Shaping Stability: Can the Finance-Growth Nexus Achieve It?

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This paper assesses the tripartite link between a country's financial (in) stability, its level of financial development, and economic growth. Using a panel of 21 countries over the period 2001–2020 and using the IMF Financial Market Index to proxy financial development, we find (i) that financial stability varies positively with the development of the financial system, and (ii) that the relationship between financial stability and economic growth depends critically on the level of financial development of each country. These results show that in the absence of financial development, the impact of economic growth on financial (in)stability will have different effects. In addition, we performed a subsample analysis by dividing the overall sample into two subsamples based on stability levels. We find that financial development enhances stability more in the more stable subsample, while growth does so in the less stable subsample.

Keywords: financial (in)stability, financial development, economic growth, financial market index, emerging and developing markets
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Introduction

In this paper, our analysis searches into the dynamics of growth, the extent of financial development, and their impact on financial stability. We place particular emphasis on exploring the potential advantages associated with 'more development in the financial sector' in terms of enhancing stability. Furthermore, we investigate whether the stability of the financial system shows variations in response to shifts in levels of financial development. Our approach begins by examining the intricate interplay between financial (in)stability and financial development. Subsequently, we extend our investigation to capture how financial stability responds to the interactions between financial development and growth.

Finally, we assess whether this interaction differs between more stable and less stable countries.

The Financial Stability Board's 2022 annual report highlights the formidable challenges that the current economic landscape poses to financial stability (Financial Stability Board 2022). The report attributes these challenges to a numbers of factors, notably high inflation rates, sluggish economic growth, and a considerably more restrictive set of financial conditions. Similarly, the International Monetary Fund talked about these concerns in its 2022 Global Financial Stability Report. Their report highlighted the strain experienced in global financial markets, primarily due to a combination of geopolitical uncertainties and factors (International Monetary Fund 2022). This has led to a reduction in market liquidity, heightened stress levels in certain non-bank financial institutions, declining asset prices, and subsequently, an escalation in financial stability risks. It has therefore become urgent to understand the determinants and dynamics of financial stability, particularly in developing countries and emerging markets.

Previous studies have highlighted the significance of financial development in a country's financial stability (e.g. Abbas et al. 2021; Ge et al. 2025). Research has shown that well-developed financial systems can enhance stability by improving resource allocation, risk diversification and market efficiency (e.g. Levine 2005). However, in the absence of adequate development, financial systems can instead exacerbate vulnerabilities, increasing the likelihood of crises and instability (e.g. Wang et al. 2021; Elekdog et al. 2025). Moreover, evidence shows similar duality in the case of emerging and developing countries. For example, Avalos and Moreno (2013) find that the development of financial markets, particularly derivatives markets, could support financial stability. In many emerging economies, these markets remain underdeveloped, resulting in high hedging costs. These conditions limit the ability of borrowers and investors to effectively manage their exposure to currency and other risks according to their risk preferences. On the other hand, the same derivatives can also have a destabilizing effect on the financial systems of developing and emerging countries. For instance, Keffala (2015) argues that the use of futures, and especially options, has been linked to weaker banking stability in emerging markets and has been partly implicated in the amplification of the recent global financial crisis.

Evidence also shows that the impact of financial development on financial stability depends on macroeconomic factors and country-spe-

cific initial characteristics. Factors such as inflation, financial inclusion, and financial liberalization can either amplify or attenuate the stabilizing role of financial development. Elgharib (2024) finds that in the MENA region financial inclusion moderates the positive effect that financial development has on stability. Adem (2025) shows that in the case of strict regulatory policies, the effect of financial development becomes negative and reduces financial stability. At the national level, the effect of financial development on stability also depends on initial conditions. Rioja and Valev (2004) show that countries with lower initial levels of financial development experience faster credit growth, which can harm the economy.

Therefore, in this study we investigate how financial development influences financial stability in developing and emerging countries, while accounting for the moderating role of growth. In addition, we examine whether the strength and direction of this relationship varies according to different levels of financial stability. To conclude, this study examines the following questions:

- *RQ1.* How does financial development influence financial stability across developing and emerging countries?
- *RQ2.* How does the relationship between financial development and financial stability vary depending on the level of growth?
- *RQ3.* Does the impact of financial development and economic growth on financial stability differ between more stable and less stable countries?

The structure of this paper is as follows: in the next section, we expand on the literature in question. The third section is where we explain the concepts, models, and statistical approaches we used. Following that, in the fourth section, we provide visualizations, interpretations, and discussions of our empirical results. Finally, we conclude in the fifth section.

Literature Review

While the extensive literature has addressed the debate on the interplay between financial development and economic growth (e.g. Boikos et al. 2022; Keh et al. 2022; Poghosyan 2022), inquiry into the combined impact of these factors on financial system stability has remained a relatively understudied area. From a theoretical standpoint, it is evident that both financial development and economic growth have favourable

effects on financial stability. To elaborate, financial stability is achieved when the financial system effectively supports economic performance and mitigates the emergence of financial imbalances resulting from unpredicted or endogenous events (Schinasi 2004). Simultaneously, financial development signifies efficiency in providing individuals access to essential services at minimal cost, thereby fostering economic growth (Mahmoudi and Torra 2023). This logical alignment implies a positive relationship between these variables. However, it is not that simple. What is even more complex than a two-way relationship is a three-way relationship, involving various internal and external factors, and the unpredictable influence they exert on the combined effect.

Prior studies have consistently underscored the importance of concurrent examination of financial stability, financial development, and growth. In the case of African countries, a study conducted by Batuo et al. (2018) revealed an inverse relationship between financial instability and growth. This suggests that as growth rates decrease, the incidence of financial instability tends to rise. Notably, the introduction of financial liberalization policies into the equation moderates this relationship. This implies that countries pursuing financial liberalization policies often experience a less stable financial system, which, in turn, affects their levels of growth. Interestingly, when financial development is considered as a regressor, the results show a positive coefficient. These findings support the hypothesis that growth has a favourable impact, while financial development has a potentially adverse effect on the stability of the 41 African countries within the study sample. In a similar vein, Sahay et al. (2015) shed light on the concept of the 'benefits-risk trade-off' inherent in the relationship between growth and stability. Their findings demonstrated that when the Financial Development Index surpasses 0.6, the advantages of financial development pose challenges to financial stability while still exerting positive effects on growth. Nevertheless, when the Financial Development Index approaches 1, the negative consequences of an improvement in the level of financial development on financial stability become noticeably significant.

In this paper, our empirical analysis is based on two theoretical approaches. First, it is widely acknowledged that the nexus between financial development and growth plays an important role in bolstering the stability of the financial system, rendering it more resilient and ultimately more profitable, especially in developed nations, where financial markets and institutions wield substantial influence over the country's growth

and overall development. On one hand, they facilitate the allocation of capital, channel savings towards productive investments, oversee their efficient utilization, curtail transaction costs, enable risk diversification, and facilitate trade, among other functions. These dynamics, in turn, lead to a reciprocal growth trajectory. On the other hand, they contribute to the broader development agenda by generating employment opportunities, alleviating poverty, introducing innovative approaches to address retirement challenges (Merton and Muralidhar 2020), enhancing overall well-being, and more. A review of the literature underscores the consensus among both academics and policymakers that the finance-growth relationship is a fundamental driver of progress and a keystone for enhancing stability (e.g. Abbas et al. 2021; Pisicoli 2023). From this perspective, economies characterized by elevated levels of financial development and growth tend to exhibit higher levels of financial stability compared to their counterparts.

Second, an influential theory posits that financial development has the capacity to stimulate a heightened tendency toward risk-taking among economic agents, such as borrowers. This, in turn, can contribute to the exacerbation of financial system instability. To illustrate this concept, consider a normally functioning economy. During euphoric phases, interest rate structures tend to favour short-term financing over long-term options. This shift in interest rates piques the interest of economic agents in short-term financing arrangements. Moreover, any dip in income can push some firms into what is termed 'Ponzi financing', a situation that can trigger bankruptcies, thus unsettling the economic system. Indeed, as managers become increasingly aware of the success of prudently financed projects and witness soaring expectations, two distinct trends materialize: 'Debt is easily provided and highly leveraged units prosper' (Minsky 1977). Consequently, risk premiums come to be perceived as excessive. Fuelled by optimism, economic agents start taking greater risks, leading to a surge in asset prices as a result of the expanded volume of investments (Schinasi 2006). However, it is essential to recognize that excessive investment can eventually have adverse repercussions on the economy. Returns on capital decline, bankruptcy rates surge, businesses curtail their investment initiatives, and economic agents reassess their capacity to meet debt obligations. This sequence of events unfolds a highly volatile macroeconomic landscape on the brink of a financial crisis. Beck et al. (2006) found that financial deepening does not necessarily mitigate the impact of trade volatility, but it does

tend to amplify inflation volatility to some extent. Similarly, Arcand et al. (2015) demonstrate the relationship between financial development and the volume of credit extended to the private sector. In their study, the authors highlight the concept of a 'vanishing effect' of financial development on growth. They note that this effect becomes negative when the volume of credit provided to the private sector exceeds 100% of GDP.

To further investigate the link between financial development, growth, and stability, we ask whether the impact of financial development and growth on financial stability depends on a country's initial level of stability. The rationale is straightforward: if a country is already financially unstable, investing in financial sector development and promoting growth may not necessarily enhance stability – and could even exacerbate fragility. Conversely, in more stable economies, financial deepening might contribute positively to resilience. As we discussed above, the literature presents mixed evidence on the impact of financial development. While it is generally associated with economic growth and stability, its effects may diminish or even reverse and contribute to financial instability (e.g. Halili et al. 2021; Wang et al. 2021), although our global sample does not provide evidence supporting this concern.

Financial instability itself is a factor that can weaken the positive effect of financial development, as it reduces its effectiveness (Loayza and Rancière 2006). This means that the stabilising role of financial development is not uniform, but varies from one country to another depending on their initial stability situation. More broadly, the impact of financial development depends on several contextual factors: for example, it varies according to income level (Naceur et al. 2019) and stage of financial development (Aghion et al. 2005). Overall, these results highlight that financial development can have heterogeneous effects depending on initial stability.

From the above we develop three testable hypotheses. First, financial development is positively associated with financial stability. Second, the relationship between financial development and financial stability is conditional on the level of growth, such that financial development strengthens stability more in countries with higher growth. Third, the effects of financial development and growth on stability differ across countries depending on their baseline stability levels, with financial development having a stronger stabilizing impact in more stable countries and growth playing a larger role in less stable ones.

Data and Econometrics

DATA SOURCES AND THE STUDY VARIABLES

To investigate the intricate relationship among financial (in)stability, financial development, and growth, we have compiled a novel dataset. This dataset is based on annual cross-national data from 21 emerging and developing countries, covering the period 2001–2020. A comprehensive list of these 21 countries may be found in table 2. Our data sources primarily include the Global Financial Development database (GFD), the World Development Indicators (WDI) from the World Bank, and information from the International Monetary Fund (IMF), along with data provided by the Federal Reserve Economic Data (FRED) database, and Chinn and Ito (2006). We will briefly discuss the specific variables employed as proxies in our analysis in the following paragraphs.

FINANCIAL (IN)STABILITY

In the existing literature, different measures are employed to assess financial (in)stability. The common one, attributed to Roy (1952), is the z-score. This measure serves as an indicator of 'bank soundness', gauging the proximity of a bank to insolvency. In simpler terms, it quantifies the likelihood that the value of a bank's assets might dip below the value of its liabilities, signifying that a higher z-score corresponds to a higher likelihood of the bank's solvency. This relationship can be expressed mathematically as follows:

$$Z_{i,t} = \frac{ROA_{i,t} + (E/A)_{i,t}}{\sigma(ROA)_{i,t}}, \tag{1}$$

where: $ROA_{i,t}$, $(E/A)_{i,t}$ and $\sigma(ROA)_{i,t}$ are the return on assets, the equity-to-assets ratio, and the standard deviation of return on assets, respectively. In this study, we evaluate bank soundness by employing the natural logarithm of the z-score, following a similar approach utilized by several previous studies such as Shabir et al. (2024) and Vashisht and Mundi (2025), among others. This logarithmic transformation helps in mitigating the influence of extreme values that can be observed in the z-score. Moreover, to ensure that changes in the z-score value are not solely attributed to fluctuations in profitability and capital levels, rather than reflecting the overall performance over the entire period, we adopt a rolling three-year time window (Heitmann et al. 2025).

The second measure is stock price volatility, which is widely used to proxy the soundness of the financial system (e.g. Vuong et al. 2024; Zheng et al. 2025). As well as assessing the solvency levels of the banking system through the z-score, this additional measure captures market perceptions of uncertainty and systemic stress. By using these two measures, we integrate both balance-sheet-based and market-based perspectives on financial stability. However, we anticipate an opposite sign to that of the z-score coefficient due to the contrasting implications of these two variables.

Financial Development

When assessing financial development, researchers commonly rely on three key indicators. The first indicator, frequently used to gauge the depth of financial institutions, is the ratio of credit to the private sector relative to GDP. This ratio quantifies the proportion of loans extended by various financial entities, such as banks (e.g. commercial banks) and other financial institutions (e.g. insurance companies), to the private sector in relation to the overall GDP. The second indicator, derived from the first, is the ratio of bank credit to the private sector as a percentage of GDP. This indicator specifically focuses on loans issued by banks to the private sector concerning the nation's gross domestic product. The final indicator, referred to as broad money to GDP, represents the total amount of currency circulating in the economy. Nevertheless, it is essential to acknowledge that these indicators have their limitations. As noted by Sahay et al. (2015), although bank lending to the private sector remains a significant component of financial development, it accounts for less than 15% of all subcomponents used to measure financial development comprehensively. Similarly, Beck (2015) points out that the ratio of private credit to GDP predominantly considers the quantity of loans extended by regulated financial institutions, overlooking the quality and quantity of loans provided by unregulated financial entities. This narrow focus may inaccurately portray the depth of the financial system, particularly in countries where access to financial services is initially limited.

Therefore, in this study, we use the Financial Markets Index, initially proposed, developed, and employed by Čihák et al. (2012) and Sahay et al. (2015), to address these concerns. This index is calibrated on a scale from 0 to 1, where 0 represents the lowest level and 1 signifies the highest level of development. Therefore, countries with values approaching 1 are considered to be the most advanced in terms of financial development.

Growth

We present growth through two distinct perspectives. Initially, we gauge economic growth by examining the annual expansion in GDP. Subsequently, we measure well-being by evaluating GDP per capita. The GDP per capita, which measures a nation's economic output per person, serves as a vital indicator of a country's level of growth. In this analysis, we employ the natural logarithm of GDP per capita. This approach, as suggested in the literature (Fang et al. 2014; Batuo et al. 2018), offers a more precise representation of the growth rate and provides better control over the 'highly skewed' nature of GDP per capita data. We also assess variations in growth rates through GDP growth (annual %), which is retained in its standard format. Both of these variables play a crucial role in helping us comprehend the extent to which growth influences financial (in)stability.

Control Variables

In line with existing literature (e.g. Ramey and Ramey 1995; Demirgüç-Kunt and Detragiache 1998; Ma and Lv 2023), we incorporate five control variables aimed at capturing the potential influences on financial system stability. These variables are selected to account for macroeconomic factors that could impact the performance of the banking sector.

The first control variable is the inflation rate, which reflects the extent of price changes across the economy. These changes can lead to market volatility, indirectly increasing the risk of banking problems. High or volatile inflation erodes the real value of financial assets, increases uncertainty about future cash flows, and can weaken the intermediary role of banks, which can destabilize the financial system. We measure this variable using the annual growth rate of the GDP deflator. The second control variable pertains to the volatility of the economy's growth rate, calculated through a rolling three-year time window of the standard deviation of the annual GDP growth rate (Khan 2022). The volatility of growth reflects the instability of the economic environment in which banks operate, which directly influences financial stability.

Additionally, we consider financial and trade openness as indicators of a country's susceptibility to external shocks in both the financial and real sectors. For financial openness, we employ the Chinn-Ito index, attributed to Chinn and Ito (2006). Unlike trade openness, which relies on the ratio of imports and exports to GDP, the Chinn-Ito index, also known as the KAOPEN index, assesses the level of capital account openness for each

country. The KAOPEN index measures cross-border financial mobility, which can both impact financial development and increase vulnerability to external shocks. In contrast, trade measures integration into global goods markets, which shapes the banking sector through trade finance, foreign exchange operations, and exposure to fluctuations in global demand.

Furthermore, given the nature of our sample and following the recommendation of Roodman (2009), we introduce time dummies to account for time-specific effects.

Summary Statistics

Table 1 shows the summary statistics for the various variables used.

All variables in table 1 are country-level variables obtained from the databases of the Global Financial Development (GFD), the World Development Indicators (WDI) of the World Bank, the International Monetary Fund (IMF), the Federal Reserve Bank of St. Louis (FRED), and Chinn and Ito (2006). The full sample contains 3,780 observations. The table is in two parts. The first is a list of all the variables used in the estimation study.

- Financial (in)stability is defined by two measures: first, the three-year rolling window of the natural logarithm of the Z-score, calculated as the return on assets plus the ratio of assets to capital divided by the standard deviation of the return on assets; second, the vola-

TABLE 1 Summary Statistics (Period 2001–2020; 21 Countries)

	Variable	Observation	Mean	Standard deviation	Minimum	Maximum
Dependent variables	Z-Score	420	2.87	0.60	0.80	4.19
	Volatility of stock price	420	17.91	8.34	5.62	52.97
Independent variables	FMD	420	0.35	0.17	0.02	0.74
	Log. GDP per capita	420	8.71	1.25	6.46	11.31
	Growth rate	420	3.95	4.24	−21.40	26.17
Control variables	Economic volatility	420	2.08	2.00	0.03	12.13
	Inflation rate	420	5.63	8.87	−25.95	85.54
	Financial openness	420	0.28	1.45	−1.93	2.30
	Trade openness	420	81.22	37.63	23.12	210.37

tility of the stock price, measured as the 360-day standard deviation of the return on the national stock market index.

- *FMD* represents the Financial Markets Index provided by the IMF.
- The *GDP growth rate* (annual %) and the *log. GDP per capita* (in logarithms) are used as proxies of growth.
- *Economic volatility* (the three-year rolling window standard deviation of GDP growth), *Inflation rate* (GDP deflator, annual %), *Financial openness* (the Chinn-Ito index) and *Trade openness* (Merchandise trade (% of GDP)) are used as controlling variables.

Table 2 presents a detailed list of key variables for each country. Within this dataset, the first column of table 2 provides the mean logged z-scores

TABLE 2 The Averages of the Main Variables or Each Country

Country	*Z*-score	Volatility of the stock price	*FMD*	Log. *GDP* per capita	Growth rate	Economic volatility	Inflation rate	Financial openness	Trade openness
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
South Africa	2.59	18.62	0.43	8.65	2.15	1.16	6.43	−1.24	53.60
Bangladesh	2.74	13.91	0.17	6.93	5.98	0.64	6.85	−1.24	36.43
Egypt	2.88	26.08	0.36	8.03	4.25	1.02	11.04	0.86	47.04
India	2.76	21.09	0.50	7.17	5.98	1.63	5.55	−1.24	43.20
Indonesia	1.42	20.65	0.30	7.93	4.91	0.68	7.64	0.43	49.86
Israel	3.38	17.69	0.40	10.41	3.28	1.78	1.49	2.13	66.19
Jordan	3.98	11.81	0.42	8.33	4.17	0.91	4.36	2.30	112.33
Kuwait	2.81	12.68	0.40	10.40	3.24	4.25	3.24	1.03	93.15
Lebanon	2.88	15.02	0.11	8.93	2.02	2.55	7.01	0.66	78.58
Kenya	1.71	30.99	0.07	7.69	1.95	4.90	15.52	−1.66	97.30
Malaysia	2.84	12.07	0.58	9.04	4.35	1.99	2.79	−0.32	162.44
Morocco	3.66	12.31	0.24	7.92	3.68	1.96	1.06	−1.24	67.92
Oman	2.87	12.57	0.29	9.89	2.94	2.54	4.24	2.19	92.32
Pakistan	2.38	18.97	0.25	7.17	4.05	1.29	7.48	−1.24	28.68
Philippines	3.10	20.29	0.34	7.83	4.77	1.54	3.37	−0.28	69.83
Qatar	3.22	18.12	0.62	11.07	8.42	4.07	3.71	2.30	93.08
Saudi Arabia	2.99	22.77	0.54	9.98	3.47	2.86	4.01	1.03	74.78
Thailand	3.00	19.10	0.33	9.17	1.13	2.81	5.23	0.93	61.70
Tunisia	2.64	8.72	0.12	8.21	2.44	1.82	4.76	−1.24	94.86
UAE	3.23	17.12	0.48	10.76	3.37	3.24	3.35	2.30	143.85
Vietnam	3.47	23.80	0.40	7.68	6.41	0.61	9.06	−0.54	138.56

for all 21 countries. A closer examination of the z-scores reveals Jordan leading the way with a score of 3.98, while Indonesia ranks lowest with a score of 1.42. The average z-score for this sample is around 2.87, implying that approximately 52.4% of the countries in the dataset have z-scores above the average. The standard deviation of 0.60 indicates relatively limited variation from the mean.

Our assessment of the Financial Market Index (table 2, column 3) reveals a wide range, from a low of 0.07 in Kenya to a high of 0.62 in Qatar. The average Financial Markets Index stands at 0.35, indicating that approximately 52.4% of the sample is above average. Examining the results, we find that 19.05% of our sample falls into the category of low-ranking countries, characterized by an average index below 0.2. On the other hand, 14.28%, 42.86 %, and 23.81% of the sample belong to the groups with average indices below 0.3, 0.44, and 0.64, respectively. Notably, no country attains a score surpassing 0.64.

Table 2 reports the main estimation variables, averaged per country.

Columns 4 and 5 present estimations of growth. It is noteworthy that our two indicators, namely GDP per capita and GDP growth, do not always align. To illustrate, let us consider Qatar, the United Arab Emirates, and Israel. The average natural logarithm of GDP per capita places Qatar in the lead at 11.07, followed by UAE at 10.76, and Israel at 10.41. However, the GDP growth rate does not tell the same story. In table 2, Column 5, Qatar is still in first place with an average growth rate of 8.42%, while the UAE and Israel are in 13th and 14th place with growth rates of 3.37% and 3.28%, respectively. This underlines the importance of using several economic growth indicators. The standard deviations of inflation rate, financial openness, and trade openness are 8.87, 1.45, and 37.63, respectively, indicating a moderate to large degree of variation from the mean values. Another interesting statistic concerns economic volatility. The coefficient of variation is 0.96 (= 2/2.08), indicating that economic volatility fluctuates widely from its mean. Mathematically, this means that the standard deviation is equal to 96% of the mean, which is considerably high.

Table 3 reports information on the correlation between the variables of the regression. The results indicate that financial stability, as measured by the z-score, is positively and significantly correlated with financial market development. Additionally, the z-score and GDP per capita show a strong positive correlation, while GDP growth exhibits an insignificant relationship with financial stability. Higher inflation is associated with lower financial stability, as reflected in the negative correlation coeffi-

TABLE 3 Correlation Matrix Estimation (2001–2020)

Variables	Z-score	FMD	Log. GDP per capita	Growth rate	Economic volatility	Inflation rate	Financial openness
FMD	0.184***						
Log. GDP per capita	0.320***	0.432***					
Growth rate	0.032	0.198***	−0.040				
Economic volatility	−0.055**	0.027	0.346***	−0.174***			
Inflation rate	−0.215***	−0.103**	−0.180***	0.015	0.189***		
Financial openness	0.339***	0.420***	0.742***	0.048	0.118**	−0.143***	
Trade openness	0.204***	0.291***	0.369***	0.059	0.158***	−0.054	0.290***

NOTE *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

cient (−21.5%). Furthermore, financial systems characterized by greater trade and financial openness tend to exhibit lower risk, as indicated by their significant correlations with the z-score. All these correlations are significant at the 1% level, except for economic volatility, which is significant at the 5% level. Moreover, economic volatility exhibits a negative correlation with the z-score.

EMPIRICAL METHODOLOGY

Methodology

To investigate the connections between financial (in)stability, financial development, and growth, we conducted a series of regression analyses using country-level data. Specifically, we regressed financial (in)stability on financial development and growth while controlling for other relevant factors. In this study, we focus solely on the development of financial markets as our variable. Given that our sample consists of developing and emerging countries, this approach will help us shed light on its importance for growth and stability.

We initiated our examination by exploring the association between financial (in)stability and financial development, utilizing the Financial Markets Index as our primary measure. We sought to determine whether a higher financial markets development is linked to increased stability, in line with the findings of Sahay et al. (2015). Subsequently, we expanded our analysis to investigate whether the relationship between financial (in)stability and financial development is influenced by growth.

Subsequently, in order to obtain a more focused conclusion, we modify the framework by splitting the sample into two subsamples for countries below and above the median log z-score of the overall sample. A significant aspect of our study is estimating how changes in the financial markets index can impact the connection between financial (in)stability and growth. To achieve this, we formulated the following model:

$$\begin{aligned} FS_{i,t} = {} & \alpha + \beta_0 FS_{i,t-1} + \beta_1 FMD_{i,t} + \beta_2 Gper_{i,t} + \beta_3 Gro_{i,t} \\ & + \beta_4 (FMD_{i,t} * Gper_{i,t}) + \beta_5 (FMD_{i,t} * Gro_{i,t}) \\ & + \delta_k \sum_k X_{i,t} + \mu_t + \epsilon_{i,t} \end{aligned} \tag{1}$$

In this equation, the time period and country are denoted as t and i, respectively. The variable $FS_{i,t}$ represents the financial (in)stability indicator, measured by the three-year rolling window of the natural logarithm z-score, as previously explained. Additionally, we incorporate the logged dependent variable, denoted as $FS_{i,t-1}$ on the right-hand side of our estimation model, following the recommendations of Deephouse (1999) and Wooldridge (2013). The inclusion of $FS_{i,t-1}$ in the equation serves the purpose of controlling for omitted variables. It is conceivable that countries with a high level of financial stability, indicated by a high z-score, may exhibit a higher level of financial development (and possibly growth). Moreover, there could be unobserved factors that simultaneously influence $FS_{i,t}$ along with $FMD_{i,t}$ (and growth indicators). Such a scenario would violate the assumptions of the classical linear regression model (CLRM), resulting in a biased and inconsistent estimator, as discussed by Baltagi (2005). Therefore, by introducing $FS_{i,t-1}$ into the equation, we aim to measure, to a certain extent, the true effect of financial development (and growth) on financial (in)stability, particularly when the initial levels of financial (in)stability in two countries are similar. The issue of endogeneity, arising from unobserved omitted variables, will be addressed in a subsequent sub-section.

Furthermore, within our model, $FMD_{i,t}$, $Gper_{i,t}$ and $Gro_{i,t}$ represent the Financial Markets Index, the logarithm of GDP per capita, and the annual growth rate of GDP for the period from 2001 to 2020, respectively. Additionally, we introduce $FMD_{i,t} \times Gper_{i,t}$ and $FMD_{i,t} \times Gro_{i,t}$ as interaction terms, capturing the combined effects of the financial markets index and our two indicators of growth (namely, log(GDP per capita) and GDP growth rate) on financial (in)stability. This allows us to estimate the

joint influence of financial development and growth on financial (in)stability, meaning that:

- First, the interaction term $FMD_{i,t} \times Gper_{i,t}$ examines the combined effects of financial development and GDP per capita on financial (in)stability. It seeks to understand how the relationship between a country's economic well-being per person and financial (in)stability varies across different levels of financial development.
- Second, the interaction term $FMD_{i,t} \times Gro_{i,t}$ investigates the joint effects of financial development and the annual growth rate on financial (in)stability. It aims to analyse how the relationship between a nation's annual growth rate and financial (in)stability changes with varying levels of financial development. These interactions will be explored in detail in the fourth section.

The vector of control variables is denoted by $Xi,_t$ and includes variables such as the inflation rate, financial and trade openness, and economic volatility. To account for unobserved time-specific effects and errors in our model, the terms μ_i and $\varepsilon_{i,t}$ were incorporated, respectively.

To anchor our empirical specification in theory, we expect financial development (*FMD*) to have a positive effect on financial stability (*FS*), as more developed financial systems improve resource allocation and risk diversification (Umar et al. 2020). Similarly, stronger economic growth should enhance stability by improving asset quality and bank profitability (Apau et al. 2023). The interaction terms between *FMD* and growth indicators should also be positive, reflecting the idea that financial development amplifies the stabilizing effects of growth. Among the control variables, economic volatility and inflation should have destabilizing effects, in line with the idea that macroeconomic instability erodes bank balance sheets (Qin et al. 2025). Conversely, greater financial openness and great-

TABLE 4 The Expected Impact of Variables

Variable	Expected impact
Explanatory variables: Financial development	+
Growth	+
Financial development × Growth	+ (for both interaction terms)
Control variables: Economic volatility	–
Inflation rate	–
Financial openness	+
Trade openness	+

er trade openness should promote stability by improving risk-sharing opportunities and strengthening resilience to internal shocks (Ma and Yao 2022). The summary of the expected effects of these different variables is in table 4.

Data Specifications and the Choice of Estimator

In a 2015 editorial published in the *Journal of Operations Management (JOM)*, Guide and Ketokivi (2018) emphasize the imperative need to address endogeneity more rigorously in research. Neglecting to tackle this issue can significantly bias research outcomes. As elucidated in Davidson and MacKinnon (2004), endogeneity typically arises from two main sources. First, it can be attributed, as mentioned earlier, to unobserved omitted variable(s) that concurrently influence both the dependent variable and one (or more) of the explanatory variable(s). Second, it can be attributed to simultaneity, indicating that the dependent variable and one (or more) of the explanatory variable(s) are mutually determined (Wooldridge 2010). In our model, we believe that endogeneity may arise due to simultaneity. The literature suggests that while financial development can influence financial stability, prevailing stability conditions may also shape financial markets' incentives to develop (e.g. Espinoza et al. 2013; Vithessonthi 2014).

In accordance with the editorial recommendations and drawing on the insights from Ketokivi and McIntosh (2017), we employ the instrumental variable approach proposed by Lu et al. (2018) for addressing endogeneity unless stated otherwise. Moreover, our data's characteristics necessitate specific model specifications. In addition to addressing the endogeneity concern, we identify potential heteroscedasticity within our dataset. It is well-established that under heteroscedasticity, the two-stage least squares (2SLS) approach is not the most efficient choice (Baum et al. 2007). Therefore, in this paper, we propose a two-step analytical approach. First, we employ a base regression with 2SLS-IV robust standard errors, as recommended by Cameron and Trivedi (2005), to address the heteroscedasticity issue. In the second step, as a robustness check, we use the generalized method of moments (GMM) estimator developed by Arellano and Bover (1995) and Blundell and Bond (1998), which combines moment conditions in first differences and in levels. Following Roodman (2009), we use a reduced instrument matrix and limit the number of instruments to less than the number of banks in the sample to avoid overfitting. Standard errors are corrected using Windmeijer's

(2005) finite sample adjustment. Lagged levels dated *t-2* and earlier are used as instruments for the difference equation, while lagged differences are used as instruments for the level equation.

The Choice of Instrumental Variables

Given the practical impossibility of accounting for all unobserved variables in our model, the endogeneity problem is a pervasive concern, as noted by Rossi (2014). In our context, the literature suggests the presence of a potential omitted variable that could simultaneously influence financial (in)stability, financial development, and growth. This variable is financial liberalization. Evidence shows a causality link between financial liberalization and each of these three variables. From a learning perspective, the initial idea is that financial liberalization helps to develop a country's domestic financial markets by increasing the efficiency of its functions through the reduction of government control over capital movements, leading to both growth and stability (Abraham et al. 2019). However, in emerging markets, this conventional view is not always valid. While financial liberalization can indeed foster financial development, particularly in countries with stronger legal institutions (Ahmed 2013), it can also exacerbate financial instability if the regulatory environment is weak (Broner and Ventura 2008). As far as growth is concerned, there is generally a positive and favourable impact (Bekaert et al. 2005). In short, whatever the direction of the impact of financial liberalization on our variables, the link is rather proven, which leads us to think that our model could suffer from endogeneity.

We use five instruments, selected in accordance with the established literature to ensure both their relevance (strong correlation with endogenous regressors) and their exogeneity (independence from the error term). More specifically, the second lag of the dependent variable is used as an instrument for FS_{t-1}, a common strategy in dynamic panel models that ensures correlation with the regressor while avoiding endogeneity bias. For financial development, we rely on the country's legal origin (La Porta et al. 1999; Central Intelligence Agency 2003) and its first lagged value, as these two elements have been widely validated as exogenous determinants of financial structure, unaffected by contemporary shocks. Finally, labour and natural resource endowments are used as instruments of growth at the national level, as they are largely determined by geography and history, making them plausible as exogenous to stability, while being strongly linked to long-term growth.

Results and Discussion

All the results reported are robust to heteroscedasticity and panel-clustered.

FINANCIAL (IN)STABILITY AND FINANCIAL DEVELOPMENT

Initial Results

The results presented in table 5 show the important role of financial markets development in promoting financial stability. We start our estimations by accounting for economic volatility (*Economic volatility*) and the level of a country's financial markets development (*FMD*). In regression (1), FMD exhibits a positive and statistically significant impact at the 1% level. This implies that an improved financial market is closely linked to enhanced stability. From an economic perspective, the estimates in Column (1) indicate that a one standard deviation increase in FMD (0.21) results in a 0.363 standard deviation change in the z-score. As anticipated, these results align with the hypothesis that well-developed financial markets are associated with reduced financial instability (Sahay et al. 2015) and that developed countries tend to be more stable and resilient against both internal and external shocks (Denizer et al. 2002). These findings persist when we modify our model specifications. In regression (2), FMD enters negatively and significantly at the 5% level, meaning that higher financial development is correlated with lower share price volatility. However, we observe a smaller magnitude than the previous impact on the z-score. This confirms our findings from regressions (1) and (3). Furthermore, to comprehensively capture the effect of FMD on the z-score, we control for several country-level characteristics in Column (3). Alongside economic volatility (*Economic volatility*), we incorporate variables such as inflation rate (*Inflation rate*), financial openness (*Financial openness*), trade openness (*Trade openness*), and time dummies (*Time dummies*). Notably, these additional indicators do not alter our conclusions.

Moreover, our results are confirmed by system GMM estimates. In Column (4), financial markets development enters the regression positively, demonstrating its significance at the 1% level. As can be seen, the estimates show no difference between the results in Columns (3) and (4), indicating that clustering the 2SLS estimations by country addressed the heteroscedasticity problem.

Beyond Robustness

To enhance the robustness of our initial findings, we conducted a series of supplementary tests. First, to gain greater control over a country's level of financial development, we introduced an exclusionary threshold for the Financial Markets Index. Although our primary focus was on emerging and developing countries in this study, our sample encompassed nations with developed (FMI > 0.44), moderately developed (0.44 > FMI > 0.20), and underdeveloped (FMI < 0.20) financial markets. This diversity raised concerns regarding the heterogeneity of the sample. Therefore, we refined our sample to only include countries with a minimum financial markets index of 0.2 (FMI > 0.2). Importantly, our results remained consistent, and our conclusions held.

FINANCIAL (IN)STABILITY, FINANCIAL DEVELOPMENT AND GROWTH

Estimation Results

Moving beyond the simple 'bivariate' relationship between financial (in) stability and financial development, previous arguments suggest that the influence of the financial system's development on its stability is contingent on growth. To gain a more comprehensive understanding of the significance of financial development for its stability, we now investigate whether the relationship between financial (in)stability and financial development is conditional on growth.

Table 5 reports estimation results of financial (in)stability indicators on the financial development variable. The sample includes 21 countries over the period 2001–2020. All variables are country-level variables. Unless otherwise stated, the dependent variable is *z-score* calculated as the natural logarithm of the three-year rolling window of the country's z-score. The dependent variable in Column (2) is *volatility of stock price,* which represents the volatility of the equity price index. $FSi_{,t-1}$ is the first lagged value of the dependent variable. *Time dummies* is a time dummy that captures country-specific effects. All the regressions are estimated using the instrumental variables approach. The regressions are estimated using two-stage least squares (2SLS), with the exception of regression (4) for which the GMM system is used. The standard errors are robust and clustered by country. Heteroscedasticity is checked by the Breusch-Pagan test. Endogeneity is tested by the Durbin-Wu-Hausman test and the GMM distance test. In addition, we report 'instruments relevancy' tests.

TABLE 5 Financial (In)Stability and Financial Development

Variable	2SLS			GMM
	Z-score	Volatility of stock price	Z-score	
	(1)	(2)	(3)	(4)
$FS_{i,\,t-1}$	0.787***	0.99***	0.591***	0.595***
	(0.522)	(0.854)	(0.418)	(0.415)
FMD	0.605***	−0.055**	0.211***	0.211***
	(0.469)	(0.026)	(0.119)	(0.1
Economic volatility	−0.806**	0.377**	−0.124**	−0.122**
	(0.662)	(0.199)	(0.087)	(0.088)
Inflation rate	—	—	−0.041	−0.040
			(0.030)	(0.031)
Financial openness	—	—	0.251**	0.250**
			(0.101)	(0.107)
Trade openness	—	—	1.135	1.130
			(1.030)	(1.035)
Log. GPD per capita	—	—	0.533***	0.534***
			(0.331)	(0.330)
Growth rate	—	—	0.097*	0.098*
			(0.055)	(0.530)
Time dummies	—	—	Included	Included
Heteroscedasticity test	0.0001	0.0002	0.0071	—
Endogeneity test	0.000***	0.001***	0.002***	0.0022***
Instruments legitimacy tests:				
Instrument validity test	0.778	0.693	0.544	0.545
Weak instrument test	0.005***	0.002***	0.000***	—
Under-identification test	0.001***	0.022**	0.000***	0.0002***
Number of countries	21	21	21	21
Number of observations	420	420	420	420

NOTES *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Table 6 presents the results of our direct and interactive estimations involving financial (in)stability, financial development, and growth. These estimations encompass various national characteristics and incorporate interaction terms between each growth variable and the level of financial development in each country. We utilized instrumental variables in these regression analyses. Drawing from the existing literature (e.g. Solow 1956; Gerbens-Leenes et al. 2010), we employed the size of the labour force and the percentage of total natural resource rents in GDP as instruments for growth. Given the specific specifications of our model, we contend that the influence of these instruments on financial (in) stability operates primarily through their effect on growth rather than

TABLE 6 Financial (In)Stability and Financial Development

Variable	2SLS				GMM
	Z-score	Z-score	Z-score	Volatility of stock price	
	(1)	(2)	(3)	(4)	
$FS_{i,\,t-1}$	0.591***	0.620***	0.696***	0.867***	0.692***
	(0.310)	(0.444)	(0.499)	(0.686)	(0.48)
FMD	0.367***	0.4**	0.492***	−0.094***	0.491***
	(0.224)	(0.289)	(0.306)	(0.001)	(0.302)
Economic volatility	−0.100**	−0.085*	−0.223*	0.145*	−0.223*
	(0.077)	(0.030)	(0.100)	(0.065)	(0.102)
Inflation rate	- 0.072	−0.055	- 0.100	0.239**	- 0.108
	(0.053)	(0.024)	(0.054)	(0.117)	(0.055)
Financial openness	0.196**	0.204**	0.156**	−0.011**	0.155**
	(0.082)	(0.107)	(0.097)	(0.001)	(0.096)
Trade openness	−0.116	−0.006	0.003	−0.07*	0.004
	(0.066)	(0.001)	(0.001)	(0.001)	(0.001)
Log. GPD per capita	0.199***	0.128**	0.216***	−0.306***	0.216***
	(0.101)	(0.045)	(0.110)	(0.188)	(0.111)
Growth rate	0.023	0.026*	0.015*	−0.122**	0.014*
	(0.009)	(0.001)	(0.001)	(0.071)	(0.001)
FMD × Log. GDP per capita	0.264***	—	0.348**	−0.188***	0.349**
	(0.163)		(0.222)	(0.009)	(0.221)
FMD × Growth rate	—	0.105*	0.055*	−0.117**	0.055*
		(0.069)	(0.001)	(0.033)	(0.002)
Time dummies	Included	Included	Included	Included	Included
Heteroscedasticity test	0.001	0.000	0.005	0.000	–
Endogeneity test	0.002***	0.000***	0.001***	0.000***	0.004***
Instruments legitimacy tests:					
Instrument validity test	0.782	0.776	0.341	0.500	0.309
Weak instrument test	0.005***	0.000***	0.000***	0.000***	—
Under-identification test	0.001***	0.000***	0.000***	0.049**	0.001***
Number of countries	21	21	21	21	21
Number of observations	420	420	420	420	420

NOTES *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

through alternative channels. Recognizing the central role of a country's growth level in this relationship, we considered two distinct measures of growth: GDP per capita, to measure the levels of wealth per person, and the country's GDP growth rate. As table 6 illustrates, the direction of the relationship between financial (in)stability and GDP per capita significantly depends on the country's level of financial development.

Table 6 reports estimation results of financial (in)stability indicators on financial development and growth variables that include the interactions between financial development and growth variables. Unless otherwise stated, the dependent variable is *z-score* calculated as the natural logarithm of the three-year rolling window of the country's z-score. The dependent variable in Column (4) is *volatility of stock price,* which represents the volatility of the equity price index. *FMD* × *Log. GDP per capita* is the interaction term of the Financial Markets Index and log. GDP per capita. *FMD* × *Growth rate* is the interaction term of the Financial Markets Index and country's growth rate. The regressions are estimated using two-stage least squares (2SLS), with the exception of regression (5), for which the GMM system is used.

In regressions where we control for the interaction between financial development and GDP per capita, the latter variable enters the equation positively and significantly. This outcome suggests that an increase in a country's per capita output has a positive influence on maintaining the stability of its financial system. Indeed, the findings in Columns (1) and (3) reveal the direct impact of higher per capita output on the preservation of banking stability.

Moreover, the results indicate that growth is contingent on financial development. Specifically, the interaction between FMD and GDP per capita enters positively and significantly in regressions (1) and (3). This implies that the stabilizing effects of high individual well-being are amplified when the financial markets are highly developed. In more financially advanced countries, a growing economy enhances the resilience of the financial system against shocks and destabilization issues. Therefore, disregarding these interactions between the level of wealth per capita and financial development could lead to less effective policies for maintaining financial stability. Notably, these results remain robust even when we employ alternative variables and estimators. The findings in Columns (4) and (5) affirm the same conclusions when estimating our model. In essence, both regressions demonstrate that GDP per capita has a risk-mitigating effect on the financial system.

In economic terms, as demonstrated in regression (1) of table 6, financial instability is projected to decrease by 0.24 standard deviations for each one standard deviation increase in GDP per capita (1.25). Moreover, for the same one standard deviation increase in GDP per capita, the reduction in risk is even more substantial (0.31 standard deviations), when considering financial market development. Additionally, regressions (2)

and (3) introduce the interaction between FMD and GDP growth. In both regressions, GDP growth enters positively and significantly, indicating that an increase in a country's annual growth rate has a positive impact on financial system stability. However, the significance level of the interaction between FMD and GDP growth appears to decrease from 1% to 10%. Although the interaction results suggest a positive influence on financial stabilization, the effect is less pronounced compared to the first interaction. Regression (2) suggests that financial instability is expected to decrease by nearly 0.11 standard deviations for each one standard deviation increase in GDP growth (4.24). However, when FMD is taken into account, the reduction in financial instability's standard deviation becomes 0.186, representing a 69% stronger mitigating effect.

To summarize, our findings provide strong evidence that financial development can amplify the impact of growth on financial stability. Our estimation results have underscored the significance of financial development in enhancing financial system stability, and this effect extends to magnify the positive impact of growth. The results of the interaction between financial development and growth align with our initial expectations. However, the impact of GDP per capita is more pronounced than that of GDP growth, and this can be attributed to several factors. Firstly, our small sample size may have limited our ability to detect the impact of GDP growth, particularly in countries with under-developed financial systems. And secondly, GDP growth focuses on changes in the economy-wide rate over a specific period, which may not capture the long-term stability dynamics of the financial system.

Model Relevancy

In unreported regressions, we assessed the effectiveness of our instrumental variables approach. Comparing the ordinary least squares estimates (OLS) with the instrumental variables (IV) estimates, we observed that the absolute values of the interaction coefficients in OLS were smaller than those obtained with IV. This discrepancy suggests that OLS tends to underestimate the true effects of financial development and growth on financial stability when endogeneity is present. For instance, the *Durbin-Wu-Hausman test* results in Column (3) of Table 6 provided strong evidence of endogeneity in our model ($p = 0.001$). The same conclusion was supported by the results of the *GMM distance test* ($p = 0.004$) in Column (5), both of which successfully rejected the null hypothesis of exogeneity. Additionally, we reported the results of the *Sargan test* (p =

TABLE 7 Estimation of Financial (In)Stability, Financial Development and Growth for the Two Subsamples: Less Stable and Stable

Variable	Overall sample (5)	Less stable (1)	Stable (2)
FMD	0.491***	0.168***	0.543***
	(0.322)	(0.097)	(0.382)
Economic volatility	−0.223*	−0.388*	−0.102*
	(0.111)	(0.173)	(0.025)
Financial openness	0.155**	0.057**	0.183**
	(0.042)	(0.002)	(0.088)
Log. GDP per capita	0.216***	0.311***	0.119***
	(0.111)	(0.154)	(0.037)
FMD × Log. GDP per capita	0.349**	0.351**	0.330**
	(0.116)	(0.125)	(0.2)
Number of countries	21	11	10

NOTES *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

0.341) and *Hausman's J test* (p = 0.309). Both of these tests did not reject the null hypothesis, indicating the validity of the instruments used and the correct specification of the model. To examine the weakness of the instruments, we attempted to conduct the widely-used *Stock-Yogo test*. However, this test could not be effectively applied in our model due to the inability of the *Breusch-Pagan test* (p = 0.005) to satisfy the assumption of homoscedasticity (Sanderson and Windmeijer 2016). This suggests the presence of heteroscedasticity in our data. As an alternative, we resorted to the *Anderson-Rubin Wald test* (p = 0.000) and the *Kleibergen and Paap test* (p = 0.000). Both of these tests successfully rejected the respective null hypotheses of weak identification and under-identification.

Table 7 presents the results of estimating financial (in)stability indicators on financial development and growth variables for less stable and stable countries. The subsample of less stable countries is made up of 10 countries, while the subsample of stable countries is made up of 11 countries. The regressions are estimated using the GMM system.

SUBSAMPLING ANALYSIS

Given the influence of a country's initial level of stability, we divide the full sample into two subsamples: countries with a higher log z-score are referred to as the 'stable' sample and countries with a lower log z-score are referred to as the 'less stable' sample. We have reported only those variables that were influenced by the division of the sample:

- Less stable countries are: South Africa, Bangladesh, India, Indonesia, Kuwait, Kenya, Malaysia, Oman, Pakistan, Tunisia, and Vietnam.
- Stable countries are: Thailand, Egypt, Israel, Jordan, Lebanon, Morocco, the Philippines, Qatar, Saudi Arabia, and UAE.

Table 7 shows that FMD has a positive impact on both subsamples, but that there is a difference in the level of magnitude. Specifically, the coefficients are 0.168 and 0.543 for the less stable and stable subsamples, respectively, with a difference of 223%. From an economic point of view, this means that a one-unit increase in the log z-score increases the impact of FMD on the stability by 0.375. This implies that the development of financial markets increases financial stability, but with a more pronounced impact in stable countries. This is consistent with the literature which suggests that the benefits of financial development depend on a country's initial conditions. While some studies highlight the risk of rapid financial development and economic expansion leading to instability (Klomp 2010; Koh et al. 2020), our results suggest that in stable countries, financial market development plays a stronger stabilizing role. Although we do not find a negative impact in less stable countries, the smaller magnitude of the coefficient suggests a more limited stabilizing effect in such contexts.

Another notable observation concerns the interaction terms. The results indicate no significant difference between the two interaction terms in the subsamples, despite the variable impact of FMD – particularly for *FMD* × *Log. GDP per capita*. We attribute this to the role of growth in log. GDP per capita in the less stable countries, which compensates for differences in the impact of FMD across stability levels. This is reflected in the difference in magnitude, with coefficients of 0.311 and 0.119 in the less stable and stable subsamples, respectively. These results indicate that, for less stable countries, economic growth, particularly through GDP per capita, plays a greater stabilizing role than the development of financial markets and potentially offsets the reduced impact of the latter, implying that growth is more conducive to financial stability than financial development (Batuo et al. 2018).

The subsampling also has an effect on the influence of economic volatility and financial openness. In contrast to the stable subsample, the positive impact of financial openness is weaker and the absolute value of economic volatility is greater in the less stable subsample.

TABLE 8 Estimation of nonlinear relationship for the two subsamples: less stable and stable

Variable	Less stable (1)	Stable (2)
FMD	0.690***	0.834**
	(0.498)	(0.570)
FMD^2	−0.633*	1.085
	(0.322)	(0.645)
Number of countries	11	10

NOTES *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

This change due to the division of the sample prompted us to go further and ask the following question: does a possible non-linear relationship between financial development and stability remain insignificant even when distinguishing between stable and less stable financial systems? Table 8 reports the results.

As the results show, FMD^2 enters insignificantly in the stable countries, as in the overall sample. However, in the less stable subsample, FMD^2 enters negatively and significantly at the 10% level. This implies a concave relationship, meaning that while FMD initially enhances stability, this impact reverses and financial development begins to increase instability. This aligns with the notion that financial development can have non-linear effects, where excessive financial deepening, in the absence of sufficient stability, may amplify vulnerabilities rather than mitigate them. It supports the view that financial market expansion, when some conditions are not met, can exacerbate risks rather than enhance resilience after a certain point (Arcand et al. 2015). Our results imply that one of these conditions is an initial level of financial stability.

Conclusion

This paper (i) assessed the impact of financial development on financial (in)stability and (ii) explored the potential link through which growth interferes with their relationship. Our theoretical model emphasized the importance of a well-developed financial market for stability, on the one hand, and its trade-off, on the other. The theory highlights the potential conflict that promoting financial development can have on the economy, and in particular on stability. The literature points out that promoting financial development is not always favourable and that although a high level of financial development is necessary to promote growth, the evidence also shows the opposite impact on stability.

In line with theory, we initially find that financial development tends to promote greater stability. We confirm that the impact of growth on financial stability depends on a country's financial markets. This indicates that growth can affect the stability of the financial system in different ways depending on a country's initial level of financial development, emphasizing how ignoring it can lead to incomplete conclusions about the impact of growth and volatility, inflation rate, and financial and trade openness on financial (in)stability.

We also found that the country's initial stability levels are also important. To examine this, we divided the sample into stable and less stable countries, based on the median of the log of the z-score. The results indicate that while financial development has a positive effect in both subsamples, its magnitude is much smaller in the less stable countries. We also find that growth, particularly in terms of GDP per capita, is more stability-enhancing for less stable countries than financial development. Finally, we confirm the existence of a non-linear relationship between financial development and stability, but only within the less stable subsample.

On the basis of the empirical results obtained here, we have come to the conclusion that financial (in)stability is affected by financial development, growth and their interactions. However, given that the empirical results for 'stable' and 'less stable' countries are different, we take this into account in our recommendations. For less stable countries, strengthening financial stability requires prioritizing economic growth, as our findings suggest that GDP per capita has a greater stabilizing effect than financial development. This means that governments should focus on inclusive, broad-based growth strategies, such as investments in infrastructure, education, and reforms aimed at improving productivity, which generate long-term resilience. At the same time, targeted financial reforms should focus on strengthening confidence in institutions and improving regulators' oversight capacity before pursuing rapid liberalization. It is therefore essential to sequence reforms: growth-oriented policies should precede or accompany the gradual deepening of the financial sector in order to avoid amplifying vulnerabilities.

For stable countries, financial development plays a more important role in strengthening stability. Given its greater positive impact in this subsample, policymakers could prioritize measures to deepen financial markets and improve access to financial services while maintaining rigorous regulatory oversight. Expanding capital markets, promoting

financial innovation within a framework of strict prudential rules, and improving the efficiency of credit allocation can help maintain stability. Furthermore, as we found no evidence of a nonlinear relationship in stable countries, the risk that financial development will lead to instability appears less of a concern. However, regulators must remain vigilant, as international data suggest that excessive credit booms and weak governance can ultimately undermine stability.

Declarations

All authors declare that they have no conflicts of interest.

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