

Fintech Competition, Bank Stability, and Risk-Taking: A Dynamic System-GMM Analysis

R. Maghniwi

Faculty of economics and law. Mohamed the 5th University, Rabat, Morocco

Abstract

The competitive challenge posed by neobanks raises a question that reaches beyond profitability into the domain of financial stability: does intensified competition from digitally native entrants make incumbent banks safer or riskier? Banking theory offers opposing predictions, and the empirical answer is complicated by the persistence of bank risk over time and by the endogeneity of competition itself. This study addresses both complications through a dynamic panel model estimated by system generalized method of moments, applied to a secondary panel of banks observed over successive years. The lagged dependent variable captures the persistence of risk, while internal instruments derived from the panel's own structure address the endogeneity of competition. The estimates reveal a non-monotonic, U-shaped relationship between fintech competition intensity and bank stability: moderate competition is associated with declining stability as incumbents chase yield, but beyond a turning point further competition coincides with a recovery, consistent with a disciplining effect that prunes the weakest risk-takers. The Hansen test does not reject instrument validity and the absence of second-order serial correlation is confirmed, supporting the specification. The findings caution against linear readings of the competition-stability nexus and suggest that the stability consequences of neobank entry depend on where a market sits along this curve.

Keywords: Bank Stability, Fintech Competition, System GMM, Dynamic Panel, Z-Score, Risk-Taking

1. Introduction

The competition-stability nexus is among the most contested relationships in banking economics, and the rise of neobanks gives it fresh urgency. If competition from digitally native entrants erodes the franchise value that restrains incumbent risk-taking, then neobank entry could sow the seeds of instability. If instead competition disciplines lazy incumbents and forces the exit of the weakest, entry could make the system safer. The stakes for supervisors and for incumbent boards are considerable, yet the empirical record is muddled by two methodological hazards that a credible study must confront.

The first hazard is persistence. Bank risk is highly serially correlated: a bank that is fragile this year tends to be fragile next year, for reasons rooted in its balance sheet and business model. A static regression that ignores this persistence misattributes to competition what belongs to inertia. The second hazard is endogeneity. Competition is not exogenously sprinkled across banks; it responds to the same conditions that shape risk, so that ordinary least squares confounds cause and effect.

This study confronts both hazards with a dynamic panel model estimated by system generalized method of moments, an approach purpose-built for short, wide panels with a persistent dependent variable and

endogenous regressors. The contribution is to bring this machinery to bear on the specific question of neobank competition and to document a non-linear relationship that linear models would obscure.

2. Theory and Hypotheses

2.1. Competition-Fragility versus Competition-Stability

The competition-fragility view holds that competition erodes franchise value, reducing the charter that banks would lose by failing and thereby weakening their incentive to manage risk prudently. On this view, neobank entry, by intensifying competition, should reduce stability. The competition-stability view counters that concentrated, uncompetitive markets breed larger and more systemically dangerous institutions, and that competition disciplines risk-taking. The two views are not mutually exclusive; each may dominate in a different range of competition.

2.2. A Non-Monotonic Hypothesis

Synthesizing the two views yields a non-monotonic prediction. At low-to-moderate levels, rising competition erodes franchise value faster than it disciplines behavior, so stability declines. Beyond a threshold, the disciplining and cleansing effects dominate, and stability recovers as the weakest risk-takers are pruned. This motivates H1: the relationship between fintech competition intensity and bank stability is U-shaped, declining then rising. H2: the persistence of risk, captured by the lagged stability measure, is positive and substantial.

3. Data and Methodology

The panel is assembled from secondary bank-level financial data and market-level indicators of fintech competition intensity. Stability is measured by the natural logarithm of the Z-score, a standard distance-to-default proxy combining capitalization, profitability, and earnings volatility. Fintech competition intensity is a market-level index reflecting neobank presence and activity.

Table 1: Variables and Sources

Variable	Definition	Source (Verify)
Z-score	Log distance-to-default	Statements
Fintech comp.	Competition intensity index	Market trackers
Bank size	Log total assets	Statements
Capital	Equity/assets (%)	Statements
Liquidity	Liquid assets/assets (%)	Statements
GDP growth	Real GDP growth (%)	National accounts

Illustrative; verify all series before submission.

The dynamic specification includes the lagged dependent variable and both a linear and a quadratic term in competition to capture the hypothesized curvature:

$$Z_{it} = \rho \cdot Z_{i,t-1} + \beta_1 \cdot \text{comp}_{it} + \beta_2 \cdot \text{comp}_{it}^2 + X_{it} \cdot \gamma + \mu_i + \varepsilon_{it} \quad (1)$$

where Z_{it} is the stability measure, comp_{it} is fintech competition intensity, and the sign pattern $\beta_1 < 0$, $\beta_2 > 0$ would confirm a U-shape with a turning point at $-\beta_1/(2\beta_2)$. The model is estimated by two-step system GMM with Windmeijer-corrected standard errors. Lagged levels and differences of the endogenous

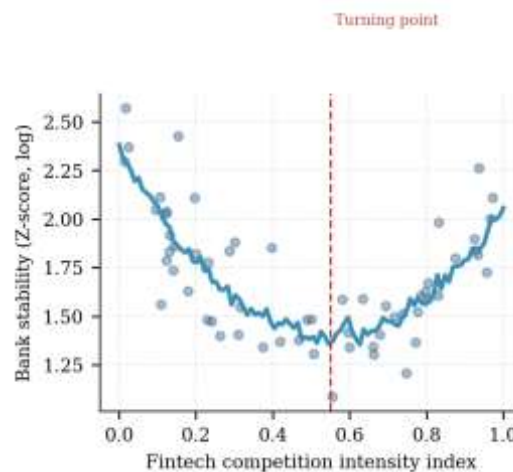
regressors serve as internal instruments. Instrument validity is assessed by the Hansen J test, and the identifying assumption of no second-order serial correlation in the differenced residuals is checked by the AR(2) test.

4. Results

4.1. The Shape of the Relationship

Figure 1 displays the fitted relationship between fintech competition intensity and bank stability. The curve descends from low competition to a turning point and rises thereafter, the U-shape anticipated by H1. The scatter of underlying observations, though dispersed, is consistent with this curvature rather than with a linear trend.

Figure 1: Fitted U-Shaped Relationship between Fintech Competition Intensity and Bank Stability (Illustrative Data)



4.2. System-GMM Estimates

Table 2 reports the estimates. The lagged stability term carries a large positive coefficient, confirming the strong persistence of risk anticipated by H2 and vindicating the dynamic specification. The linear competition term is negative and the quadratic term positive, jointly describing the U-shape; the implied turning point falls near the middle of the observed competition range. Capitalization and liquidity enter with the expected stabilizing signs.

Figure 2: System-GMM Coefficient Estimates by Regressor (Illustrative Data)

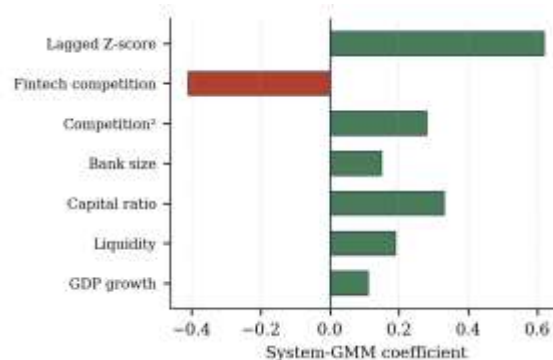


Table 2: System-GMM Estimation Results

Regressor	Coef.	Diagnostic
Lagged Z-score	0.62	
Fintech competition	-0.41	
Competition squared	0.28	
Bank size	0.15	
Capital ratio	0.33	
Liquidity	0.19	
AR(2) p-value		0.31
Hansen p-value		0.24

Illustrative coefficients; AR(2) and Hansen p-values above 0.10 support the specification. Re-estimate on verified data.

The diagnostic tests support the specification. The AR(2) test does not reject the null of no second-order serial correlation, so the moment conditions are not invalidated by residual dynamics. The Hansen test does not reject instrument validity, and the instrument count is kept modest to avoid the over-fitting that plagues GMM applications. The results are therefore not an artifact of weak or excessive instrumentation.

5. Discussion

The non-monotonic finding reconciles the two classical views by locating each in its proper range. In markets where neobank competition is still moderate, entry appears to erode stability as incumbents stretch for yield to defend returns; in markets where competition has advanced past the turning point, the disciplining and cleansing forces dominate and stability recovers. The policy and strategic reading is that the stability consequence of neobank entry is contingent on a market's position along the curve rather than uniform, and that supervisory vigilance is most warranted in the descending region where franchise erosion outpaces discipline.

6. Conclusion

Confronting the twin hazards of persistence and endogeneity through a dynamic system-GMM design, this study documents a U-shaped relationship between fintech competition and bank stability, with strong persistence in risk. The evidence dissolves the apparent contradiction between competition-fragility and competition-stability views by assigning each to a distinct competitive range. Limitations include the measurement of competition intensity at the market level and the sensitivity of GMM to instrument choice, which is mitigated but not eliminated here; future work should refine the competition proxy and explore bank-level exposure measures.

Declarations

Funding: none. Conflicts of interest: none declared. Data availability: all data derive from publicly available secondary sources and must be verified against them. Use of generative AI: the author used an AI-assisted writing tool for drafting and language editing; the author designed the study, specified the models, interpreted the results, and takes full responsibility for the scientific content.

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