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Asset Quality Across Indian Public-Sector Banks: Persistence, Regime-Dependence, and a Forward Stress Test

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ABSTRACT

This study examines the dynamics of asset quality across all twelve Indian public-sector banks (PSBs) over fiscal years 2011–2026, using a merger-consistent (pro-forma) panel of 192 bank-years constructed from Reserve Bank of India (RBI) data and bank disclosures. The empirical workhorse is deliberately simple: the canonical non-performing-loan (NPL) determinants panel, in which the gross non-performing-asset (GNPA) ratio is regressed on its own lag, real GDP growth, the ten-year government-bond yield, and lagged credit growth, with bank fixed effects and standard errors clustered by bank. Three findings emerge. First, asset quality is highly persistent: the autoregressive coefficient is about 0.71 with the full set of controls—implying a half-life of roughly two years—and is robust to adding year fixed effects and to excluding the pandemic years. Second, the relationship between GNPAs and the macroeconomy is not structurally stable: interest rates matter, but the coefficient on GDP growth is weak and wrong-signed in the pooled panel, and when the identical regression is estimated separately before and after the AQR the GDP coefficient collapses from +1.20 to zero—evidence that the 2016 surge was a supervisory recognition event rather than a business-cycle effect. Third, a transparent, calibrated stress test—reconciled to the RBI June 2026 Financial Stability Report—finds that all twelve banks remain above the eight-per-cent CET1 prompt-corrective-action floor even under a severe five-percentage-point GDP contraction, with the asset-weighted GNPA ratio rising from 1.94 to 3.93 per cent. Cross-sectionally, the stressed-capital ranking is governed by starting capital and bank size rather than current asset quality.

Keywords: Asset Quality Review, capital adequacy, non-performing assets, panel data, stress testing

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1. Introduction

Public-sector banks (PSBs) intermediate a majority of bank credit in India and carry significant fiscal weight as majority government-owned institutions. Their asset quality deteriorated markedly after the Reserve Bank of India (RBI) forced recognition of stressed exposures through the 2015–16 Asset Quality Review (AQR), with system gross non-performing assets (GNPAs) peaking near 14 per cent in FY2018, and has since improved to a multi-decade low below 2 per cent by FY2026, following recapitalization and the 2017–20 consolidation of the sector into twelve entities [1], [10].

This study addresses three questions using a bank-level panel spanning the full cycle: (i) how persistent is asset quality once impaired; (ii) is the empirical relationship between NPAs and the macroeconomy stable enough to support forecasting; and (iii) how resilient is each PSB to a renewed downturn? The study contributes a merger-consistent panel of all twelve current PSBs, evidence of high persistence and of an unstable (non-structural) macro elasticity, and a transparent forward stress test reconciled to the RBI's own projections. A methodological implication is emphasized: where a panel is dominated by a one-off supervisory event, reduced-form elasticities are not structurally stable and should be calibrated rather than extrapolated. A further, practical virtue of the simple specification is that every coefficient carries a one-line interpretation, which matters when the cross-section is small.

2. Literature Review

The determinants of non-performing loans (NPLs) are well studied. Cross-country and single-country evidence consistently finds that NPLs decline with GDP growth and rise with interest rates and prior credit growth, and that they exhibit strong persistence [11], [5], [7], [4], [2]. Indian evidence mirrors these regularities [3], [10]. This literature has a workhorse specification—the NPL ratio regressed on its own lag, a few macro variables, and one or two bank controls, with bank fixed effects—which this study adopts deliberately. Persistence is captured through the lagged dependent variable, which introduces the dynamic-panel bias identified by Nickell [6]: the within estimator of the autoregressive coefficient is biased toward zero in short panels. Because instrumental-variable and GMM corrections are unreliable at twelve cross-sectional units, the fixed-effects estimate is read here as a conservative lower bound on true persistence rather than corrected with additional estimators.

This study extends the literature by demonstrating that, in a sample containing a supervisory structural break, the estimated macro elasticity is not stable across sub-periods, linking the reduced-form NPL literature to supervisory top-down stress testing. The Indian AQR provides an unusually clean example of such a break, because the recognition of stressed assets was

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administratively imposed rather than driven by contemporaneous macroeconomic deterioration [1], [8].

3. Data and Methodology

Data pertaining to individual banks for the period 2011–2025 are available in the RBI Statistical Tables Relating to Banks in India, while the figures for 2026 have been manually compiled from bank performance statements and Basel III Pillar 3 disclosures. The macroeconomic data and scenario parameters are taken from the RBI Handbook of Statistics and the Financial Stability Report of June 2026. Since six banks merged during 2017–2020, a pro-forma figure has been calculated by aggregating the acquirer and target amounts prior to the merger and then recomputing the ratios. Thus a balanced panel of twelve banks over sixteen years (192 observations) is formed.

Table 1. Descriptive statistics (n = 192)

Variable	Mean	SD	Min	Max
Gross NPA ratio (%)	7.63	5.62	1.40	25.00
Net NPA ratio (%)	3.49	3.08	0.18	14.06
Capital adequacy ratio (%)	13.56	2.55	9.04	20.53
Return on assets (%)	0.18	0.87	-2.98	1.56
Credit growth (%)	8.48	8.00	-15.07	25.86
Real GDP growth (%)	6.16	3.39	-5.80	9.70

The workhorse is the canonical NPL-determinants panel, estimated with bank fixed effects and standard errors clustered by bank (Eq. 1): the gross NPA ratio is regressed on its own lag, real GDP growth, the ten-year government-bond yield, and lagged credit growth. The persistence coefficient ρ implies a half-life for a shock to the ratio of ln 0.5 / ln ρ. To test whether the macro relationship is structural, the identical equation is re-estimated on the two halves of the sample, split at the AQR—the pre-recognition period (FY2011–15) and the recognition-and-clean-up period (FY2016–26); a structural relationship would leave the GDP coefficient unchanged across the split.

$$\mathrm{GNPA}_{it} = \alpha_i + \rho\,\mathrm{GNPA}_{i,t-1} + \beta_1\,\mathrm{GDPg}_t + \beta_2\,\mathrm{Yield}_t + \beta_3\,\mathrm{CredGr}_{i,t-1} + \varepsilon_{it} \qquad (1)$$

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The stress projection holds persistence fixed and applies calibrated, sign-restricted elasticities (−0.15 per unit increase in GDP growth; +0.08 per 100-basis-point increase in the repo rate) as deviations from a baseline path, anchored to each bank's FY2026 GNPA ratio (Eq. 2). Incremental NPAs are provisioned at 60 per cent and charged against two years of pre-provision operating profit; any residual, plus a mark-to-market loss on the securities book under the rate shock, is deducted from CET1 capital, and the stressed ratio is compared with the 8 per cent PCA floor [9] (Eq. 3).

$$\widehat{\mathrm{GNPA}}_{i,2028} = \mathrm{GNPA}_{i,2026} + \rho\, dev_{i,1} + \tilde{b}_g\,(g_2 - g_2^{B}) + \tilde{b}_r\,\Delta\mathrm{Repo}_2 \qquad (2)$$

$$\mathrm{buffer}_i = 100\left[\mathrm{CET1}_i - \max\left(0.6\,\Delta\mathrm{NPA}_i - 2\,\mathrm{PPOP}_i,\, 0\right) - \mathrm{MTM}_i\right]/\mathrm{RWA}_i - 8.0 \qquad (3)$$

4. Results and Discussion

4.1 Persistence of asset quality

Table 2 presents the canonical NPL panel in four columns. Persistence is the most robust feature: the autoregressive coefficient is 0.885 with persistence and the cycle alone (column 1), 0.713 with the full control set (column 2), 0.741 once year fixed effects are added (column 3), and 0.707 excluding the pandemic years (column 4)—a tight band implying a half-life of about two years. The interest-rate channel is also robust: a one-point rise in the ten-year yield raises the GNPA ratio by about 1.08 points. Lagged credit growth enters negatively (a denominator effect, as rapid loan growth dilutes the current ratio before new loans season), while the coefficient on contemporaneous GDP growth is small, insignificant, and wrong-signed once persistence and rates are controlled—the anomaly examined next.

Table 2. Determinants of the GNPA ratio (canonical NPL panel).

	(1) Base	(2) Full	(3) +Year FE	(4) ex-COVID
Lagged GNPA (ρ)	0.885***	0.713***	0.741***	0.707***
	(0.011)	(0.031)	(0.034)	(0.041)
Real GDP growth	0.136**	0.083		0.481***
	(0.061)	(0.064)		(0.174)
10-year G-sec yield		1.077***		0.900***
		(0.186)		(0.172)
Credit growth (t−1)		-0.195***	0.008	-0.231***

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		(0.038)	(0.024)	(0.045)
Bank FE / Year FE	Y/N	Y/N	Y/Y	Y/N
Observations	168	168	168	144

*Dependent variable is the gross NPA ratio (%); bank fixed effects; SE clustered by bank in parentheses. *** p<0.01, ** p<0.05, * p<0.10.*

4.2 The macro relationship is not structural

Re-estimating the identical model on the two halves of the sample shows that the macro slope is not a stable parameter (Table 3, Fig. 1). In the boom (FY2011–15) the coefficient on GDP growth is large, positive, and significant (+1.20), while persistence is absent (ρ = −0.19); after the AQR (FY2016–26) the GDP-growth coefficient is exactly zero (0.00) and persistence takes over (ρ = 0.64). The same regression, run on two adjacent sub-periods, delivers a GDP slope that swings from strongly positive to nothing. Economically, low and falling NPAs coincided with high growth in the boom (a spurious positive correlation), whereas the 2016–2018 surge was administrative—the AQR forcing recognition—rather than cyclical. A pooled elasticity therefore averages conflicting forces and cannot be extrapolated, which motivates a calibrated rather than estimated projection.

Fig. 1. GDP-growth and persistence coefficients from the same regression, estimated separately before and after the AQR, with 95% confidence intervals

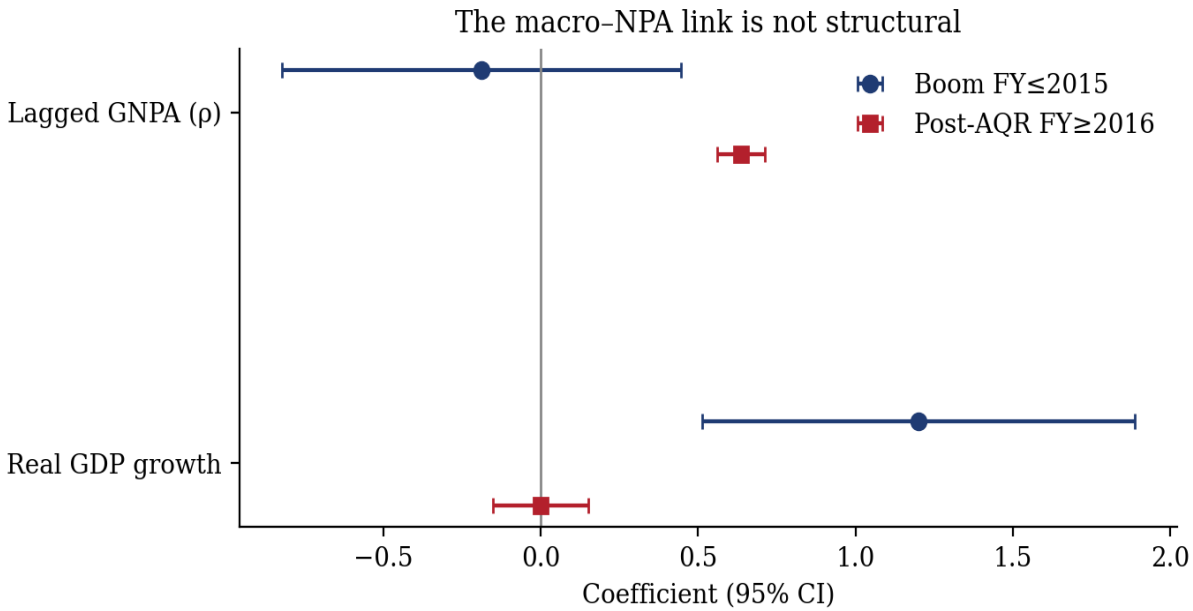

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Table 3. The same model, split at the AQR

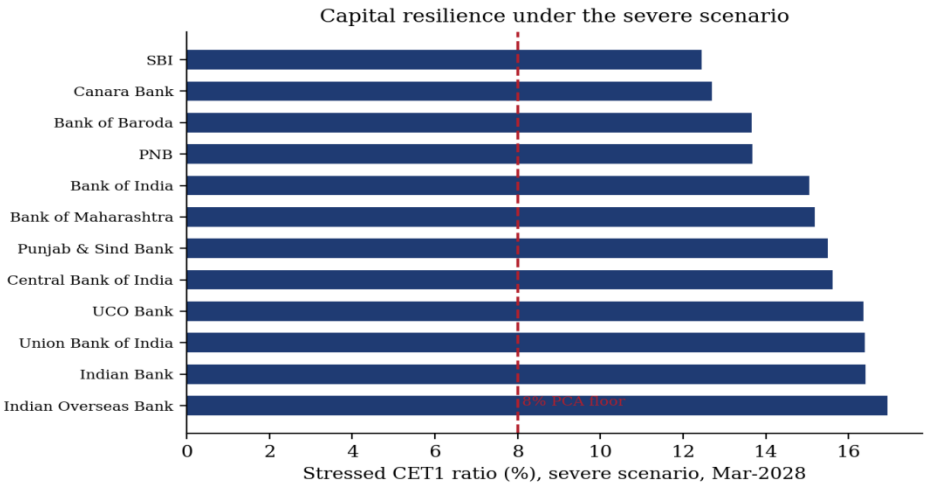
	Boom FY2011–15	Post-AQR FY2016–26
Lagged GNPA (ρ)	-0.188	0.637***
	(0.323)	(0.038)
Real GDP growth	1.200***	0.000
	(0.350)	(0.077)
10-year G-sec yield	-0.144	2.149***
	(0.262)	(0.543)
Credit growth (t−1)	-0.010	-0.235***
	(0.044)	(0.041)
Observations	36	132

*Eq. (1) estimated separately on each sub-period; bank fixed effects; SE clustered by bank. *** p<0.01, ** p<0.05, * p<0.10.*

4.3 Forward stress test

The baseline projection reaches an asset-weighted GNPA ratio of 1.94 per cent by March 2028, reconciling with the RBI system projection of about 1.9 per cent. The adverse, concentration, and severe scenarios yield 2.24, 3.64, and 3.93 per cent respectively. All twelve banks remain above the 8 per cent CET1 floor in every scenario: two years of pre-provision operating profit absorb the incremental credit provisioning, so the material capital drain arises only from mark-to-market losses on securities under the rate shock (Fig. 2).

Fig. 2. Stressed CET1 ratio under the severe scenario, ranked; dashed line is the 8% PCA floor



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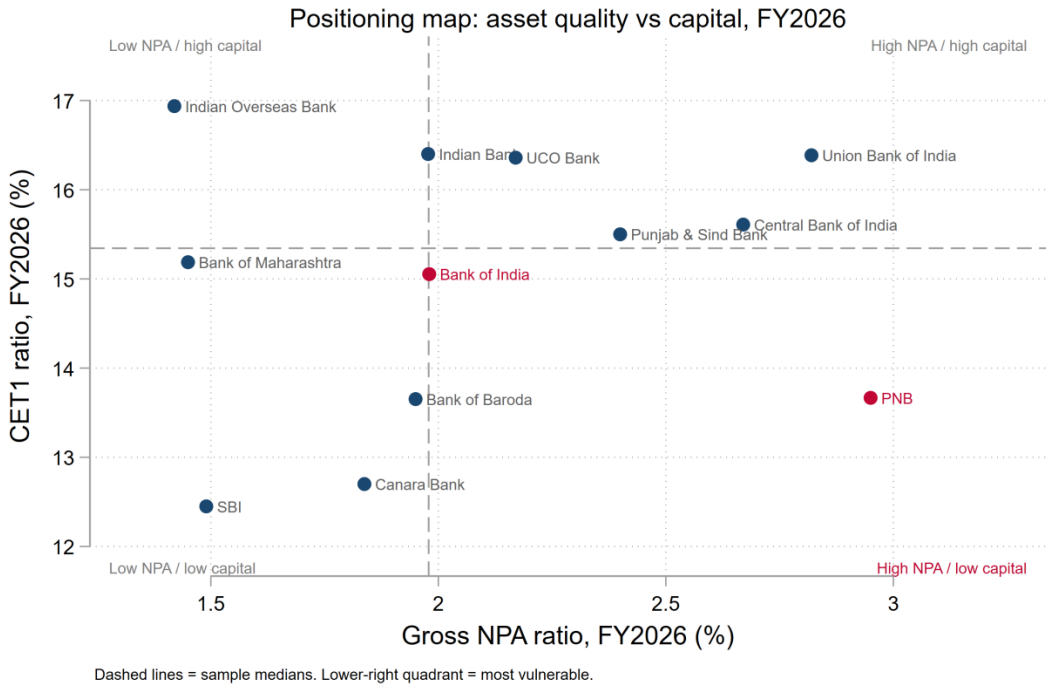
4.4 Cross-sectional resilience

The banks facing the most severe asset stress (Punjab National Bank, Union Bank of India, Central Bank of India) are not the ones with the smallest capital cushions (State Bank of India, Canara Bank, Punjab National Bank). The stressed minimum CET1 cushion has a near-perfect positive correlation with the starting level of CET1 (0.99) and a negative relationship with bank size (−0.65), but no relationship with current asset quality (0.09). The largest banks therefore have the least headroom, because they operate closest to the regulatory minimum (Fig. 3).

Fig. 3. Positioning map: FY2026 gross NPA ratio versus CET1 ratio; dashed lines are sample medians



4.5 Why not a causal design?

It is natural to prefer a causal design, and two were explored and reported transparently as inconclusive. A difference-in-differences around the mergers is statistically indistinguishable from zero (0.991, s.e. 1.549); the only significant variant is confounded by COVID-19. An AQR loan-growth exposure design is a clean null—pre-AQR loan growth does not explain the cross-bank AQR-era GNPA increase (0.033, s.e. 0.336). With twelve cross-sectional units these designs are underpowered, and the null results are reported rather than over-interpreted; the paper is built on the reduced-form panel instead.

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4.6 Robustness

The two most important robustness checks are already contained in the headline table (Table 2): adding year fixed effects leaves persistence at 0.74, and excluding the pandemic years leaves it at 0.71, while the interest-rate coefficient stays positive and significant and the GDP coefficient remains weak and unstable—reinforcing the finding that the macro elasticity is not a stable parameter. The stress test is invariant at the baseline and yields a severe-scenario system GNPA of 3.2–4.6 per cent across calibrations of the GDP elasticity (Table 4), with no bank breaching the capital floor across this range.

Table 4. Stress-test sensitivity to the calibrated GDP elasticity

Elasticity b̃_g	Baseline GNPA 2028 (%)	Severe GNPA 2028 (%)
-0.10	1.94	3.24
-0.15 (headline)	1.94	3.93
-0.20	1.94	4.61

5. Implications and Recommendations

At a system GNPA ratio below 2 per cent, the salient question is which PSBs are most exposed to the next cycle. This study reframes that question along two axes—projected asset-quality deterioration and stressed capital headroom—and shows they identify largely different banks: the weakest-asset-quality banks are comfortably capitalized, whereas the thinnest-capital banks have strong asset quality but operate closest to the regulatory minimum. The high persistence of NPAs implies that impairment reverses only slowly, so early forced recognition is valuable; and the instability of the macro slope cautions that an elasticity estimated across a structural break can carry a perverse sign, making a transparent calibrated overlay preferable to a spuriously precise projection. For supervisors and analysts, the practical recommendation is to monitor PSBs along both axes rather than a single composite vulnerability score.

6. Future Research

Three extensions follow directly. First, because the twelve-bank cross-section limits statistical power, future work should deepen the unit of analysis to the firm or sector level to identify the loan composition that drove cross-bank differences in AQR-era severity. Second, the calibrated stress test would benefit from uniformly disclosed Basel III Pillar 3 data on sectoral exposures and available-for-sale durations, replacing the assumption-based inputs behind the concentration and interest-rate channels. Third, the finding that the macro slope is not structural invites replication across other banking systems that experienced discrete supervisory recognition episodes.

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7. Conclusion

This paper shows that there is strong persistence in the asset quality of PSBs in India, that the relationship between NPAs and macroeconomic variables is not structurally stable—the coefficient on GDP growth swings from strongly positive before the AQR to zero afterwards—and that a well-calibrated stress test keeps every PSB above the CET1 PCA threshold even under a severe downturn. Under this framework, the ability of capital to withstand stress depends largely on the initial level of capital and the scale of operations rather than on contemporaneous asset quality. The implication is that sector risk has shifted from solvency toward earnings and interest-rate risk. The main limitations are the small cross-sectional sample and the assumptions used for sectoral exposures, both natural avenues for extension.

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References

[1] V. V. Acharya, Quest for Restoring Financial Stability in India. New Delhi: SAGE Publications, 2020.

[2] R. Beck, P. Jakubik, and A. Piloiu, "Key determinants of non-performing loans," Open Economies Review, vol. 26, no. 3, pp. 525–550, 2015.

[3] A. Ghosh, "Banking-industry specific and regional economic determinants of non-performing loans," Journal of Financial Stability, vol. 20, pp. 93–104, 2015.

[4] N. Klein, "Non-performing loans in CESEE," IMF Working Paper 13/72, 2013.

[5] D. P. Louzis, A. T. Vouldis, and V. L. Metaxas, "Macroeconomic and bank-specific determinants of non-performing loans in Greece," Journal of Banking & Finance, vol. 36, no. 4, pp. 1012–1027, 2012.

[6] S. Nickell, "Biases in dynamic models with fixed effects," Econometrica, vol. 49, no. 6, pp. 1417–1426, 1981.

[7] M. Nkusu, "Nonperforming loans and macrofinancial vulnerabilities in advanced economies," IMF Working Paper 11/161, 2011.

[8] R. G. Rajan, Note to the Parliamentary Estimates Committee on Bank NPAs. Government of India, 2018.

ISSN: 2455-8834

Volume:11, Issue:07 "July 2026"

[9] Reserve Bank of India, Revised Prompt Corrective Action (PCA) Framework for Banks, RBI/2021-22/118, 2021.

[10] Reserve Bank of India, Financial Stability Report, June 2026. Mumbai: RBI, 2026.

[11] V. Salas and J. Saurina, “Credit risk in two institutional regimes,” Journal of Financial Services Research, vol. 22, no. 3, pp. 203–224, 2002.

