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Banking Crises and Macroeconomic Forces: Global Perspectives

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ABSTRACT

This study examines the likelihood of banking crises employing the logistic regression approach. The data is sourced from the Global Macro Database, a comprehensive macroeconomic time series repository covering 243 countries and territories. The findings suggest that GDP growth reduces the probability of banking crises, and conversely, tight monetary policy increases the likelihood. Likewise, appreciation in housing prices in the current period lowers the risk; however, the housing price in the past increases the probability of crises. The other control variables are money supply, sustainable public finance, and favorable current account balance, which significantly lower the probability of a crisis. Policymakers should strive to balance fiscal and monetary measures for sustainable growth and implement macro-prudential regulations to prevent excessive speculation in the asset market. Timely consideration of short-term and long-term risk factors strengthens financial stability and minimizes the probability of banking crises in the future.

Keywords: Banking Crisis, Macroeconomic Indicators, Panel Data, Logistic Regression, Financial Stability

JEL Classification: G01, E60, C23, C35, G18

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1. INTRODUCTION

Banking crises have substantial macro-financial implications. It disrupts the credit channel of the monetary policy. The immediate impact is the erosion of banks' balance sheets and the loss of confidence among financial consumers. When banks experience significant losses, their capital buffer depletes. Laeven and Valencia (2010) noted that capital deterioration of banks restricts credit expansion when underlying economic conditions warrant expansionary policies. This further amplifies the downturn and transmits uncertainty throughout the financial system. The interbank lending market is susceptible to such shocks, and banks become reluctant to lend to one another. This exacerbates liquidity shortages and increases the probability of further bank runs.

Bernanke (2023) noted that financial distress disrupts the credit market, declines private investment, and results in a fall in consumption. This ultimately reduces the aggregate demand of the economy. Kaminsky and Reinhart (1999) mentioned that periods of excessive credit growth and the formation of bubbles in the asset market can lead to financial crises. The Global Financial Crises (GFC) 2008 is a recent reference. Reinhart and Rogoff (2009) argued that recovering from banking crises is difficult for economies with persistently low growth. Banking crisis also impacts fiscal sustainability since the government might have to intervene in the banking system by injecting capital or announcing bailout packages to prevent a systemic collapse. This escalates the public debt and might trigger a vicious cycle as high debt levels and fiscal imbalances further destabilize the banking sector.

Financial crises have long captured the attention of scholars and policymakers for its substantial macroeconomic consequences. The incidence of some bank failures in the USA in 2023, the Global Financial Crisis of 2008, and events mentioned by Reinhart and Rogoff (2009) and Kaminsky and Reinhart (1999) warrant understanding and predicting distress. This analysis attempts to go beyond country or region-specific approaches by integrating the dynamics of economic growth, volatility in housing prices, and changes in monetary policy stance within a global framework using the most recent dataset. For this, the study employs the well-established logistic regression approach for the prediction of banking crises. Policymakers, central banks, and financial institutions are believed to benefit from this literature as early detection of vulnerabilities can facilitate timely interventions to stabilize the systems. Following sections of the article include a literature review, the methodology, results and discussion, and the conclusion.

2. LITERATURE ON BANKING CRISIS

2.1 Theoretical Underpinning

Minsky (1986) proposed the financial instability hypothesis. According to him, prolonged periods of economic stability favor risky behavior of agents. This increases the leverage and speculation in the financial market, which makes the system fragile. If there is any adverse shock in such an economy, it triggers a financial crisis. This is attributed to the collapse in price of assets and broader disruption in macroeconomic activity, which infers the cyclical nature of financial markets and the inherent tensions between stability and risk accumulation. Bernanke and Gertler (1995) illustrate the financial accelerator mechanism. As banks face high risk and weak capital positions, they restrict lending. This credit crunch further depresses economic activity and potentially triggers a prolonged downturn. Brunnermeier (2009)'s liquidity spiral concept demonstrates how liquidity shocks can precipitate a rapid decline in asset prices, compelling banks to deleverage and further constrict credit flows. This causes a vicious cycle where declining asset values and tighter credit conditions exacerbate each other, deepening the banking crisis and the economic contraction.

2.2 Empirical Review

The literature on banking crises and macroeconomic stability has evolved significantly over the past decades. IMF (2010) illustrates how financial market dynamics and macroeconomic stability are deeply intertwined. Building on this foundation, Claessens & Kose (2018) explored the relationship between asset prices, credit cycles and economic fluctuations, and financial imperfections in the propagation of economic shocks. Further, Borio & Disyatat (2022) have documented how evolving bank behaviors-characterized by increased leverage and risk taking-are linked to macroeconomic performance in the post-war period.

Logit (binary) models are widely used to predict banking crises. Demirguç-Kunt and Detragiache (1998) demonstrated that by coding crisis episodes as 1 (crisis) and 0 (no crisis), one can effectively relate macroeconomic variables: credit expansion, asset price surges, and fiscal imbalances: to the probability of a banking crisis. Kaminsky, Lizondo, and Reinhart (1999) extended this framework, adapting the methodology developed initially for currency crises to banking crises characterizing financial distress.

More recent contributions have refined these logit-based early warning systems. Jimenez et al. (2012) integrated bank-level balance sheet data with aggregate macroeconomic indicators to enhance predictive accuracy. Cerutti, Claessens, and Laeven (2017) compared the efficacy of

logistic regression with alternative methods. These studies confirm that binary models are robust tools for capturing the complex dynamics underlying banking crises.

Within the South Asian context, researchers have tailored these methodologies to address the region's unique economic and structural features. In India, for example, studies by Chakraborty (2015) and Singh and Sharma (2018) have shown that combining traditional macroeconomic variables with financial sector indicators improves crisis prediction.

Similarly, research in Pakistan by Khan and Ahmed (2012) points to the critical roles of fiscal deficits, high inflation, and exchange rate volatility in banking sector vulnerabilities. In Bangladesh, Hossain and Rahman (2013) further illustrate how local structural factors and policy measures, including banking supervision and monetary interventions, are instrumental in mitigating systemic risks.

Research extending the binary model approach in South Asia also incorporates political and institutional dimensions. Studies by Rizvi and Mustafa (2017) and Ali (2019) suggest that political stability and regulatory quality are pivotal in shaping the dynamics of banking crises in the region, reinforcing the notion that macro-financial linkages must be understood within their specific socio-political contexts.

Adhikari and Sharma (2017) employed logit models to identify critical predictors—such as GDP growth, inflation, and credit expansion—that significantly affect the probability of crisis events in Nepal. Aryal (2018) further examined the impact of external shocks, including exchange rate volatility and remittance flows, on the stability of Nepalese banking sector. Paudel (2019) integrated bank-level data with macroeconomic measures to strengthen early warning indicators. Karki and Thapa (2020) underscored the mitigating role of regulatory reforms and improved banking supervision. These studies highlight that using logit methodologies in global and region-specific studies reinforces the predictive power of macroeconomic indicators.

3. DATA AND VARIABLES

This study used the dataset from the Global Macro Database. Muller et al. (2025), the Global Macro Database is an open-source, continuously updated repository that unifies and extends macroeconomic time series by integrating data from 32 contemporary sources - including the IMF, World Bank, and OECD-with historical records from 78 additional datasets. This comprehensive resource provides annual time series for 46 key macroeconomic variables across 243 countries and territories, with coverage from as early as 1086 to 2024 and

projections extending to 2030. The database supports time series and panel analyses by standardizing data into consistent annual observations. Continuous updates from international aggregators make it an invaluable resource for cross-country empirical research and long-run analyses of macroeconomic trends and impact of events like financial crises. The database captures banking crisis events by incorporating binary indicators coded as 1 for crisis and 0 otherwise. In doing so, it draws on established frameworks from studies such as Reinhart and Rogoff (2009), Jorda et al. (2017), and Laeven and Valencia (2013). This comprehensive approach ensures that banking crises are consistently identified across countries and historical periods. It enables robust empirical investigations into their long-term macroeconomic impacts. The variables selected for this analysis based on various research mentioned in the empirical review section are presented in Table 1, with their short definition.

Table 1: List of Variables

Sector	Name of the Variable	Symbol	Definition
Macroeconomic Indicators	Growth rate of real GDP (USD)	*d_lnrgdp_USD*	The percentage change in real GDP, measuring economic growth.
	Growth rate of money supply (M2)	*d_ln_m2*	The percentage change in broad money supply (M2), indicating liquidity levels.
	Inflation	*infl*	The percentage change in consumer prices, reflecting inflationary pressure.
	Unemployment rate	*unemp*	The percentage of the labor force that is unemployed.
Monetary Policy Indicators	Central bank policy rate	*cbrate*	The interest rate set by the central bank to influence monetary policy.
	Short-term interest rate	*strate*	The market-determined short-term lending rate reflects liquidity conditions.
Housing Market Indicators	The growth rate of the housing price index	*d_ln_HPI*	The percentage change in the housing price index indicates real estate trends.
External Sector Indicators	Real effective exchange rate	*REER*	A weighted average of a country's currency relative to other currencies, adjusted for inflation.
	Current account balance (% of GDP)	*CA_GDP*	The net flow of goods, services, and financial transfers as a percentage of GDP.
Public Sector Indicators	Government deficit (% of GDP)	*govdef_GDP*	The government's fiscal deficit as a share of GDP indicates fiscal health.
Financial Stability Indicator	Banking Crisis (Dependent Variable)	*BankingCrisis*	A binary variable indicating whether a banking crisis occurred (1) or not (0).

Source: Author's elaboration

4. METHODOLOGY AND MODEL ESTIMATION

Logistic regression is a widely used econometric technique for modeling a binary dependent variable (Hosmer et al., 2013). Unlike ordinary least squares (OLS) regression, assuming continuous outcome, logistic regression estimates the probability that an observation belongs to one of two categories (Wooldridge, 2010). This method is appropriate when the dependent variable, Y, takes two possible values, i.e., banking crisis (1) versus no banking crisis (0), success (1) versus failure (0), and default (1) versus non-default (0). The key objective of logistic regression is to model the probability that Y=1 given a set of explanatory variables X.

The general form logistic regression model is expressed as:

$$P(Y=1|X) = \frac{e^{\beta_0+\beta_1X_1+\beta_2X_2+\cdots+\beta_kX_k}}{1+e^{\beta_0+\beta_1X_1+\beta_2X_2+\cdots+\beta_kX_k}} \quad (1)$$

Where,

P(Y=1|X) is the probability that the event Y =1 occurs

β *is the intercept term*

$\beta_1, \beta_2, \ldots\ldots\ldots\ldots, \beta_k$ *are the regression coefficients for explanatory variables* $X_1, X_2, \ldots\ldots, X_K$

The function maps any real-valued input to the (0, 1) probability range (Gujarati & Porter, 2009). To linearize the relationship, we take the logit transformation (Menard, 2002):

$$\log\left(\frac{P(X=1|X)}{1-P(Y=1|X)}\right) = \beta_0 + \beta_1X_1 + \beta_2X_2 + \cdots + \beta_kX_k \quad (2)$$

In equation (2), the left-hand side is the log-odds (logit function). The logistic function ensures that predicted probabilities lie between 0 and 1. For our analysis, the equation (2) is modified as:

$$\text{Bankingcrisis} = \alpha + \beta_1 d(\text{lnrgdp}) + \beta_2 d(\text{lnm}_2) + \beta_3 \text{infl} + \beta_4 \text{L1\_infl} + \beta_5 d(\text{lnHPI}) + \beta_6 d(\text{L1}_{\text{lnHPI}}) + \beta_7 d(\text{L2}_{\text{lnHPI}}) + \beta_8 d(\text{L3}_{\text{lnHPI}}) + \beta_9 d(\text{L4}_{\text{lnHPI}}) + \beta_{10}\text{unem} + \beta_{11}\text{L3}_{\text{unemp}} + \beta_{12}\text{REER} + \beta_{13}\text{govedef}_{\text{GDP}} + \beta_{14}\text{CA}_{\text{GDP}} + \beta_{15}\text{strate} \quad (3)$$

Since logistic regression is nonlinear, ordinary least squares (OLS) estimation is inappropriate. Instead, the model parameters are estimated using Maximum Likelihood Estimation (Greene, 2018).

The likelihood function is given by:

$$L(\beta) = \prod_{i=1}^{N} P_i^{Yi} \, (1 - Pi)^{(1-Yi)} \tag{4}$$

Where,

$P_i = \frac{e^{Xi\beta}}{1+ e^{Xi\beta}}$ is the probability of Y = 1

Y_i takes the value 1 or 0 for each observation, and the likelihood function is to obtain the optimal β coefficients.

Taking the log-likelihood function,

$$lnL(\beta) = \sum_{i=1}^{N} [y_i lnP_i + (1 - Y_i) \ln(1 - P_i)] \tag{5}$$

Maximizing this function provides the best estimates of β, which are computed numerically in statistical software (STATA in our case). Unlike OLS regression, logistic regression coefficients are interpreted in terms of odds ratios (OR) (Long & Freese, 2014):

$$OR_j = e^{\beta_j} \tag{6}$$

To understand how a one-unit change in X_j affects the probability of Y=1, we can compute the marginal effect:

$$\frac{\delta P}{\delta X_j} = \beta_j P(1 - P) \tag{7}$$

Where P is the predicted probability. These marginal effects vary depending on the value of P (Cameron & Trivedi, 2005).

5. EMPIRICAL RESULTS

5.1 Descriptive Statistics

The descriptive statistics provide key insights into the distribution and characteristics of the variables used in the study. Real GDP growth has a mean of 3.3% with moderate variation (std. dev. = 6.87%), indicating a generally stable economic growth rate across observations. Money supply growth shows a relatively higher standard deviation (34.18%) than its mean (15.6%), suggesting variability in liquidity conditions across countries. Inflation has a mean of 8.67%, but a significant standard deviation (21.62%) and a wide range (-18.7% to 160.6%) indicate significant differences in price stability, with some countries experiencing deflation while others have high inflation. Real effective exchange rate (*REER*) has a high standard deviation (198.98), showing significant differences in currency competitiveness.

The monetary policy proxies, central bank policy rate (cbrate) and short-term interest rate (*strate*), have mean values of 7.92% and 7.57%, respectively, with relatively high standard deviations. This suggests substantial cross-country variations in interest rate policies. Housing price index growth has a mean of 3.5% but a very high standard deviation (27.55), indicating strong fluctuations in real estate markets. Unemployment averages 7.69%, but the wide range (0% to 70%) reflects structural differences in labor markets. Government deficit and current account balance have negative mean values (-1.94% and -2.42% of GDP), indicating that most countries in the dataset run fiscal and external deficits. However, their large standard deviations highlight significant variability across economies (Table 2). The descriptive statistics highlight substantial heterogeneity in macroeconomic conditions, monetary policies, and financial stability indicators across different economies. The stationarity of the variables was ensured before the estimation of the models.

Table 2: Descriptive Statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
Growth rate of real GDP (USD)	14,990	0.033	0.0687	-1.0556	1.0076
Growth rate of money supply (M2)	10,298	0.1564	0.3418	-5.3893	19.8252
Inflation rate	19,692	8.6696	21.6239	-18.705	160.5955
Real effective exchange rate	11,525	144.9799	198.9838	30.9751	1,708.35
Central bank policy rate	8,730	7.9172	9.2236	-0.4	66
Short-term interest rate	7,383	7.5685	8.7623	-0.33	61.7
Growth rate of housing price index	3,453	3.5035	27.5481	-45.2837	1,196.38
Unemployment rate	7,645	7.6862	6.2599	0	70
Government deficit (% of GDP)	13,674	-1.9372	10.5289	-557.499	125.135
Current account balance (% of GDP)	12,986	-2.419	12.6079	-242.188	314.906

Source: Author's calculation using STATA

5.2 Logistic Regression Result

This study estimated four logistic regression models to predict the banking crises (see Table 3). The models mainly differ on the choice of monetary policy proxy: Models 1 and 2 include the central bank policy rate (cbrate), while Models 3 and 4 use the short-term interest rate (strate) as the alternative proxy. Given their high correlation, they were incorporated in separate specifications to avoid multicollinearity. The variance inflation factors (VIF) of the variables used for estimation are presented in ANNEX 3. Models 1 and 3 (Fixed effect models) account for within-country variations by controlling for unobserved heterogeneity at the country level. Model 2 and 4 (random effect models) allow for both within and between-country variations. Mundlak test (Mundlak, 1978) was conducted to choose between random-effects and fixed-effects logistic regression model (ANNEX 2). Although the Mundlak test suggests that the fixed-effects models are the preferred specification, the results are broadly consistent with some variations in coefficients and significance levels.

Table 3: Logistic Regression Estimates

Dependent variable: **Banking Crisis**

Category	**Variable**	**Model 1_Fe**	**Model 2_Re**	**Model 3_Fe**	**Model 4_Re**
Macroeconomic Indicators	Real GDP Growth (d_lnrgdp_USD)	-17.0478*** (5.0373)	-18.4750*** (3.5860)	-18.3489*** (5.2331)	-19.589*** (4.6539)
	Money Supply Growth (d_ln_m2)	-4.6812* (2.7480)	-5.0430** (2.0840)	-5.005* (2.8965)	-5.030** (2.1874)
	Inflation (infl)	-0.0635* (2.7480)	-0.0720** (0.0359)	-0.1066** (0.0444)	-0.1005** (0.0446)
	Lagged Inflation (L1_infl)	-0.0005 (0.0185)	0.0012 (0.0116)	-0.0010 (0.0404)	-0.0070 (0.0472)
Housing Market Variables	Housing Price Growth (d_ln_HPI)	-0.2243*** (0.0508)	-0.2150*** (0.0492)	-0.2129*** (0.0507)	-0.2038*** (0.0474)
	Lagged Housing Prices (L1_d_ln_HPI)	0.1469*** (0.0548)	0.1180** (0.0419)	0.1515*** (0.0591)	0.1263*** (0.0442)
	Second Lag (L2_d_ln_HPI)	-0.0292 (0.0570)	0.0073 (0.0474)	-0.0272 (0.0651)	0.0027 (0.0596)
	Third Lag (L3_d_ln_HPI)	0.0197 (0.0670)	-0.0260 (0.0361)	0.00995 (0.0742)	-0.0299 (0.0397)
	Fourth Lag (L4_d_ln_HPI)	-0.0428 (0.0708)	-0.0420** (0.0204)	-0.0481 (0.0790)	-0.0432* (0.0224)
Labor Market Variables	Unemployment Rate (unemp)	-0.1931** (0.0888)	-0.2530*** (0.0819)	-0.2232** (0.0896)	-0.2692*** (0.0801)
	Third Lag Unemployment (L3_unemp)	0.2244*** (0.0767)	0.2120** (0.0773)	0.2336*** (0.0745)	0.2064*** (0.0764)
External and Fiscal Indicators	Real Effective Exchange Rate (REER)	0.0021 (0.0039)	0.0015 (0.0010)	0.0028* (0.0016)	0.0002 (0.0004)
	Government Deficit-to-GDP (govdef_GDP)	0.1049** (0.0525)	0.0630 (0.0460)	0.1207** (0.0528)	0.0517 (0.0484)
	Current Account Balance (CA_GDP)	-0.1233*** (0.0404)	-0.0860*** (0.0264)	-0.1136*** (0.0419)	-0.0642** (0.0314)
Monetary policy indicator	Central bank policy rate (cbrate)	0.1668*** (0.0444)	0.1428*** (0.0293)	-	-
	Shor term Interest rate (strate)	-	-	0.2321*** (0.0509)	0.1950*** (0.0411)

Model Fit Statistics				
Number of Observations	1,501	1,746	1,501	1,749
Number of Groups (Panels)	24	45	23	43
Log Likelihood	-160.1751	-203.6451	-155.6121	-199.2472
Wald chi^2 (15) / LR chi^2 (15)	82.65	254.47	94.11	345.75
Prob > chi^2	0	0	0	0
Minimum Observations per Group	14	1	14	1
Average Observations per Group	62.5	38.8	65.3	40.7
Maximum Observations per Group	143	143	143	143
Integration Method (RE Models Only)	N/A	mvaghermite (12)	N/A	mvaghermite (12)
Sigma_u (Panel-Level Variance, RE Only)	N/A	0.0005581	N/A	0.0013107
Rho (Fraction of Variance Due to Panel Effects, RE Only)	N/A	9.47E-08	N/A	5.22E-07

Source: Authors Estimation Note: ***p < 0.01, **p < 0.05, *p < 0.1

The coefficients presented in Table 3 are the log odds ratios, indicating how a unit change in an explanatory variable affects the log odds of occurring a banking crisis. The marginal effect estimate of the models is included in ANNEX 1. The above results provide key insights into the role of economic growth, monetary policy, and housing prices in predicting the banking crisis. The findings are broadly consistent with earlier research on financial crises, particularly those of Reinhart & Rogoff (2009), Kaminsky & Reinhart (1999), and Schularick & Taylor (2012), which emphasize the role of macroeconomic balances, monetary policy, and asset price cycles in financial stability.

The Real GDP Growth significantly reduce the log odds of a banking crisis. This aligns with the findings of Demirguç-Kunt & Detragiache (1998) and Reinhart & Rogoff (2009), who documented that economic downturns significantly raise the probability of banking crises. Likewise, the monetary policy instrument i.e. central bank policy rate (cbrate) in models 1 and 2 and alternative monetary policy instrument taken for this study i.e. short term interest rate (strate) in models 3 and 4, is highly significant (1 % level of significance). It implies that higher policy rates significantly increase the likelihood of a crisis, supporting the findings of Borio & Lowe (2002), who argued that abrupt monetary tightening could trigger financial instability by tightening liquidity. Similarly, Cecchetti et al. (2000) found that sudden interest rate hikes disrupt financial stability.

Looking into the housing market, increasing real estate prices at the current period significantly lowers the log-odds of a banking crisis. This supports Claessens et al. (2010), who found that housing market collapses are strong predictors of financial crises. However, rising house prices in the past increases the log-odds of a crisis, consistent with Jorda, Schularick, and Taylor

(2015), who showed that property booms fuel financial instability. However, the 4th lag of the housing price has a negative and significant effect in Model 2 and Model 4. It suggests that a prolonged housing market correction may reduce the probability of a financial crisis over time. This infers that a gradual price decline allows banks and policymakers to adjust, tightening lending standards, and reducing credit risks. This ultimately lowers the probability of a future banking crisis. This effect is significant only in the random effects model because it captures cross-country variations in financial sector responses to long-term housing cycles. In contrast, the fixed effects model focuses only on within-country variations, potentially absorbing structural adjustments. This finding aligns with Jorda, Schularick, and Taylor (2015) and Reinhart and Rogoff (2009), who argue that controlled housing price corrections can stabilize the financial system and prevent crises.

Similarly, the other control variables, such as money supply, lower the crisis risk marginally. It supports the liquidity argument presented by Schularick and Taylor (2012) that loose monetary conditions help to prevent financial stress in the short run. These outcomes are consistent in all the models. The negative and significant effect of current inflation (infl) and the insignificance of lagged inflation in all 4 models suggest that moderate inflation may reduce financial crisis risk in the short term, but does not have a lasting impact. This supports Bernanke & Gertler (1999), who argued that inflation can ease real debt burdens and improve liquidity, stabilizing financial conditions. This also aligns with research by von Hagen and Ho (2007), who found that hyperinflation increases the likelihood of banking crises, while moderate inflation does not have a significant effect. However, the insignificance of lagged inflation aligns with Bordo and Meissner (2016), who state that historical inflation trends alone do not drive banking crises as financial instability is more influenced by credit growth and external imbalances than past inflation levels.

Looking into the labor market, higher unemployment in the current period unexpectedly reduces the log-odds of a crisis. It is consistent across the models, which might be due to countercyclical fiscal interventions that accompany rising unemployment. However, higher unemployment three periods earlier significantly increases the log-odds, supporting the delayed stress transmission theory by Laeven and Valencia (2012). It links past recessions to later banking crises. The other control variables of the external and fiscal sectors also show their impact on the probability of a banking crisis. The real effective exchange rate (REER) is found statistically insignificant in models 1, 2, and 4, whereas it is marginally significant (10 percent significance level) in model 3. Reinhart and Rogoff (2009) argue that exchange rate misalignments contribute to crises only when combined with external debt crises or sudden capital outflows. Likewise, all the models predicted that a more substantial external balance

(Current Account Balance) significantly reduces the log odds of a crisis. It confirms with Milesi-Ferretti & Razin (1998), who demonstrated that external deficits are early warning indicators of financial fragility. Likewise, according to models 1 and 3, an increase in fiscal deficit (Government deficit-to-GDP) increases the log odds of a crisis, reinforcing the arguments of Kaminsky & Reinhart (1999), who found that unsustainable fiscal policies often lead to financial distress.

In summary, the estimation results from all four models indicate that higher economic growth reduces the log odds of a banking crisis, consistent with the financial stability literature. Conversely, tight monetary policy significantly increases financial risk. Housing market trends serve as critical early warning indicators. Additionally, fiscal and external imbalances contribute to banking crises, while labor market dynamics exhibit a delayed impact. These findings underscore the crucial role of economic growth, monetary policy, housing market cycles, and labor market conditions in predicting financial in/stability. This emphasizes the need for policymakers to carefully manage monetary policy operations, liquidity constraints, and housing market risks to mitigate crisis vulnerabilities, ensuring a conducive environment for high and sustained economic growth.

6. CONCLUSION AND POLICY IMPLICATIONS

6.1 Conclusion

This study used global macroeconomic data and logistic regression to examine the impact of GDP growth, monetary policy, and housing prices to predict banking crises. The findings reveal that higher GDP growth reduces the likelihood of a crisis, whereas tight monetary policy increases the crisis probability. Likewise, housing price appreciation in the current period lowers the crisis risk, and lag real estate bubbles cause distress in the banking sector. Other control variables representing different sectors of the economy, such as an appropriate level of money supply, optimum inflation, and large current account surplus, significantly reduce the distress probability. Conversely, unsustainable government deficits and past unemployment (in the third period) increase the underlying risks.

The findings illustrate the importance of sustained economic expansion, accommodative monetary policy, and a stable housing market for financial stability. In addition, the availability of appropriate liquidity in the financial market and price stability have a crucial role in financial resilience. In contrast, severe fiscal shortfall and labor market vulnerabilities contribute to financial distress. The fixed effects logit models are preferred over the random effect model

based on the Mundlak test, ensuring that country-specific unobserved factors do not bias the estimates. However, the estimate is consistent in both fixed-effect and random-effect models.

6.2 Policy Implications

As economic growth is the most potent predictor of the banking crisis, high and sustainable growth strengthens financial stability by reducing loan defaults, enhancing bank resilience, and supporting fiscal sustainability. It promotes employment, increases private sector investment, and ensures stable credit expansion. Promoting investment in human capital and institutional development favors sustainable growth in the long term. From a monetary policy perspective, the findings suggest frequent policy shocks may destabilize financial markets and create distortions. While monetary tightening is often necessary to curb inflation, policymakers must balance its effects on financial stability. In the real estate domain, the results emphasize the importance of macro-prudential regulations to prevent excessive speculation and asset price bubbles, which can lead to delayed financial instability. Short-term housing prices reduce the crisis risk, while their lagged effects (first lag) indicate that sudden corrections in property prices may trigger financial distress, necessitating careful monitoring of real estate markets.

Furthermore, the delayed effects of labor market distress (third lag) suggest worsening employment conditions, necessitating proactive labor market policies. Additionally, the negative impact of the current account deficit on crisis probability highlights the importance of balancing the external sector through policies that promote trade balance, reduce reliance on volatile capital flows, and ensure foreign exchange stability. Likewise, fiscal policy must ensure the sustainability of government deficit, as excessive public debt can undermine investor confidence and financial sector stability. A coordinated approach integrating monetary, fiscal, and macro-prudential policies is essential to strengthen financial resilience and reduce the likelihood of banking crises.

Although this study is based on global data, its findings can be generalized to the Nepalese context. Given ample liquidity and low interest rates in the banking system, sufficient foreign exchange reserves, and significant inflow of remittances, Nepalese policymakers must strive for high and sustained economic growth. This can be accomplished through the optimal coordination of fiscal, monetary, and sectoral policies, which ultimately generate positive externalities across various sectors of the economy, including the financial sector.

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ANNEX 1

Marginal Effect of the Models (1-4)

Category	Variable	Model 1	Model 2	M3	M4
Macroeconomic Indicators	Real GDP Growth (d_lnrgdp_USD)	-3.2737*** (0.8679)	-0.5085*** (0.1015)	-3.4147*** (0.8987)	-3.4147*** (0.8987)
	Money Supply Growth (d_ln_m2)	-0.899* (0.5104)	-0.1388** (0.0589)	-0.9314* (0.5222)	-0.9314* (0.5222)
	Inflation (infl)	-0.0122* (0.0073)	-0.0020** (0.0010)	-0.0198** (0.0080)	-0.0198** (0.0080)
	Lagged Inflation (L1_infl)	-0.0001 (0.0035)	0.0000 (0.0003)	-0.0002 (0.0075)	-0.0002 (0.0075)
Housing Market Variables	Housing Price Growth (d_ln_HPI)	-0.0431*** (0.0092)	-0.0059*** (0.0013)	-0.0396*** (0.0089)	-0.0396*** (0.0089)
	Lagged Housing Prices (L1_d_ln_HPI)	0.0282*** (0.0104)	0.0032** (0.0012)	0.0282*** (0.0108)	0.0282*** (0.0108)
	Second Lag (L2_d_ln_HPI)	-0.0056 (0.0109)	0.0002 (0.0013)	-0.0051 (0.0120)	-0.0051 (0.0120)
	Third Lag (L3_d_ln_HPI)	0.0038 (0.0129)	-0.0007 (0.0010)	0.0019 (0.0138)	0.0019 (0.0138)
	Fourth Lag (L4_d_ln_HPI)	-0.0082 (0.0135)	-0.0012* (0.0006)	-0.0090 (0.0146)	-0.0090 (0.0146)
Labor Market Variables	Unemployment Rate (unemp)	-0.0371** (0.0157)	-0.0069*** (0.0022)	-0.0415*** (0.0154)	-0.0415*** (0.0154)
	Third Lag Unemployment (L3_unemp)	0.0431*** (0.0140)	0.0058** (0.0021)	0.0435*** (0.0132)	0.0435*** (0.0132)
External and Fiscal Indicators	Real Effective Exchange Rate (REER)	0.0004 (0.0008)	0.0000 (0.0000)	0.0005* (0.0003)	0.0005* (0.0003)
	Government Deficit-to-GDP (govdef_GDP)	0.0201** (0.0096)	0.0017 (0.0013)	0.0225** (0.0094)	0.0225** (0.0094)
	Current Account Balance (CA_GDP)	-0.0237*** (0.0073)	-0.0024*** (0.0008)	-0.0211*** (0.0074)	-0.0211*** (0.0074)
Monetary policy indicator	Central bank policy rate (cbrate)	0.0320*** (0.0081)	0.0039*** (0.0008)	-	-
	Short Term Interest Rate (strate)	-	-	0.0432*** (0.0082)	0.0432*** (0.0082)

Source: Author's estimate

ANNEX 2

Result of Model Selection (Mundlak Tests)

Test	Chi^2 (df)	p-Value	Decision
Model 1 & 2	22.48 (9)	0.0075	Reject RE, use FE logit
Model 2 & 3	29.09 (9)	0.0006	Reject RE, use FE logit

ANNEX 3

Variance Inflation Factor Among the Variables

Variable	VIF (Specification with cbrate)	1/VIF	VIF (Specification with strate)	1/VIF
Unemployment (unemp)	5.54	0.1806	5	0.2001
Lagged Unemployment (L3_unemp)	5.36	0.1867	4.82	0.2076
Inflation (infl)	2.64	0.3785	4.21	0.2373
Lagged Inflation (L1_infl)	1.5	0.6664	2.48	0.4036
Central Bank Policy Rate (cbrate)	1.92	0.52	-	-
Short-term Interest Rate (strate)	-	-	2.29	0.4365
Housing Price Growth (d_ln_HPI)	1.67	0.599	1.69	0.5908
Lagged Housing Price Growth (L1_d_ln_HPI)	2.18	0.4595	2.16	0.4625
Lagged Housing Price Growth (L2_d_ln_HPI)	2.06	0.4849	2.17	0.4617
Lagged Housing Price Growth (L3_d_ln_HPI)	1.94	0.515	2.05	0.4878
Lagged Housing Price Growth (L4_d_ln_HPI)	1.48	0.6764	1.53	0.6524
Money Supply Growth (d_ln_m2)	1.47	0.6815	1.85	0.54
GDP Growth (d_lnrgdp_USD)	1.29	0.7765	1.27	0.7858
Government Deficit (govdef_GDP)	1.27	0.7859	1.25	0.801
Current Account Balance (CA_GDP)	1.24	0.8065	1.24	0.8055
Real Effective Exchange Rate (REER)	1.02	0.9793	1.01	0.9878
Mean VIF	**2.17**		**2.34**	