Financial Development and Economic Recession: Nonlinear and Causal Evidence from Advanced and Emerging Economies

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ABSTRACT

We investigate how financial development, proxied primarily by private credit, bank deposits, and bank profitability, influences economic recession. We employ a logistic regression model with both country and time fixed effects, thereby controlling for unobserved heterogeneity across countries and global shocks over time. We found that financial development plays an important role in shaping macroeconomic stability, though its effects vary across country groups. In advanced economies, higher levels of private credit, stronger bank deposit bases, and higher bank profitability reduce the probability of recession, indicating that well-developed financial systems enhance economic resilience. Whereas the effects in emerging economies are less consistent, suggesting that rapid financial expansion may increase vulnerability to recession, reflecting weaker institutional frameworks and less mature financial systems. We also found a nonlinear relationship between financial development and the risk of an economic recession. While initial improvement in the financial system may not immediately reduce the severity of a recession, the stabilizing effects become more pronounced as financial systems deepen and become more efficient. However, the results from the 2SLS model indicate that the direct causal effect of financial development is limited once endogeneity is addressed, which underscores the importance of institutional factors. Moreover, our robustness checks addressing endogeneity suggest that the effectiveness of financial development depends heavily on institutional quality, governance, and the strength of the banking sector. These findings provide important policy insights for designing financial systems that support long-term economic stability and resilience.

Keywords: Financial development; Economic recession; Private credit; Advanced economies; Emerging economies; Nonlinear

INTRODUCTION

For more than three decades, financial development has been regarded as a fundamental driver of economic growth and macroeconomic stability. Several theoretical and empirical studies have implied that a well-functioning financial system mobilizes savings, allocates capital efficiently, facilitates risk diversification, and enhances productivity by supporting innovation and investment. Early theoretical contributions have emphasized the role of financial intermediaries in promoting technological progress and economic expansion by channeling resources toward productive activities. And subsequent studies further reinforced this perspective, arguing that financial institutions and markets improve capital allocation, reduce transaction costs, and stimulate economic development through improved financial intermediation and investment efficiency (Levine, 1997; Schumpeter, 1911).

Despite this widely accepted view, the relationship between financial development and macroeconomic stability remains highly debated. While financial development of a country can accelerate its economic growth, it may simultaneously make that country susceptible to macroeconomic instability. The global financial crisis

of 2008 serves as a perfect example of how excessive credit expansion, financial innovation, and inadequate regulatory oversight can amplify systemic risks and trigger severe economic recessions. As a consequence of that, recent empirical studies have highlighted the potential trade-off between financial development and economic stability, implying that deeper financial markets may promote long-term economic growth. And they can also increase the probability and severity of financial crises if financial expansion becomes excessive or poorly regulated.

Some scholars argue that financial development contributes positively to growth only up to a certain threshold, beyond which the marginal benefits diminish, and the risks of financial instability rise. In particular, excessive credit expansion and rapid financial sector growth have been identified as key predictors of financial instability and economic downturns (Cecchetti & Kharroubi, 2015; Arcand et al., 2015). These findings have given rise to the "too much finance" hypothesis (Law & Singh, 2014), which suggests that beyond a certain level, financial sector expansion may crowd out productive investment and reduce the overall efficiency of a country's economic activity.

Additionally, the impact of financial development on economic performance appears to be nonlinear and context-dependent. To that end, we hypothesized that the relationship between financial development and economic recessions may differ across countries, specifically between advanced and emerging economies, as one would intuitively expect. Our reasoning is that emerging economies often experience higher financial volatility due to having weaker institutions, nascent financial markets, and their exposure to external shocks. Thus, large capital inflows during periods of financial liberalization may create temporary booms that are typically followed by abrupt reversals, which occasionally lead to economic contraction. Historical analyses show that episodes of rapid financial boom and credit expansion frequently precede crises and subsequent declines in economic growth, particularly in emerging markets. Conversely, advanced economies tend to possess deeper financial markets and stronger regulatory frameworks, which may mitigate, but not eliminate, the destabilizing effects of financial sector expansion.

Given these perspectives, understanding the role of financial development in shaping economic recessions remains a critical subject for policymakers and researchers. While some studies have emphasized the growth-enhancing role of financial development, others have highlighted the destabilizing effects of "too much" financial development and its potential to trigger recession. The mixed empirical findings suggest that the relationship between financial development and economic recessions may depend on country-specific characteristics such as institutional quality, financial regulation, market structure, and the stage of economic development. Despite that, the vast majority of these studies have not been from the lens of advanced and emerging countries.

Against this backdrop, this study provides nonlinear and causal evidence of the effect of financial development on economic recessions from the perspective of advanced and emerging economies. By comparing these two groups of countries, we seek to provide a broader understanding of how financial development influences macroeconomic stability across different institutional and economic contexts. Our findings contribute to the ongoing debate on whether financial development acts primarily as a stabilizing force that supports economic resilience or as a potential source of systemic risk that amplifies economic downturns.

Research Hypotheses

Financial Development and Economic Recession

From a theoretical perspective, financial development may help economies absorb shocks and reduce the frequency of economic downturns. Efficient financial systems enable firms and households to access credit during periods of economic stress, allowing them to smooth consumption and maintain investment levels. Moreover, diversified financial markets enhance risk-sharing and improve the resilience of the economy to external shocks (Levine, 1997). Empirical studies have shown that countries with a higher level of financial development tend to experience more stable economic growth and greater resilience to macroeconomic fluctuations (Beck et al., 2009). These findings suggest that financial development can act as a stabilizing mechanism that mitigates the severity of recessions.

As we pointed out, the relationship between financial development and economic recessions may differ between advanced and emerging economies due to variations in institutional quality, regulatory frameworks, and financial market maturity. Advanced economies typically possess deeper and more diversified financial systems, which may enhance economic resilience by improving access to liquidity and risk-sharing mechanisms. In contrast, emerging economies often experience higher financial volatility and may be more susceptible to boom-bust cycles driven by rapid credit expansion and capital flow reversals (Kaminsky & Reinhart, 1999; Rancière et al., 2008). And because of that, the impact of financial development on economic recessions may be more complex in emerging markets compared to advanced economies.

Based on these theoretical arguments and empirical findings, we formulated the following hypotheses:

H1: Financial development has a significant effect on economic recessions.

H2: Higher levels of financial development reduce the likelihood or severity of economic recessions by improving financial intermediation and economic resilience.

H3: The effect of financial development on economic recessions differs between advanced and emerging economies.

H4: The relationship between financial development and economic recession is nonlinear, and the negative effect will be magnified as financial development deepens.

LITERATURE REVIEW

Financial Development and Economic Recession

A strand of literature has suggested that financial development may either mitigate or amplify economic recessions depending on the structure and stability of the financial system. On one hand, well-developed financial markets may reduce the severity of recessions by providing liquidity and enabling economic agents to smooth consumption and investment during periods of economic stress (Levine & Zervos, 1998). On the other hand, excessive financial leverage and speculative investment may increase systemic risks and magnify economic contractions during financial crises (King & Levine, 1993).

Several empirical studies have also highlighted the role of financial frictions in shaping business cycle dynamics. Demetriades & Rousseau (2016) argue that financial liberalization can stimulate economic growth but may simultaneously increase the likelihood of financial crises and economic downturns. They found that findings indicate that economies with rapid financial expansion often experience periods of strong growth followed by severe economic contractions.

Financial Development in Advanced and Emerging Economies

The impact of financial development on economic recessions may differ significantly between advanced and emerging economies. Advanced economies generally possess deeper financial markets, more diversified financial instruments, and stronger regulatory frameworks. These characteristics can enhance the resilience of financial systems and reduce the vulnerability of economies to financial shocks.

In contrast, emerging economies often face higher financial volatility due to weaker institutional frameworks and less mature financial markets. Capital inflows into emerging markets can lead to rapid credit expansion and economic booms, but sudden reversals of capital flows may trigger financial crises and economic recessions. Kaminsky & Reinhart (1999) found that financial liberalization in emerging markets frequently precedes banking and currency crises, which often result in severe economic downturns.

Moreover, differences in financial regulation, institutional quality, and macroeconomic policy frameworks can influence the extent to which financial development contributes to economic stability. Beck et al. (2009) suggest that stronger financial institutions and regulatory systems can mitigate the destabilizing effects of financial sector expansion, particularly in advanced economies.

Data & Variables

Sample selection

The selection of our sample was carefully considered to ensure the representation of a diverse set of countries from both advanced and emerging economies. The dataset utilized in this study encompasses 40 countries, including 22 emerging economies and 18 advanced economies, over the period of 2003-2021. Our inclusion of both advanced and emerging economies allows for a comparative analysis of the impact of financial development on economic recession across different stages of economic development. This is important because emerging economies often exhibit distinct characteristics in terms of financial systems, institutional frameworks, and policy environments compared to advanced economies. This geographic diversity adds a different layer of richness to our analysis by capturing different economic, social, and institutional contexts that may influence the relationship between financial development and recession.

Table 1: Sampled Countries

Countries	**Advanced**	**Emerging**	**Countries ID**
Armenia	No	Yes	1
Austria	Yes	No	2
Belgium	Yes	No	3
Bangladesh	No	Yes	4
Bulgaria	No	Yes	5
Bolivia	No	Yes	6
Chile	No	Yes	7
China	No	Yes	8
Colombia	No	Yes	9
Czech Republic	Yes	No	10
Germany	Yes	No	11
Denmark	Yes	No	12
Ecuador	No	Yes	13
Spain	Yes	No	14
Finland	Yes	No	15
France	Yes	No	16
Gabon	No	Yes	17
Greece	Yes	No	18
Hungary	Yes	No	19
Indonesia	No	Yes	20

India	No	Yes	21
Ireland	Yes	No	22
Iceland	Yes	No	23
Israel	Yes	No	24
Italy	Yes	No	25
Japan	Yes	No	26
Korea, Republic	Yes	No	27
Lithuania	No	Yes	28
Latvia	No	Yes	29
Mexico	No	Yes	30
Macedonia, FYR	No	Yes	31
Malta	No	Yes	32
Malaysia	No	Yes	33
Netherlands	Yes	No	34
Peru	No	Yes	35
Philippines	No	Yes	36
Poland	No	Yes	37
Portugal	Yes	No	38
Russia	No	Yes	39
Saudi Arabia	No	Yes	40

Descriptive Statistics

The descriptive statistics of the variables are shown in Tables 2, 3 &4. For the full sample, financial development indicators such as private credit and bank deposits show relatively high mean values (65.4 and 57.2, respectively), but also large standard deviations, indicating substantial cross-country variation. The positive skewness of these variables suggests that a few countries with very deep financial systems drive the upper tail of the distribution. In contrast, recession occurrences are relatively low on average (mean = 0.119), confirming that recession episodes are infrequent but not negligible across countries.

It can also be seen that advanced countries exhibit significantly higher levels of financial development, with mean private credit and bank deposits far exceeding those of emerging economies.

Table 2: Descriptive statistics (All Countries)

	N	Mean	SD	Variance	Skewness	Min	Max
privatecredit	889	65.394	42.348	1793.381	0.958	5.389	262.948
bankdep	887	57.169	35.45	1256.685	1.737	3.218	229.563
roe	889	13.089	16.168	261.398	-6.958	-275.324	72.25
cpi	900	6.025	35.167	1236.699	28.143	-4.146	1037.593
generalgov	900	17.423	4.848	23.505	-0.25	5.023	28.87
trade	900	91.695	61.303	3758.006	2.569	19.016	440.157
recession	900	0.119	0.324	0.105	2.355	0	1

Table 3: Descriptive statistics (Advanced Countries)

	N	Mean	SD	Variance	Skewness	Min	Max
privatecredit	424	87.142	40.586	1647.211	1.039	20.911	262.948
bankdep	420	73.233	34.557	1194.153	2.478	18.959	229.563
roe	427	10.354	12.042	144.999	-1.111	-59.687	42.796
cpi	432	2.976	2.458	6.042	1.913	-4.146	18.4
generalgov	432	20.098	3.754	14.09	-.549	8.866	28.384
trade	432	102.561	70.087	4912.141	2.461	19.016	440.157
recession	432	.109	.312	.097	2.513	0	1

Table 4: Descriptive statistics (Emerging Countries)

	N	Mean	SD	Variance	Skewness	Min	Max
privatecredit	465	45.563	33.23	1104.211	1.149	5.389	166.34
bankdep	467	42.722	29.562	873.884	1.575	3.218	140.846
roe	462	15.617	18.873	356.196	-8.402	-275.324	72.25
cpi	468	8.838	48.565	2358.607	20.406	-1.682	1037.593
generalgov	468	14.954	4.418	19.517	.112	5.023	28.87
trade	468	81.665	49.908	2490.858	2.293	22.35	324.782
recession	468	.128	.335	.112	2.224	0	1

Aggregate trend of variables

The graphs in Figures 1, 2, 3, and 4 show that financial development has generally improved over time, with both private credit and bank deposits to GDP displaying steady upward trends, indicating deeper financial

intermediation and stronger banking system funding. In contrast, bank profitability (ROE) is more volatile, experiencing noticeable fluctuations, including sharp declines and recoveries, reflecting sensitivity to changing economic conditions. Meanwhile, recession periods remain relatively infrequent, with mostly low values throughout but a sharp spike at one point, suggesting that downturns are rare but can be severe when they occur. Overall, the trends highlight a growing financial system alongside unstable bank performance and occasional but pronounced economic shocks.

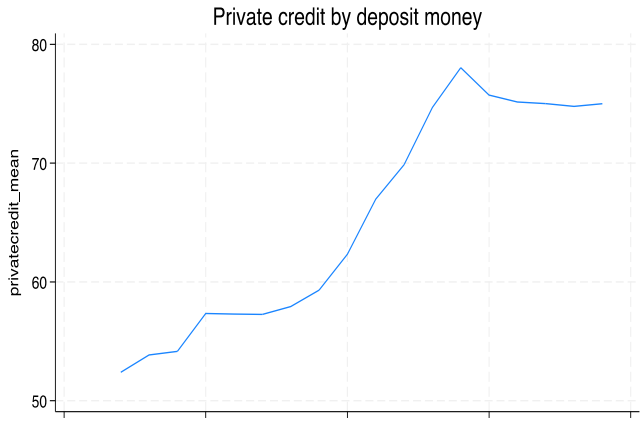


Figure 1: Trend movement of private credit

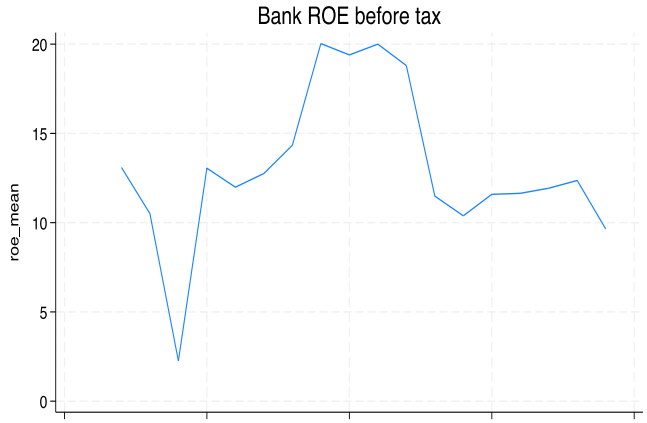


Figure 2: Trend movement of bank return on equity

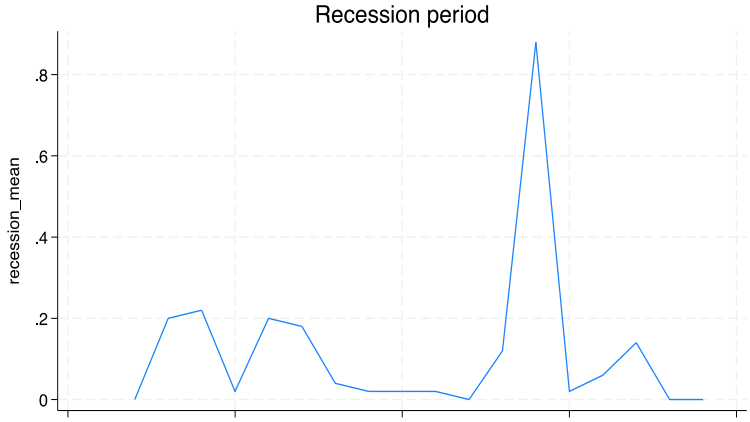


Figure 3: Trend movement of recession

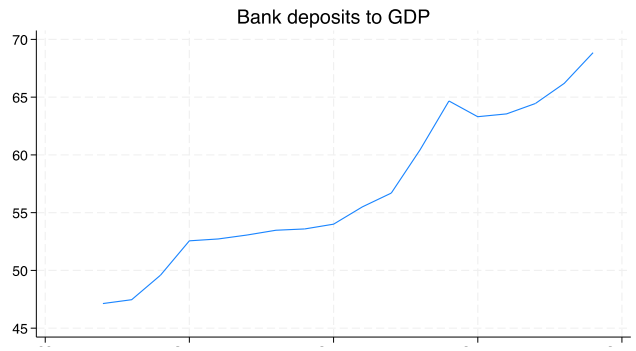
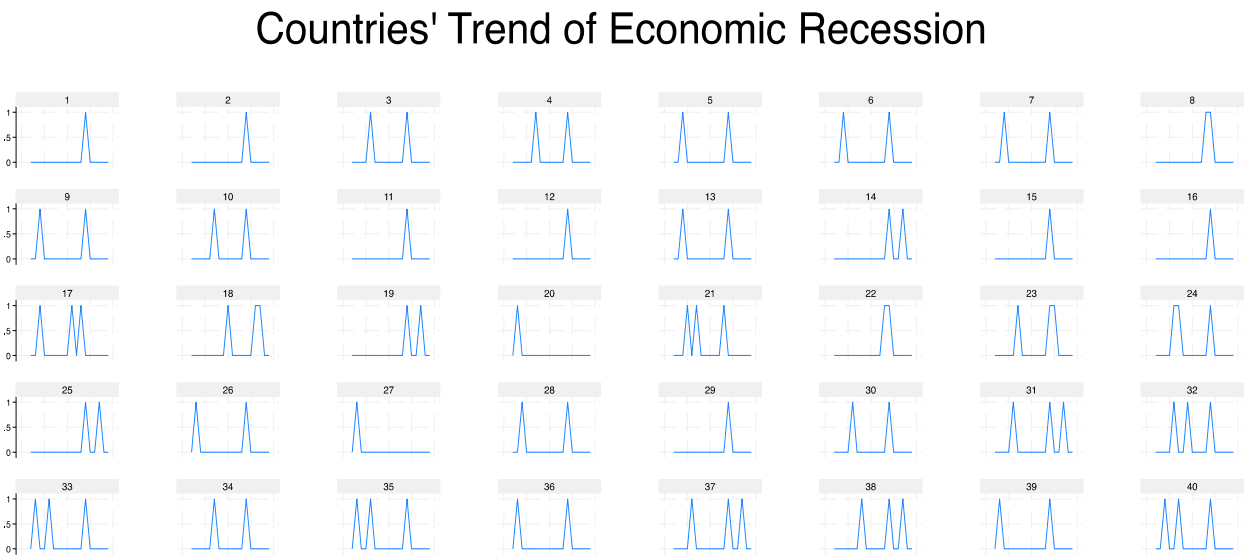


Figure 4: Trend movement of bank deposits

Source: Authors' visualization



Source: Authors' visualization

Variables

The dataset comprises 22 emerging and 18 advanced countries, enabling comprehensive analysis across diverse economic contexts. The variables of interest in this study are financial development and economic recession. We defined economic recession as a binary variable equal to 1 when a country experiences a contraction in economic activity and 0 otherwise. Specifically, recession periods are identified based on negative real GDP growth rates, consistent with standard macroeconomic definitions used in cross-country studies. This approach ensures comparability across countries by applying a uniform rule for identifying downturns, although it may not fully capture the depth or duration of recessions.

We measure financial development using three key indicators. First, we consider private credit by deposit money banks as a share of GDP, which reflects the depth of credit intermediation in the economy. Second, we examine bank return on equity as a measure of the profitability and efficiency of the banking sector, which plays a central role in financial intermediation. Thirdly, we include bank deposits to GDP as a gauge of the overall level of deposits within the banking system, indicating the extent of financial intermediation and savings mobilization.

In addition to the key variables of interest, we include several control variables to account for other factors that may affect the likelihood of a country experiencing economic recession. These control variables include trade openness, expressed as a percentage of GDP, to capture the degree of integration with the global economy and its potential impact on economic recession; general government expenditure, and inflation, proxied by the consumer price index (CPI).

Table 5: Variables

Variable	Definition	Proxy
RECESSION	Economic recession	Recession period
FIN	Financial development	Private Credit by deposit money banks to GDP (% of GDP); Bank deposits to GDP (% of GDP); Banks return on equity (% before tax)
X	Control Variables	Government expenditure, Trade openness, and Inflation (CPI).
ε	Error term	The sum of the deviations of each actual observation from a model regression line.

METHODOLOGY

Econometric framework

This study adopts a stepwise empirical strategy to examine the relationship between financial development and economic recessions. The analysis begins with a baseline logistic regression model, followed by fixed-effects estimations, a nonlinear specification, and finally an instrumental variables (2SLS) approach to address endogeneity concerns.

First, the baseline model estimates the probability of a recession using a logistic regression framework:

$$P(RECESSION)_{it} = \frac{1}{1+e^{-(\beta_0+\beta_1 FIN_{it}+X_{it}+\varepsilon_{it})}} \quad (1)$$

where $RECESSION_{it}$is a binary variable indicating recession periods, FIN_{it}represents financial development indicators, and X_{it} is a vector of control variables.

Second, the model incorporates country fixed effects to control for time-invariant country-specific characteristics, and time fixed effects to capture global shocks affecting all countries simultaneously. This specification improves identification by isolating within-country variation over time.

Third, we estimated a nonlinear model by including squared terms of financial development variables to test whether the relationship between financial development and recession risk changes as financial systems deepen. The model is mathematically expressed as:

$$P(RECESSION)_{it} = \frac{1}{1+e^{-(\beta_0+\beta_1 FIN_{it}^2+X_{it}+\varepsilon_{it})}} \quad (2)$$

Finally, to address potential endogeneity of financial development**, a** two-stage least squares (2SLS) approach is employed. Financial development is instrumented using institutional variables, including the rule of law, judicial efficiency, and governance indicators. This approach allows for a more cautious interpretation of causal effects. We denote the 2SLS process mathematically as:

$$FIN_{it} = \beta_0 + \beta_1 IV_{it} + \beta_2 X_{it} + \varepsilon_{it} \quad (3)$$

$$\widehat{FIN}_{it} = \hat{\beta}_0 + \hat{\beta}_1 IV_{it} + \hat{\beta}_2 X_{it} + \varepsilon_{it} \quad (4)$$

$$FIN_{it} = \beta_0 + \beta_1 \widehat{FIN}_{it} + \beta_2 X_{it} + \varepsilon_{it} \quad (5)$$

Equations (3) and (4) are the mathematical expressions of the first-stage regression and the fitted value of the endogenous variables. Equation (5) is the 2SLS regression, where economic recession is finally regressed.

RESULTS & DISCUSSION

Pairwise correlation matrix

Table 6 shows the pairwise correlations between financial development indicators and economic recession, along with our control variables. Our focus here is on private credit, bank deposits, and bank profitability (ROE). We observe that private credit has a positive and significant relationship, suggesting potential financial vulnerabilities linked to credit expansion. Bank profitability (ROE) exhibits a negative and significant relationship, indicating that stronger banking sector performance is associated with greater economic stability. Most importantly, these relationships are relatively weak in magnitude. This means that simple correlations do not fully capture the complexity of the dynamics, highlighting the need for more advanced econometric analysis to better understand how financial development affects economic recessions.

Table 6: Pairwise correlations matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) privatecredit	1.000						
(2) bankdep	0.686	1.000					
	(0.000)						
(3) roe	-0.217	-0.215	1.000				
	(0.000)	(0.000)					
(4) cpi	-0.088	-0.079	0.044	1.000			
	(0.008)	(0.019)	(0.187)				
(5) generalgov	0.360	0.178	-0.090	-0.088	1.000		
	(0.000)	(0.000)	(0.007)	(0.008)			
(6) trade	0.250	0.328	-0.033	-0.031	0.026	1.000	
	(0.000)	(0.000)	(0.322)	(0.354)	(0.436)		
(7) recession	0.074	0.053	-0.081	-0.005	0.033	0.017	1.000
	(0.028)	(0.118)	(0.015)	(0.889)	(0.328)	(0.604)	

Source: Authors' computation

Baseline model

Table 7 reports the baseline regression results examining the determinants of economic recession. The estimates reveal how financial development and the financial systems, broadly speaking, relate to macroeconomic stability. It is evidenced that financial development – private sector credit, and bank deposits – play a protective role against economic recessions, judging by their respective significant, at the 1% level, coefficients. At the same time, the broader banking environment, measured by deposits and profitability, reinforces this stabilizing effect. All the evidence points to the argument that a well-developed and stable financial system is not only important for promoting economic growth but also essential for reducing the economic vulnerability of a country to recession.

Table 7: Determinants of Economic Recession

	(1)
VARIABLES	RECESSION
Private credit	-0.006***
	(0.013)
bankdep	-0.001***
	(0.018)
roe	-0.079**
	(0.023)
cpi	0.101**
	(0.069)
General gov	-0.349***
	(0.112)
trade	-0.007***
	(0.008)
lnsig2u	
Constant	4.456
	(7.640)
Observations	863
Number of id	40

Source: Authors' computation

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Hausman Test

The results of the Hausman test for the fixed-effects and random-effects models are presented below. The p-values are statistically significant at the 1% level; hence, the null hypothesis that there is no systematic difference between the fixed-effect and random-effects estimators is rejected. This further confirmed our employment of the fixed effect estimator as it is more consistent and efficient.

Table 8: Hausman test

	Coef.
Chi-square test value	44.547

P-value	0.000

Source: Authors' computation

Fixed Effect Models

Fixed Effect (All countries)

In Table 9, private credit and bank deposits are both statistically significant at the 1% level, albeit negative. Both private credit (-0.023**)** and bank deposits (-0.016**)** have negative coefficients, and this suggests that financial development decreases the recession risk. The significance of private credit and bank deposits clearly confirms our first hypothesis and supports Levine (2005) and Bernanke & Gertler (2005) findings that financial variables are key drivers of recession dynamics. This suggests that deeper financial systems improve financial intermediation, allowing resources to flow more efficiently to productive sectors, while also helping households and firms manage shocks. As a result, economies become more resilient and less prone to downturns. This also aligns with our second hypothesis, which argues that higher levels of financial development reduce the likelihood or severity of economic recessions. This finding aligns with Rajan & Zingales (1998)**,** who show that financial development enhances economic resilience by easing access to finance and supporting firm growth. Similarly, Aghion et al. (2005) argue that financial development facilitates innovation and helps economies better absorb shocks, thereby reducing volatility. The negative relationship between bank profitability and recession is consistent with Claessens et al. (2012)**,** who found that stronger and more profitable banks are better able to withstand financial stress and maintain lending during downturns.

Table 9: Fixed Effect (All countries)

	(1)
VARIABLES	RECESSION
privatecredit	-0.023***
	(0.008)
bankdep	-0.016***
	(0.017)
roe	-0.008*
	(0.006)
cpi	0.003***
	(0.004)
generalgov	-0.438***
	(0.090)
trade	-0.021***
	(0.008)
Constant	

Observations	841
R-squared	
Number of id	38
Country FE	Yes
Time FE	No

Source: Authors' computation

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Fixed Effect (Advanced countries)

The results for the fixed-effects model for advanced countries in Table 10 indicate that the coefficient on private credit is negative and highly significant (-0.014, $p < 0.01$). This indicates that increases in credit to the private sector are associated with a reduction in the likelihood or severity of recessions in advanced economies. This result suggests that well-developed financial systems in advanced countries are effective in supporting economic activity during downturns. Firms can continue to access financing, and households are better able to smooth consumption. In these economies, credit expansion appears to reflect efficient financial intermediation**,** rather than excessive risk-taking. The coefficient on bank deposits is negative and strongly significant (-0.032, p<0.01)**,** with a larger magnitude than private credit. This implies that deposit growth plays an even stronger stabilizing role in advanced economies. A deep and stable deposit base provides banks with reliable funding, allowing them to sustain lending even in periods of stress. This reduces the chances of credit disruptions, which are often a key trigger of recessions. The coefficient on bank profitability is also negative and significantly robust. These results are fully consistent with our third hypothesis, that the effect of financial development differs between advanced and emerging economies.

Table 10: Fixed Effect (Advanced countries)

	(1)
VARIABLES	RECESSION
privatecredit	-0.014***
	(0.010)
bankdep	-0.032***
	(0.026)
roe	-0.022***
	(0.015)
cpi	0.093***
	(0.080)
generalgov	-0.579***

	(0.173)
trade	-0.043***
	(0.016)
Constant	
Observations	398
R-squared	
Number of id	18

Source: Authors' computation

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Fixed Effect (Emerging countries)

Table 11 presents the fixed effects estimates for emerging countries. The coefficient on private credit is positive and statistically significant (0.038, $p < 0.01$). This suggests that, in emerging economies, increases in credit to the private sector are associated with a higher likelihood or severity of economic recession. This contrasts sharply with the results for advanced economies in Table 10, where private credit reduces recession risk, highlighting an important heterogeneity across country types. Unlike advanced economies, credit expansion in emerging countries appears to be linked with economic vulnerability rather than resilience. Rapid credit growth may reflect looser lending standards, higher leverage, or misallocation of resources, which can exacerbate the risk of downturns when economic shocks occur. The coefficient on bank deposits is also positive and significant, which also indicates that increases in bank deposits in emerging markets are associated with a slightly higher risk of recession. In these economies, deposit growth may feed into excessive lending or riskier financial practices, especially when institutional frameworks and regulatory oversight are weaker.

Unlike in advanced economies, where private credit, deposits, and ROE reduce recession risk, in emerging economies, private credit and deposits increase recession risk, while profitability offers only a modest stabilizing effect. The findings align with our third hypothesis, and with prior research suggesting that rapid financial expansion can be risky in less developed financial systems. It also shows that financial development in emerging economies could be a double-edged sword: it can support growth but may also raise recession risk if not carefully managed.

Table 11: Fixed Effect (Emerging countries)

	(1)
VARIABLES	RECESSION
privatecredit	0.038***
	(0.018)
bankdep	0.008***
	(0.026)

roe	-0.002***
	(0.009)
cpi	0.002***
	(0.004)
generalgov	0.356***
	(0.111)
trade	-0.015***
	(0.010)
Constant	
Observations	443
R-squared	
Number of id	22

Source: Authors' computation

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Time Fixed Effect (All countries)

Table 12 presents the results for the time fixed effects, which control for global shocks or events that affect all countries in a given period. We can see that financial development continues to have a stabilizing effect, even when global shocks are considered. In other words, access to credit allows firms and households to maintain investment and consumption during downturns, hence reinforcing economic resilience. These results support our first and second hypotheses, showing that financial development significantly affects recessions and that deeper financial systems reduce recession risk.

Table 12: Time Fixed Effect (All countries)

	(1)
VARIABLES	RECESSION
privatecredit	-0.026**
	(0.010)
bankdep	-0.014***
	(0.026)
roe	-0.003**
	(0.008)

cpi	0.035*
	(0.021)
generalgov	0.231**
	(0.106)
trade	-0.002
	(0.011)
Observations	841
R-squared	
Number of id	38

Source: Authors' computation

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Combined Test

The testparm result for the time fixed effect model, in Table 13, indicates that all the explanatory variables in our model–private credit, bank deposits, ROE, CPI, government spending, and trade–are jointly statistically significant in explaining the likelihood of an economic recession. Hence, the null hypothesis of no time effect was rejected, which means that at least one variable contributes significantly to explaining recession outcomes, and this further confirms that our model is not misspecified.

Table 13: Testparm

	Coef.
Chi-square test value	79.71
P-value	0.000

Source: Authors' computation

Non-linear model

Table 14 presents the results of the nonlinear model. The coefficient on private credit is positive and significant (0.004, $p < 0.01$), while privatecredit_sq is negative and significant (-0.002, $p < 0.01$). This indicates a non-linear relationship, which supports our fourth hypothesis. This pattern aligns with Deidda & Fattouh's (2002) findings that moderate credit expansion may initially increase vulnerability, particularly when lending standards are weak. However, once financial systems reach sufficient depth and efficiency, credit growth enhances resilience, supporting sustained economic activity. Similar to private credit, bank deposits initially have a minor destabilizing effect, but the stabilizing benefits strengthen as deposit bases expand further. This reflects the importance of stable funding in reducing systemic risk as financial systems deepen. ROE has a negative linear coefficient (-0.002, $p < 0.05$) and a negative squared term (-0.000, $p < 0.01$); this means that higher bank profitability reduces recession risk, and this effect grows as banks become stronger, further emphasizing that a profitable and resilient banking sector could serve as a key buffer against economic downturns. Both private credit and bank deposits show that the stabilizing effect grows as financial

development deepens, consistent with theory. We can also see that trade has a negative coefficient (-0.003, $p < 0.01$), which indicates that trade openness slightly reduces the likelihood of an economic recession.

Table 14: Non-linear model

	(1)
VARIABLES	RECESSION
privatecredit	0.004***
	(0.002)
privatecredit_sq	-0.002***
	(0.000)
bankdep	0.001**
	(0.003)
bankdep_sq	0.000***
	(0.000)
roe	-0.002**
	(0.001)
roe_sq	-0.000***
	(0.000)
cpi	0.000*
	(0.000)
generalgov	0.039***
	(0.009)
trade	-0.003***
	(0.001)
Constant	-1.546*
	(0.892)
Observations	874
R-squared	0.081
Number of id	40

Source: Authors' computation

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Endogeneity Test

In Table 15, to ensure the validity of the instrumental variable approach, both instrument relevance and exogeneity are assessed. The first-stage regression results show that institutional variables—such as rule of law, judicial efficiency, and governance indicators—are strongly correlated with private credit, as evidenced by high F-statistics and statistically significant coefficients. This confirms that the instruments satisfy the relevance condition. In addition, endogeneity tests (Durbin and Wu–Hausman) reject the null hypothesis of exogeneity, supporting the use of instrumental variables. However, while the instruments appear strong, the exclusion restriction cannot be tested directly. Therefore, the causal interpretation of the 2SLS results should be treated with caution.

Table 15: 1SLS Regression Result

privatecredit	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
rule_law	3.425	0.763	4.49	0.000	1.926	4.923	***
secu_1st	19.345	3.447	5.61	0.000	12.573	26.117	***
cumu_vot	9.892	3.027	3.27	0.001	3.945	15.839	***
c1sh_1vo	15.216	3.56	4.27	0.000	8.222	22.21	***
eff_jud	-5.536	0.773	-7.16	0.000	-7.056	-4.017	***
bankdep	0.334	0.047	7.14	0.000	0.242	0.426	***
roe	-0.236	0.062	-3.80	0.000	-0.358	-0.114	***
cpi	-0.391	0.164	-2.39	0.017	-0.713	-0.069	**
generalgov	4.468	0.383	11.65	0.000	3.715	5.221	***
trade	0.149	0.024	6.18	0.000	0.102	0.197	***
Constant	-9.655	34.424	-0.28	0.779	-77.284	57.974	
Mean dependent var		75.924	SD dependent var			42.474	
R-squared		0.676	Number of obs			522	
F-test		96.821	Prob > F			0.000	
Akaike crit. (AIC)		4829.589	Bayesian crit. (BIC)			4880.681	
*** p<.01, ** p<.05, * p<.1							

Source: Authors' computation

Table 16 reports the Durbin and the Wu–Hausman test for endogeneity. Both tests are statistically significant at the 1% level, meaning the null hypothesis of exogeneity is rejected. It reinforces our first hypothesis: financial development significantly affects recession, but the relationship is not purely exogenous. It supports our broader framework that financial development is shaped by institutional and macroeconomic factors, which in turn influence the possibility of a recession.

Table 16: Durbin Wu-Hausman Endogeneity test

```
Tests of endogeneity
H0: Variables are exogenous

Durbin (score) chi2(1)          =  8.83908  (p = 0.0029)
Wu-Hausman F(1,517)             =  8.90521  (p = 0.0030)
```

Source: Authors' computation

Table 17 presents the results of the 2SLS regression. The endogeneity tests (Durbin and Wu–Hausman) reject the null hypothesis of exogeneity, supporting the use of instrumental variables. However, while the instruments appear strong, the exclusion restriction cannot be tested directly. Compared to the baseline and fixed effects estimates, the 2SLS results are weaker in magnitude and statistical significance, suggesting that endogeneity may bias conventional estimates upward. Therefore, the causal interpretation of the 2SLS results should be treated with caution.

Table 17: 2SLS Regression Result

	(1)
VARIABLES	2SLS RECESSION
privatecredit	-0.006
	(0.001)
bankdep	0.001
	(0.001)
roe	-0.002*
	(0.001)
Constant	0.154***
	(0.046)
Observations	522
R-squared	

Source: Authors' computation

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Granger causality test

The Granger causality test results indicate that the null hypothesis that financial development does not Granger-cause should be rejected, as the p-value is statistically significant at the conventional 1% level. This suggests that financial development (private credit) increases the likelihood of an economic recession for at

least one panel (id), indicating a statistically significant causal relationship between financial development and economic recession.

Table 18: Granger Causality test

```
Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 1
W-bar =          2.0797
Z-bar =          5.3983   (p-value = 0.0000)
Z-bar tilde =    3.4318   (p-value = 0.0006)
------------------------------------------------------------
H0: privatecredit does not Granger-cause recession.
H1: privatecredit does Granger-cause recession for at least one panel (id).
```

Source: Authors' computation

CONCLUSION & IMPLICATIONS

Conclusion

We examine the nonlinear and causal effects of financial development and economic recession from the perspectives of advanced and emerging economies. Across our analyses, several key insights emerge. First, we found that financial development exhibits a statistically significant relationship with economic recession. Specifically, higher levels of private credit and larger deposit bases generally reduce the likelihood of an economic recession. This aligns with our first and second hypotheses. These findings are consistent with prior literature – Levine, 2005; and Claessens et al., 2012 – highlighting the stabilizing role of financial development in promoting efficient resource allocation and mitigating economic volatility. Second, we saw that the results differ when considering advanced versus emerging economies. In advanced economies, financial development exhibits a stronger stabilizing effect, whereas in emerging economies, the impact of private financial development is modest. This supports our third hypothesis, indicating that the effect of financial development on recession is context-dependent and influenced by institutional quality, governance, and the maturity of financial systems. Third, our nonlinear model confirms our fourth hypothesis: the relationship between financial development and recession is not strictly linear. Moderate increases in private credit may initially carry some risk, but as financial systems get stronger and banks become more profitable, the marginal effect becomes strongly stabilizing. Lastly, in our 2SLS results, we found that the direct causal effect of financial development (private credit) on recession is smaller than suggested by the fixed-effects models. And our endogeneity tests confirm that private credit is influenced by institutional and macroeconomic factors, highlighting that financial development alone is insufficient to prevent recessions; instead, the stabilizing effect depends on strong institutions, governance, and bank profitability. Overall, the findings suggest that financial development is associated with lower recession risk, particularly in advanced economies. However, the instrumental variable results indicate that the direct causal effect of financial development is weaker than suggested by baseline estimates. This implies that part of the observed relationship may be driven by underlying institutional and macroeconomic factors. Therefore, while financial development appears to contribute to economic stability, the results should be interpreted with caution, and strong causal claims cannot be made without reservation. The effectiveness of financial development depends critically on institutional quality, banking sector strength, and macroeconomic conditions.

Implications

Our findings carry important policy implications for both advanced and emerging economies. While financial development plays a key role in reducing recession risk, credit markets must expand in a balanced and well-regulated manner. Policymakers should promote private sector lending to support economic activity, but this must be accompanied by strong regulatory oversight and sound risk management, especially in emerging economies where rapid credit growth can increase financial vulnerability. At the same time, the results highlight the importance of a strong and stable banking sector, as higher bank profitability and deeper deposit bases consistently reduce recession risk, indicating that well-capitalized and efficient banks serve as critical buffers during economic recessions. The results also emphasized the central role of institutional quality, as

financial development is closely linked to factors such as the rule of law, judicial efficiency, and governance, which suggests that financial sector policies must be supported by broader institutional reforms. Plus, the evidence from our nonlinear model shows that the benefits of financial development are not immediate but depend on the maturity and efficiency of the financial systems.

Data Availability

The data used in this study were sourced from the World Bank Data Bank.

Conflict of Interest

The authors declare no conflict of interest.

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