Too Few to Fail? Stock Market Concentration and Systemic Vulnerability

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Abstract

Stock market concentration has surged to record levels, exceeding those of the dot-com bubble and raising growing concerns among investors and regulators. This paper provides the first cross-country evidence on the structural effect of stock market concentration on systemic financial crises. Using a panel of 30 major stock markets from 1998 to 2020 and systemic crisis episodes from the Global Crises dataset compiled by the Behavioral Finance and Financial Stability (BFFS) project at Harvard Business, I estimate probit models with correlated random effects (Mundlak correction) and employ a control-function IV strategy to address endogeneity concerns. The results show that higher concentration significantly increases the likelihood of systemic crises, even after controlling for established macro-financial predictors. Liquidity emerges as the key transmission channel, consistent with theories of fire sales and rapid asset liquidations under stress. Robustness checks, including alternative crisis definitions, functional forms, and instrumental variables, confirm the stability of the findings. The evidence demonstrates that stock market concentration is not merely a byproduct of financial development, but a fundamental structural driver of systemic fragility, with critical implications for the design of macroprudential policy.

Keywords: Stock Market Concentration; Systemic Crisis; Financial Stability; Market Structure

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1 Introduction

Stock market concentration has intensified in recent years, approaching record highs. As of August 2024, the ten largest firms accounted for 34% of the S&P 500's capitalization, compared with about 27% at the peak of the dot-com bubble in 2000 (Capital Group, 2024; CFA Institute, 2025[1]). Unlike the 1990s, when concentration reflected speculative valuations of unproven firms, today's dominance stems from the entrenched profitability and global reach of a small group of firms, amplified by the rise of passive investment flows. This shift has made aggregate market performance increasingly dependent on the fortunes of just a few firms, raising the question of whether equity market structure itself has become a source of systemic fragility.

In principle, equity markets promote stability by dispersing risk across firms and sectors through diversification, liquidity, and price discovery. From this perspective, the rise of dominant firms may simply reflect efficiency gains, economies of scale, technological leadership, and global reach, that strengthen aggregate performance. Analogies can be drawn to banking, where concentrated systems have sometimes been argued to enhance resilience by allowing large institutions to diversify more effectively and absorb losses (Allen and Gale, 2000; Beck et al., 2003).

Yet an opposing view emphasizes that excessive concentration can itself be a source of fragility. Recent research highlights that the surge in stock market concentration is not only a byproduct of firm fundamentals but also of structural shifts in asset management. In particular, Jiang et al. (2024), show that flows into passive funds disproportionately raise the prices of the economy's largest firms, especially those already overvalued, thereby reinforcing their market share. This structural force strengthens the case that concentration is not transitory but a persistent feature

[1] Market Concnetration and the Lost Decades, Bill Pauley, Kevin Bales and Adam Schreiber, https://blogs.cfainstitute.org/investor/2025/04/02/market-concentration-and-lost-decades/

of modern equity markets, with important implications for systemic risk. When market capitalization is narrowly distributed, the system becomes more exposed to the performance of a few firms, magnifying the impact of idiosyncratic shocks. Evidence at the micro level shows how fire sales triggered by investor redemptions depress prices and transmit stress across otherwise unrelated assets (Coval and Stafford, 2007). Ownership concentration and correlated trading exacerbate fragility by amplifying volatility in downturns (Greenwood and Thesmar, 2011). Similar mechanisms operate in banking, where interconnected balance sheets and concentrated exposures make large institutions "too interconnected to fail" (Greenwood, Landier, and Thesmar, 2015). In equity markets, high concentration may interact with passive flows and index rebalancing to create channels through which distress at the top propagates system-wide.

Cross-country and macro-level evidence reinforces these concerns. Stock market concentration has been linked to slower innovation and weaker dynamism (Bae et al., 2021; Neuhann and Sockin, 2024; Zhou and Zhang, 2025), while firm-level studies show that larger, more leveraged companies suffer disproportionate losses during crashes (Wang et al., 2009). At the global level, increased financial integration has further reduced diversification benefits and accelerated contagion across markets (Lehkonen, 2015). Theoretical research also provides insight into the mechanisms through which financial systems become vulnerable to shocks. Shin (2005) emphasizes how liquidity constraints and balance-sheet feedbacks can generate self-reinforcing downturns, producing "twin crises" through procyclical amplification. Danielsson et al. (2013) develop the concept of endogenous risk, showing how systemic fragility can arise endogenously through leverage, fire sales, and correlated trading even in the absence of large external shocks. Although these studies do not examine stock market concentration directly, they establish that systemic fragility can emerge endogenously from structural features of financial systems.

Taken together, these findings suggest that the relationship between concentration and stability is theoretically and empirically ambiguous. On the one hand, large and diversified firms may provide stability by absorbing shocks. On the other hand, concentration can magnify fragility by tying the system's performance to a narrow set of firms and increasing the likelihood that shocks propagate through correlated portfolios and herding dynamics. Despite growing recognition of these channels, no study has systematically examined the direct link between stock market concentration and the incidence of systemic financial crises across countries. This paper is the first to provide evidence of the effect stock market concentration on the probability of systemic crises. Using panel data from 30 stock exchanges across 30 countries between 1998 and 2020, I provide cross-country evidence that equity market concentration operates as an independent structural determinant of systemic fragility. Stock market concentration is measured as the share of total market capitalization accounted for by the ten largest firms, using data from the World Federation of Exchanges. Crises are identified primarily using the Broad Financial Distress Episodes (BFFS) database compiled by Reinhart and Rogoff (2009), with the Laeven and Valencia (2020) dataset employed both as a complement and as an independent robustness check. The baseline specification is a panel probit model that estimates the probability of crisis as a function of stock market concentration and standard macro-financial controls. To account for unobserved heterogeneity, I employ the Mundlak correction, which allows the model to capture within-country variation while retaining the advantages of a random-effects framework.

Endogeneity concerns are addressed through a control-function strategy: concentration is first modeled using predictive determinants and external instruments, and the residual is then included in the crisis equation. This strategy corrects for endogeneity and allows me to estimate the structural effect of concentration on systemic risk. The analysis also identifies liquidity as the primary transmission channel, consistent with theories of fire sales, fragility, and the amplification mechanisms emphasized in Shin (2005) and Danielsson et al. (2013).

To ensure robustness, I validate the baseline results using alternative functional forms: a logit model, a complementary log-log (cloglog) model appropriate for rare events, and a linear probability model (LPM) that, while less suitable econometrically, provides an intuitive benchmark. Across all models, I compute average marginal effects to translate coefficients into economically meaningful magnitudes.

This paper makes three contributions to the financial stability literature. First, it is the first to establish equity market concentration as a structural determinant of systemic crises, complementing existing work on credit booms, bubbles, and banking fragility. Second, it connects insights from theories of liquidity spirals, endogenous risk, and fire sales with cross-country evidence on systemic crises. Third, it underscores the importance of monitoring equity market structure in macroprudential surveillance, particularly in light of the unprecedented levels of concentration observed in today's global markets.

The remainder of the paper is structured as follows. Section 2 positions the paper within the related literature on financial crises and market concentration. Section 3 describes the data and outlines the construction of the stock market concentration measure and systemic crisis indicators. Section 4 details the empirical framework, including the panel probit specification, the Mundlak correction, and the control-function approach. Section 5 presents the main results and highlights liquidity as the central transmission channel, while also examining alternative specifications of the baseline model. Section 6 reports a series of robustness tests, including alternative functional forms and crisis definitions. Section 7 concludes by discussing the broader implications for systemic risk monitoring and macroprudential policy.

2 Literature Review

The early literature on financial crises emphasizes macroeconomic imbalances, credit booms, current account deficits, asset bubbles, and fiscal excesses. Reinhart and Rogoff (2009) document that crises typically involve deep and prolonged contractions in output, asset prices, and employment, often requiring major policy interventions. Laeven and Valencia (2020) formalize this understanding with a comprehensive cross-country database of systemic banking crises, which constitutes a central resource for empirical research. Empirical studies consistently highlight macro-financial predictors of crises. Davis et al. (2016) use panel logit and linear probability models for 35 countries (1970–2010) and show that rapid private credit growth combined with deteriorating current accounts strongly raises crisis risk. Roy (2022) emphasizes housing bubbles and external deficits in advanced economies as dominant precursors of instability. Shen and Hsu (2022) introduce a panel threshold logit model, showing that crisis probabilities increase sharply once credit-to-GDP or interest rates cross critical thresholds. This evidence underscores that systemic crises are often preceded by sustained macroeconomic imbalances.

Building on this macro perspective, a second strand of work explores how financial market structure contributes to systemic fragility. Banking concentration has received particular attention. Beck, Demirgüç-Kunt, and Levine (2006) and Bretschger, Kappel, and Werner (2012) provide cross-country evidence that higher banking concentration can destabilize financial systems, especially in low-income economies with weaker institutions. Greenwood, Landier, and Thesmar (2015) highlight how concentration and interconnectedness render banks vulnerable, with small shocks amplified through balance-sheet contagion. These debates reflect two competing views: the "concentration–stability" hypothesis, which emphasizes diversification, and the "concentration–fragility" hypothesis, which stresses systemic exposure.

Analogous concerns have been raised in equity markets. A key strand of literature highlights amplification mechanisms under stress. Coval and Stafford (2007) show that fire sales caused by investor redemptions can depress asset prices and spill over to unrelated securities. Greenwood and Thesmar (2011) develop the concept of "fragility" in concentrated ownership structures, demonstrating that correlated trading amplifies volatility during downturns. Patro et al. (2013) show that idiosyncratic return correlations spike during crises, reflecting systemic herding and a breakdown of diversification. At the firm level, Wang et al. (2009) and Andreou et al. (2021) find that smaller, more leveraged, and opaque firms experience disproportionately severe losses in crises. In highly concentrated markets, their limited weight reduces the scope for systemic diversification, leaving aggregate outcomes more dependent on a small number of large firms. As a result, concentration and correlated exposures amplify fragility in periods of stress.

The literature has also linked stock market concentration to innovation and capital allocation. Bae et al. (2021) document that when the top five firms account for a larger share of market capitalization, IPO activity, firm entry, R&D, and productivity growth all decline. Neuhann and Sockin (2024) show theoretically and empirically that concentration misallocates capital: dominant firms attract flows even when less productive, crowding out more efficient competitors and increasing systemic vulnerability. A complementary strand of research focuses on the role of passive investment flows (Jiang et al., 2024) demonstrate that passive investing systematically channels disproportionate demand into the largest firms, raising their valuations and increasing their idiosyncratic volatility. This mechanism provides a structural explanation for the sustained rise in concentration, linking asset management trends to the fragility channels emphasized in this paper.

Dynamic studies emphasize that crises themselves can reinforce concentration. Zhang et al.

(2023) find that post-crisis recoveries are slower for small- and mid-cap firms, which deepens concentration after shocks. Lehkonen (2015) shows that equity market co-movement increased sharply during the 2008 global financial crisis, especially in developed markets, reducing international diversification benefits precisely when they were needed most. This suggests that crises not only emerge from concentrated structures but also reshape market concentration in their aftermath.

Theoretical contributions also provide insight into how concentration can amplify systemic risk. Shin (2005) emphasizes liquidity spirals and balance-sheet effects, showing how procyclical feedbacks can trigger twin crises in banking and currency markets. Danielsson, Shin, and Zigrand (2013) introduce the concept of endogenous risk, where systemic instability emerges from within the financial system through leverage, fire sales, and correlated behavior. These frameworks imply that equity market concentration can serve as a structural amplifier of endogenous risk, magnifying systemic fragility when shocks affect dominant firms.

In summary, the literature has advanced in two broad directions: one focusing on macro-financial imbalances (credit booms, bubbles, and external balances) as crisis predictors, and another on market structure and concentration as amplifiers of fragility. While evidence shows that concentration impairs innovation, distorts capital allocation, and magnifies volatility through fire sales and correlated trading, its role as a direct, structural determinant of systemic financial crises remains underexplored. This paper is the first to bridge these strands by providing cross-country empirical evidence that stock market concentration significantly increases the probability of systemic crises, thereby extending the financial stability literature to a novel and previously overlooked dimension of market structure.

3 Methodology

3.1 Data

This study investigates whether stock market concentration influences the probability of systemic financial crises using an unbalanced panel of 30 countries from 1998 to 2020.[2] Systemic crisis episodes are identified using two complementary sources. The baseline crisis variable follows Reinhart and Rogoff (2009), as compiled in the Harvard BFFS dataset. In their framework, a systemic crisis is defined as a period of widespread banking distress, characterized by bank runs, failures, or major liquidations, typically requiring extensive government intervention such as recapitalizations, deposit freezes, or nationalizations of large institutions. This broad definition emphasizes the macroeconomic impact and prolonged aftermath of financial distress.

To test robustness, I construct an alternative crisis variable based on Laeven and Valencia (2020). Their definition is narrower and more operational: a systemic crisis is recorded only when two conditions are jointly satisfied—(i) the banking system exhibits significant distress (bank runs, large losses, or widespread liquidations), and (ii) the authorities undertake major policy interventions, such as nationalizations, liquidity support exceeding 5% of deposits, guarantees, asset purchases, or fiscal restructuring costs above 3% of GDP. The onset year is coded as the first year in which both conditions are met.

The central explanatory variable is stock market concentration (*Stock Market Concentration*), measured as the market share of the top ten firms' capitalization relative to the total domestic

[2]The country sample for the regression analysis using the BFFS definition of systemic crises includes both advanced and emerging economies: Australia, Austria, Brazil, Canada, Chile, Colombia, Germany, Switzerland, Spain, the United Kingdom, Greece, Ireland, Italy, Japan, South Korea, Morocco, Mexico, Malaysia, Norway, New Zealand, the Philippines, Poland, Russia, Singapore, the United States, and South Africa.

Using the alternative definition of Laeven and Valencia (2020), the sample is extended to include Hong Kong, Hungary, and Iran, which are classified as experiencing systemic crises in their dataset.

market capitalization. This measure captures the degree of dominance by a narrow group of large firms and provides a proxy for the vulnerability of equity markets to firm-specific shocks.

Table 2 reports the descriptive statistics for the main variables. Crises are relatively rare, with systemic events occurring in 10.5% of the sample years and alternative crisis measures in 8.1%. This frequency is consistent with the view of crises as infrequent but high-impact events. Stock market concentration averages 53.1 with a standard deviation of 18.9, ranging from below 10 to nearly 100. The wide dispersion indicates that while some countries have relatively broad-based equity markets, others are almost entirely dominated by a few firms.

Domestic credit averages 88% of GDP but varies substantially, with some emerging economies under 10% and advanced financial systems above 200%. The current account averages close to balance but spans persistent deficits of 16.8% of GDP to surpluses above 27%. The financial account shows similar dispersion, ranging from outflows of 17% to inflows of 26% of GDP, consistent with the volatility of capital flows. Inflation averages 4.9%, though the distribution is highly skewed, with some crises associated with extreme spikes exceeding 100%. GDP per capita averages about $23,000, but the minimum and maximum span three orders of magnitude—from below $1,000 in low-income economies to above $110,000 in wealthy financial centers.

Market depth also varies widely: market capitalization to GDP averages 93% but ranges from under 1% to nearly 1,800%, while turnover averages 257% with some exchanges recording extraordinarily high trading intensity. Institutional variables show strong heterogeneity: creditor rights range from 0 to 4, religious fractionalization from nearly homogeneous societies to highly diverse ones, and about 36% of the sample adopts UK legal origin.

Tables 3 and 4 present country averages. Systemic crises remain rare in most economies, but

Hungary, Greece and Ireland record non-trivial incidence, reflecting episodes of banking instability and sovereign debt distress. Stock market concentration displays striking cross-country patterns: in advanced, diversified markets such as the United States, Canada, and the United Kingdom, concentration averages below 30; in contrast, small or emerging economies such as Hungary[3] ,Morocco, and Colombia record concentration above 70, in some cases exceeding 90. These differences underscore the structural contrasts between mature, liquid markets and narrow, firm-dominated ones.

GDP per capita highlights the economic heterogeneity of the sample, with high-income economies such as Switzerland, and the United States averaging above $50,000, while countries such as India, Indonesia, and the Philippines average below $5,000. Inflation follows a similar split: advanced economies like Japan and Switzerland show persistent low inflation or mild deflation, whereas emerging markets such as Brazil record sustained double-digit price growth. Current account balances also diverge structurally, with consistent surpluses in export-driven economies like Singapore and Switzerland, versus persistent deficits in the U.K., U.S., and South Africa. The financial account shows extreme movements in Hungary and other transition economies, likely reflecting privatization inflows and volatile foreign investment.

Market development indicators also reveal wide heterogeneity. The U.S., Switzerland, and Singapore display very high market capitalization relative to GDP (often above 120%), whereas many emerging economies (e.g., Morocco, Colombia, the Philippines) average below 50%. Turnover ratios likewise diverge, with highly liquid exchanges (U.S., Hong Kong, South Korea) exceeding 150%, while others (New Zealand, Morocco) remain below 20%. These country-level differences

[3] Hungary exhibits unusually high levels of stock market concentration, making it an outlier in the sample. To ensure robustness, the main models are re-estimated excluding Hungary; the results remain qualitatively unchanged.

highlight the diversity of equity market structures, which is central to the empirical strategy of testing how concentration conditions systemic risk.

Table 5 reports Pearson correlations among the main variables. Several important patterns emerge. First, stock market concentration is positively correlated with systemic crises ($\rho = 0.17$), consistent with the hypothesis that more concentrated equity markets are more fragile. The correlation is moderate in size and statistically significant. Second, SMC is negatively correlated with market capitalization ($\rho = -0.19$) and creditor rights ($\rho = -0.39$). These bivariate associations suggest that, on average, larger markets and stronger legal environments are associated with lower measured concentration. However, these simple correlations should be interpreted cautiously, as they do not account for endogeneity or dynamic effects. Indeed, in the instrumental-variables framework presented later, stronger creditor rights are found to increase stock market concentration, consistent with the idea that enhanced investor protection may channel capital disproportionately toward already dominant firms. Finally, SMC is positively correlated with religious fractionalization ($\rho = 0.47$), which may partly reflect the prevalence of concentrated markets in emerging economies with higher societal heterogeneity. Third, systemic crises are negatively correlated with GDP per capita ($\rho = -0.19$) and positively with inflation ($\rho = 0.11$), consistent with the macro-financial literature linking crises to weak fundamentals and price instability. Fourth, the current and financial accounts are highly correlated ($\rho = 0.95$), which is expected given their accounting identity. Both serve as measures of external imbalances, but they capture different aspects: the current account reflects persistent trade and income flows, while the financial account captures the volatility of capital movements. In the regressions, the financial account often shows stronger explanatory power, suggesting that abrupt capital flow reversals may be more closely linked to systemic crises than gradual trade imbalances. Finally, institutional variables are mutually correlated. Legal origin is positively associated with creditor rights and negatively with religious fractionalization, capturing how common-law systems tend to coincide with stronger investor protections and lower societal fragmentation. While these institutional correlations are high, robustness checks show that collinearity does not drive the results.

In sum, the descriptive statistics underscore three points: (i) crises are rare but economically significant events; (ii) stock market concentration varies widely across countries and is systematically higher in smaller, less developed markets; and (iii) concentration is empirically linked to both systemic crises and institutional quality. This motivates the central question of the paper: whether stock market concentration exerts an independent structural effect on the probability of systemic financial crises, even after controlling for macro-financial and institutional determinants.

3.2 Econometric Methodology

Given the binary nature of the dependent variable and the rarity of systemic crises, the baseline specification is a random effects probit model. This choice reflects the structure of the dataset. Fixed effects probit estimators, such as Chamberlain's conditional likelihood approach, are subject to the incidental parameters problem and become unreliable in short panels where the dependent variable exhibits little within-country variation. In this sample, many countries experience no systemic crisis events during the observation window. Applying fixed effects would therefore eliminate entire units and discard cross-sectional variation that is central to the analysis. By contrast, the random effects framework retains all available information and permits the inclusion of time-invariant or slowly evolving regressors.

To relax the strict exogeneity assumption underlying random effects, I complement the baseline specification with a correlated random effects (CRE) model using the Mundlak (1978) correction. This approach augments the probit regression with the country-specific means of the time-varying covariates, thereby accounting for potential correlation between unobserved heterogeneity and explanatory variables. As Wooldridge (2010) notes, this strategy maintains consistency while avoiding the efficiency losses associated with fixed effects, making it particularly well-suited for short and unbalanced macro-financial panels.Formally, I test the validity of the CRE specification using a joint Wald test of the Mundlak means. Rejection of the null confirms that unobserved heterogeneity is correlated with the regressors, implying that standard random effects would be inconsistent.The Wald statistic is large ($\chi^2 = 51.95$, $p < 0.001$; Table 17), providing strong support for the CRE specification as the baseline.

Beyond the probit specification, I test robustness across alternative binary response models. First, a logit model is estimated to verify that the results are not specific to the normal distributional assumption of the probit. Second, a complementary log-log (cloglog) model is implemented, which is particularly appropriate for rare events given its asymmetric link function that captures nonlinear hazard dynamics. Finally, a linear probability model (LPM) is estimated as a transparent benchmark. While the LPM has well-known drawbacks, including heteroskedastic errors and non-bounded predicted probabilities, it provides coefficients that are easily interpretable as marginal effects. Together, these alternative link functions serve as robustness checks against functional form misspecification, following best practice in the early warning systems literature (e.g., Jemović and Marinković, 2021).

A further concern is the potential endogeneity of stock market concentration. Concentration may itself be influenced by crisis risk, for example through reverse causality when financial distress reshapes market structure. To address this, I employ a control-function approach. In the first stage, stock market concentration is regressed on its predictive determinants and external instruments, including creditor rights, religious fractionalization, and legal origin. The fitted residual from this regression is then included in the second-stage crisis equation. This procedure, widely used in nonlinear panel models, provides a test of endogeneity:a significant coefficient on the residual implies that concentration is endogenous, while insignificance supports the baseline model as structural. Importantly, the control-function framework accommodates nonlinear probability models and maintains interpretability in terms of average marginal effects.

Explanatory variables are lagged by one period throughout the analysis. This timing convention is standard in early warning system frameworks, reflecting the economic structure in which current macro-financial conditions affect future crisis risk (Bretschger et al., 2012). Lagging also mitigates concerns of simultaneity and contemporaneous feedback effects between crises and financial variables (Bae et al., 2021).

Finally, the analysis incorporates several dimensions of capital market structure as robustness checks. Stock market capitalization (as a share of GDP) is included to capture market depth, while stock market turnover serves as a measure of liquidity. These variables allow me to test whether the observed relationship between concentration and systemic crises is truly structural or simply reflects broader features of market size and trading intensity (Heikki, 2019; Andreou et al., 2021).

Overall, this modelling strategy combines a theoretically motivated baseline with multiple diagnostic tests. The random effects probit with Mundlak correction provides a consistent framework suited to the panel structure; a Wald test of the Mundlak means formally evaluates the CRE specification; alternative link functions confirm robustness to distributional assumptions; the control-function approach both corrects for and tests endogeneity; and the inclusion of structural controls disentangles concentration effects from broader features of financial development. This design minimizes concerns that the findings are driven by functional form, unobserved heterogeneity, or reverse causality, and instead supports the interpretation of stock market concentration as a structural determinant of systemic financial crises.

3.2.1 Econometric Specification

Formally, let $Y_{it} \in \{0, 1\}$ indicate the incidence of a systemic crisis in country i and year t. The latent index representation is

$$Y_{it}^* = \beta\, X_{it} + \boldsymbol{\gamma}'\mathbf{C}_{it} + \tau_t + u_i + \varepsilon_{it}, \tag{1}$$

$$Y_{it} = \mathbf{1}\{Y_{it}^* > 0\}, \tag{2}$$

where X_{it} denotes stock market concentration, $\mathbf{C}_{it}$ is a vector of controls, τ_t are year fixed effects, $u_i \sim \mathcal{N}(0, \sigma_u^2)$ is a country-specific random effect, and $\varepsilon_{it} \sim \mathcal{N}(0, 1)$ is the idiosyncratic error. Standard errors are clustered at the country level to allow for arbitrary within-country correlation.

Stock market concentration is potentially endogenous due to reverse causality (e.g., crises altering market structure) and omitted drivers of both concentration and systemic risk. To address this, I implement a control-function strategy. The first-stage equation for concentration is

$$X_{it} = \rho\, X_{i,t-1} + \boldsymbol{\pi}'\mathbf{Z}_{i,t-1} + \boldsymbol{\delta}'\mathbf{C}_{it-1} + \kappa_t + \mu_i + v_{it}, \tag{3}$$

where $\mathbf{Z}_{i,t-1}$ are excluded instruments, κ_t are year effects, μ_i are country effects, and v_{it} is the structural innovation. Predicted residuals $\hat{v}_{it}$ are then added to the crisis equation:

$$P(Y_{it} = 1 \mid X_{it}, \mathbf{C}_{it-1}, \mathbf{Z}_{i,t-1}) = \int \Phi\big(\beta X_{it} + \boldsymbol{\gamma}'\mathbf{C}_{it-1} + \lambda \hat{v}_{it} + \tau_t + u\big)\, \phi(u; 0, \sigma_u^2)\, du, \tag{4}$$

where $\Phi(\cdot)$ is the standard normal cdf. A Wald test of $H_0 : \lambda = 0$ provides a direct test of exogeneity of concentration. Significance of λ would indicate that endogeneity is present and validates the control-function correction. To confirm robustness across different link functions, I estimate the model using three alternative binary response models: logit, complementary log-log (cloglog), and linear probability (LPM). The logit provides an alternative symmetric specification; the cloglog is particularly appropriate for rare events such as systemic crises; and the LPM, while less theoretically grounded, offers a transparent linear benchmark. All models report both coefficient estimates and average marginal effects, ensuring comparability of the economic magnitudes across functional forms. The structural crisis equation, including all covariates used in the empirical analysis, is specified as

$$\begin{aligned}
\text{SystemicCrisis}^*_{i,t} = \beta_0 &+ \beta_1\, \text{StockMktConc}_{i,t} \\
&+ \beta_2\, \text{DomesticCredit}_{i,t-1} + \beta_3\, \text{GDPpc}_{i,t-1} + \beta_4\, \text{Inflation}_{i,t-1} \\
&+ \beta_5\, \text{CurrentAccount}_{i,t-1} + \beta_6\, \text{FinAccount}_{i,t-1} \\
&+ \beta_7\, \Delta\text{Trade}_{i,t-1} + \beta_8\, \Delta\text{Rate}_{i,t-1} \\
&+ \beta_9\, \text{StockMktCap}_{i,t-1} + \beta_{10}\, \text{StockMktTurnover}_{i,t-1} \\
&+ \tau_t + u_i + \varepsilon_{it},
\end{aligned} \tag{5}$$

with $Y_{it} = \mathbf{1}\{\text{SystemicCrisis}^*_{i,t} > 0\}$. Here, stock market concentration enters contemporaneously as the variable of interest, while all controls are lagged one period to ensure they are predetermined relative to the crisis outcome. Year fixed effects (τ_t) absorb global shocks, and u_i captures country-specific heterogeneity. For interpretation, I report *average marginal effects* (AMEs), which convert probit coefficients into changes in crisis probability. For a continuous regressor x_{kit}, the marginal effect at observation (i, t) is

$$\mathrm{ME}_{it}(x_k) = \phi(\beta X_{it} + \boldsymbol{\gamma}'\mathbf{C}_{it-1} + \lambda\hat{v}_{it} + \tau_t + u_i)\ \beta_k,$$

where $\phi(\cdot)$ denotes the standard normal density. The AME is the sample average,

$$\overline{\mathrm{ME}}(x_k) = \frac{1}{N}\sum_{i,t}\mathrm{ME}_{it}(x_k),$$

which measures the expected change in the probability of a systemic crisis from a one–unit increase in x_k. Reporting AMEs facilitates comparability across models and makes the economic magnitude of coefficients directly interpretable.

3.2.2 Instrumental Variable Choice

To address potential endogeneity in stock market concentration, I employ the *Creditor Rights Index* of Djankov et al. (2007), measured in 2002, as an excluded instrument. The choice of the 2002 index is motivated by both econometric and institutional considerations. First, the index is effectively time-invariant during my sample period: as documented by Djankov et al. (2007). Using the 2002 cross-sectional measure thus captures meaningful cross-country variation while avoiding spurious dynamics from noise in marginal reforms. This strategy follows the approach in

Cho et al. (2014) and Brockman and Unlu (2009), who rely on the 2002 creditor rights coding as a benchmark institutional determinant of financial structure.

Relevance (economic mechanism). Creditor protection shapes firms' financing choices and the breadth of public equity markets: stronger enforcement expands and cheapens debt finance, affecting the composition of firms that access public equity. Mid–sized firms substitute toward bank finance or remain private, while large, reputable firms continue to issue in public markets. The net effect is a skewed equity market composition in which large incumbents dominate, raising measured concentration. Cross–country law–and–finance evidence documents that creditor–rights reforms materially shift financing structure; in my data, this channel manifests as a strong first–stage link from Creditor Rights to Stock Market Concentration.

Exclusion (identification). The exclusion restriction posits that, conditional on the macro–financial control set, year effects, and Mundlak means, the 2002 creditor–rights level affects systemic–crisis risk only through its impact on equity–market structure. This is plausible because (i) the index is predetermined and rarely changes within the sample window; (ii) direct banking/credit channels are absorbed by controls for domestic credit, market capitalization, turnover, external balances, growth, and inflation; and (iii) year effects purge global shocks while the CRE/Mundlak terms allow regressors to be correlated with country effects, tightening the exclusion argument in both stages.

First–stage strength and validity (diagnostics). The instrument is statistically powerful and economically meaningful. In the SMC first stage, the coefficient on Creditor Rights is positive and highly significant across specifications. Weak–IV concerns are decisively ruled out, with Kleibergen–Paap rk Wald F-statistics ranging between 17.88 and 240.52, comfortably above the conventional threshold of 10. Underidentification is rejected by rk LM tests (χ^2 between 11.33 and 14.57, $p < 0.01$), and Anderson–Rubin Wald statistics (6.42–11.06) are significant across all specifications, confirming joint relevance of the excluded instrument. Overidentification tests further support validity, with Hansen J-test p-values between 0.19 and 0.98. In their entirety, these diagnostics establish both the *relevance* and *exogeneity* of the Creditor Rights instrument and justify its use in the control–function correction.

4 Results

We begin our empirical investigation by exploring how stock market concentration differs between crisis and non-crisis periods. Figure 1 presents a boxplot comparing the distribution of stock market concentration (measured as the share of market capitalization held by the top 10 firms) across systemic crisis states. The median concentration is visibly higher during crisis episodes, with the interquartile range also shifting upward. The presence of long upper tails in both groups suggests heterogeneity across countries, but the bulk of observations during crisis years are clustered at substantially higher concentration levels. This pattern provides preliminary visual evidence that systemic crises tend to occur in environments where a small number of firms dominate equity markets.

[INSERT Figure 1]

This insight is reinforced by the kernel density estimates in Figure 2, which plot the smoothed distribution of stock market concentration separately for crisis and non-crisis observations. The crisis density curve (dashed orange) is noticeably right-shifted, peaking at higher concentration levels and maintaining a thicker upper tail relative to the non-crisis distribution. While both densities are unimodal, the difference in location and shape confirms that the likelihood of a crisis increases in more concentrated equity markets, even before controlling for other variables.

[INSERT Figure 2]

4.1 Baseline Results

Table 6 reports the structural estimates of the relationship between stock market concentration (SMC) and the probability of systemic crisis. Across all four specifications, probit, logit, cloglog, and linear probability model, the coefficient on SMC is positive and statistically significant at the 1% level. This finding provides strong evidence that equity markets dominated by a small set of firms are more vulnerable to systemic financial distress. The consistency of the estimates across different link functions confirms that the result does not depend on distributional assumptions.

Control variables behave in line with theoretical priors. Domestic credit is positive and significant in all specifications, underscoring the role of credit booms in amplifying systemic risk[4]. GDP per capita enters with a positive and significant coefficient: richer economies face a higher baseline probability of crisis, consistent with the view that financial crises are more frequent in financially developed systems once growth dynamics and other fundamentals are controlled for. By

[4] The current account balance and the net financial account are linked by balance-of-payments accounting, which can generate collinearity when both are included. However, they are not exact mirror images in the data, since capital account items, statistical discrepancies, and different measurement practices introduce variation. Results are robust to retaining only one of the two measures; for completeness I report specifications with both.As an additional robustness check, I replace the net financial account in levels with its percentage change relative to GDP, capturing shifts in cross-border capital flows rather than stock positions. The results remain qualitatively and quantitatively similar, further reinforcing that the effect of stock market concentration on systemic crisis risk is not sensitive to alternative measures of external imbalances.

contrast, current account balances are not significant predictors, while the net financial account is negative and significant in the nonlinear models, consistent with the idea that sudden stops in capital flows raise systemic vulnerability. Exchange rate depreciation is positively associated with crisis incidence, while inflation remains insignificant in most cases.

[INSERT Table 6]

Table 7 presents the corresponding average marginal effects (AMEs), which translate the coefficients into probabilities. This effect is economically large and highlights concentration as a central structural risk factor. Domestic credit also exerts a positive marginal effect, though smaller in magnitude, while GDP per capita increases crisis likelihood at the margin. Exchange rate depreciation remains significant, reinforcing its role as an early-warning indicator.

Overall, the baseline results establish three key findings: (i) stock market concentration is a statistically and economically significant predictor of systemic crises; (ii) this effect is robust across different functional forms; and (iii) macro-financial fundamentals such as domestic credit and exchange rate volatility continue to matter, but their inclusion does not diminish the core effect of concentration.

Importantly, the residual term $\hat{v}_{it}$ enters negatively and is statistically significant at the 1% level across all baseline specifications, rejecting the null of exogeneity. This provides strong evidence that stock market concentration is endogenous and validates the use of the control–function correction. Once endogeneity is addressed, the coefficient on SMC remains large and positive, underscoring its structural role in driving systemic crises.

[INSERT Table 7]

4.2 Baseline Results with Financial Market Controls

Table 8 reports the baseline regression results when stock market depth and liquidity are explicitly controlled for, while Table 9 presents the corresponding average marginal effects. Across all four specifications,probit, logit, cloglog, and LPM,the coefficient on stock market concentration remains positive and statistically significant at the 1% level. This reinforces the central finding: higher concentration in equity markets is robustly associated with an elevated probability of systemic crisis.

[INSERT Table 8]

The average marginal effects in Table 9 indicate that a one–standard deviation increase in concentration raises the probability of a systemic crisis by roughly 2–2.6 percentage points across nonlinear specifications. Given the sample mean crisis incidence of about 10%, this represents a sizeable increase in systemic vulnerability, highlighting the structural importance of equity market distribution. These estimates align with the argument in Patro et al. (2013) that concentration amplifies systemic risk by increasing correlations and reducing diversification, and with Hou and Robinson (2006), who show that industry concentration shifts return dynamics in ways that magnify firm-specific shocks.

By contrast, the financial depth and liquidity proxies do not exhibit systematic effects on systemic crises. Stock market capitalization is uniformly insignificant across models, while turnover is weakly significant only in the cloglog and LPM specifications, with small economic magnitudes. This suggests that the size and activity of equity markets, while important for intermediation, do not mitigate the risks generated by highly concentrated market structures. This is consistent with Lehkonen (2015), who documents that global market co-movement rose sharply during 2008 regardless of capitalization levels, underscoring that diversification benefits vanish when dominance is concentrated among a limited number of firms.

Control variables behave broadly as expected. Domestic credit enters positively and significantly, consistent with the view that rapid credit expansion raises financial fragility (Laeven and Valencia, 2012; Schularick and Taylor, 2012). Net financial account changes show a negative and significant effect in the cloglog specification, consistent with the idea that sudden reversals in capital inflows are destabilizing. GDP per capita growth enters positively in this specification. This result should not be interpreted as higher growth causing crises; rather, it reflects the inclusion of average GDP levels as a control. Once income levels are conditioned on, the growth coefficient captures short-run accelerations relative to long-run development trends, which in this sample are often associated with credit booms and heightened vulnerability. Inflation remains insignificant, while external shocks,proxied by exchange rate changes, enter positively and significantly in most models, in line with evidence that sharp depreciations often trigger banking stress (Reinhart and Rogoff, 2009). The residual $\hat{v}_{it}$ remains negative and significant across probit, logit, and cloglog specifications, indicating that endogeneity persists even when controlling for stock market capitalization and turnover. This strengthens the interpretation that the estimated effects of SMC on systemic crises reflect a causal channel rather than omitted liquidity or depth effects.

In aggregate, these results strengthen the paper's main conclusion: stock market concentration retains a strong and independent association with systemic crisis risk, even when controlling for financial market depth and liquidity. This finding suggests that structural concentration in equity markets should be treated as a distinct dimension of systemic vulnerability, not simply a correlate of market size or activity.

[INSERT Table 9]

4.3 Channel Analysis

Tables 10 and 11 extend the baseline results by incorporating interaction terms between stock market concentration (SMC) and three key dimensions of equity market structure: liquidity (turnover), credit depth, and capitalization. This allows us to evaluate whether concentration amplifies crisis risk through theoretically grounded channels such as fire-sale contagion, bank fragility, and the stabilizing role of market depth.

[INSERT Table 10]

[INSERT Table 11]

Across all seven specifications, the coefficient on SMC remains positive and statistically significant, reinforcing its role as a structural determinant of systemic crises. The average marginal effects in Table 11 indicate that a one–standard deviation increase in concentration raises the probability of a systemic crisis by roughly 1.7–2.5 percentage points. This effect is both statistically and economically meaningful, given the low unconditional crisis frequency in the sample.

Liquidity channel. The interaction of SMC with turnover is consistently positive and highly significant across specifications. This suggests that concentration is most destabilizing in markets with higher trading activity, where fire-sale dynamics are most likely to propagate. Theoretical models emphasize that when large firms liquidate assets in stress events, illiquidity transmits shocks across balance sheets through price spirals (Shleifer and Vishny, 2011; Acharya, Shin, and Yorulmazer, 2011). In concentrated markets, the liquidity of dominant firms' securities accelerates these spirals, magnifying volatility and raising systemic risk.

Credit channel. The SMC–credit interaction is small and statistically insignificant in most specifications, implying that equity market concentration does not systematically magnify the risks associated with domestic credit booms. Nonetheless, the positive and highly significant main effect of domestic credit underscores the established link between rapid credit expansions and financial fragility (Schularick and Taylor, 2012; Laeven and Valencia, 2020). This finding suggests that while excess credit independently increases systemic risk, it does not meaningfully compound the destabilizing effect of equity market concentration. In line with Beck, Demirgüç-Kunt, and Levine (2006) and Bretschger, Kappel, and Werner (2012), bank fragility remains a distinct source of vulnerability, but its interaction with stock market concentration appears weaker in the cross-country setting.

Market depth channel. By contrast, the interaction between SMC and stock market capitalization enters with a consistently negative and significant coefficient. This indicates that deeper equity markets mitigate the adverse effects of concentration. When capitalization is broad, the systemic weight of individual firms declines, reducing their ability to transmit idiosyncratic shocks to the financial system. This finding supports Hou and Robinson (2006), who show that deeper markets dilute the impact of dominant firms, and is consistent with Lehkonen (2015), who documents that global co-movement shocks are less destabilizing in more developed financial systems. Importantly, the result highlights that market depth is not unconditionally stabilizing: its protective role is conditional on the distribution of capitalization across firms.

Macroeconomic controls. Control variables behave consistently with theoretical expectations. Domestic credit remains a strong and positive predictor of crisis risk, while GDP per capita growth enters positively because the Mundlak specification absorbs long-run averages. Inflation often shows a negative coefficient, suggesting that deflationary environments, rather than moderate inflation, may exacerbate systemic fragility. Exchange rate changes are strongly positive and significant, consistent with the twin-crisis literature emphasizing currency mismatches as crisis triggers (Reinhart and Rogoff, 2009). Current and financial accounts, while correlated, remain weak predictors once concentration and other controls are included, consistent with their complex role in cross-border adjustment dynamics.

In all channel specifications, the residual term $\hat{v}_{it}$ continues to be negative and highly significant, reaffirming the presence of endogeneity. The persistence of this result, even when including interactions with liquidity, capitalization, and credit, confirms that the amplification mechanisms operate on top of an already endogenous relationship between concentration and systemic crises.

In sum, the results confirm that the risks of stock market concentration operate through specific amplification channels. Liquidity accelerates fragility via fire-sale spillovers; market depth cushions it by broadening risk-bearing capacity; and credit booms independently heighten vulnerability without compounding concentration effects. These findings align with theoretical perspectives on asset fire sales (Shleifer and Vishny, 2011), banking fragility (Beck et al., 2006; Bretschger et al., 2012), and market depth (Hou and Robinson, 2006; Lehkonen, 2015), and demonstrate that systemic risks in equity markets cannot be understood by concentration alone, but by its interaction with the surrounding financial architecture.

5 Robustness

5.1 Alternative Crisis Definition

A key robustness check is to verify that the main findings are not specific to the Reinhart and Rogoff (2009) crisis coding. I therefore re–estimate the baseline model using the alternative classification of systemic crises provided by Laeven and Valencia (2020).

Laeven and Valencia (2020) define a systemic banking crisis as an episode in which both conditions hold: (i) the banking system experiences significant distress, indicated by bank runs, large-scale losses, or liquidations; and (ii) the authorities implement extensive interventions, including significant liquidity support (exceeding 5% of deposits or liabilities), bank recapitalizations, gross fiscal outlays above 3% of GDP, blanket guarantees, or nationalizations. The first year in which both conditions are satisfied marks the onset of the crisis. This definition is more restrictive than Reinhart and Rogoff (2009), who classify systemic crises whenever widespread banking distress leads to large-scale policy interventions such as closures, recapitalizations, or deposit freezes.

Tables 12 and 13 report the results of probit and logit specifications under the Laeven–Valencia coding. The coefficient on stock market concentration (SMC) remains positive and highly significant across all specifications. In the structural regressions (Table 12), the SMC coefficient ranges from 0.22 to 0.47 depending on the control set and estimator, with significance at the 1% level in all cases. Average marginal effects (Table 13) show that a one–standard deviation increase in concentration raises systemic crisis probability by 1.6–2.1 percentage points, closely mirroring the magnitudes found under the Reinhart–Rogoff definition.

Interaction terms between concentration and financial structure variables behave similarly to the baseline. The SMC–turnover interaction is positive and significant in specifications (e)–(f), suggesting that fire-sale amplification remains an important channel. By contrast, the SMC–credit and SMC–capitalization interactions are small and statistically insignificant, echoing previous results. Control variables retain their expected signs: domestic credit expansion is consistently associated with higher crisis probability, exchange rate changes are destabilizing, while GDP growth exerts a modest effect.

When systemic crises are redefined following Laeven and Valencia (2020), the residual $\hat{v}_{it}$ remains statistically significant, once again rejecting the exogeneity of SMC. The robustness of this finding across two widely used crisis datasets ensures that the causal interpretation is not driven by the particular crisis definition employed.[5]

These findings demonstrate that the concentration–crisis link holds consistently across alternative crisis definitions. Instead, it holds under the stricter Laeven–Valencia operationalization, which requires both distress and government intervention. This reinforces the structural nature of the concentration–crisis link and highlights its robustness across alternative datasets.

[INSERT Table 12] [INSERT Table 13]

5.2 Alternative Instruments and Dynamic Lags

Tables 14 and 15 report robustness checks that extend the baseline IV framework in two ways: (i) augmenting the instrument set with religious fractionalization and legal origin, and (ii) instrumenting stock market concentration with deeper lags (SMC_{t-2}, SMC_{t-3}) to mitigate simultaneity concerns. Both approaches are motivated by the law-and-finance literature (La Porta et al., 1999; Stulz and Williamson, 2003; McCaig and Stengos, 2005), which identifies religion and legal origin as exogenous institutional determinants of financial structure, and by recent applications emphasizing lagged concentration as a robust instrument for persistent market structure (Zhou and Zhang, 2025).

[INSERT Table 14]

Baseline stability. Across columns (a)–(d), the coefficient on stock market concentration remains positive and highly significant, with magnitudes slightly larger than in the baseline. Average

[5] I also estimated the models using the Laeven and Valencia (2020) database, where systemic crises represent about 4% of observations. While my main analysis combines their definition with Reinhart and Rogoff (2009), I conducted the analysis using only the Laeven–Valencia dataset as a robustness check. The results remain consistent across most specifications and are available upon request.

marginal effects in Table 15 indicate that a one–standard deviation increase in SMC raises crisis probability by roughly 1.7–3.1 percentage points, closely aligned with the baseline estimates. This confirms that the main result is not sensitive to the choice of instruments or lag structure.

Alternative instruments. When religious fractionalization and legal origin are added to the instrument set (columns b and d), SMC remains strongly significant. The interactions in Table 15 suggest that legal origin operates mainly through its effect on equity market depth, while religion captures additional institutional variation in ownership and investor protection. Importantly, the Hansen J tests (Table 16) do not reject overidentification ($p = 0.19$–0.98), supporting the validity of these instruments.

Columns (e) and (f) replace SMC_{t-1} with SMC_{t-2} and SMC_{t-3}. The coefficients on SMC remain positive and significant, albeit with somewhat larger standard errors, reflecting weaker predictive power of longer lags. Nevertheless, the Kleibergen–Paap F statistics remain above conventional thresholds (65–134), ruling out weak-IV concerns. In sum, these robustness checks confirm that the systemic risk implications of stock market concentration are not sensitive to alternative instrument sets or lag structures. In particular, extending the prediction horizon from $t-1$ to $t-2$ and $t-3$ produces qualitatively similar results, with precision declining as the horizon lengthens and the number of effective observations decreases. This approach follows the identification strategy of Furceri, Loungani, and Ostry (2019), Kim and Lin (2011), and McCaig and Stengos (2005), who emphasize that deeper lags mitigate contemporaneous feedback effects and reduce endogeneity concerns. The consistency of the estimates across these alternative specifications strengthens confidence that the baseline findings are not driven by model design choices or weak identification.

Control variables behave in line with prior sections: domestic credit remains positive and significant, confirming its role as a robust predictor of financial fragility (Schularick and Taylor, 2012). Net financial account shocks continue to enter with large negative coefficients, consistent with the importance of capital flow reversals in driving systemic crises (Calvo et al., 2004). GDP growth remains positive due to long-run averages absorbed in the Mundlak correction, while inflation and current account terms remain unstable across specifications, suggesting limited independent predictive power once concentration and capital flows are controlled for.

With the inclusion of religion and legal origin as additional instruments, and when extending the lag structure of the first stage to two and three periods, the residual term $\hat{v}_{it}$ consistently remains negative and significant. This further validates the identification strategy and shows that the structural effect of concentration on crises is robust to alternative instrument sets and to deeper lags, as suggested by Furceri et al.(2019), Kim and Lin (2011), and McCaig and Stengos (2005).

These robustness exercises demonstrate that the concentration effect is not contingent on modeling design but instead captures a persistent and economically meaningful channel of systemic vulnerability. Rather, they reflect a structural relationship that holds when concentration is instrumented with deep institutional determinants (creditor rights, religion, legal origin) or with lagged values that mitigate reverse causality. The consistency of the estimates across alternative designs strengthens the credibility of the control-function strategy and confirms that concentrated equity markets constitute a distinct and robust predictor of systemic vulnerability.

[INSERT Table 15]

6 Thresholds in Stock Market Concentration and Systemic Stability

The marginal effects plots in Figure 3 provide a more granular view of the mechanisms through which stock market concentration influences systemic crises. Across all specifications, the relationship is non-linear and displays a distinct threshold pattern.

At low levels of concentration (below roughly 25–30%), the estimated marginal effect on crisis probability is close to zero and statistically insignificant. This suggests that moderately concentrated markets do not materially elevate systemic fragility and may even reflect efficient clustering of capital in leading firms.

Beyond this point, however, the crisis risk associated with concentration rises sharply. Between 30% and 60%, the marginal effect increases almost monotonically, indicating that concentration amplifies the transmission of firm-specific shocks and erodes diversification benefits. The effect peaks around 60–70%, where the probability of systemic crisis is estimated to be 1.5–2 percentage points higher relative to markets with moderate concentration. Given that systemic crises are rare but high-impact events, this magnitude is economically significant.

Interestingly, once concentration surpasses roughly 70%, the marginal effect begins to taper off. This pattern reflects the fact that beyond a certain point, additional increments of concentration no longer fundamentally alter the competitive structure of equity markets. When markets have already transitioned to a non-competitive environment dominated by a small set of firms, the systemic risks associated with reduced diversification and distorted capital allocation are already fully at play. In this regime, further concentration adds relatively little to crisis probability compared to the earlier stages where concentration first erodes competition and begins to amplify systemic fragility.

From a policy perspective, these results highlight the existence of a “danger zone” for stock market concentration. While regulators need not be overly concerned when concentration is below one-third of market capitalization, levels above 50% warrant close monitoring as they consistently signal elevated systemic vulnerability. Incorporating concentration-based thresholds into macroprudential frameworks, for instance, as triggers for heightened disclosure requirements or concentration-adjusted capital surcharges, would allow policymakers to address systemic risks originating outside the traditional banking system. By explicitly recognizing that the destabilizing effects of equity market structure emerge only beyond identifiable thresholds, regulators can better calibrate their interventions to the nonlinear nature of financial fragility.

7 Conclusions

This paper provides new evidence on the systemic consequences of stock market concentration by analyzing a panel of 30 countries from 1998 to 2020. Using multiple nonlinear probability models (probit, logit, cloglog) and complementary linear benchmarks, the results consistently indicate that greater equity market concentration significantly increases the likelihood of systemic financial crises. This effect persists under alternative crisis definitions (Reinhart and Rogoff, 2009; Laeven and Valencia, 2020), across different estimation strategies (random effects probit, correlated random effects à la Mundlak, and control-function IV), and when conditioning on broader measures of financial development and institutional quality.

The empirical analysis highlights several key mechanisms through which concentration amplifies systemic fragility. First, interactions with liquidity demonstrate that concentration is particularly destabilizing in markets with high turnover, consistent with theories of fire-sale contagion (Shleifer and Vishny, 2011). Second, market depth mitigates but does not eliminate these risks: larger capitalized markets dilute the dominance of leading firms, echoing the diversification arguments of Hou and Robinson (2006) and Lehkonen (2015). Third, while credit booms independently raise systemic risk (Schularick and Taylor, 2012; Beck et al., 2006), they do not systematically interact with equity concentration, suggesting parallel but distinct channels of fragility. Overall, these findings underscore that concentration effects are conditional on the surrounding financial architecture, liquidity accelerates fragility, depth cushions it, and credit booms amplify systemic vulnerability through separate channels.

The econometric robustness of the results further strengthens the argument. Instrumental variable estimates based on exogenous variation in creditor rights (Djankov et al., 2007), supplemented with legal origin and religious fractionalization, confirm the relevance and validity of the instruments. First-stage diagnostics decisively reject weak identification, and overidentification tests support exogeneity. Lagged-instrument specifications, following Furceri et al. (2019), Kim and Lin (2011), and McCaig and Stengos (2005), yield consistent results, reducing concerns about contemporaneous feedback. Across all settings, the average marginal effect of a one–standard deviation increase in concentration raises systemic crisis probability by roughly 2–3 percentage points, an economically meaningful effect in the context of rare events.

From a policy perspective, the results suggest that the architecture of capital markets is integral to systemic stability. Traditional macroprudential frameworks, which focus primarily on banks and credit cycles, overlook the vulnerabilities that arise from excessive equity market concentration. The structural nature of stock market concentration is further reinforced by the rise of passive investing. Jiang et al. (2024) show that passive inflows magnify the dominance of large firms through an amplification loop, raising both their valuations and their volatility. This implies that the systemic risk effects documented here are unlikely to dissipate endogenously and call for macroprudential monitoring of equity market structure.

Monitoring concentration as a systemic risk indicator, encouraging broader equity participation, and facilitating access to capital for mid-sized firms are potential policy levers to reduce fragility. Such measures could complement existing banking regulations and provide a more comprehensive approach to financial stability.

Overall, the study contributes to the systemic risk literature by demonstrating that stock market concentration is not merely a by-product of market evolution, but a structural determinant of financial fragility. Its destabilizing impact is amplified in liquid but shallow systems, conditional on institutional environments, and robust to multiple definitions and econometric approaches. Recognizing equity concentration as a systemic vulnerability is therefore essential for building resilient financial systems in an era of rising dominance by a small number of systemically important firms.

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Data Availability

The data can be provided upon request.

Appendix

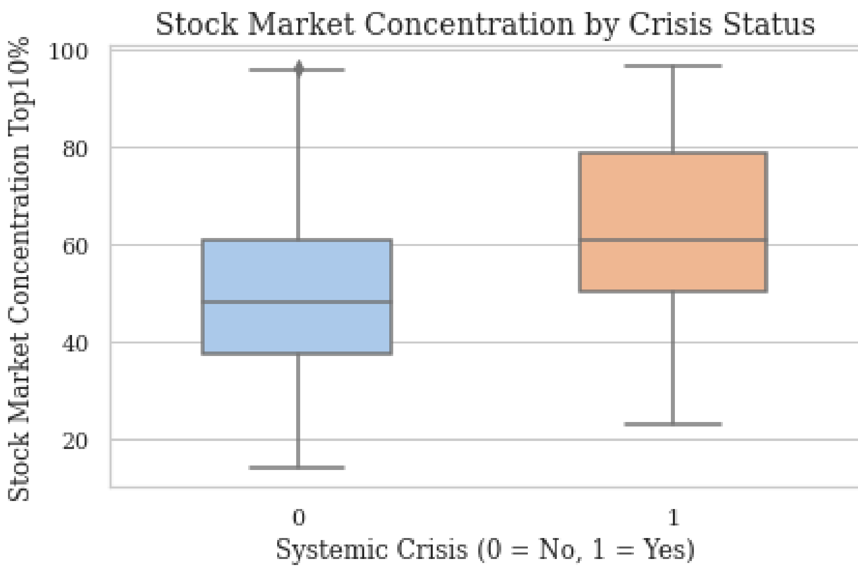


Figure 1: Stock Market Concentration by Crisis Status

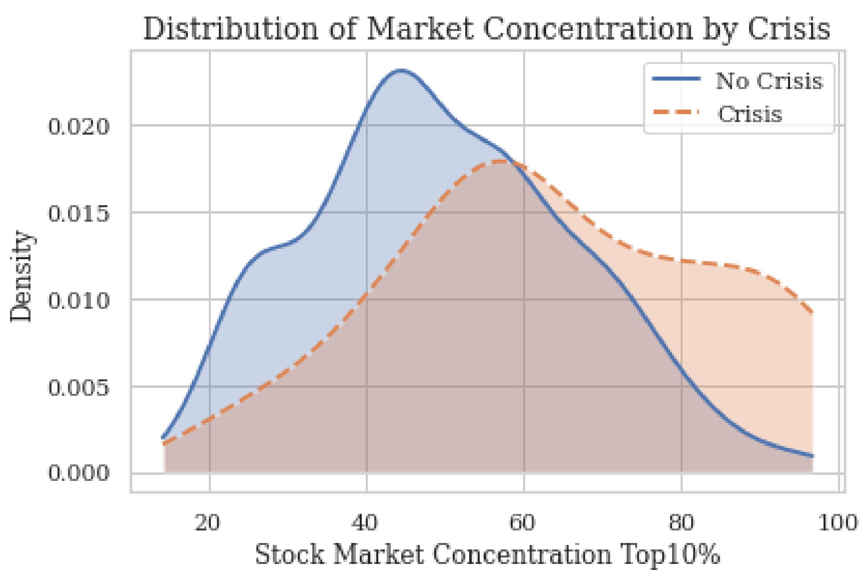


Figure 2: Distribution of Stock Market Concnetration by Crisis

Table 1: Variable Definitions and Data Sources

Variable	**Description**	**Data Source**
Systemic Crisis	Binary indicator equal to 1 if a systemic banking crisis is identified in a given year, 0 otherwise	Harvard BFFS Database
Alternative Indicator	Binary indicator equal to 1 if a systemic banking crisis is identified in a given year, 0 otherwise	Laeven and Valencia (2020)
Stock Market Concentration	Stock Market Concentration, measured as the market capitalization share of the top 10 firms to total domestic stock market capitalization	World Federation of Exchanges
GDP per capita	Annual growth rate of real GDP per capita (%)	WDI, World Bank
Inflation	Inflation rate, measured using the GDP deflator (annual, %)	WDI, World Bank
Δ*Trade*	Change in the trade ratio of international price of exported goods to international price of the imported goods	WDI, World Bank
Δ*Rate*	Change in the real effective exchange rate denominated in USD per local currency	WDI, World Bank
Net Financial Account to GDP	Financial account to nominal GDP ratio	WDI, World Bank
Current Account to GDP	Current account balance as a percentage of GDP	WDI, World Bank
Creditor Rights	Index of creditor protection (0–4), measuring legal rights of lenders against borrowers	Djankov et al. (2007)
Religion Fractionalization	Probability that two randomly selected individuals in a country belong to different religions (ranges 0–1)	Alesina et al. (2003)
Legal Origin	Dummy variables indicating whether a country's legal system is based on English, French, German, or Scandinavian law	La Porta et al. (1998)
Stock Market Capitalization	Stock market capitalization as a percentage of GDP	WDI, World Bank
Stock Market Turnover	Stock market turnover ratio (value traded to market capitalization, %)	WDI, World Bank

Note: This table summarizes all variables used in the empirical analysis, along with their definitions and respective data sources.

Table 2: Aggregate Summary Statistics

Variable	**Mean**	**Std Dev.**	**Min**	**Max**	**Obs**
Systemic Crisis	.1051724	.3070403	0	1	580
Alternative Crisis	.080891	.2728276	0	1	853
Stock Market Concentration	53.11783	18.87451	8.96635	99.09984	853
Domestic Credit	88.01424	50.88892	9.682518	249.2181	660
Current Account	.5298489	6.294516	-16.80081	27.14333	822
Financial Account	.0046614	.0612376	-.1706218	.2644831	819
GDP per capita	23393.52	22084.01	778.5074	112417.9	853
Inflation	4.862268	8.424864	-16.55884	143.6397	853
Δ*Trade*	7029.246	214561	-692717.1	5766242	733
Δ*Rate*	.1261263	6.906366	-62.07866	30.0218	607
Stock Market Turnover	257.0376	5723.836	.1469249	165149.1	832
Stock Market Capitalization	93.27032	157.1794	.023168	1777.54	832
Creditor Rights	1.898089	1.055747	0	4	785
Religion Fractionalization	52.00835	37.71545	0.4	99.6	853
Legal Origin	.3622509	.4809328	0	1	853

Note: This table reports summary statistics of the main variables used in the analysis for the 30-country regression sample between 1998 and 2020.

Table 3: Summary Statistics by Country (Part A: A–L)

Country	SysCr	AltCr	SMC	DomCred/GDP	CA/GDP	FA/GDP	GDPpc	Infl	ΔTrade	ΔREER	Turnover	MktCap/GDP	CR	RelFrac	Legor_UK
Australia	0.000	0.000	43.028	111.553	-4.502	-0.045	52017.859	2.664	6.582	1.201	70.298	105.505	3.000	29.800	1.000
Austria	0.000	0.059	62.574	93.344	2.627	0.024	41327.906	1.596	-18.271	-0.074	78.014	25.984	3.000	89.400	0.000
Brazil	0.000	0.000	50.101	44.215	-2.299	-0.021	8048.900	7.420	-30.977	-1.205	59.206	49.191	1.000	87.900	0.000
Canada	0.000	0.000	28.043	109.308	-0.650	-0.006	40635.951	1.946	-96.606	0.524	67.425	121.773	1.000	47.200	1.000
Chile	0.000	0.000	45.159	92.802	-1.077	-0.009	11034.050	4.758	-346.584	-1.291	13.523	98.999	2.000	82.100	0.000
Colombia	0.000	0.000	71.916	33.301	-3.115	-0.030	5481.093	4.579	-20.306	0.245	14.237	45.430	0.000	96.800	0.000
Germany	0.222	0.190	44.752	94.261	4.642	0.038	38419.726	1.243	35.430	-0.629	118.782	47.959	3.000	35.020	0.000
Greece	0.474	0.391	59.255	91.114	-6.318	-0.049	19702.067	1.545	36.632	-0.121	42.627	36.656	1.000	1.900	0.000
Hong Kong		0.000	45.985	169.891	6.750	0.074	35949.451	0.400	6.472	-0.543	52.533	858.970	4.000	8.400	1.000
Hungary		0.063	93.796	46.338	-4.143	-0.031	11244.348	4.917	139.335	1.557	71.995	20.849	1.000	53.900	0.000
Ireland	0.526	0.500	84.320	108.630	-0.519	-0.031	49990.110	2.492	582.687	0.213	19.557	51.798	1.000	95.300	1.000
Iran		0.000	43.879	35.826	5.069	0.043	4607.336	21.936	-80.856	3.212	19.611	54.879	2.000	98.000	0.000
Italy	0.167	0.167	56.759	72.512	-0.638	-0.010	32871.302	2.393	-34.462	0.554	13890.164	40.494	2.000	83.300	0.000
Japan	0.235	0.174	24.817	174.336	2.883	0.030	33344.217	-0.476	209.192	-1.136	103.221	83.389	2.000	0.600	0.000

Notes: SysCr = systemic crisis indicator; AltCr = alternative crisis indicator; SMC = top-10 firms' market-cap share; DomCred/GDP = domestic credit to private sector (% GDP); CA/GDP = current account (% GDP); FA/GDP = financial account (% GDP); GDPpc = GDP per capita; Infl = CPI inflation; ΔTrade = change in trade openness; ΔREER = change in real effective exchange rate; Turnover = stock turnover ratio; MktCap/GDP = market capitalization (% GDP); CR = creditor rights; RelFrac = religious fractionalization; Legor_UK = UK legal-origin dummy.

Table 4: Summary Statistics by Country (Part B: M–Z)

Country	SysCr	AltCr	SMC	DomCred/GDP	CA/GDP	FA/GDP	GDPpc	Infl	ΔTrade	ΔREER	Turnover	MktCap/GDP	CR	RelFrac	Legor_UK
Malaysia	0.250	0.190	36.247	116.742	9.085	0.067	8164.218	3.079	-43.209	-0.643	31.928	136.538	3.000	52.200	1.000
Mexico	0.000	0.000	60.604	20.480	-1.517	-0.020	9635.112	6.548	-10.712	-0.752	27.231	29.714	0.000	94.700	0.000
Morocco	0.000	0.000	72.756	83.365	-4.949	-0.046	3047.919	0.677	-21.668	-0.427	6.361	55.372	1.000	99.600	0.000
New Zealand	0.000	0.000	53.998	151.915	-3.715	-0.035	35497.150	2.227	-16.909	0.946	19.597	38.258	4.000	18.700	1.000
Norway	0.000	0.000	69.679	117.390	11.606	0.098	72635.169	3.966	-26.557	-0.301	74.208	53.080	2.000	0.400	0.000
Philippines	0.211	0.190	51.532	33.264	1.599	0.012	2327.716	4.073	2.098	0.911	18.104	56.297	1.000	88.400	0.000
Poland	0.000	0.000	60.141	32.619	-4.069	-0.035	9683.678	3.770	110.795	0.761	38.002	26.530	1.000	81.000	0.000
Russia	0.000	0.091	63.306	47.464	3.904	0.034	9231.964	9.618	14.851	-1.084	40.541	40.464	2.000	12.700	0.000
Singapore	0.000	0.000	40.608	104.657	19.176	0.187	44728.353	0.909	315.913	0.104	50.487	203.915	3.000	22.100	1.000
South Africa	0.000	0.000	34.404	121.021	-2.569	-0.025	5589.294	6.803	139.694	-0.994	28.747	198.333	3.000	11.700	1.000
South Korea	0.313	0.250	40.831	114.821	3.252	0.033	23196.787	2.054	-12.091	2.916	171.649	69.871	3.000	3.900	0.000
Spain	0.000	0.050	49.208	142.273	-3.118	-0.024	25548.897	2.164	68.673	0.323	128.048	76.935	2.000	96.900	0.000
Switzerland	0.000	0.063	68.986	147.933	8.601	0.113	77640.475	0.744	5.055	0.513	69.468	209.471	1.000	53.100	0.000
United Kingdom	.067	0.063	38.318	146.737	-2.459	-0.029	41745.321	2.059	0.091	-1.652	79.701	122.589	4.000	14.500	1.000
United States	.053	0.053	26.844	180.217	-3.570	-0.034	52154.493	1.853	-0.380	-0.006	176.869	128.095	1.000	30.800	1.000

Notes: Variable abbreviations as in Table 3. Country list reflects rows provided; fill remaining blanks as needed.

Table 5: Pearson Correlations among Main Variables

	SysCrisis	AltCrisis	SMC	DomCred/GDP	CurrAcc/GDP	FA/GDP	GDPpc	Inflation	ΔTrade	ΔREER	Turnover	MktCap/GDP	CR	RelFrac	Legor_UK
SysCrisis	1														
AltCrisis	0.9376*	1													
SMC	0.1748*	0.1092*	1												
DomCred/GDP	0.1159*	0.1123*	-0.2887*	1											
CurrAcc/GDP	0.0439	0.0272	-0.0835*	0.1287*	1										
FA/GDP	0.0255	0.0096	-0.0724*	0.3477*	0.9542*	1									
GDPpc	-0.0149	0.0096	0.1438*	-0.0439	0.3477*	0.3452*	1								
Inflation	0.0564	0.0517	0.0287	-0.4591*	-0.0439	-0.0438	-0.2568*	1							
ΔTrade	-0.0153	-0.0097	-0.0229	0.0537	0.0197	0.0215	-0.0314	-0.0105	1						
ΔREER	-0.0517	-0.0119	-0.0062	-0.0416	0.0229	0.0219	0.0026	0.0808*	-0.0269	1					
Turnover	-0.0137	-0.0092	0.0010	0.3662*	0.0063	-0.0039	0.0125	-0.0101	0.0247	0.0359	1				
MktCap/GDP	-0.1878*	-0.0902*	-0.1862*	0.4299*	0.2468*	0.2807*	0.2304*	-0.1132*	-0.0033	0.0393	-0.0207	1			
CR	-0.0327	-0.0396	-0.3943*	0.4790*	0.3125*	0.2965*	0.2767*	-0.0918*	0.0034	-0.0064	0.0049	0.3730*	1		
RelFrac	-0.0282	-0.0308	0.4652*	-0.5020*	-0.2039*	-0.2238*	-0.1667*	0.2194*	-0.0474	0.0190	0.0262	-0.2345*	-0.5529*	1	
Legor_UK	-0.0151	-0.0268	-0.3289*	0.3562*	0.1287*	0.0989*	0.1642*	-0.1651*	0.0515	-0.0190	-0.0268	0.3121*	0.4847*	-0.4612*	1

Note: Pairwise Pearson correlations for all country-year observations. Variables: systemic crisis (SysCrisis), alternative crisis (AltCrisis), stock market concentration (SMC), domestic credit to GDP (DomCred/GDP), current account to GDP (CurrAcc/GDP), financial account to GDP (FA/GDP), GDP per capita (GDPpc), inflation, change in trade openness (ΔTrade), change in real effective exchange rate (ΔREER), stock turnover (Turnover), market capitalization to GDP (MktCap/GDP), creditor rights (CR), religious fractionalization (RelFrac), and UK legal origin dummy (Legor_UK).

Table 6: Regressions for the Effect of Stock Market Concentration on Systemic Risk

	(a) Probit	(b) Logit	(c) Cloglog	(d) LPM
StockMarketConc	0.402***	0.736***	0.456***	0.021***
	(0.083)	(0.165)	(0.076)	(0.007)
Domestic Credit	0.061**	0.111**	0.074***	0.005**
	(0.025)	(0.048)	(0.023)	(0.002)
Current Account	0.044	0.092	-0.019	0.005
	(0.155)	(0.285)	(0.156)	(0.010)
Net Financial Account	-0.199	-0.377	-0.273**	-0.008
	(0.144)	(0.264)	(0.124)	(0.008)
GDP	2.666e-04**	4.994e-04*	2.986e-04*	8.840e-06
	(1.398e-04)	(2.707e-04)	(1.788e-04)	(9.050e-06)
ΔTrade	1.157e-04	2.149e-04	3.050e-05	8.000e-06
	(1.381e-04)	(2.644e-04)	(2.716e-04)	(6.150e-06)
Inflation	-0.028	-0.050	0.028	0.003
	(0.059)	(0.113)	(0.141)	(0.004)
ΔRate	0.080**	0.152**	0.077*	0.002
	(0.039)	(0.077)	(0.039)	(0.002)
Constant	0.882	1.510	0.088	-0.081
	(2.905)	(5.375)	(2.869)	(0.172)
$\hat{v}_{it}$	-0.306***	-0.555***	-0.353***	-0.017***
	(0.059)	(0.116)	(0.074)	(0.005)
σ_u	0.994	1.828		0.140
ρ	0.497	0.504		0.269
Countries	26	26	26	26
Observations	321	321	321	321
(pseudo)R-squared	0.49	0.49	0.57	0.35

Note: This table presents the results of probit, logit, cloglog, and linear probability panel regressions evaluating the effect of stock market concentration on the likelihood of systemic risk. The sample includes 26 countries and 321 observations. All variables are defined in Table 1. Robust standard errors clustered at the country level are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 7: Average Marginal Effects of Stock Market Concentration on Systemic Risk

	(a) Probit	(b) Logit	(c) Cloglog	(d) LPM
StockMarketConc	0.024***	0.024***	0.026***	0.021***
	(0.005)	(0.005)	(0.004)	(0.007)
Domestic Credit	0.004***	0.004***	0.004***	0.005**
	(0.001)	(0.001)	(0.001)	(0.002)
Current Account	0.003	0.003	-0.001	0.005
	(0.009)	(0.009)	(0.009)	(0.010)
Net Financial Account	-0.012	-0.012	-0.016**	-0.008
	(0.008)	(0.008)	(0.007)	(0.008)
GDP	1.560e-05***	1.620e-05**	1.710e-05*	8.840e-06
	(6.420e-06)	(7.290e-06)	(9.890e-06)	(9.050e-06)
ΔTrade	6.790e-06	6.970e-06	1.750e-06	8.000e-06
	(7.770e-06)	(8.450e-06)	(1.550e-05)	(6.150e-06)
Inflation	-0.002	-0.002	0.002	0.003
	(0.003)	(0.004)	(0.008)	(0.004)
ΔRate	0.005**	0.005**	0.004**	0.002
	(0.002)	(0.002)	(0.002)	(0.002)
Countries	26	26	26	26
Observations	321	321	321	321

Note: This table reports average marginal effects from probit, logit, cloglog, and linear probability models of systemic risk on stock market concentration and control variables. Standard errors clustered at the country level are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 8: Regressions for the Effect of Stock Market Concentration on Systemic Risk- Finance Controls

	(a) Probit	(b) Logit	(c) Cloglog	(d) LPM
StockMarketConc	0.395***	0.732***	0.518***	0.020***
	(0.093)	(0.191)	(0.093)	(0.006)
StockMarketCap	0.001	0.000	-0.002	0.001
	(0.011)	(0.021)	(0.013)	(0.000)
StockMarketTurnover	0.008	0.014	0.009*	0.001*
	(0.005)	(0.009)	(0.005)	(0.001)
Domestic Credit	0.067***	0.123**	0.092***	0.005**
	(0.026)	(0.052)	(0.027)	(0.002)
Current Account	0.061	0.123	0.045	0.006
	(0.136)	(0.243)	(0.162)	(0.010)
Net Financial Account	-0.233	-0.452	-0.353**	-0.007
	(0.154)	(0.293)	(0.142)	(0.009)
GDP	2.968e-04*	5.682e-04*	4.485e-04**	5.160e-06
	(1.583e-04)	(3.121e-04)	(1.864e-04)	(9.210e-06)
ΔTrade	8.680e-05	1.543e-04	-2.180e-05	6.960e-06
	(1.270e-04)	(2.309e-04)	(1.635e-04)	(5.960e-06)
Inflation	-0.042	-0.072	-0.022	0.000
	(0.061)	(0.120)	(0.156)	(0.005)
ΔRate	0.077*	0.148	0.090*	0.002
	(0.046)	(0.094)	(0.049)	(0.002)
Constant	4.480	8.502	5.858	-0.279
	(5.392)	(9.145)	(4.609)	(0.183)
$\hat{v}_{it}$	-0.303***	-0.553***	-0.397***	-0.016***
	(0.067)	(0.132)	(0.082)	(0.005)
σ_u	0.667	1.193		0.164
ρ	0.308	0.302		0.347
Countries	26	26	26	26
Observations	319	319	319	319
(pseudo)R-squared	0.53	0.53	0.63	0.37

Note: Note: This table presents the results of probit, logit, cloglog, and linear probability panel regressions evaluating the effect of stock market concentration on the likelihood of systemic risk. The specifications include financial market controls as well as stock market capitalization and stock market turnover. The sample includes 26 countries and 321 observations. All variables are defined in Table 1. Robust standard errors clustered at the country level are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 9: Average Marginal Effects of Stock Market Concentration on Systemic Risk Table-Finance Controls

	(a) Probit	(b) Logit	(c) Cloglog	(d) LPM
StockMarketConc	0.024***	0.024***	0.026***	0.020***
	(0.005)	(0.005)	(0.004)	(0.006)
StockMarketCap	4.020e-05	6.630e-06	-1.113e-04	5.834e-04
	(6.430e-04)	(6.910e-04)	(6.572e-04)	(4.795e-04)
StockMarketTurnover	4.970e-04	4.828e-04	4.523e-04*	0.001*
	(3.183e-04)	(3.222e-04)	(2.558e-04)	(7.751e-04)
Domestic Credit	0.004***	0.004**	0.005***	0.005**
	(0.001)	(0.002)	(0.001)	(0.002)
Current Account	0.004	0.004	0.002	0.006
	(0.008)	(0.008)	(0.008)	(0.010)
Net Financial Account	-0.014	-0.015*	-0.018***	-0.007
	(0.009)	(0.009)	(0.006)	(0.009)
GDP	1.780e-05**	1.900e-05**	2.260e-05***	5.160e-06
	(8.470e-06)	(9.070e-06)	(8.640e-06)	(9.210e-06)
*Δ*Trade	5.220e-06	5.160e-06	-1.100e-06	6.960e-06
	(7.710e-06)	(7.890e-06)	(8.220e-06)	(5.960e-06)
Inflation	-0.003	-0.002	-0.001	-3.266e-04
	(0.004)	(0.004)	(0.008)	(0.005)
*Δ*Rate	0.005*	0.005*	0.005**	0.002
	(0.003)	(0.003)	(0.002)	(0.002)
Countries	26	26	26	26
Observations	319	319	319	319

Note: Note: This table reports average marginal effects from probit, logit, cloglog, and linear probability models evaluating the effect of stock market concentration and control variables on the likelihood of systemic risk. Standard errors clustered at the country level are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 10: Regressions for the Effect of Stock Market Concentration on Systemic Risk-Interactions

	(a)	(b)	(c)	(d)	(e)	(f)	(g)
Stock Market Conc	0.448***	0.462***	0.374***	0.472***	0.388***	0.419***	0.429***
	(0.139)	(0.099)	(0.104)	(0.123)	(0.105)	(0.139)	(0.117)
Stock Market Cap	-0.034**	0.003	0.006	-0.036**	0.007	-0.023	-0.025
	(0.016)	(0.011)	(0.010)	(0.016)	(0.010)	(0.014)	(0.017)
Stock Market Turnover	-0.001	0.009	0.008	0.002	0.008	0.001	0.003
	(0.007)	(0.006)	(0.005)	(0.009)	(0.006)	(0.006)	(0.008)
Domestic Credit	0.104***	0.086**	0.065***	0.121***	0.069**	0.096***	0.105***
	(0.031)	(0.037)	(0.025)	(0.036)	(0.034)	(0.030)	(0.039)
Current Account	0.177	0.009	0.001	0.150	-0.019	0.135	0.125
	(0.157)	(0.105)	(0.139)	(0.139)	(0.088)	(0.147)	(0.140)
Net Financial Account	-0.370***	-0.198	-0.181	-0.342**	-0.165	-0.314	-0.298*
	(0.194)	(0.154)	(0.177)	(0.167)	(0.154)	(0.206)	(0.182)
GDP	5.603e-04***	2.734e-04*	2.269e-04*	5.063e-04***	2.196e-04	4.512e-04***	4.282e-04**
	(1.834e-04)	(1.605e-04)	(1.415e-04)	(1.862e-04)	(1.424e-04)	(1.597e-04)	(1.749e-04)
Δ Trade	-3.270e-06	1.206e-04	-4.930e-05	2.330e-05	-2.900e-05	-1.510e-04	-1.199e-04
	(1.599e-04)	(1.315e-04)	(1.687e-04)	(1.093e-04)	(1.528e-04)	(2.067e-04)	(1.885e-04)
Inflation	-0.091	-0.056	-0.038	-0.113*	-0.038	-0.087*	-0.095*
	(0.066)	(0.050)	(0.042)	(0.062)	(0.040)	(0.052)	(0.056)
Δ Rate	0.183***	0.081	0.057	0.191***	0.056	0.153***	0.156***
	(0.060)	(0.052)	(0.042)	(0.059)	(0.042)	(0.049)	(0.048)
Constant	5.267	1.205	-0.862	1.193	-1.832	2.296	0.230
	(3.789)	(7.279)	(2.770)	(5.260)	(3.559)	(2.978)	(5.024)
*StockMarketConc*Turnover*	6.076e-04***			6.950e-04***		5.085e-04***	5.671e-04**
	(1.371e-04)			(2.172e-04)		(1.378e-04)	(2.791e-04)
*StockmarketConc*Credit*		-3.854e-04		-4.457e-04	-9.700e-05		-2.311e-04
		(3.741e-04)		(3.661e-04)	(3.448e-04)		(5.387e-04)
*StockMarketConc*StockMarketCap*			-0.001**		-0.001**	-0.001*	-0.001
			(4.876e-04)		(4.909e-04)	(4.970e-04)	(5.456e-04)
$\hat{v}_{it}$	-0.384***	-0.308***	-0.237***	-0.361***	-0.238***	-0.317***	-0.310***
	(0.107)	(0.067)	(0.076)	(0.101)	(0.077)	(0.097)	(0.094)
σ_u	0.738	0.998	0.551	1.128	0.634	0.667	.006
ρ	0.353	0.499	0.233	0.560	0.287	0.308	0.453
Countries	26	26	26	26	26	26	26
Observations	319	319	391	391	391	391	391
R-squared	0.63	0.54	0.6	0.63	0.6	0.65	0.66

Note: This table reports the results of probit panel regressions evaluating the effect of stock market concentration on the likelihood of systemic financial crises. Column (a) includes the interaction of stock market concentration with Stock Market Turnover, column (b) with Domestic Credit, and column (c) with Stock Market Capitalization, to assess distinct channels through which concentration may affect systemic risk. Columns (d)–(g) combine these interactions. The inclusion of interaction terms allows the effect of concentration to vary with market liquidity, credit depth, and overall market size, highlighting conditional marginal effects. Robust standard errors clustered at the country level are reported in parentheses. All specifications include a Mundlak correction. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 11: Average Marginal Effects of Stock Market Concentration on Systemic Risk-Interactions

	(a)	(b)	(c)	(d)	(e)	(f)	(g)
Stock Market Conc	0.021***	0.025***	0.020***	0.019***	0.021***	0.019***	0.017***
	(0.006)	(0.004)	(0.004)	(0.006)	(0.003)	(0.005)	(0.006)
Stock Market Cap	-0.002**	0.000	0.000	-0.001**	0.000	-0.001*	-0.001*
	(7.210e-04)	(5.900e-04)	(5.654e-04)	(6.343e-04)	(5.611e-04)	(6.088e-04)	(6.051e-04)
Stock Market Turnover	-3.370e-05	4.933e-04	4.311e-04	9.360e-05	4.320e-04	5.580e-05	1.096e-04
	(3.471e-04)	(3.184e-04)	(3.391e-04)	(3.772e-04)	(3.401e-04)	(2.556e-04)	(3.167e-04)
Domestic Credit	0.005***	0.005***	0.004***	0.005***	0.004**	0.004***	0.004***
	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
Current Account	0.008	0.001	0.000	0.006	-0.001	0.006	0.005
	(0.007)	(0.006)	(0.008)	(0.005)	(0.005)	(0.007)	(0.005)
Net Financial Account	-0.017***	-0.011	-0.010	-0.014**	-0.009	-0.014*	-0.012*
	(0.008)	(0.008)	(0.008)	(0.007)	(0.007)	(0.008)	(0.007)
GDP	2.600e-05***	1.490e-05	1.220e-05	2.070e-05**	1.160e-05	2.000e-05***	1.740e-05*
	(8.570e-06)	(9.390e-06)	(7.730e-06)	(8.750e-06)	(7.790e-06)	(7.230e-06)	(9.250e-06)
ΔTrade	-1.520e-07	6.570e-06	-2.660e-06	9.530e-07	-1.530e-06	-6.680e-06	-4.880e-06
	(7.460e-06)	(7.430e-06)	(8.730e-06)	(4.580e-06)	(7.820e-06)	(8.460e-06)	(7.690e-06)
Inflation	-0.004	-0.003	-0.002	-0.005**	-0.002	-0.004**	-0.004**
	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
ΔRate	0.009***	0.004*	0.003	0.008***	0.003	0.007***	0.006***
	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
*StockMarketConc*Turnover*	2.820e-05***			2.840e-05***		2.250e-05***	2.310e-05***
	(6.320e-06)			(7.380e-06)		(6.840e-06)	(8.410e-06)
*StockmarketConc*Credit*		-2.100e-05		-1.820e-05	-5.140e-06		-9.420e-06
		(2.080e-05)		(1.350e-05)	(1.780e-05)		(2.030e-05)
*StockMarketConc*StockMarketCap*			-5.620e-05***		-5.440e-05**	-3.830e-05**	-3.280e-05
			(2.030e-05)		(2.140e-05)	(1.960e-05)	(2.540e-05)
Countries	26	26	26	26	26	26	26
Observations	319	319	319	319	319	319	319

Note: Note: This table reports **average marginal effects (AMEs)** from probit panel regressions evaluating the effect of stock market concentration on the likelihood of systemic financial crises. Column (a) includes the interaction of stock market concentration with Stock Market Turnover, column (b) with Domestic Credit, and column (c) with Stock Market Capitalization, to assess distinct channels through which concentration may affect systemic risk. Columns (d)–(g) combine these interactions. AMEs are reported to capture conditional marginal effects, showing how the impact of concentration varies with market liquidity, credit depth, and overall market size. Robust standard errors clustered at the country level are reported in parentheses. All specifications include a Mundlak correction. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 12: Regressions for the Effect of Stock Market Concentration on Systemic Risk-Alternative Crisis

	(a)	(b)	(c)	(d)	(e)	(f)
Stock Market Conc	0.253***	0.472***	0.254***	0.468***	0.224***	0.426***
	(0.060)	(0.110)	(0.067)	(0.126)	(0.073)	(0.144)
Stock Market Cap			0.012**	0.021*	0.007*	0.014
			(0.006)	(0.013)	(0.004)	(0.009)
Stock Market Turnover			0.006*	0.012*	0.003	0.006
			(0.003)	(0.006)	(0.003)	(0.005)
Domestic Credit	0.042***	0.078***	0.045***	0.083***	0.047**	0.091**
	(0.014)	(0.026)	(0.015)	(0.028)	(0.022)	(0.045)
Current Account	0.056	0.100	0.072	0.130	0.058	0.106
	(0.079)	(0.151)	(0.080)	(0.158)	(0.072)	(0.137)
Net Financial Account	-0.198***	-0.369***	-0.206***	-0.373***	-0.173**	-0.314**
	(0.069)	(0.135)	(0.068)	(0.135)	(0.071)	(0.131)
GDP	1.706e-04**	3.279e-04**	1.366e-04	2.572e-04	1.034e-04	1.961e-04
	(6.950e-05)	(1.315e-04)	(8.550e-05)	(1.682e-04)	(7.440e-05)	(1.527e-04)
Δ *Trade*	4.430e-05	7.950e-05	3.690e-05	5.730e-05	2.960e-05	5.770e-05
	(6.330e-05)	(1.312e-04)	(7.040e-05)	(1.486e-04)	(6.410e-05)	(1.237e-04)
Inflation	0.082	0.139	0.075	0.147	0.084	0.167
	(0.058)	(0.119)	(0.064)	(0.137)	(0.062)	(0.143)
Δ *Rate*	0.045**	0.087**	0.040*	0.070	0.052**	0.093**
	(0.023)	(0.043)	(0.023)	(0.048)	(0.024)	(0.049)
Constant	-2.874*	-4.814	-3.620**	-6.105*	-4.825	-9.247
	(1.650)	(3.043)	(1.820)	(3.740)	(3.742)	(7.702)
*StockMarketConc*Turnover*					1.606e-04**	2.870e-04*
					(8.140e-05)	(1.718e-04)
*StockmarketConc*Credit*					-1.287e-04	-3.114e-04
					(2.936e-04)	(5.763e-04)
*StockMarketConc*StockMarketCap*					-2.830e-04	-5.508e-04
					(2.045e-04)	(3.950e-04)
$\hat{v}_{it}$	-0.207***	-0.388***	-0.205***	-0.379***	-0.162***	-0.304***
	(0.054)	(0.097)	(0.059)	(0.110)	(0.052)	(0.105)
σ_u	0.678	1.208	0.666	1.156	0.898	1.755
ρ	0.315	0.307	0.307	0.289	0.446	0.484
Countries	30	30	30	30	30	30
Observations	402	402	399	399	399	399
R-squared	0.36	0.36	0.41	0.41	0.47	0.47

*Note:*This table reports the results of panel probit and logit regressions evaluating the effect of stock market concentration on the likelihood of systemic financial crises. Systemic crises are defined using the BFFS dataset and complemented with Laeven and Valencia's systemic crisis episodes. Columns (a), (c), and (e) present probit specifications, while columns (b), (d), and (f) report corresponding logit models. Robust standard errors clustered at the country level are reported in parentheses. All specifications include a Mundlak correction to account for unobserved heterogeneity. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 13: Average Marginal Effects of Stock Market Concentration on Systemic Risk-Alternative Crisis

	(a)	(b)	(c)	(d)	(e)	(f)
Stock Market Conc	0.021***	0.021***	0.020***	0.020***	0.016***	0.016***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Stock Market Cap			9.575e-04*	8.760e-04*	5.425e-04*	5.290e-04
			(4.920e-04)	(5.354e-04)	(3.061e-04)	(3.443e-04)
Stock Market Turnover			4.900e-04	4.835e-04*	1.913e-04	2.224e-04
			(2.726e-04)	(2.699e-04)	(2.162e-04)	(1.970e-04)
Domestic Credit	0.004***	0.004***	0.004***	0.003***	0.003***	0.004**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Current Account	0.005	0.005	0.006	0.005	0.004	0.004
	(0.006)	(0.007)	(0.006)	(0.007)	(0.005)	(0.005)
Net Financial Account	-0.017***	-0.017***	-0.016***	-0.016***	-0.013***	-0.012**
	(0.005)	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)
GDP per capita	1.440e-05***	1.500e-05***	1.060e-05*	1.080e-05*	7.510e-06	7.580e-06
	(5.480e-06)	(5.590e-06)	(6.240e-06)	(6.690e-06)	(5.630e-06)	(6.050e-06)
Δ Trade	3.450e-06	3.290e-06	2.860e-06	2.400e-06	2.150e-06	2.230e-06
	(5.290e-06)	(6.100e-06)	(5.490e-06)	(6.260e-06)	(4.780e-06)	(4.840e-06)
Inflation	0.007	0.006	0.006	0.006	0.006	0.006
	(0.005)	(0.006)	(0.005)	(0.006)	(0.005)	(0.006)
Δ Rate	0.004**	0.004**	0.003*	0.003	0.004**	0.004**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
*StockMarketConc*Turnover*					1.170e-05**	1.110e-05*
					(5.510e-06)	(6.030e-06)
*StockMarketConc*Credit*					-9.340e-06	-1.200e-05
					(2.050e-05)	(2.120e-05)
*StockMarketConc*StockMarketCap*					-2.050e-05	-2.130e-05
					(1.380e-05)	(1.430e-05)
Countries	30	30	30	30	30	30
Observations	402	402	399	399	399	399

*Note:*This table reports **average marginal effects (AMEs)** corresponding to the panel probit and logit specifications in Table 12. Systemic crises are defined using the BFFS dataset and complemented with Laeven and Valencia's systemic crisis episodes. Robust standard errors clustered at the country level are reported in parentheses. All specifications include a Mundlak correction to account for unobserved heterogeneity. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 14: Regressions for the Effect of Stock Market Concentration on Systemic Risk- Robustness

	(a)	(b)	(c)	(d)	(e)	(f)
Stock Market Conc	0.395***	0.429***	0.651***	0.755***	0.620***	0.562***
	(0.093)	(0.117)	(0.126)	(0.142)	(0.182)	(0.205)
Stock Market Cap	6.688e-04	-0.025	0.011	-0.034	0.002	-0.040***
	(0.011)	(0.017)	(0.010)	(0.021)	(0.009)	(0.016)
Stock Market Turnover	0.008	0.003	0.010**	0.002	0.008**	0.001
	(0.005)	(0.008)	(0.005)	(0.010)	(0.004)	(0.005)
Domestic Credit	0.067**	0.105***	0.096***	0.136**	0.066**	0.072***
	(0.026)	(0.039)	(0.028)	(0.053)	(0.028)	(0.027)
Current Account	0.061	0.125	0.301*	0.398***	0.047	-0.135
	(0.136)	(0.140)	(0.161)	(0.122)	(0.181)	(0.168)
Net Financial Account	-0.233	-0.298*	-0.443*	-0.583***	-0.257	-0.202
	(0.154)	(0.182)	(0.241)	(0.209)	(0.231)	(0.239)
GDP	2.968e-04*	4.282e-04**	4.134e-04**	6.255e-04***	4.560e-04**	6.801e-04
	(1.583e-04)	(1.749e-04)	(1.702e-04)	(1.645e-04)	(1.866e-04)	(2.348e-04)
Δ Trade	8.680e-05	-1.199e-04	9.840e-06	-1.629e-04	1.434e-04*	6.150e-05
	(1.270e-04)	(1.885e-04)	(1.741e-04)	(3.083e-04)	(7.980e-05)	(1.334e-04)
Inflation	-0.042	-0.095*	-0.066	-0.070	-0.129	-0.587*
	(0.061)	(0.056)	(0.077)	(0.053)	(0.114)	(0.310)
ΔRate	0.077*	0.156***	0.050	0.178***	0.019	0.086***
	(0.046)	(0.048)	(0.044)	(0.074)	(0.041)	(0.034)
Constant	4.480	0.230	5.286	0.515	5.500	3.467
	(5.392)	(5.024)	(6.030)	(4.926)	(4.510)	(4.303)
*StockMarketConc*Turnover*		5.671e-04**		8.221e-04**		6.484e-04***
		(2.791e-04)		(3.653e-04)		(1.341e-04)
*StockmarketConc*Credit*		-2.311e-04		-1.901e-04		-1.324e-04
		(5.387e-04)		(6.241e-04)		(2.412e-04)
*StockMarketConc*StockMarketCap*		-8.051e-04		-7.687e-04		-6.501e-04
		(5.456e-04)		(8.688e-04)		(5.707e-04)
$\hat{v}_{it}$	-0.303***	-0.310***	-0.490***	-0.634***	-0.464***	-0.429
	(0.067)	(0.094)	(0.096)	(0.135)	(0.164)	(0.182)
σ_u	0.667	0.909	1.137	1.377	0.638	5.419e-04
ρ	0.308	0.453	0.564	0.655	0.289	2.940e-07
Countries	26	26	26	26	26	26
Observations	319	319	319	319	303	303
R-squared	0.53	0.66	0.58	0.7	0.58	0.69

Note: Note: This table presents robustness checks from panel probit regressions evaluating the effect of stock market concentration on systemic financial crises. Columns (a)–(b) augment the baseline specification with additional instruments for identification (religious fractionalization and legal origin). Columns (c)–(d) modify the predictive process from X_{t-1} to X_{t-2}, while columns (e)–(f) extend it to X_{t-3}, both with the additional instruments. Robust standard errors clustered at the country level are reported in parentheses. All models include a Mundlak correction to address unobserved heterogeneity. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. Variable definitions are provided in Table 1.

Table 15: Average Marginal Effects of Stock Market Concentration on Systemic Risk — Robustness

	(a)	(b)	(c)	(d)	(e)	(f)
Stock Market Conc	0.024***	0.017***	0.030***	0.024***	0.031***	0.025***
	(0.005)	(0.006)	(0.005)	(0.004)	(0.006)	(0.004)
Stock Market Cap	4.020e-05	-0.001*	5.205e-04	-0.001*	1.021e-04	-0.002***
	(6.430e-04)	(6.051e-04)	(5.027e-04)	(5.711e-04)	(4.623e-04)	(5.622e-04)
Stock Market Turnover	4.970e-04	1.096e-04	4.796e-04*	6.690e-05	4.190e-04*	3.420e-05
	(3.183e-04)	(3.167e-04)	(2.704e-04)	(2.994e-04)	(2.570e-04)	(2.267e-04)
Domestic Credit	0.004***	0.004***	0.004***	0.004***	0.003**	0.003**
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
Current Account	0.004	0.005	0.014**	0.013***	0.002	-0.007
	(0.008)	(0.005)	(0.007)	(0.004)	(0.009)	(0.007)
Net Financial Account	-0.014	-0.012*	-0.020**	-0.018**	-0.013	-0.008
	(0.879)	(0.732)	(0.984)	(0.764)	(0.972)	(0.830)
GDP	1.780e-05**	1.740e-05*	1.890e-05***	1.970e-05***	2.260e-05***	2.940e-05***
	(8.470e-06)	(9.250e-06)	(6.890e-06)	(5.950e-06)	(8.040e-06)	(5.800e-06)
Δ Trade	5.220e-06	-4.880e-06	4.500e-07	-5.120e-06	7.120e-06	3.470e-06
	(7.710e-06)	(7.690e-06)	(7.990e-06)	(1.020e-05)	(4.730e-06)	(5.610e-06)
Inflation	-0.003	-0.004**	-0.003	-0.002*	-0.006	-0.025***
	(0.004)	(0.002)	(0.003)	(0.001)	(0.006)	(0.009)
ΔRate	0.005*	0.006***	0.002	0.006***	0.001	0.003**
	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
StockMarketConc × Turnover		2.310e-05***		2.590e-05***		2.860e-05***
		(8.410e-06)		(9.170e-06)		(5.490e-06)
StockMarketConc × Credit		-9.420e-06		-5.980e-06		-5.510e-06
		(2.030e-05)		(1.890e-05)		(1.010e-05)
StockMarketConc × Stock Mkt Cap		-3.280e-05		-2.420e-05		-2.550e-05
		(2.540e-05)		(2.890e-05)		(1.800e-05)
Countries	26	26	26	26	26	26
Observations	399	399	399	399	399	399

Notes: Table reports **average marginal effects (AMEs)** corresponding to the robustness specifications in Table **??**. AMEs are computed from panel probit models of systemic financial crises (BFFS, complemented with Laeven–Valencia). Columns (a)–(b) include additional instruments (religious fractionalization, legal origin); columns (c)–(d) and (e)–(f) shift the predictive horizon to X_{t-2} and X_{t-3}, respectively. AMEs are interpretable as percentage–point changes in crisis probability. Robust standard errors clustered at the country level in parentheses. All models include a Mundlak correction. *Significance:* * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 16: First-Stage Instrument Relevance and IV Diagnostics

	(a)	(b)	(c)	(d)	(e)	(f)
Panel A: First stage (dependent variable: SMC_{it})						
Creditor Rights	3.783***	3.675***	4.194***	4.388***	5.331***	7.019***
	(1.160)	(1.391)	(1.448)	(1.301)	(1.386)	(1.471)
Religion			1.038**	1.210**	1.178**	1.605**
			(0.506)	(0.485)	(0.570)	(0.657)
Legal Origin			-16.920***	-17.456***	-21.715***	-27.435***
			(3.990)	(4.129)	(3.827)	(4.111)
Panel B: Identification diagnostics (matching each column/spec)						
Kleibergen–Paap rk LM χ^2	12.130***	13.350***	14.570***	12.420**	11.750**	11.330**
Kleibergen–Paap rk Wald F	30.830***	17.880***	107.750***	240.520***	134.120***	64.980***
Anderson–Rubin Wald (stat)	6.780**	6.670**	11.060**	8.990*	7.710*	6.420
Hansen J (p–value)	0.975	0.955	0.192	0.466	0.526	0.429
Observations	321	321	321	321	321	321
Country FE / Year FE	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes

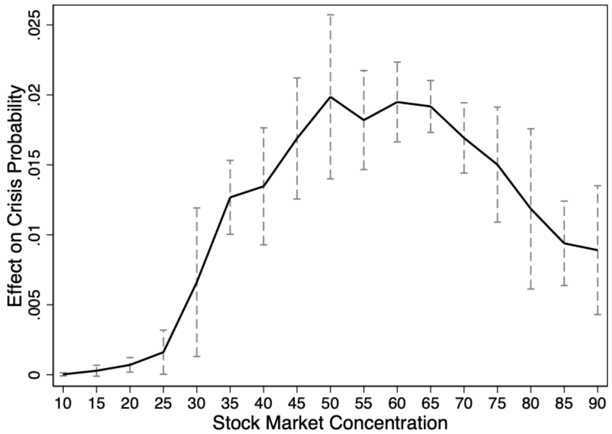
Note: Panel A reports excluded-instrument coefficients from the first-stage regression of stock market concentration (SMC) on instruments and controls, with cluster-robust standard errors in parentheses. Column (a) is the baseline; (b) adds financial controls; (c)–(d) replicate with the same instruments, while (e)–(f) shift the predictive process to X_{t-2} and X_{t-3}. Panel B reports identification diagnostics: Kleibergen–Paap rk LM tests under-identification; rk Wald F tests weak identification; Anderson–Rubin Wald statistics are weak-IV-robust; and Hansen J reports the overidentification p-value. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 17: Diagnostics: Random Effects vs. Mundlak Specifications

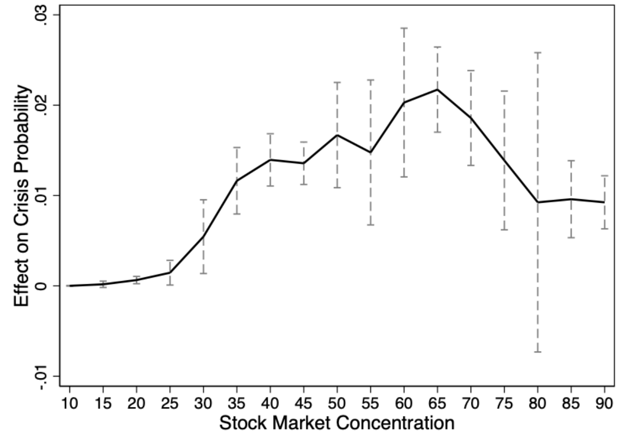
	(1) Baseline	(2) Finance	(3) Interactions	(4) Alt. Crisis	(5) Add. Instr.	(6) Lagged SMC
LM test ($\mathbf{H}_0$: $\rho = 0$)						
χ^2	32.29	30.22	51.95	58.64	30.42	55.02
p-value	0.0001	0.0008	0.0000	0.0000	0.0007	0.0000
Wald test: Mundlak means joint						
χ^2	40.41	35.68	35.79	23.77	23.77	29.43
p-value	0.0000	0.0001	0.0001	0.0082	0.0082	0.0011

Note: Specification diagnostics comparing standard random effects and Mundlak (correlated random effects) panel probit models. The upper panel reports LM tests of $H_0: \rho = 0$ (no random effects), which are highly significant across columns (1)–(6), indicating non-negligible unobserved heterogeneity. The lower panel reports joint Wald tests of the Mundlak means; significance in all cases supports including Mundlak terms to mitigate correlation between regressors and unit effects. Results are consistent across additional model variants; for brevity, only the main configurations are shown.

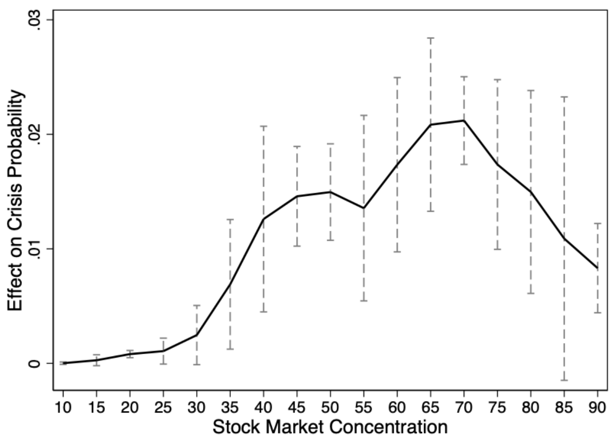
Marginal Effects of Stock Market Concentration on Systemic Crisis



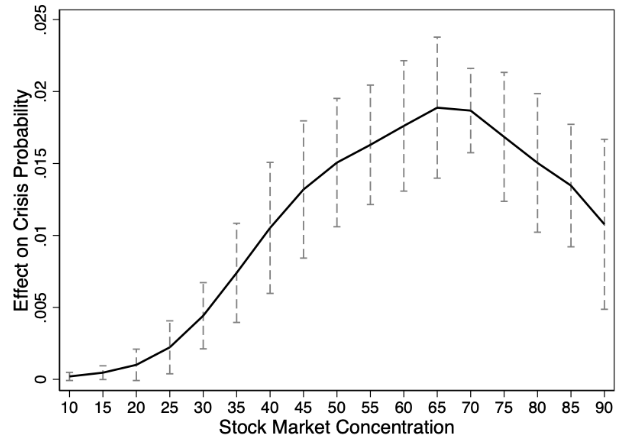
(a) Baseline probit



(b) Baseline with Finance Controls



(c) Interactions Probit



(d) Alternative Crisis

Figure 3: Marginal effects of stock market concentration on the probability of systemic crisis under alternative model specifications. Dashed lines denote 95% confidence intervals.