



Determinants of banking crises (Fragility) in the Malawian banking sector

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Abstract

This paper studies the determinants of banking crises or fragility in Malawi. In this study we modelled banking crisis conditions in a developing country banking sector applying a Logistic Regression model using data for Malawi for the period 1980 to 2022. We embedded banking crisis dummy, bank specific and macroeconomic drivers of crisis in the model. Our study finds that under crisis conditions macroeconomic, monetary and fiscal drivers such as the ratio of external debt stock to gross national income ratio, debt service costs to primary export revenue ratio, broad money to GDP ratio, changes in real interest rates, growth in real GDP, total reserves to GDP ratio has a negative and significant impact on banking crisis and fragility in Malawi. These findings are important for policy makers especially in an environment where fiscal dominance is prevalent and drives a significant build up of domestic debt (treasury assets) on the banks' balance sheets.

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1. Introduction

Banking crises occur when many banks in a nation have simultaneous or individual severe issues with their solvency or liquidity. This can happen either due to a common external shock affecting all banks, or because the failure of one bank or a group of banks spreads to other banks within the system. Systemic banking crisis refers

to a scenario when a nation's corporate and financial sectors encounter numerous instances of failure to meet financial obligations. Consequently, there is a significant rise in non-performing loans, leading to the depletion of a substantial portion, if not all, of the overall capital of the banking system. The lack of appropriate study on the issue of banking crises in poor nations like Malawi is mostly owing to the absence of preventative policy action by regulators. Caprio and Klingebiel (1996); Laeven and Valencia (2008a) and Reinhart and Rogoff (2009) provide definitions of banking crises as instances where "a significant portion of the capital in the banking system has been exhausted," while Calomiris (2010) describes banking crises as "episodes of panic or a series of bank failures."

A banking crisis may be defined as a scenario where banks are forced to halt the internal convertibility of their obligations due to real or anticipated bank runs or collapses. This may also lead to government intervention by providing extensive assistance. Laeven and Valencia (2010) measure the components of extensive government intervention. Banking crises are defined as instances where there are clear indications of financial turmoil inside the banking system, such as substantial bank runs, bank losses, and bank liquidations, or notable policy interventions specifically targeting banks. Systemic banking crises can have severe detrimental effects. They have a tendency to steer impacted economies towards severe recessions and abrupt reversals in their current account. Certain crises have demonstrated an infectious nature, swiftly disseminating to other nations without any discernible weaknesses. Banking crises have been caused by various factors, including unsustainable macroeconomic policies characterised by large current account deficits and unsustainable public debt. Additionally, excessive credit booms, significant capital inflows, and balance sheet fragilities have contributed to these crises. Furthermore, policy paralysis resulting from a range of political and economic constraints has also played a role. Currency and maturity mismatches were a key characteristic in several financial crises, while in other cases, the off-balance sheet operations of the banking industry took front stage.

It is essential to dedicate ourselves to studying this issue since banking crises erode the stability of the financial system and frequently trigger economic crises or serve as a harbinger of recessions. As far as we are aware, there are no existing studies in Malawi that have utilised this technique, examined this specific topic, and developed a model of the Malawi banking system in the same way as we did in this work. Our study finds that macroeconomic variables such as exchange rate depreciation and inflation does not have a significant influence on banking crises or fragility in Malawi, but real GDP growth rate and real interest rates were found to have negative and significant influence in propagating banking crises and fragility in Malawi. The study also found that monetary variables such as the ratio of broad money to reserves, domestic credit to private sector to GDP, cost of financing (Risk premium), did not have significant influence on propagating banking crisis or fragility in Malawi.

Our study found that fiscal variables such as the ratio of broad money to GDP, total reserves to external debt, debt service costs to primary export revenues had a negative and significant influence in propagating bank crises or banking fragility in Malawi. These findings are consistent with studies of Lindgren, Garcia, and Saal (1996); Reinhart and Rogoff (2009); Brunnermeier (2001); Kindleberger (1978); Smith (2002); De Nicolò, Dell'Ariccia, Laeven, and Valencia (2010); Dell'Ariccia, Laeven, and Marquez (2010); Rochet (2008); Caprio and Honohan (2010); Calomiris (2010); Bhattacharya and Thakor (1993); Boot and Greenbaum (1993); Laeven (2002); Hovakimian, Kane, and Laeven (2003) and Demirgüç-Kunt, Kane, and Laeven (2008).

The rest of the paper is organised as follows: Section 2 discusses the context of the study; Section 3 looks at the review of relevant literature; Section 4 discusses the modelling framework used in the paper; Section 9 discusses results from the modelling experiments; and Section 10 concludes.

2. Context of the Study

2.1. History of Malawi Banking Sector, Reforms and Consolidations

In 1964, Malawi's banking sector was predominantly controlled by two foreign commercial banks, namely Standard Bank and Barclays Bank. There were also government-owned financial institutions, including New Building Society (NBS), National Finance Company (NFC), and the Post Office Savings Bank (POSB), which offered some degree of competition. In 1971, Standard Bank and Barclays Bank amalgamated to establish the National Bank of Malawi (NBM). The Commercial Bank of Malawi (CBM) was established in 1969 and commenced operations in 1970.

The Investment and Development Bank (INDEBANK) was formed by the Government of Malawi in 1972 as a development finance organisation. Its main objective is to promote private sector investment and initiatives inside the country. During the late 1980s and 1990s, there was a moderate increase in the participation of non-bank financial firms in providing commercial banking services. The incorporation of Leasing and Finance Company of Malawi (LFC) took place in 1987, with the primary purpose of providing financial leases. The financial system underwent liberalisation in the 1990s, allowing for increased market entrance. Several new financial organisation were established, including INDEFinance, Finance Company of Malawi (FINCOM), First Merchant Bank (FMB), and Malawi Finance Bank (MFB). The Post Office Savings Bank (POSB), established in 1911, was merged with Malawi Savings Bank in 1990.

The banking industry in Malawi has seen significant transformations throughout the years. Despite the limited literature on mergers and acquisitions in the banking industry in Malawi, there have been instances of

such activities taking place. The following [Table 1](#) provides a concise overview of the transformations that have occurred in the banking industry during the 1970s. The author has collated this material. The primary impetus behind mergers and acquisitions in the banking industry has been to salvage financially troubled institutions grappling with solvency and liquidity issues. The Government of Malawi was compelled to divest its stake in the Banking industry due to financial sector reforms advocated by the International Development Association and International Monetary Fund.

Table 1. Malawi historical banking sector restructurings.

Name of the institution	Year of establishment	Year of disposal	Buyer	Reasons of sale
Standard bank – 100%	1890	1971	National bank of Malawi formed in 1971 with original shareholding as Standard bank -25%, Barclays-25%, Private sector Malawi investment company -29%, Admarc – 20%	Solvency and liquidity
Barclays bank – 100%	1890	1971	National bank of Malawi with new shareholding as Press corporation – 51.5%, Old mutual group -25.1%, Members of the public – 21.6% ESOP – 1.8%	Solvency and liquidity
Commercial bank of Malawi (Owned by press – 40%, MDC-30% and Malawi government -30%)	1969	2001	Standard bank Plc (Standard bank group-54.7%, Public -18.85%, Nico holdings – 18.20%, Old mutual life – 4.89%, Press trust -2.11%, Magetsi pension fund – 1.25%)	Solvency and liquidity
Investment and development bank of Malawi (INDEBANK)	1972	2015	National bank of Malawi	Solvency and liquidity
Post and savings bank of Malawi (POSBM)	1911	1990	Malawi savings bank	Solvency and liquidity
New building society (NBS)	1964	-	Recapitalized in 2012	Solvency and liquidity
Opportunity international bank of Malawi			First capital bank	Solvency and liquidity
International commercial bank			First capital bank	Solvency and liquidity
Malawi savings bank	1990	2015	FDH bank	Solvency and liquidity
Finance company of Malawi (Fincom) formerly owned 100% by ADMARC	1976	2002	Nedbank	Solvency and liquidity
Nedbank Malawi	2002	2019	My bucks banking corporation (MBC)	Solvency and liquidity
Finance bank	1999	2005	Reserve bank of Malawi	Regulatory disposal
New finance bank	2014	2019	My bucks banking corporation (MBC)	Regulatory disposal
MyBucks banking corporation	2019	2023	Centenary rural bank	Solvency and liquidity

Table 2. Policy reforms and deregulation were implemented in the financial and banking sector in Malawi between 1982 and 2000.

Year	Banking crisis /Fragility indicator	Policy actions
1982	Yes	The Malawi kwacha had a depreciation of 15 percent in April. Interest rate adjustment.
1983	Yes	The Malawi kwacha had a depreciation of 12 percent in April. Interest rate adjustment.
1984	Yes	The Malawi kwacha had a depreciation of 3 percent in January. Interest rate adjustment.
1985	Yes	The Malawi kwacha had a depreciation of 15 percent in April. Interest rate adjustment.
1986	Yes	The Malawi kwacha had a depreciation of 9.5 percent in January and 10 percent in August. Interest rate adjustment. The leasing and finance company was established in 1986.
1987	Yes	The Malawi kwacha had a 20 percent depreciation in February. Deregulation of lending rates
1988	Yes	The Malawi kwacha had a 15 percent depreciation in January. Removal of government restrictions on interest rates on deposits
1989	Yes	Review of the legislative structure governing the financial industry, which has resulted in the development of new and modified laws: Specifically, the reserve bank act of 1989 and the Banking Act of 1989, which facilitated the relaxation of restrictions on entering the banking sector. As of June 1, the liquidity reserve requirement (LRR) mandated that commercial banks set aside 10 percent of their liabilities. Additionally, commercial banks are now able to collect income on these reserves.
1990	Yes	The Malawi kwacha had a 7 percent depreciation in March. The transformation of the post office savings bank into the Malawi savings bank. The process of establishing a leasing finance bank by incorporating a leasing and finance company. On the 14th of September. The practice of providing preferential loans to the agriculture industry was discontinued. The reserve bank of Malawi has implemented the issuance of its own banknotes. The LRR was modified on four occasions: January 2 (25 percent), May 15 (15 percent), June 1 (10 percent), and September 1 (20 percent). As of December 1, LRR no longer accrues interest.
1991	Yes	National financing company was established as a lease financing bank on April 17th. The establishment and integration of CBM Financial Services as a subsidiary of the commercial bank of Malawi. We established ourselves as a leasing finance firm on June 28th. The finance corporation of Malawi was officially established as a corporate bank specialising in trade finance on August 1st. Indebank financial services was officially established as a corporate bank specialising in trade finance on September 6th. The LRR has been reduced to 15 percent, effective from August 1. Full deregulation of foreign exchange allocation.
1992	Yes	The Malawi kwacha had a depreciation of 15 percent in June and a further depreciation of 22 percent in July. The LRR has been raised to 20 percent, effective from December 23. An 18 percent penalty was implemented for failure to comply with LRR.
1993	Yes	The LRR has been raised to 30 percent, effective from October 29.
1994	Yes	The Malawi kwacha was subjected to flotation in the foreign exchange market in February. The first merchant bank was established and registered as a commercial bank on July 5th.

Year	Banking crisis /Fragility indicator	Policy actions
		The LRR has been raised to 35 percent, effective from December.
1995	Yes	The penalty for failing to comply with the LRR was raised from 45 percent at the start of the year to 55 percent in April, and further increased to 60 percent in June. Finance bank was officially established and integrated as a commercial bank on March 29. Malawi's incorporation.
1996	Yes	The bank rate was decreased from 45% on June 12th to 35% on September 9th, then further cut to 27% on November 13th. Additionally, the LRR (Loan repayment rate) was decreased from 55% to 47%.
1997	Yes	The bank rate was decreased from 27 percent to 23 percent on August 1st. The penalty for failure to comply with the LRR has been decreased to 43 percent, and the method of calculating the LRR has been revised. The frequency of the change was modified from a daily basis to a monthly average, and RBM initiated the practice of paying interest on reserves.
1998	Yes	The establishment and integration of continental discount house in March, along with the implementation of inter-bank market lending among financial institutions. Daily routine introduction commercial banks' compliance with LRR regulations starting from August 1, RBM discontinued the payment of interest on reserves. The introduction of commercial banks' option to allocate reserves to either the reserve bank of Malawi (RBM), a discount house, or their own vaults occurred. The bank rate was reduced from 32.5 percent to 30 percent, effective September 14. Loita investment bank was established as a merchant bank on November 28th. The Malawi kwacha has experienced a significant decline in value.
1999	Yes	The bank rate rose from 43 percent to 47 percent on January 11.
2000	Yes	In June, the LRR was reduced to 30 percent and a penalty of ¼ percent per day was imposed on any deficits in the LRR account. The RBM has re-introduced its own bills, resulting in a drop in the bank rate to 44.5 percent in August. Rose to 53.2 percent in December.

Source: Mlachila and Chirwa (2004) and current authors additions.

3. Theoretical and Empirical Literature Review of Banking Crises

3.1. Causes of Banking Crises and Malawi Banking Sector Restructuring Applications

Friedman and Schwartz (1963) were the first to propose theories on the primary causes of banking crises. They argued that these crises are triggered by depositor panics, which involve unwarranted withdrawals that exert excessive pressure on a bank's liquidity position. Bryant (1980) and Diamond and Dybvig (1983) have reached the conclusion that bank runs are events that confirm themselves in a situation where the requirements for consumption are uncertain and it is expensive to convert long-term investments into cash. Bank runs can also occur when depositors withdraw funds in anticipation of economic downturns that may decrease the value of bank assets and increase the risk of banks being unable to fulfil their obligations (Allen & Gale, 1998; Chari & Jagannathan, 1988; Jacklin & Bhattacharya, 1988). These crises are more probable when there is unequal information among depositors on the imminent financial troubles of a bank. Significantly, Diamond and Rajan (2005) expanding upon their 2001 model (Diamond & Rajan, 2005) determined that if a bank's lack of liquidity stems from the assets it holds, bank runs can occur and trigger widespread crises, even in the absence of depositor panic. In other words, a bank can fail without depositors displaying any signs of panic. The most detrimental panics are those that depositors experience, which subsequently lead to contagion consequences. They generate liquidity constraints that propagate across the financial system and result in bank failures. Contagion can occur due to direct contractual connections between banks, such as interbank loans, or indirect connections, such as vulnerability to common shocks through balance sheet exposures (Allen & Gale, 2000; Bhattacharya & Douglas Gale, 1987).

The second theoretical perspective on the origins of financial crises posits that these crises stem from extensive losses on banks' assets, leading to their insolvency. Losses typically result from a prolonged decline in the quality of assets and are caused by negative macroeconomic shocks, market deficiencies, government

intervention, or fraudulent activities. The majority of these ideas are grounded in alterations in economic fundamentals and view banking crises as an inherent outcome of business cycles, wherein credit expands in tandem with economic growth (Gorton, 1988; Minsky, 1982). Credit expands significantly during periods of economic growth, as investors become more hopeful about the future and lending criteria weaken. During periods of economic downturn, a phenomenon known as a flight to quality leads to a significant decline in lending. The inherent procyclicality of the financial system renders it delicate and susceptible to crises. Temin (1976); Wicker (1980); Wicker (1996) and Calomiris and Mason (2003a) provide empirical support for the notion that the primary causes of U.S. bank failures during the Great Depression were predominantly rooted in economic fundamentals, rather than being triggered by panics or the spread of failures. Contemporary theories consider financial crises to be the result of asset price bubbles that are not grounded in economic fundamentals. These theories necessitate the presence of irrational behaviour or information asymmetry.

The third hypothesis of banking crises posits that they have macroeconomic foundations. The theory posits that banking crises are caused by macro policies that are not sustainable, global financial circumstances, and misalignments in exchange rates (Lindgren et al., 1996). The implementation of excessively expansionary monetary and fiscal policies has resulted in a surge in lending, an excessive buildup of debt, and an excessive investment in tangible assets, leading to a decline in the quality of bank assets. Reinhart and Rogoff (2009) have discovered that financial crises often occur after periods of increased borrowing and inflated asset prices. Emerging markets that heavily rely on short-term foreign currency loans are vulnerable to significant bank distress when faced with macroeconomic shocks. The presence of currency or maturity mismatches in firms' balance sheets can lead to indirect credit risk. This risk is manifested when exchange rates depreciate or global interest rates increase, resulting in potential losses for banks. Additionally, significant changes in the terms of trade can negatively impact the ability of exporting firms to repay their debts. An illustrative instance is the Latin American debt crisis of the 1980s, which developed after Western banks extended substantial dollar loans to Latin American nations with favourable economic prospects and significant current account deficits. The significant influx of foreign capital resulted in a substantial increase in the value of the real exchange rate in the nations that borrowed, which in turn caused several borrowers to be unable to repay their debts. The crisis concluded with a decrease in debt amounting to \$250 billion, out of a total outstanding debt of around \$800 billion.

Banking crises often occur during a time of sharp decline in asset values following a period of abnormally high expansion (a bubble). The atypical fluctuations in prices may alone be attributed to a combination of irrational investor conduct, the existence of information asymmetry, market deficiencies, or too broad government initiatives (Brunnermeier, 2001). The primary catalyst for asset price bubbles is an abundance of inexpensive capital (liquidity) resulting from expansionary fiscal policies and loose monetary policy attitudes (Kindleberger, 1978). Banking crises frequently occur in the aftermath of periods characterised by elevated inflation or diminished interest rates. According to Smith (2002) when inflation is reduced, it leads to a decrease in financial crises. However, this also results in banks holding more cash reserves instead of investing in assets that may potentially give greater returns. Diamond and Rajan (2006) demonstrate that this issue may be mitigated by using monetary intervention, wherein the central bank purchases bonds using money. This enables banks to finance a greater number of long-term projects than would be feasible otherwise. In the study conducted by Diamond and Rajan (2009) it was shown that when banks experience sudden decreases in available money, they are compelled to sell assets that are not easily converted into cash in order to satisfy their short-term obligations. This results in a significant rise in interest rates and subsequently causes a decrease in the overall value of the bank. Ultimately, these circumstances can lead to instances of bank runs. By increasing interest rates during periods of low rates, regulators can counteract the incentives for banks to engage in higher levels of illiquid lending. The studies conducted by De Nicolò et al. (2010) and Dell'Araccia et al. (2010) suggest that when interest rates are low due to a loose monetary policy, banks are more likely to take on additional risk. This is because banks tend to invest in higher yielding assets like treasury bonds and increase their borrowing in order to benefit from higher returns. However, this behaviour also increases the vulnerability of banks to financial instability. Farhi and Jean (2012) and Diamond and Rajan (2009) investigated the impact of monetary rescues and collective moral hazard on banks' decisions about liquidity. If banks anticipate a robust policy reaction from the monetary authorities in the event of a significant negative shock, they are more likely to assume an excessive amount of liquidity risk.

Government involvement in different sectors of the economy have frequently served as a forerunner to banking crises. These actions, such as adjusting the distribution or cost of credit, quickly opening up financial markets, and having ineffective oversight or regulations, have frequently been responsible for causing banking crises (Bhattacharya & Thakor, 1993; Boot & Greenbaum, 1993; Calomiris, 2010; Caprio & Honohan, 2010; Demirgüç-Kunt et al., 2008; Hovakimian et al., 2003; Levin, Lin, & Chu, 2002; Rochet, 2008). Government-subsidized housing policies have frequently led to real estate bubbles, which in turn have caused financial crises (Herring & Wachter, 2003).

The U.S. mortgage crisis of 2007 was a result of the government's deliberate efforts to promote homeownership. Another notable instance is the real estate and financial crisis that occurred in Japan during the 1990s, subsequent to a decade of real estate price escalation by a factor of 10. Financial liberalisation and deregulation often precede periods of increased loan activity and can contribute to the occurrence of banking

crises (Drees & Pazarbasioglu, 1998; Kaminsky & Reinhart, 1999). The magnitude of credit extended by the financial sector is a significant factor in determining asset values. Domestic financial liberalisation, through the expansion of credit, can result in an asset price bubble if banks fail to assess the quality of the investments they finance (Allen & Gale, 2000). Furthermore, the process of capital account liberalisation, which encourages the influx of capital, has the potential to create periods of excessive credit expansion and speculative increases in asset prices (Ranciere, Tornell, & Westermann, 2008). The period following 1970, in which several nations implemented financial market liberalisation and opened up their capital accounts, has been unparalleled in terms of the frequency and intensity of banking crises. Based on the findings of Laeven and Valencia (2010) the frequency of banking crises experienced by nations during the 1970s peaked at 21 in 2008, in response to the U.S. mortgage crisis. This occurred after a brief period of no banking crises in 2006.

Fraudulent activities has also been the underlying cause of several significant bank collapses, a few of which resulted in banking crises (Caprio & Honohan, 2010). The high leverage of banks means that even little instances of fraud can lead to insolvency. Notable instances of deceitful conduct by banks include Venezuela in 1994 and the Dominican Republic in 2003. Insiders misappropriated depositor funds at systemically significant institutions in both instances. The most significant financial loss resulting from fraudulent activities that has been documented to date was incurred by Société Générale, a French bank, in 2008. Jerome Kerviel, a rogue trader, caused a loss of \$7 billion to the bank. Accounting fraud played a role in the collapse of Lehman Brothers, a U.S. investment firm. The firm employed buyback agreements to temporarily eliminate securities from its balance sheet at each filing date, so inflating the firm's worth. On September 15, 2008, the company declared bankruptcy, which became the biggest bankruptcy in U.S. history, with a total debt of \$768 billion. The fall of Lehman Brothers caused huge disruptions in worldwide banking markets, as other banks had substantial financial ties to Lehman Brothers. This event also instilled dread among investors, who were concerned that other banks could have also been poorly managed.

4. Modelling Framework

4.1. Empirical Modelling Framework

We employ a multivariate logit model to calculate the likelihood of a financial crisis. During each phase, the country is either undergoing a crisis or it is not. Consequently, our dependent variable, referred to as the crisis dummy, has a value of zero when there is no crisis and a value of one when there is a crisis. The occurrence of a crisis at a certain period in a specific nation is postulated to depend on a vector of n explanatory factors $X(i, t)$. The selection of the explanatory variables is addressed in the next section. Let $P(i, t)$ be a binary variable that equals one when a financial crisis happens in nation i at time t , and zero otherwise. β represents a vector with n unspecified coefficients, whereas $F(\beta'X(i, t))$ is the cumulative probability distribution function calculated at $\beta'X(i, t)$. The log-likelihood function model may be expressed as follows:

$$\ln L = \sum_{t=1, \dots, T} \sum_{i=1, \dots, n} P(i, t) \ln\{F(\beta'X(i, t))\} + [1 - P(i, t)] \ln\{1 - F(\beta'X(i, t))\} \quad (1)$$

The logistic functional form is employed for modelling the probability distribution. Hence, while analysing the regression findings, it is crucial to bear in mind that the estimated coefficients do not signify the exact rise in the likelihood of a crisis when the relevant explanatory factors increase by one unit. However, in the aforementioned specification, the coefficients represent the impact of a modification in an explanatory variable on the natural logarithm of the ratio $\ln\{P(i, t)/(1 - P(i, t))\}$. Hence, the rise in the likelihood is contingent upon the beginning probability as well as the starting values of all independent variables and their coefficients. The sign of the coefficient indicates the direction of change, whereas the amount is determined by the slope of the cumulative distribution function $\beta'X(i, t)$. Put simply, altering the explanatory variable will provide varying impacts on the likelihood of a crisis, contingent upon the original crisis probability of the country. According to the logistic specification, when a country has an extremely high or low initial probability of a banking crisis, small changes in the independent variables have minimal impact on its prospects. However, if the country's probability of crisis is in an intermediate range, the same small changes have a greater effect.

Following the start of a financial crisis, the crisis itself is likely to impact the behaviour of some explanatory factors. As an example, one of the explanatory variables included in the regression analysis is the credit-to-GDP ratio. This ratio is expected to decline due to the financial crisis, which, in turn, may impact another explanatory variable, namely GDP growth. The banking crisis might potentially impact the real interest rate, causing it to decrease due to the implementation of expansionary monetary policies commonly associated with banking sector rescue efforts. To ensure accurate identification of associations, we exclude any observations after a financial crisis from the panel in the initial set of regressions. This is done to avoid the interference caused by these feedback effects. The limitations of this technique are the omission of instances involving several crises and the potential exclusion of numerous observations.

In an alternate methodology, we determine the year when each financial crisis concluded by using the data provided in the previous case studies. In a subsequent series of regressions, we incorporate all observations that occurred after the specified end date into the panel. The second panel is significantly broader than the first one and encompasses recurring instances of financial crises. One limitation of this technique is the challenge in accurately defining the cessation of the impacts of a financial crisis, making the selection of observations to

include in the panel more subjective. Moreover, in this series of regressions, the likelihood of a crisis occurring in a country that has had previous issues is expected to vary.

In panel data analysis, the inclusion of country fixed effects in the empirical model is common practice. This is done to account for the potential variation of the dependent variable between countries, which may occur independently of the explanatory factors included in the regression. When doing logit estimate, incorporating country fixed effects necessitates excluding from the panel any countries that did not have a financial crisis during the specified time (Greene, 1987). The logistic distribution model framework, as described in Equation 1 is frequently employed in research on banking challenges, as demonstrated by Cole and Gunther (1993) and Gonzales-Hermosillo, Pazarba~IOglu, and Billings (1997).

5. Banking Crisis Variable

An essential component of our investigation involves creating the financial crisis dummy variable. In order to do this, we have determined and established the episodes of financial instability in the banking sector between the years 1980 and 2000 as crisis periods, using the indicators provided in Table 2 of section 2.1. Similarly, we have designated the period from 2000 to 2023 as a non-crisis era. Typically, the majority of research on banking crises or fragility rely on five recent studies as their main sources: Caprio and Klingebiel (1996); Kaminsky and Reinhart (1999); Lindgren et al. (1996) and Sheng (1995) in order to identify occurrences or circumstances of crisis. For instance, the proportion of non-performing assets to total assets in the banking system surpassed 10%. The expense of the banking rescue operation amounted to no less than 2% of the Gross Domestic Product (GDP). The issues faced by the banking sector led to the extensive nationalisation of banks and the implementation of deposit guarantees or regulators imposing banking holidays in response to bank runs. Collectively, these studies constitute a thorough examination of the vulnerability of the banking system on a global scale. Obtaining accurate data on the performance of non-performing loans in the banking sector is challenging. Consequently, we believe that instances of banking crisis or vulnerability are politically sensitive in Malawi. As a result, banks supervisors do not provide sufficient and accurate reports on the actual performance of the sector. Examining variables such as the ratio of non-performing loans to total assets in the banking system can be misleading in assessing the true state of the banking sector. These indicators are reported annually and do not accurately reflect the credit performance of the banking sector.

Supervisors in Malawi do not publicly disclose the financial bailout packages they provide to struggling banks. This makes it challenging to accurately determine the actual expenses of rescue operations for ailing banks and the proportion of GDP that the rescue package represents. However, it is known that banking supervisors do offer liquidity assistance facilities to distressed banks. Identifying indicators of banking crises or fragility in developing countries is challenging due to the sensitivity of critical information regarding regulatory interventions. Regulators are reluctant to make this information public due to the potential political consequences. However, it is possible to infer the same conclusion by examining broader policy interventions implemented by regulators in the banking industry as measures to mitigate the vulnerability or emergencies within the banking sector. In order to achieve this objective, we have utilised the indicators presented in Table 2 of section 2.1 to detect instances of banking distress and vulnerability. Subsequently, we have assigned a crisis dummy variable to each identified period.

6. Explanatory Variables

Our choice of explanatory variables reflects both the theory of the determinants of banking crises summarized in Section 3. A list of the variables and their sources are in Table 3.

Table 3. Variables, expected signs, and data sources.

Variable name	Variable description	Expected signs	Rationale	Source
Depreciation	Rate of change of the USD exchange rate	+/-	Currency appreciation should lead to strong economy and healthy banking sector and a currency depreciation should lead to banking sector fragility and crises	World banks database
Inflation	Rate of change of the GDP deflator	-/+	Lower inflation signals a strong economy and healthy banking sector and higher inflation should lead to banking sector fragility and crises	World banks database

Variable name	Variable description	Expected signs	Rationale	Source
Growth	Rate of growth of real GDP	+/-	An increase in rate of GDP growth should lead to strong economy and healthy banking sector and a decrease in economic growth should lead to banking sector fragility and crises	World banks database
Real interest/Risk premium	Nominal interest rate minus the contemporaneous rate of inflation	-/+	Decrease in nominal interest rates should lead to strong economy and healthy banking sector and an increase in nominal interest rates should lead to banking sector fragility and crises	World banks database
Private credit/GDP	Ratio of domestic credit to private sector GDP	+/-	The higher ratio signals a strong economy and healthy banking sector and lower ratio signals banking sector fragility and crises	World banks database
Broad money/Total reserves	Ratio of broad money to total reserves of the central bank	+/-	The lower ratio signals a strong economy and healthy banking sector and higher ratio signals banking sector fragility and crises	World banks database
	Rate of growth of broad money	+/-	In the medium to long term, inflation is closely correlated with broad monetary aggregates. This link is consistent over time, as well as across different countries and monetary policy regimes: it is inherently embedded in the fundamental structure of the economy. A greater percentage indicates an impending financial or currency crisis.	World banks database
Short term debt/Export revenue	Ratio of government short term debt to export revenues	+/-	The lower the ratio signals a strong economy and healthy banking sector as it reduces Government excessive appetite from domestic borrowing (Crowding out effects) and also reduction in banks balance sheet exposure to sovereign risks.	World banks database
Debt service cost/Export revenue	Ratio of government debt service costs to export revenues	+/-	The lower the ratio signals a strong economy and healthy banking sector as it reduces Government excessive appetite from domestic borrowing (Crowding out effects) and also reduction in banks' balance sheet exposure to sovereign risks.	World banks database
External debt/Gross national income	Ratio of government external debt to gross national income	+/-	The lower the ratio signals a strong economy and healthy banking sector as it reduces Government excessive appetite from domestic borrowing (Crowding out effects) and also reduction in banks' balance sheet exposure to sovereign risks.	World banks database

Variable name	Variable description	Expected signs	Rationale	Source
Broad money/GDP	The ratio of broad money to GDP		This is a proxy measure of financial development. The higher the ratio signals a strong economy and might spur banks to assume more risks by excessively expanding their balance sheets.	World banks database
Cash/Bank	Ratio of bank liquid reserves to bank assets	+/-	The higher ratio signals a strong economy and healthy banking sector and lower ratio signals banking sector fragility and crises.	World banks database

In order to measure the negative impact of macroeconomic shocks on banks, namely the increase in non-performing loans, we employ many variables as predictors. These variables include the depreciation of the exchange rate, the rate of growth of real GDP, the rate of inflation change, and the real short-term interest rate. High short-term interest rates have a negative impact on bank balance sheets if banks are unable to rapidly raise their lending rates, as detailed in Section 3. Furthermore, the real interest rate may be seen as a representative measure of financial liberalisation. This is supported by Galbis (1995) research, which indicates that the process of liberalisation often results in elevated real rates. Financial liberalisation might potentially lead to a rise in financial fragility due to the heightened possibilities for excessive risk-taking and fraudulent activities. Kaminsky and Reinhart (1999) discovered that the presence of a financial liberalisation dummy variable is a reliable indicator for predicting the likelihood of banking crises in their study of 20 nations. Pill and Pradhan (1995) determine that the most effective measure of the development of financial liberalisation is the ratio of credit allocated to the private sector in relation to the Gross Domestic Product (GDP). Hence, we incorporate this variable as an independent variable in our calculations. Inflation is included as an explanatory factor due to its probable correlation with elevated nominal interest rates and its potential to represent macroeconomic mismanagement, which has negative repercussions on the economy and the financial sector through several channels. In addition, the rate of depreciation of the exchange rate is used to test the concept that banking crises can be caused by excessive foreign exchange risk exposure either in the banking system itself or among bank borrowers.

In addition, we have included monetary shocks to measure the impact of different monetary variables on the banking sector. Indicators such as the broad money to total reserves ratio, domestic credit to private sector as a percentage of GDP, risk premium as measured by the difference between bank lending rates and the risk-free rate (treasury bill rates/policy rates), broad money annual growth rate, broad money as a percentage of GDP, and liquid assets as a percentage of total monetary assets. These measurements quantify the extent of financial expansion and advancement, specifically the magnitude of the banking industry. They have an impact on the risk appetite of banks and affect many aspects of their financial stability, rendering them susceptible to crises.

We also included fiscal shocks that examined the effect of central government funding tools on the banking sector. The government short term debt as a proportion of export revenue; debt service expenses and a percentage of export revenue; external debts as a percentage of gross national income (GNI). This document outlines the financial requirements of the central government. These factors are significant for two reasons: firstly, they impact revenue. The central government frequently fails to implement stringent prudential rules that would typically enhance the banking industry and banks' financial position, in order to facilitate their borrowing during periods of poor tax revenue collections. This inclination frequently leads to prudential authorities refraining from addressing minor issues that might lead to systemic difficulties. Lindgren et al. (1996) state that supervisors frequently face obstacles when attempting to address issues in banks that are publicly known and that result in government spending. Common rationales for not taking action include claims of insufficient budgetary capacity or a precarious economic condition that precludes addressing banking issues. Even if government authorities are willing to act despite financial constraints, the public may perceive otherwise, leading to bank runs that exacerbate the initial issues and escalate them into a full-blown crisis. Another rationale for considering the government's fiscal condition is that the inability to manage the budget deficit might provide a significant hindrance to the achievement of effective financial deregulation (McKinnon, 1991). Failed endeavours to implement financial deregulation might subsequently lead to complications for the banking sector.

7. Data and Sources

Table 3 presents the dependent variables used in the study, their expected signs and the sources of data used in the analysis. This research employs annual panel data, which entails aggregating the data from commercial banks in Malawi from 1980 to 2022. The data used in this study was obtained from the IMF World

Economic Outlook database, World Bank Data Bank and Reserve Bank of Malawi Website Database. The research use Stata 15.0 software for doing econometric estimates.

8. Robustness Check

We employed various Lagrange multiplier (LM) tests, including the Levin et al. (2002); Harris and Tzavalis (1999); Breitung (2000); Breitung and Das (2005) and Im, Pesaran, and Shin (2003) Fisher-type (Choi, 2001) and Hadri (2000) tests, to assess the presence of unit root issues in our variables. The null hypothesis in all of these tests assumes the presence of a unit root. The findings of our analysis refuted the null hypothesis and established that there was no presence of a unit root in our data. The outcomes are in Table 4 below. Subsequently, we may utilise the variables in their present state to do our logistic regression analysis.

Furthermore, we conducted an assessment to determine if the logistic model is an appropriate form to employ in our investigation. In logistic regression modelling, it is assumed that the logarithm of the odds of the outcome variable is a linear combination of the independent variables. This entails two facets, as we are addressing the two components of our logistic regression equation. Firstly, examine the link function of the dependent variable on the left side of the equation. It is presumed that the logit function is the appropriate function to utilise in logistic regression. Furthermore, on the right-hand side of the equation, we make the assumption that we have included all the pertinent variables, excluded any variables that should not be part of the model, and that the logit function is a linear amalgamation of the predictors. There is a possibility that the logit function may not be the appropriate option as the link function, or that the connection between the logit of the outcome variable and the independent variables is not linear. Regardless of the scenario, we are faced with a specification error. The misapplication of the link function is often less significant as compared to employing alternative link functions such as probit, which is based on the normal distribution. In practical terms, our primary concern is whether our model includes all the pertinent variables and if the linear combination of these predictors is satisfactory.

We employed the Stata command "linktest" to identify a specification mistake, which is executed subsequent to the "logit" or "logistic" function. The underlying concept of linktest is that if the model is well described, any extra variables that are statistically significant should not be discoverable, unless by random accident. Following the regression command (namely, logit or logistic), linktest use the linear predicted value (_hat) and linear predicted value squared (_hatsq) as the predictors for reconstructing the model. Given that the variable _hat represents the expected value from the model, it should serve as a statistically significant predictor. This will only occur if the model is entirely mischaracterized. However, if our model is well defined, the variable _hatsq should not have significant predictive ability except via random accident. Consequently, if the value of _hatsq is meaningful, then the linktest is also meaningful. This often indicates that we have either excluded pertinent variable(s) or inaccurately stated our connection function. The findings indicated that our logistic regression model was accurately described.

We further performed a goodness-of-fit model test. The Hosmer and Lemeshow's goodness-of-fit test is a widely used measure of model fit. The concept underlying the Hosmer and Lemeshow's goodness-of-fit test is that there should be a tight correspondence between the anticipated frequency and the actual frequency, and that a higher degree of correspondence indicates a better fit. The Hosmer-Lemeshow goodness-of-fit statistic is calculated by using the Pearson chi-square value derived from the contingency table that contains the observed frequencies and anticipated frequencies. A test of association for a two-way table, such as Hosmer and Lemeshow's test, will result in a significant p-value if there is a good match. When there are continuous predictors in the model, the presence of several cells defined by the predictor variables leads to the creation of a very large contingency table. Consequently, this often results in a significant outcome. A conventional approach involves consolidating the patterns created by the predictor variables into 10 groups and constructing a contingency table with dimensions of 2 by 10. Based on a p-value of 0.61, we may conclude that Hosmer and Lemeshow's goodness-of-fit test suggests that our model is an excellent fit for the data.

Table 4. Model robustness check results.

Type of test	Method used	Null hypothesis	Result
Panel unit root test	Levin et al. (2002); Harris and Tzavalis (1999); Breitung (2000); Jörg Breitung and Das (2005); Im et al. (2003) Fisher-type (Choi, 2001) and Hadri (2000) Lagrange multiplier (LM)	The null hypothesis tests are that all panels have a unit root.	The data strongly rejects the unit root null hypothesis, indicating stationarity for all model variables.
Model selection test	Linktest	The null hypothesis states that there are no misspecification errors and therefore no need to	The data substantially accepted the null hypothesis that there are no specification errors and that the logistic regression was the preferred

Type of test	Method used	Null hypothesis	Result
		include or omit variables and that the predicated Yhat is very identical to the real Y dependent variable values; hence the selected logistic model is correct.	model. The variable_hat is statistically significant predictor with p-value (0.003), and variable_hatsq is statistically insignificant with a p-value of 0.864 (insignificant). Therefore, the linktest is insignificant. The results showed that our logistic regression model was correctly specified.
Model goodness-of-fit test	Hosmer and Lemeshow's test	The null hypothesis states that there are is goodness of fit.	The test statistic follows a Chi-squared distribution with G-2 degrees of freedom. A large value of Chi-squared (with small p-value < 0.05) indicates poor fit and small Chi-squared values (with larger p-value closer to 1) indicate a good logistic regression model fit. The test result is a small Chi-squared of 6.30 with p-value of 0.6142, indicating that the selected logistic model has goodness of fit and we accept the null hypothesis.

9. Empirical Results and Discussions

9.1. The Impact of Macroeconomic Variables in influencing Banking Crisis or Fragility in Malawi

The regression results are shown in Table 5. When examining the effects of macroeconomic variables in propagating banking crises or fragility, we found that exchange rate depreciation does not have a significant influence on banking crises or fragility in Malawi, though it has negative impact on banking crises or fragility. Our study found that inflation does have a positive effect but insignificant influence on banking crisis or fragility in Malawi. Real GDP growth rate was found to have negative and significant influence in propagating banking crises and fragility in Malawi. Real interest rates were also found to have positive and significant influence in fostering banking crises or fragility in Malawi.

Table 5. Summary of effects of macroeconomic variables on banking crisis or fragility.

Variable	Exchange rate depreciation	Real GDP growth rate	Real interest rate	Inflation
Banking crisis/Fragility dummy	-ve (Insig.)	+ve *(Sig)/(Sig)**	+ve *(Sig)/(Sig)**	+ve (Insig)

Note: ** p<0.05, * p<0.1.

9.2. The Impact of Monetary Variables in influencing Banking Crisis or Fragility in Malawi

Various empirical studies have shown that broad money to reserve ratio, domestic credit to private sector as % of GDP, cost of financing (Risk premium), real interest rates, Broad money as % of GDP and Total reserves to External debt ratio affect bank crises or fragility in various countries. Tables 6 summarise our results on these influence on Malawi's banking industry.

Table 6. Summary of effects of monetary variables on banking crisis or fragility.

Variable	Broad money to reserve ratio (%)	Domestic credit to private sector as % of GDP	Risk premium on lending (Lending rate minus treasury bill rate, %)	Real interest rate	Broad money as % of GDP	Total reserves to external debt (%)
Banking crisis/Fragility dummy	+ve *(Sig.)	+ve (Insig.)	+ve (Insig.)	+ve *(Sig.)/(Sig.)**	-ve *(Sig.)/(Sig.)	-ve *(Sig.)

Note: ** p<0.05, * p<0.1.

9.3. The Impact of Fiscal Variables in Influencing Banking Crisis or Fragility in Malawi

Various empirical studies have shown that short term debt to country's primary revenue, debt service costs to primary export revenue, proportion of short-term debt to total external debt and external debt stock as a % of gross national income affect bank crises or fragility in many countries. **Tables 7** summarise our results on these influence on Malawi's banking industry and fragmented banking sector.

Table 7. Summary of effects of effects of fiscal variables on banking crisis or fragility.

Variable	Short term debt to primary export revenue	Debt service cost (PPG and IMF) to primary export revenue	Short term debt to total external debt	External debt stock as a % of gross national income
Banking crisis/Fragility dummy	+ve (Insig.)	-ve **(Sig.)	+ve (Insig.)	+ve **(Sig.)

Note: ** p<0.05.

Table 8. Model comparison results.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Equation1	Equation2	Equation3	Equation4	Equation5	Equation6	Equation7
Rateofchangeofu~e	-6.4293 (7.9665)				-3.3387 (3.9572)		
Changeinflation	2.2429 (1.9769)	2.0531 (2.0207)			0.6005 (1.011)	1.4809 (1.284)	
Gdpgrowthannual	-3.1249* (1.6194)	-3.0805* (1.6306)	-2.3099* (1.2567)		-1.3211** (0.6492)	-2.7452** (1.2254)	
Realinterestrate	0.6655* (0.341)	0.5796* (0.306)	0.5055* (0.2993)	0.1905 (0.2003)	0.2913* (0.165)	0.4725** (.2197)	
Broadmoneytotot~i	3.5481 (2.8585)	2.638 (2.4967)	2.4217 (2.3452)	3.5046* (2.0776)			2.8703 (1.8502)
Domesticcreditt~r	0.4108 (4.4216)	0.985 (4.0776)	1.3727 (3.8688)	-2.6463 (2.7003)			-1.5596 (2.5438)
Riskpremiumonle~a	0.2954 (0.505)	0.2884 (0.6549)	0.3517 (0.704)	0.357 (0.6766)			0.4551 (0.973)
Broadmoneygrowt~l	-0.1341 (0.0969)	-0.1267 (0.0948)	-0.127 (0.097)	0.0193 (0.0692)			0.0108 (0.0689)
Totalreservesof~d	4.7135** (2.3262)	4.6757** (2.31)	3.8839** (1.94)	2.976 (1.8293)		2.0705** (0.9958)	2.4567 (1.6575)
Shorttermdebtotf~s	0.2968 (3.9023)	-0.737 (3.0526)	0.739 (2.4486)	0.0694 (1.3082)	-1.2287 (1.7646)	-0.8481 (2.5724)	-0.0197 (1.2534)
Debtseviceppga~p	-13.7037** (6.8206)	-12.7718** (6.1593)	-11.227** (5.3577)	-2.5734 (1.8902)	-5.1925** (2.3798)	-9.0797** (3.9652)	-2.6074 (1.8507)
Shorttermdebtotf~d	-3.7237 (5.2179)	-1.8838 (3.7277)	-3.1361 (3.1811)	-1.0665 (1.4067)	-0.3247 (1.8156)	-1.3978 (2.9726)	-0.9666 (1.3364)
Externaldebtsto~i	21.3126* (12.2048)	25.1056** (12.0398)	17.2752** (6.9461)	7.921** (3.2298)	6.155 (5.1624)	15.4674** (7.022)	7.565** (3.0945)
Broadmoneyofgdp	-21.9311** (10.3225)	-23.0179** (10.2227)	-19.7755** (7.9155)	-9.4757* (5.0717)	-10.2936** (5.1732)	-15.2994** (6.2866)	-9.3873* (4.9727)
Liquidassetsaso~y	34.1785 (21.2825)	28.071 (18.2792)	27.9899 (17.9391)	0.8024 (8.107)		18.7413 (14.606)	0.651 (8.0304)
_Cons	-1.7772 (1.6749)	-0.6425 (0.7593)	-0.7959 (0.7186)	-0.5141 (0.5609)	-0.281 (0.7673)	0.0306 (0.5512)	-0.3473 (0.5197)
Observations	43	43	43	43	43	43	43
Pseudo R ²	0.5813	0.5681	0.5435	0.3046	0.398	0.4836	0.2666

Note: Standard errors are in parentheses.

** p<.05, * p<.1.

Debt service costs to primary export revenues has a negative and significant influence on banking crises and fragility in Malawi whilst external debt stock as a percentage of gross national income has a positive and significant influence on banking crises and fragility.

9.4. Results from Model Comparisons

Table 8 above exhibits the results from nesting seven models together and varying various variables. As discussed in section 3.9.3 above, it is observed that the external debt stock to gross national income ratio, still has a significant and positive influence on banking crisis and fragility in Malawi, even across all the seven nested models where the only difference was alteration of variables.

Broad money to GDP ratio has a negative and significant impact on banking crisis and fragility in Malawi in all the seven models as well. Debt service costs to primary export revenue ratio, has a negative and significant impact on banking crisis and fragility in Malawi in all the seven models. Real interest rates have a positive and significant influence on banking crises and fragility in Malawi across models 1 to 3 and 5 and 6.

10. Conclusion and Policy Recommendations

The results of our analysis indicate that the causes of banking crises in Malawi are primarily influenced by macroeconomic, monetary, and fiscal factors. Therefore, the suitable course of action in reaction to financial crises relies on the factors that cause them. When triggers arise from external disturbances, such as exchange rate fluctuations and broader macroeconomic pressures, regulators often grant regulatory forbearance. This is accompanied by emergency liquidity support, allowing banks to operate with less strict capital compliance requirements due to the complexities of financial reporting. Laeven and Valencia (2008a) discovered that regulatory forbearance is a prevalent characteristic of crisis management. The Central Bank in Malawi often offers Liquidity Assistance Facility (LAF) to troubled banks to support them sail through tough times when they have envisaged that the causes of liquidity shocks are external. An example has been LAF given to NBS Bank when the currency was devalued in 2012, the bank had not adequately hedged its open foreign exchange position. They have also offered LAF on several occasions to MBC bank, when the balance sheet experienced significant withdrawals (technical bank run) when the market learnt of the bankruptcy of their shareholder at a holding company level. The bank was supported till it was acquired by Centenary Group of Uganda.

One often seen practice of regulatory forbearance involves the relaxation of accounting regulations specifically for banks. During the Japanese financial crisis, Japanese bank authorities permitted banks to utilise deferred tax accounting in order to strengthen their banks' regulatory capital levels in the event of worsening economic conditions (Skinner, 2008). In response to the 2007 U.S. housing crisis, authorities decided to loosen the strict assessment of the value of mortgage-backed securities held by banks. This decision was made since the market prices of these securities no longer accurately represented their true worth due to a lack of market activity and liquidity. Regulatory forbearance, by its prevention of a comprehensive reorganisation of banks, artificially revitalises banks but fails to address the fundamental issue at hand. As an illustration, in Ecuador in 1998, banks were granted a period of two years to completely adhere to new loan categorization regulations, along with additional stipulations. In Malawi regulators also offer accounting treatment relief for basel capital adequacy compliance purposes with the aim of helping ailing banks to meet regulatory capital requirements. They do allow credit enhancements on some instruments that are linked to the sovereign, for example government receivables from payroll loans books that banks advance to civil servants and that the government is technically delaying to pay financial institutions on time.

Regulators may offer assurances on bank obligations, such as comprehensive guarantees, even if explicit deposit insurance measures are already established. In their study, Laeven and Valencia (2008b) discovered that blanket guarantees are successful in reinstating the trust of local depositors. However, they observed that international creditors are mostly unaffected by the announcement of these guarantees, since their withdrawals remain unchanged. Furthermore, Honohan and Klingebiel (2000) discovered that these assurances often result in significant fiscal expenses, mostly due to their implementation during severe crises.

In cases when liquidity injections are ineffective in preventing bank runs, governments may employ more drastic measures such as implementing bank holidays and imposing a temporary halt on deposit withdrawals. Instances of deposit freezes include Argentina in 1989 and 2001, Brazil in 1990, Ecuador in 1999, and Uruguay in 2002. With the exception of Brazil, the freezing of deposits in all these instances was preceded by a bank holiday and carried out as a response to bank runs. In order to prevent the revival of financially unstable banks, authorities may employ administrative actions, such as temporarily granting regulatory officials the ability to run the banks or compelling them to shut down or merge with other financial organisations. The latter option involves a subsidised mandatory transfer of a bank's valuable assets to a financially stable bank, together with the acceptance of most or all of the failing bank's financial obligations by the acquiring bank.

Governments sometimes assist in resolving troubled loans by providing subsidies to borrowers in distress. However, this assistance is contingent upon the borrower's shareholders injecting new capital. The aim is to allow the market to determine which firms can survive with some modest assistance. Similarly, there have been initiatives that propose the infusion of government money into financially troubled institutions, on the condition that the owners of these banks provide an equal amount of funds. If these systems are based on personal

judgement, there is a potential for moral hazard as borrowers may cease their efforts to repay, hoping to be included in the group of recipients. The government has the option to separate problematic assets from banks' financial records by establishing a government-owned asset management firm. Alternatively, it can create specialised bank restructuring agency to reorganise struggling banks. The efficacy of these agencies in resolving assets has had varied results, with a generally higher success rate observed for assets that are readily marketable in secondary markets, such as real estate assets (Klingebiel, 2000). In Malawi, the Government took the approach of forming a government owned asset management company, that has been tasked to collect MK6.1 billion (equivalent to USD9.5 million) from 13 individuals and private companies when it sold Malawi Savings Bank to FDH Bank limited in 2015. The bank bought the troubled bank with spinned off balance sheet.

References

- Allen, F., & Gale, D. (1998). Optimal financial crises. *The Journal of Finance*, 53, 1245-1284. <https://doi.org/10.1111/0022-1082.00052>
- Allen, F., & Gale, D. (2000). Financial contagion. *Journal of Political Economy*, 132, 1245-1284. <https://doi.org/10.1086/262109>
- Bhattacharya, S., & Douglas Gale, D. (1987). Preference shocks, liquidity and central bank policy, in W. Barnett and K. Singleton (eds.), new approaches to monetary economics. In (pp. 69-88): Cambridge University Press. <https://doi.org/10.1017/cbo9780511759628.005>.
- Bhattacharya, S., & Thakor, A. V. (1993). Contemporary banking theory. *Journal of Financial Intermediation*, 3, 2-50. <https://doi.org/10.1006/jfin.1993.1001>
- Boot, A. W. A., & Greenbaum, S. I. (1993). Bank regulation, reputation and rents: Theory and policy implications," in capital markets and financial intermediation, C. Mayer and X. Vives. In (pp. 262-285). Cambridge: Cambridge University Press. <https://doi.org/10.1017/cbo9780511752056.017>.
- Breitung, J. (2000). The local power of some unit root tests for panel data. *Advances in Econometrics*, 15, 161-177.
- Breitung, J., & Das, S. (2005). Panel unit root tests under cross-sectional dependence. *Statistica Neerlandica*, 59(4), 414-433. <https://doi.org/10.1111/j.1467-9574.2005.00299.x>
- Brunnermeier, M. (2001). *Asset pricing under asymmetric information: Bubbles, crashes, technical analysis and herding*: Oxford University Press. <https://doi.org/10.1093/0198296983.001.0001>.
- Bryant, J. (1980). A model of reserves, bank runs, and deposit insurance. *Journal of Banking and Finance*, 4, 335-344. [https://doi.org/10.1016/0378-4266\(80\)90012-6](https://doi.org/10.1016/0378-4266(80)90012-6)
- Calomiris, C. (2010). The great depression and other 'contagious' events. *See Berger*, 27, 693-710. <https://doi.org/10.1093/oxfordhb/9780199640935.013.0027>
- Calomiris, C., & Mason, J. (2003a). Consequences of bank distress during the great depression. *American Economic Review*, 93, 937-947. <https://doi.org/10.1257/000282803322157188>
- Caprio, G., & Honohan, P. (2010). 27. Hardy perennials: Banking crises around the world in the oxford handbook of banking, edited by AN Berger, P Molyneux, JOS Wilson, 26:673-92. In (pp. 994). Oxford, UK: Oxford University Press. <https://doi.org/10.1093/oxfordhb/9780198824633.013.28>.
- Caprio, G., & Klingebiel, D. (1996). *Bank insolvencies: Cross-country experience*. Washington: World Bank Working Papers, WP1620. <https://doi.org/10.1596/r44>.
- Chari, V. V., & Jagannathan, R. (1988). Banking panics, information, and rational expectations equilibrium. *Journal of Finance*, 43, 749-761. <https://doi.org/10.1111/j.1540-6261.1988.tb04606.x>
- Choi, I. (2001). Unit root tests for panel data. *Journal of International Money and Finance*, 20, 249-272. [https://doi.org/10.1016/S0261-5606\(00\)00048-6](https://doi.org/10.1016/S0261-5606(00)00048-6)
- Cole, R. A., & Gunther, J. W. (1993). Separating the likelihood and timing of bank failure, finance and economics discussion series. In (pp. 93-20). Washington, DC: Federal Reserve Board.
- De Nicolò, G., Dell'Ariccia, G., Laeven, L., & Valencia, F. (2010). *Monetary policy and bank risk-taking*: IMF Staff Position Note, SDN/10/09. <https://doi.org/10.5089/9781455253234.004>.
- Dell'Ariccia, G., Laeven, L., & Marquez, R. (2010). *Monetary policy, leverage, and bank risk taking*. Washington D.C: IMF Working Paper 10/276. <https://doi.org/10.5089/9781455210831.001>.
- Demirgüç-Kunt, A., Kane, E. J., & Laeven, L. (2008). Determinants of deposit-insurance adoption and design. *Journal of Financial Intermediation*, 17(3), 407-438. <https://doi.org/10.1016/j.jfi.2007.03.009>
- Diamond, D., & Rajan, R. (2005). Liquidity shortages and banking crises. *Journal of Finance*, 60, 615-647. <https://doi.org/10.1111/j.1540-6261.2005.00741.x>
- Diamond, D. W., & Dybvig, P. (1983). Bank runs, deposit insurance, and liquidity. *Journal of Political Economy*, 91, 401-419. <https://doi.org/10.1086/261155>
- Diamond, D. W., & Rajan, R. G. (2006). Money in a theory of banking. *American Economic Review*, 96, 30-53. <https://doi.org/10.1257/000282806776157759>
- Diamond, D. W., & Rajan, R. G. (2009). *Illiquidity and interest rate policy*. NBER Working Paper Series, No. 15197.
- Drees, B., & Pazarbasioglu, C. (1998). *The nordic banking crisis: Pitfalls in financial liberalization*. Washington DC: IMF Occasional Paper No. 161. <https://doi.org/10.5089/9781557757005.084>.
- Farhi, E., & Jean, T. (2012). Collective moral hazard, maturity mismatch, and systemic bailouts. *American Economic Review*, 102(1), 60-93. <https://doi.org/10.1257/aer.102.1.60>
- Friedman, M., & Schwartz, A. (1963). *A monetary history of the United States, 1867-1960*. Princeton, NJ: Princeton University Press. <https://doi.org/10.2307/3112083>
- Galbis, V. (1995). *Financial sector reform in eight countries*. IMP Working Paper No. 141.
- Gonzales-Hermosillo, B., Pazarbasioglu, C., & Billings, R. (1997). 'Banking system fragility: Likelihood versus timing of failure—an application to the Mexican financial crisis. *IMF Staff Papers*, 44(3), 26.

- Gorton, G. (1988). Banking panics and business cycles. *Oxford Economics Papers*, 40, 751–781. <https://doi.org/10.1093/oxfordjournals.oep.a041885>
- Greene, W. H. (1987). *Econometric analysis* (3rd ed.). Upper Saddle River, NJ: Prentice-Hall International.
- Hadri, K. (2000). Testing for stationarity in heterogeneous panel data. *Econometrics Journal*, 3, 148–161. <https://doi.org/10.1111/1368-423X.00043>
- Harris, R. D., & Tzavalis, E. (1999). Inference for unit roots in dynamic panels where the time dimension is fixed. *Journal of Econometrics*, 91(2), 201–226. [https://doi.org/10.1016/s0304-4076\(98\)00076-1](https://doi.org/10.1016/s0304-4076(98)00076-1)
- Herring, R., & Wachter, S. (2003). Bubbles in real estate markets in asset price bubbles: The implications of monetary, regulatory, and international policies, edited by W Hunter, G Kaufman, M Pomerleano, 14:217–30. In (pp. 607). Cambridge MA Massachusetts: The MIT Press. <https://doi.org/10.7551/mitpress/1459.003.0020>.
- Honohan, P., & Klingebiel, D. (2000). *Controlling the fiscal costs of banking crises policy research working paper No. 2441*. Washington D.C: World Bank. <https://doi.org/10.1596/1813-9450-2441>.
- Hovakimian, A., Kane, E., & Laeven, L. (2003). How country and safety-net characteristics affect bank risk shifting. *Journal of Financial Services Research*, 23, 177–204. <https://doi.org/10.3386/w9322>
- Im, K. S., Pesaran, M. H., & Shin, Y. (2003). Testing for unit roots in heterogeneous panels. *Journal of Econometrics*, 115(1), 53–74. [https://doi.org/10.1016/s0304-4076\(03\)00092-7](https://doi.org/10.1016/s0304-4076(03)00092-7)
- Jacklin, C., & Bhattacharya, S. (1988). Distinguishing panics and information-based bank runs: Welfare and policy implications. *Journal of Political Economy*, 96, 568–592. <https://doi.org/10.1086/261552>
- Kaminsky, G., & Reinhart, C. (1999). The twin crises: The causes of banking and balance-of-payments problems. *American Economic Review*, 89, 473–450. <https://doi.org/10.1257/aer.89.3.473>
- Kindleberger, C. (1978). *Manias, panics, and crashes: A history of financial crises*. New York: Basic Books. <https://doi.org/10.1086/ahr/84.2.416>.
- Klingebiel, D. (2000). *The use of asset management companies in the resolution of banking crises working paper No. 2294*. Washington D.C: World Bank. <https://doi.org/10.1596/1813-9450-2284>.
- Laeven, L. (2002). Bank risk and deposit insurance. *The World Bank Economic Review*, 16, 109–137. <https://doi.org/10.1093/wber/16.1.109>
- Laeven, L., & Valencia, F. (2008a). *Systemic banking crises: A new database*. IMF Working Papers 08/224, International Monetary Fund. <https://doi.org/10.5089/9781451870824.001>.
- Laeven, L., & Valencia, F. (2008b). *The use of blanket guarantees in banking crises*. IMF Working Paper 08/250. <https://doi.org/10.5089/9781451871081.001>.
- Laeven, L., & Valencia, F. (2010). *Resolution of banking crises: The good, the bad, and the Ugly*. IMF Working Paper, No. 10/146. <https://doi.org/10.5089/9781455201297.001>.
- Levin, A., Lin, C.-F., & Chu, C.-S. J. (2002). Unit root tests in panel data: Asymptotic and finite-sample properties. *Journal of Econometrics*, 108(1), 1–24. [https://doi.org/10.1016/s0304-4076\(01\)00098-7](https://doi.org/10.1016/s0304-4076(01)00098-7)
- Lindgren, C.-J., Garcia, G., & Saal, M. (1996). *Bank soundness and macroeconomic policy*. Washington: International Monetary Fund. <https://doi.org/10.5089/9781557755995.071>.
- McKinnon, R. (1991). *The order of economic liberalization*. Baltimore and London: Johns Hopkins University Press.
- Minsky, H. (1982). The financial instability hypothesis: Capitalistic processes and the behavior of the economy in financial crises: Theory, history and policy, edited by C Kindleberger, J-P Laffargue In (pp. 13–29). Cambridge, UK: Cambridge University Press. <https://doi.org/10.2307/3114559>.
- Mlachila, M., & Chirwa, E. (2004). Financial reforms and interest rate spreads in commercial banking system in Malawi. *IMF Staff Papers*, 51(1), 96–122.
- Pill, H., & Pradhan, M. (1995). *Financial indicators and financial change in Africa and Asia*. IMF Working Paper No. 23.
- Ranciere, R., Tornell, A., & Westermann, F. (2008). Systemic crises and growth. *Quarterly Journal of Economics*, 123, 359–406. <https://doi.org/10.1162/qjec.2008.123.1.359>
- Reinhart, C. M., & Rogoff, K. S. (2009). *This time is different: Eight centuries of financial folly*. Chicago: Princeton Press. <https://doi.org/10.1515/9781400831722>.
- Rochet, J.-C. (2008). Why are there so many banking crises? The politics and policy of bank regulation. In (pp. 336). Princeton, NJ: Princeton University Press. <https://doi.org/10.1515/9781400828319.21>.
- Sheng, A. (1995). *Bank restructuring*. Washington DC: The World Bank.
- Skinner, D. (2008). The rise of deferred tax assets in Japan: The case of the major Japanese banks. *Journal of Accounting and Economics*, 46, 218–239. <https://doi.org/10.1016/j.jacceco.2008.07.003>
- Smith, B. (2002). Monetary policy, banking crises, and the friedman rule. *American Economic Review*, 92, 128–134. <https://doi.org/10.1257/000282802320189122>
- Temin, P. (1976). Did monetary forces cause the great depression? New York: Norton. *The American Historical Review*, 81, 993–994. <https://doi.org/10.1086/ahr/81.4.993-a>
- Wicker, E. (1980). A reconsideration of the causes of the banking panic of 1930. *Journal of Economic History*, 40(3), 571–583. <https://doi.org/10.1017/s0022050700085247>
- Wicker, E. (1996). The banking panics of the great depression. In (pp. 174). New York: Cambridge University Press. <https://doi.org/10.1017/s0022050700019744>.