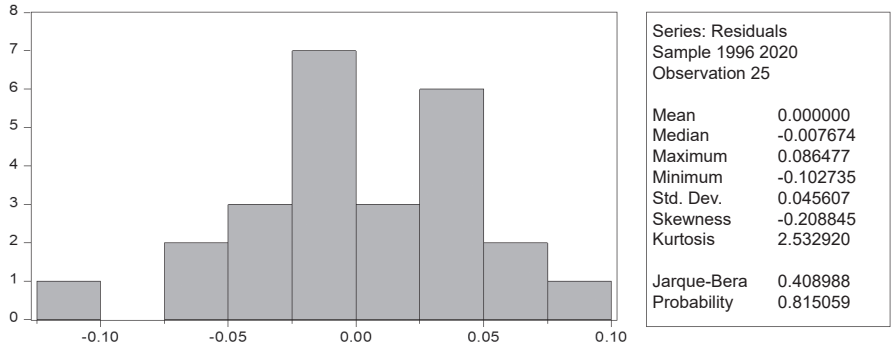

Figure 1: Normality test

Table 9 demonstrates that the estimated vector error correction model (VECM) approach is devoid of serial correlation and heteroskedasticity since the p-value of F-statistics and ChiSquare for the LM test revealed that both are larger than 0.05. The Jarque-Bera statistics are also used to assess the approach's residual terms' normality.

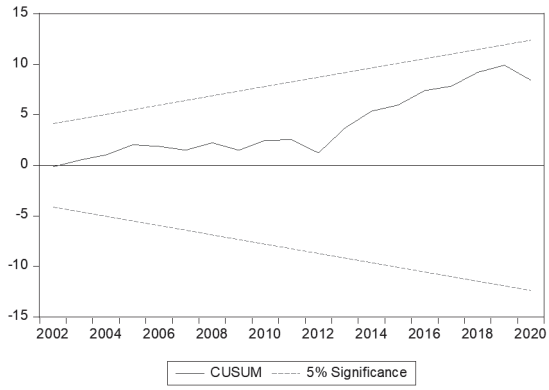

Figure 2: CUSUM test

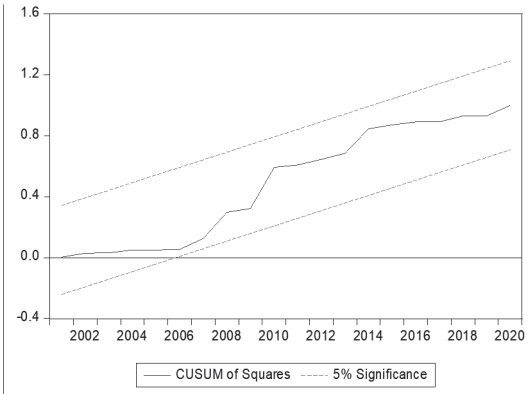

Figure 3: CUSUM square stability test

Figure 1 depicts the Jarque-Bera (JB) test statistic of 0.4089 (p=0.8150>0.05). According to the study's findings, the model's residual series is normally distributed. So, the estimated VECM model's normality has been verified. Finally, the model's long-term stability is verified using the CUSUM test and CUSUM square stability test. The CUSUM test, CUSUM of square test, and line of critical boundaries are shown in Figures 2 and 3 at a 5% level of significance. As demonstrated in Figures 2 and 3, the plots of CUSUM test and CUSUM of the square test are within the critical bounds. Therefore, it has been established that the estimated model remained constant during the research. This demonstrates the model's stability and enables its use for causality and long-term relationships.

V. Conclusions And Implications

The research concluded a long-term equilibrium relationship between macroeconomic factors and the banking sector development. With a line of theory and literature, this study demonstrates that per capita GDP has a positive and significant impact on banking sector development. It indicates that per capita GDP grows, and increased demand for financial services induces growth in the banking industry. Therefore, policymakers design and implement policies that increase the higher income of the country and promote economic growth. Similarly, the beta coefficient of remittance has a positive and significant impact on banking sector development that exploring that remittance inflows are vital not only for economic growth but also for banking sector development. This finding is consistent with Herger et al. (2008) and Nazir et al. (2018). The study, therefore, urges the authorities to design and implement policies that directly and indirectly promote the inflow of remittances in Nepal. Moreover, the study also found that government expenditure has played a significant impact on banking sector development. It also indicated that when the real worth of money rises, banking growth grows, which could only be achieved by increasing government expenditures. The study, therefore, suggests that authorities must encourage political and development viewpoints on the impact of fiscal expenditure on the development of the banking industry.

Similarly, this study revealed that banking sector development is positively affected by stock market capitalization which is similar to Ayunku & Etale (2014) and Rehman (2018). The finding indicates that the more credit is extended to the public sector then the more funding will be channeled toward

the banking sector development. The study, therefore, urges the authorities to design and implement policies that increase the financial activities of the stock market effort to promote banking sector development. However, the study also reveals that inflation rate and trade openness have found negative and insignificant impacts on banking sector development. It indicates that higher trade openness and inflation rate lower would be the development of banking industry. The study, therefore, urges that authorities should implement low trade openness and inflation with target policies to boost banking sector development. The study recommends more investigation into the factors influencing banking sector development, particularly those pertaining to institutional, political, macroeconomic, and legal challenges, as well as those on banking industry features.

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References

Aluko, O. A., & Ajayi, M. A. (2018). Determinants of banking sector development: Evidence from Sub-Saharan African countries. *Borsa Istanbul Review, 18*(2), 122-139. https://doi.org/10.1016/j.bir.2017.11.002

Ayunku, P. E., & Etale, L. M. (2014). Macroeconomic analysis of banking sector development and economic growth in Nigeria. *International Journal of Economics, Commerce and Management, 2*(2), 1-11. Retrieved from https://bit.ly/3B1GMl8

Bhattacharya, M., Inekwe, J., & Paramati, S. R. (2018). Remittances and financial development: empirical evidence from a heterogeneous panel of countries. *Applied Economics, 50*(38), 4099-4112. https://doi.org/10.1080/00036846.2018.1441513

Cherif, M., & Dreger, C. (2016). Institutional determinants of financial development in MENA countries. *Review of Development Economics, 20*(3), 670-680. https://doi.org/10.1111/rode.12192

Dogga, S. M., Patra, S. K., & Kuruva, M. B. (2017). Determinants of banking sector development in India: ARDL bound testing approach. *Asian Journal of Research in Banking and Finance, 7*(9), 133-149. https://doi.org/10.5958/2249-7323.2017.00111.0

Elsherif, M. A. (2015). The determinants of financial development: Empirical evidence from Egypt. *The Macrotheme Review, 4*(3), 69-87. Retrieved from https://bit.ly/3xefgjj

Filippidis, I., & Katrakilidis, C. (2014). Institutions, policy, and banking sector development: A reassessment. *Journal of Economics and Finance, 64*(6), 501-521. Retrieved from https://bit.ly/3QzIDDm

Fu, J., Liu, Y., Chen, R., Yu, X., & Tang, W. (2020). Trade openness, internet finance development and banking sector development in China. *Economic Modelling, 91*, 670-678. https://doi.org/10.1016/j.econmod.2019.12.008

Khalfaoui, H. (2015). The determinants of financial development: Empirical evidence from developed and developing countries. *Applied Economics and Finance, 2*(4), 1-9.

Levine, R., & Zervos, S. (1998). Stock markets, banks, and economic growth. *American Economic Review, 88*(3), 537-558. https://www.jstor.org/stable/116848

Le, T. H., Kim, J., & Lee, M. (2016). Institutional quality, trade openness, and financial sector development in Asia: An empirical investigation. *Emerging Markets Finance and Trade, 52*(5), 1047-1059. https://doi.org/10.1080/1540496X.2015.1103138

Milic, D., & Solesa, D. (2017). The analysis of macroeconomic determinants of the banking sector liquidity with role in financing agricultural sector. *Economics of Agriculture, 64*(2), 533-550. https://doi.org/10.5937/ekoPolj1702533M

Nazir, M. I., Tabassam, R., Khan, I., & Nazir, M. R. (2018). Banking Sector Development, Inflation and Economic Growth in Asian Countries: A Panel Causality and Co-Integration Approach. *International Journal of Accounting and Financial Reporting, 8*(4), 399-423.

Pagano, M. (1993). Financial markets and growth: an overview. *European Economic Review, 37*(3), 613-622. Retrieved from https://bit.ly/3BwMNrv

Pesaran, M., Shin, Y., and Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics, 16*(3), 1289-1326. https://doi.org/10.1002/jae.616

Rajan, R., & Zingales, L. (1998). Financial development and growth. *American Economic Review, 88*(3), 559-586. Retrieved from https://bit.ly/3xhmzqy

Rehman, M. Z. (2018). Banking sector development, stock market development, and economic growth evidence from Saudi Arabia. *Academy of Accounting and Financial Studies Journal, 22*(4), 1-15. Retrieved from https://bit.ly/3L4B4Dz

Rodrik, D. (1999). Where did all the growth go? External shocks, social conflict, and growth collapse. *Journal of Economic Growth, 4*(4), 385-412. Retrieved from https://link.springer.com/article/10.1023/A:1009863208706

Touny, M. A. (2014). Macroeconomic determinants of banking sector development: A comparison study between Egypt and Saudi Arabia. *Advances in Management and Applied Economics, 4*(3), 139-156. Retrieved from https://bit.ly/3BvFSyB

Tsaurai, K. (2018). An empirical study of the determinants of banking sector development in the SADC countries. *The Journal of Developing Areas, 52*(1), 71-84. Retrieved from https://muse.jhu.edu/article/676866

Yartey, C. A. (2010). The institutional and macroeconomic determinants of stock market development in emerging economies. *Applied Financial Economics, 20*(21), 1615-1625. https://doi.org/10.1080/09603107.2010.522519

Yu, H., & Gan, P. T. (2010). The determinants of banking sector development: Malaysian experience. *International Research Journal of Finance and Economics, 35*(1), 34-41.

Zheng, C., Bhowmik, P. K., & Sarker, N. (2019). Industry-specific and macroeconomic determinants of non-performing loans: A comparative analysis of ARDL and VECM. *Sustainability, 12*(1), 325-342. https://doi.org/10.3390/su12010325