FINANCIAL RESILIENCE UNDER CONSTRAINTS: EVIDENCE FROM A DUAL-RISK FRAMEWORK IN LOW- AND MIDDLE-INCOME ECONOMIES

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Abstract
This paper explores the drivers of financial resilience in low- and middle-income countries, with particular attention to the relative importance of saving behavior, financial constraints and exposure to financial risks. Based on a dual-risk framework, the analysis distinguishes between short-term financial stress and exposure to large, infrequent shocks to examine whether different forms of vulnerability are associated with financial resilience in different ways.
The empirical analysis uses cross-country data from the Global Findex Database (2024) and applies a cross-sectional OLS model to a sample of low- and middle-income economies. The objective is not to establish causal relationships, but to identify broad associative patterns consistent with the proposed conceptual framework. The results show that financial resilience is negatively and significantly associated with short-term financial stress, indicating that liquidity constraints play an important role in shaping the capacity of households to cope with unexpected financial shocks. In contrast, exposure to large financial shocks, proxied by concerns about medical expenses, is positively and significantly associated with financial resilience. This result should not be interpreted as evidence that risk exposure is beneficial in itself, but rather as a possible indication of adaptive precautionary behavior in contexts where major risks are more salient.
Saving behavior does not have a statistically significant association with financial resilience once financial constraints and risk exposure are accounted for. Similarly, the interaction between saving behavior and financial stress is not statistically significant. These findings suggest that, in constrained environments, financial resilience may depend less on saving behavior alone and more on the broader structure of liquidity constraints and risk exposure.
The paper contributes to the literature by providing exploratory cross-country evidence for the relevance of a dual-risk perspective on financial resilience. From a policy perspective, the results suggest that interventions aimed at strengthening financial resilience should move beyond a narrow focus on saving promotion and financial access, and should also address liquidity constraints, income instability and exposure to major financial shocks.

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Introduction

Financial inclusion was reinforced on the agenda of many economies over the last decade, especially in low- and middle-income countries. But, increased access does not lead automatically to stronger financial resilience. Recently, household level decision-making on finance has been emerging as crucial in household finance literature that stresses saving, credit and risk management (Campbell et al., 2006). Also, household financial outcomes are closely linked to financial literacy and financial capability to take on risks (Lusardi and Mitchell, 2014).

The capacity of households to manage unforeseen financial shocks is known as financial resilience, and it is at the heart of both theoretical research and policy concerns. Financial fragility, defined as the incapacity of households to generate an emergency fund over a short period, is a conceptually similar notion. It is established empirically that a non-trivial percentage of households are fragile, even when they have financial access (Schneider, 2011). Therefore, mere access may not be enough to ensure household level resilience (Lusardi, Schneider and Tufano, 2011).

In theory, saving behavior is considered to be an effective strategy to hedge against financial risks. In particular, the precautionary saving motive is to hold financial assets to hedge against uncertainty on future income and consumption level, with greater uncertainty implying a higher level of savings (Challe et al., 2016). Yet, the effectiveness of saving behavior is actually constrained by economic environments and institutions in the real world. Recent theoretical contributions further emphasize that liquidity constraints and precautionary saving are closely interconnected, as both are shaped by household responses to uncertainty and limited access to liquidity (Carroll, Holm and Kimball, 2021).

Most of the time, households do suffer from binding liquidity constraints that prevent them from saving enough resources. Empirically, it has been shown that these constraints impact consumption and financial behavior. Thus, the lack of saving behavior among households leads to a lower capacity to smooth consumption over time (Gross and Souleles, 2002). Consequently, the presence of saving behavior does not ensure the resilience of households against economic shocks, especially when income volatility and the financial system are weak.

In addition to liquidity constraints, the size of potential future losses may also be an important source of financial vulnerability. Health expenditure would be a relevant source of these large unexpected events, in particular in developing countries. Studies indicate that the uncertainty regarding medical expenditure has a negative effect on the capacity to save (Chou, Liu and Hammitt, 2003). Research endeavours seem to highlight that financial vulnerability can be considered both a measure of liquidity constraints and structural risks (Ampudia and Żochowski, 2014). Therefore, financial resilience might be

defined as the multidimensional concept of risk (Feldman and Lowe, 2018). Households may experience simultaneous short-term financial problems related to covering monthly expenses and future large risks related to health expenditure. These various forms of vulnerability may have different impacts on behavior and financial resilience.

The paper takes this argument one step further and separates out two dimensions of financial vulnerability: short-term financial distress and exposure to major financial shocks. The research then uses cross-country data on saving behavior, financial constraints, and risk exposure drawn from the Global Findex Database (2024) to identify the relative contributions of each factor to financial resilience. Focusing on low- and middle- income countries, where financial constraints are relatively more important, the paper runs a series of regressions.

Despite the growing literature on financial resilience, most empirical studies tend to focus either on financial behavior, such as saving, or on financial inclusion, without explicitly distinguishing between different types of financial vulnerability. In particular, limited attention has been given to how short-term financial stress and exposure to large, infrequent shocks may have distinct and potentially opposing relationships with financial resilience, especially in cross-country settings.

The contribution of this paper is threefold. First, it introduces a dual-risk perspective by distinguishing between short-term financial stress and exposure to large, infrequent shocks. This distinction allows the analysis to move beyond a general measure of vulnerability and to examine whether different types of financial pressure are associated with resilience in different ways. Second, the paper provides exploratory cross-country evidence suggesting that financial constraints may be more strongly associated with financial resilience than saving behavior alone. Third, by focusing on low- and middle-income economies, the paper highlights structural patterns of financial vulnerability that are particularly relevant in constrained environments, where access to financial services does not necessarily translate into effective resilience.

Overall, the study reframes financial resilience as an outcome shaped not only by financial behavior, but also by the interaction between liquidity constraints and exposure to major financial shocks. In doing so, it provides a more differentiated empirical perspective on the mechanisms that may support or limit resilience in low- and middle-income economies.

1. Review of the scientific literature

There has been an ongoing debate on whether financial inclusion is a pre-condition for financial resilience. Although significant progress has been made in terms of financial inclusion, especially among developing countries, evidence shows that inclusion is not enough to secure resilience among households. Rather, resilience is viewed as a phenomenon derived from the combination of capability, behavioral reactions, and circumstances of a household. To support this argument (Hamid, Loke and Chin, 2023) found that financial resilience is driven by both financial knowledge and inclusion as well as the socio-economic conditions of the household.

A similar type of argument has been used in more recent papers, where a more prominent role has been attributed to financial capability. (Liu et al., 2024) show that it is through better financial management and the building up of precaution resources, rather than

directly through interaction with the financial system, that financial literacy improves households' resilience. By a similar argument, (Peng and Liu, 2024) argue that digital financial inclusion improves resilience only indirectly by enabling more efficient usage of the services. Thus, the financial system offers possibilities, but these may depend on whether an individual can practically use it.

Another aspect observed from the literature is that financial resilience differs significantly across populations. (Tinta, Ouédraogo and Al-Hassan, 2022) observe that households, through their level of income, education and access to economic resources, determine both financial inclusion and resilience. Thus, financial participation does not determine resilience directly, rather its association is conditional on the structure, in both the countries and people groups. (Sakyi-Nyarko, Ahmad and Green, 2022) extend this view through their finding of various degrees of impact of financial inclusion based on gender. In fact, they conclude that socio-economic condition matters in determining financial inclusion outcomes. (Sethi et al., 2025) make similar observation of context dependent financial inclusion-resilience relation across institutions and levels of economic development.

In addition to heterogeneity, recent studies have also turn the research focus on the constraint aspect that affects financial decisions. Instead of an autonomous decision, saving and financial decision-making behavior are jointly determined by the income fluctuation and the financial constraints. (Chen, Hu and Wen, 2025) present a model that financial vulnerability is determined by both financial stress and structural constraints. This confirms the need to consider the surrounding context of the households' financial decision. (Kass-Hanna, Lyons and Liu, 2022) also claim that financial resilience is not solely dependent on the individual's own capacity, but on the surrounding institution and technology environment, especially including access to digital financial instruments. All the above papers conclude that saving might not capture the full dimension of financial resilience when the constraint is binding.

Another perspective of recent literature is developing the concept of heterogeneous types of financial risk. Instead of conceptualizing financial stress as a single monolithic construct, studies distinguish short-run financial pressure from large, infrequent shocks (He and Zhou, 2022). This study finds that household resilience to shocks varies, depending on changes in income and on medical expenditure, which are two different risk mechanisms. This idea of distinct types of financial risk is further strengthened by (Oppong, Yu and Mazonga Mfoutou, 2024), claiming micro-insurance helps improve household resilience through the protection of large, infrequent burdens, rather than regular financial stress. In an analogy, (Jalili et al., 2025) propose that financial risks related to health status are an independent domain of vulnerability with specific behaviors and institutions.

Finally, recent empirical literature provides a more complex view of the importance of savings behavior. Saving might lead to financial resilience, but this relationship might not be as unconditional as it initially indicates. (Verma and Chatterjee, 2025) demonstrate that saving has a much larger impact on resilience, especially when accompanied by factors such as financial inclusion and financial literacy. Savings are therefore part of a broader system, not a single mechanism of preparedness.

However, despite these advances, the literature still provides limited comparative evidence on whether different forms of financial vulnerability operate through distinct mechanisms in shaping financial resilience. In particular, relatively little attention has been paid to the possibility that short-term financial stress and exposure to large shocks may generate different behavioral and structural responses.

This perspective also aligns with the broader resilience literature, which increasingly views resilience not as a static financial condition, but as a dynamic capacity shaped by the interaction between exposure to shocks, structural constraints and adaptive responses under uncertainty (Barrett and Constas, 2014).

Overall, recent literature favors a more systemic view of financial resilience (Wu et al., 2026). It is not necessarily caused by one single factor, but seems to result from the interplay between financial behavior, structural determinants and risks, the specific types of risk exposure are based on. The distinction between stress caused by liquidity constraints and that from high shocks exposure is also an important way to analyze disparate outcomes. Therefore, this paper builds upon these arguments, uses a dual-risk perspective, and tests if financial resilience is related to financial constraints and risk exposure as much as it is related to saving behavior.

2. Research methodology

The focus on low- and middle-income economies is particularly relevant in the context of the dual-risk framework, as households in these environments are more likely to face simultaneous liquidity constraints and exposure to uninsured large shocks. As a result, the interaction between financial stress, risk exposure and resilience may be more visible in these settings than in advanced economies.

Data

The empirical section uses a cross-country dataset on the Global Findex Database (2024). This database provides harmonized and cross-country comparable measures of behavior, inclusion and vulnerability with respect to financial services. Because it covers countries with broadly similar levels of economic development and it contains measures that should be comparable across borders, this dataset enables the consistent measurement of variables to be employed.

The analysis is limited to low- and middle-income countries, as classified by the World Bank. This limitation is justified, since financial constraints and vulnerability, which are the focus of the study, are more prominent in these countries and because measures of financial stress and vulnerability risk are more consistently measured for them. After removing all observations with missing variables, there are 92 countries. Each observation represents a country-level aggregate, expressed as the share of the adult population reporting a given financial behavior or condition.

Variable definition

The empirical framework is developed to analyze three mutually reinforcing elements of financial resilience: behavior, constraint and risk exposure. Financial resilience is the dependent variable, modeled by the percentage of adults reporting to be able to pay for an unexpected financial shock out of emergency funds within 30 days with limited

difficulty. This outcome is expected to proxy the actual financial capacity of households to endure unexpected shocks, closely related to financial fragility in the more recent empirical literature.
Saving behavior is the behavioral component of household financial choices, modeled as the percentage of adults having saved during the last year. While typically linked to precautionary motivations, saving behavior may indeed be affected by the context in which individuals are making their financial decisions.
Financial constraint is measured by short-term financial distress, proxied by the percentage of adults finding it difficult to cover their monthly expenditure/bills. Consequently, it captures both the lack of liquid funds, and actual binding constraints for liquidity.

Medical expenditures, which represent intermittent, albeit possibly significant shocks to income, are included to measure risk exposure. This category and short-term financial stress are kept as separate variables, due to their nature and their differential effects on financial behavior. The short term risk is the response to concerns for a sudden drop in income or lack of sufficient funds to cover immediate needs.

A control variable is also included, regarding financial access. Account ownership is used as a measure of financial inclusion. It is defined as the proportion of adults who have an account at a financial institution or mobile money services.
In order to check the conditional effect of saving on the response variable with respect to financial situation, an interaction term of saving and short term financial stress is included.

Model specification
The empirical analysis is based on a cross-sectional Ordinary Least Squares (OLS) model, specified as follows:

$$Resilience\_i = \beta_0 + \beta_1 Saving\_i + \beta_2 Stress\_i + \beta_3 Risk\_i + \beta_4 (Saving\_i \times Stress\_i) + \beta_5 Account\_i + \varepsilon\_i$$

where
Resilience_i - Financial resilience (share of adults able to access emergency funds)
Saving_i - Saving behavior (share of adults who saved in the past year)
Stress_i - Short-term financial stress (difficulty covering expenses)
Risk_i - Exposure to large financial shocks (medical expense concerns)
Account_i - Financial inclusion (account ownership)
β_0 - Intercept
$\beta_1 \ldots \beta_5$ - Estimated coefficients
ε_i - Error term

The specification of the regression model aims at reflecting the conceptual framework described above. Specifically, it makes a clear distinction between financial behavior, financial constraints and risk exposure. Immediate liquidity constraints (short term

financial stress) and infrequent and possibly great medical expenses shocks are separated into measures of liquidity constraints and risk exposure. A more precise calculation of their impact on financial resilience is then possible.

An interaction between saving behavior and financial stress is used to check whether saving behavior is responsive to the level of financial stress. This is particularly important for environments with tight constraints, where saving may not be translated into resistance against these shocks.

Saving behavior and financial stress are used in centered form to facilitate the interpretation of the coefficients and the potential reduction of multicollinearity due to the interaction term.

The estimation strategy is set in place to compare the relative significance of financial behavior and constraints in financial resilience. A baseline regression contains all independent variables. The comparison of regression models provides us with an understanding of the individual contribution of saving behavior, risk exposure and financial constraints to financial resilience.

It is important to note that estimations capture only correlations, not causations.

While the empirical specification captures key dimensions of financial resilience, it does not fully account for all potential macroeconomic and institutional determinants, such as income levels, education or institutional quality. This limitation reflects both data availability constraints and the exploratory objective of the analysis.

In addition, the use of a cross-sectional OLS framework raises potential concerns related to omitted variable bias and endogeneity. In particular, reverse causality and unobserved heterogeneity across countries may influence the estimated relationships. However, the purpose of the analysis is not to identify causal effects, but rather to examine broad cross-country associations that are consistent with the proposed dual-risk framework.

Within this context, the model should be interpreted as a reduced-form representation of the relationship between financial resilience, financial constraints and risk exposure, rather than a structural causal model. This approach is consistent with cross-country empirical analyses that rely on comparable aggregate indicators to identify stylized relationships.

Limitations

A series of limitations should be acknowledged. First, with cross-country aggregate data, it is difficult to investigate how those mechanisms work at the individual level and may vary across countries. Second, due to the cross-sectional design, there is no possibility to investigate causal effects. Third, measures of financial distress and risk exposure rely on self-perceived information that might be subject to measurement error.

These limitations aside, the data present a credible framework to assess cross-country comparisons of financial resilience and offers meaningful insights into how financial constraints and risk exposure affect them.

3. Results and discussion

Descriptive overview and model fit

The empirical analysis is based on a cross-sectional sample of 92 low- and middle-income economies. The estimated model is statistically significant overall, as indicated by the F-

test (F = 8.575, p < 0.001), suggesting that the set of explanatory variables jointly contributes to explaining variations in financial resilience across countries.

The model exhibits a moderate explanatory power, with an R-squared value of 0.283 and an adjusted R-squared of 0.250. Given the cross-country nature of the data and the complexity of the phenomenon under investigation, this level of explanatory power is consistent with comparable empirical studies and indicates that the model captures a meaningful share of the variation in financial resilience.

Table no. 1 Determinants of financial resilience: Regression results

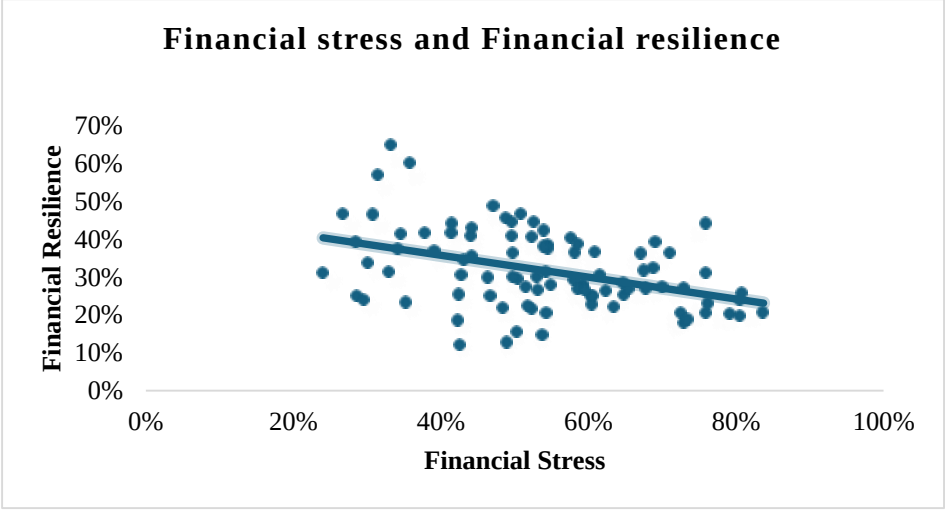
Variable	Coefficient	Std. Error	t-statistic	p-value
Intercept	0.539	0.013	40.651	0.000
Saving	-0.017	0.101	-0.168	0.867
Financial stress	-0.359	0.150	-2.399	0.019
Medical risk	0.523	0.151	3.457	0.001
Saving × Stress	0.200	0.740	0.270	0.787

Source: Author's own research

Regression results

The estimated coefficients convey a differentiated picture of financial resilience. Short-run financial stress significantly decreases financial resilience (β = -0.359, p = 0.019). Specifically, this suggests that a higher level of difficulty in meeting monthly expenses is related to a lower capacity to manage unexpected financial shocks. The strength and significance of this coefficient point towards the importance of liquidity in influencing household outcomes.

Figure no. 1 Financial stress and financial resilience



Source: Author's own research

Figure no.1 illustrates the negative relationship between financial stress and financial resilience. The downward-sloping pattern is consistent with the regression results, confirming the role of liquidity constraints in shaping financial resilience.

By contrast, the perception of high financial risk (proxied by anxiety about medical expenditures) is positively and significantly related to financial resilience ($\beta = 0.523$, $p < 0.001$). This may imply that, at the household level, the relationship between perception of risk and coping behaviors differs and that higher levels of extreme risk exposure may foster greater behavioral adaptability.

This finding may appear counterintuitive at first glance, as higher exposure to risk would typically be expected to reduce financial resilience. However, this relationship can be interpreted through the lens of adaptive precautionary behavior. In environments where large financial shocks are more salient, households may be more likely to anticipate potential adverse events and adjust their financial behavior accordingly.

Therefore, the positive association does not suggest that risk exposure is beneficial in itself, but rather that it may act as a catalyst for financial preparedness under certain structural conditions. This interpretation is consistent with recent literature emphasizing the role of perceived risk and behavioral adaptation in shaping financial outcomes.

Saving behavior (defined as the percentage of individuals who claim that they have saved during the last year) is not statistically significant ($\beta = -0.017$, $p = 0.867$). The coefficient is essentially zero and not accurately estimated, thus aggregate saving behavior does not seem to be a predictor of financial resilience in the presence of financial constraints and risk exposure.

Likewise, the interaction term for saving and short term financial distress is also insignificant ($\beta = 0.200$, $p = 0.787$). This implies that the effect of saving behavior does not consistently change according to the extent of financial stress, and that the linkage between saving and resilience is not dependent upon short term financial strain in a statistically meaningful way.

Synthesis of empirical findings

The combined evidence from these results suggests that the explanatory power of the model is mainly determined by the financial constraints and risk proxies, not by the financial behavior itself: short-term financial stress appears as a significantly negative predictor, whereas large shock exposure seems positively correlated with financial preparedness.

Meanwhile, the statistical insignificance of savings behavior and its interaction with financial stress indicate that savings, in constrained situations, may play a less important role as previously argued. These findings confirm the consistency of the data for later discussions on the relative contributions of behavioral vs structural determinants.

Although the empirical analysis does not include extensive robustness checks due to data constraints, the stability of coefficient signs and the consistency of the results with theoretical expectations provide support for the overall validity of the findings. In particular, the negative association between financial stress and resilience is well aligned

with the literature on liquidity constraints, suggesting that the results are unlikely to be driven solely by random variation.

It clearly emerges that financial resilience, at least at the level of cross-country comparison the paper is examining, seems to be dictated by constraints, rather than observed financial behavior. In fact, after financial stress variables are included in the regression, savings have no significant explanatory power, either statistically or economically. This is far from an obvious observation, as saving is traditionally perceived to be the first buffer to a financial shock.

From an economic perspective, the strong negative association between financial stress and resilience reflects the presence of binding liquidity constraints. Households that struggle to meet current expenses are less able to accumulate precautionary resources and are therefore more vulnerable to unexpected shocks.

In contrast, exposure to large financial risks may operate through a different mechanism, related to risk perception and anticipatory behavior. Unlike short-term financial stress, which constrains immediate choices, large but infrequent risks may induce forward-looking adjustments in financial planning.

The negative impact on financial resilience, associated with the short-term aspect of financial stress, is particularly remarkable. It indicates that preparedness for financial shocks is heavily conditioned on households' current financial situation. From those households, a vast fraction faces a weak starting point in building resilience. In a manner, financial stress is not just indicative of fragility, it can be itself a determinant of the potential to be resilient. This shows how, in the presence of liquidity constraints behavior is unable to act efficiently because households have little capacity to respond to negative shocks. This mechanism is consistent with the literature on coping strategies and risk management in developing economies, where households adapt their financial behavior in response to perceived exposure to future shocks. (Dercon, 2002)

On the other hand, the positive relationship between concerns about medical care and financial resilience introduces another interesting element. While the daily pressures can decrease financial resilience, the perceived threat of potentially large shocks seems to increase it. It is plausible that these kinds of shocks are salient and that they can trigger the accumulation of precautionary measures at an aggregate level, rather than destroy them.

Both these findings together support a distinction that is often implicitly made, but seldom tested: not all forms of financial stress work in the same way (Cao, Jiang and Wei, 2025). Short-run pressure restricts the scope for action, while large risks might trigger adjustments. Separating the two dimensions empirically reveals that they indeed have distinct, and in this case, opposed, relationships to financial resilience.

The unconditional effect of saving is perhaps less surprising in this regard. The aggregated saving indicator does not reflect the context in which savings are undertaken. In the presence of financial stress, savings are unlikely to be available regularly, sustainedly, or, of adequate magnitude to lessen the impact of the shocks faced. The lack of a robust effect of saving, in the presence of controls, then reflects a binding constraint on how saving can contribute to resilience. This is not to say that saving is unimportant. Rather, saving is useful, provided it is not constrained.

The interaction terms further strengthen this argument. No significant interaction effects indicate that saving does not become more useful either in high or low stress environments. In other words, the relationship between saving and resilience is neither stronger nor weaker across different levels of financial stress.

The central contribution of the paper consists precisely in this reframing. The analysis, instead, conceptualizes financial resilience, not as a by-product of saving or financial access but through financial constraints and differentiated risk exposure. By explicitly delineating between immediate financial stress and exposure to large shocks, the mechanisms that may remain hidden in a more aggregate approach become evident. The dual-risk perspective provides a much more focused explanation of how some economies might display greater resilience, despite large risk exposure, and how others might be more vulnerable, despite displaying saving behavior.

The policy implications of the above are rather straightforward. Saving and financial inclusion promoting policies may be beneficial, but are probably not sufficient, if other policies aimed at approaching the root of the financial pressure are absent. Easing liquidity constraints and curbing exposure to large risks, especially health risks, seem to be the most promising mechanisms for bolstering financial resilience. As such, policies that stabilize income, expand insurance coverage or lower the price of basic services might prove to be more immediate policy levers compared to policies targeting saving and financial behavior.

Conclusions

This paper examined the determinants of financial resilience in low- and middle-income countries, particularly with respect to the relative significance of saving behavior, financial constraints, and risk exposure.

The analysis yielded a robust and interpretable result. Short-term financial stress, captured by the existence of liquidity constraints, shows a strong and negative relationship with financial resilience. In contrast, the risk exposure variable representing fear of significantly large financial risks, specifically worries over future medical expenses, is positively related to resilience. The former reflects that, at a more fundamental level, the lack of liquidity constraints is central to households' coping capacity when facing unexpected events. At the same time, it may be that experiencing a great shock motivates individuals to prepare themselves, leading to such adaptation behavior reflected by a positive coefficient.

Saving behavior, on the other hand, does not contribute to financial resilience after accounting for financial constraints and risks. In addition, no significant interaction between saving behavior and financial distress suggests that the impact of saving on financial resilience does not systematically depend on the level of financial distress. These findings question the common sense that saving is the key tool for building up financial resilience.

The main contribution of this paper lies in demonstrating that financial resilience is better understood through the lens of constraints and differentiated risk exposure rather than through financial behavior alone. By explicitly separating short-term financial pressure from exposure to large shocks, the analysis identifies mechanisms that are often overlooked in more aggregated approaches. The contribution of the study consists in

demonstrating that the structure of financial vulnerability matters more than saving behavior itself. From a policy perspective, the results suggest that interventions aimed at strengthening financial resilience should move beyond a narrow focus on promoting saving or expanding financial access.

Finally, the findings point to several directions for future research. Further studies could explore individual-level data in order to better understand the behavioral mechanisms underlying financial resilience. In addition, longitudinal analyses could provide insights into the dynamic relationship between financial stress, risk exposure, and adaptive behavior over time.

These findings should be interpreted in light of several limitations. The cross-sectional nature of the data prevents causal inference, while the use of aggregate country-level indicators may mask important within-country heterogeneity. In addition, omitted variables related to macroeconomic and institutional conditions may influence the estimated relationships. Future research could address these limitations by using micro-level or panel data to better identify causal mechanisms.

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