Studying The Statistical Relationship Between Bank Profitability (Roa, Roe) And Credit And Deposit Intermediation

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Abstract

This research investigates how credit and deposit intermediation relate statistically to bank profitability measured by return on assets (ROA) and return on equity (ROE). Building on intermediation theory and efficiency measurement, we specify a parsimonious empirical model in which loans-to-assets and deposits-to-assets act as core intermediation proxies, while net interest margin, cost-to-income, and bank size serve as controls. We describe the construction of variables, motivate linear functional forms, discuss identification risks and diagnostics, and provide an illustrative framework for reading coefficients as conditional associations rather than causal effects. A compact table clarifies variable definitions and expected coefficient signs in ROA and ROE equations, and a conceptual diagram maps the influence channels linking intermediation to profitability under margin and cost conditions. The thesis concludes with guidance for analysts and researchers on panel specifications, disaggregation of funding and loan mixes, and transparent documentation to enhance decision relevance.

Keywords: - Bank intermediation; ROA; ROE; loans-to-assets; deposits-to-assets; cost-to-income; net interest margin; regression analysis.

Introduction

Banks create value by transforming liquid, short-term liabilities into less liquid, longer-term assets while pricing and managing risk. Profitability should therefore co-move with the intensity and quality of intermediation. Yet the mapping is conditional because asset mix, funding structure, operating costs, and market power interact. As loans expand relative to assets, interest income and credit risk rise together, and the net effect on ROA depends on spreads, provisioning, and cost discipline. As deposits deepen relative to assets, funding stability and pricing advantages often improve, but competition for deposits or interest-rate cycles can erode the implied benefit. These tensions make the statistical investigation of profitability against intermediation a matter of careful specification. ROA and ROE capture distinct perspectives: the former scales net income by the asset base and reflects earning capacity and operating efficiency; the latter amplifies performance through leverage and is sensitive to capital structure. Placing credit and deposit intermediation measures alongside margin and cost controls allows the relationship to be read as a conditional association with clear managerial implications.

The empirical approach is a cross-sectional or panel OLS framework in which ROA and ROE are regressed on loans-to-assets and deposits-to-assets, controlling for net interest margin, cost-to-income, and size measured by the logarithm of total assets. Loans-to-assets summarizes the asset allocation toward interest-earning credit, while deposits-to-assets represents reliance on

core, typically lower-cost funding as opposed to wholesale sources. Net interest margin captures revenue-side thickness driven by pricing power and balance-sheet composition; cost-to-income aggregates operating efficiency; size proxies scale economies and scope. Linear functional forms are a reasonable first approximation, with subsequent checks for nonlinearity by adding squared terms for intermediation if diminishing returns or risk saturation are suspected.

Identification is limited in pure OLS because simultaneity and omitted variables can bias coefficients. Panel designs with bank fixed effects absorb time-invariant heterogeneity in business models; time dummies capture macro and regulatory regimes; instrumental variables or lag structures mitigate simultaneity between intermediation and profitability. Diagnostics include multicollinearity checks, heteroskedasticity-robust standard errors, leverage and influence metrics, and sensitivity to alternative profitability measures such as risk-adjusted returns or pre-provision operating profit. In applied settings, disaggregation of deposits (retail versus wholesale, demand versus time) and loans (household versus corporate, secured versus unsecured) improves interpretability.

Table 1. Operational definitions and expected signs of coefficients in ROA and ROE equations given standard priors.

Variable (symbol)	Measurement	Expected sign in ROA	Expected sign in ROE
Credit intermediation (L/A)	Loans / Total assets	+	+
Deposit intermediation (D/A)	Deposits / Total assets	+	+
Net interest margin (NIM)	Net interest income / Earning assets	+	+
Cost efficiency (CIR)	Operating costs / Operating income	–	–
Size (lnA)	Natural log of total assets	±	±

When ROA is regressed on loans-to-assets and deposits-to-assets alongside net interest margin, cost-to-income, and size, the coefficients on loans-to-assets and deposits-to-assets are expected to be positive if intermediation is priced prudently and funded efficiently. The positive association between loans-to-assets and ROA reflects the shift of assets toward interest-bearing credit, which lifts net interest income per unit of assets provided that credit risk does not force compensating provisions that erase gains. The positive association for deposits-to-assets emerges from the funding side: a larger share of stable, low-cost deposits lowers average funding costs and supports wider spreads, thereby raising net income over assets. However, both effects are sensitive to margins and costs.

In ROE regressions, patterns are similar but typically larger in magnitude because equity-scaled returns amplify operating performance through leverage. A bank that deepens its credit intermediation at unchanged leverage and risk pricing will tend to produce stronger ROE, but the same mechanism magnifies downside when loan quality deteriorates. Increased dependence on deposit funding can strengthen ROE if deposits remain sticky and reprice slowly relative to assets; if deposit costs adjust rapidly to policy rates, the benefit can compress during tightening cycles.

A common empirical complication is multicollinearity between intermediation measures and net interest margins because both arise from consistent pricing and balance-sheet choices. High variance inflation factors inflate standard errors and can obscure significance. Remedies include orthogonalization or the use of lagged margins to reduce simultaneity. Another complication is the potential nonlinearity of intermediation effects. Profitability may rise with loans-to-assets up to a point, beyond which marginal risk and funding costs outweigh incremental income. This can be investigated by adding squared terms or by estimating quantile regressions to see whether the intermediation–profitability nexus differs across profitability distributions.

The funding mix deserves disaggregation because deposits are heterogeneous. Retail demand deposits are cost-advantaged and sticky, while large time deposits and wholesale funds reprice quickly and can be volatile. If the data allow, separating these categories will help attribute the profitability association more precisely. Similarly, loans can be disaggregated into retail, SME, corporate, and mortgage portfolios with distinct risk–return profiles, improving the diagnostic value of results. Even in a parsimonious model, transparent documentation of variable construction and robust standard errors improves credibility and facilitates replication by peers, supervisors, or internal audit.
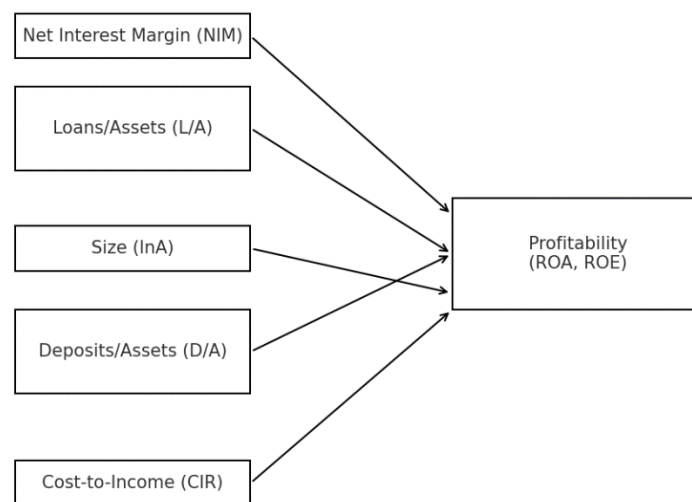

Figure 1. Conceptual path diagram of the profitability–intermediation nexus

The diagram summarizes the conditional links: asset-side and funding-side intermediation influence profitability directly, while margin, costs, and size condition both the level and the slope of these relationships. In empirical work, macro variables such as policy rates, yield-curve slope, and inflation should be included to absorb shared shocks.

The statistical relationship between bank profitability and intermediation is positive in theory and often in practice, but it is mediated by margin conditions, operating efficiency, and risk quality. Loans-to-assets and deposits-to-assets are useful, interpretable proxies that, when placed alongside net interest margin, cost-to-income, and size, yield a transparent regression framework for benchmarking institutions and monitoring strategy. ROE generally shows stronger sensitivity to intermediation than ROA because leverage magnifies results, which raises the premium on risk controls. Analysts should treat OLS coefficients as conditional associations unless panel identification or credible instruments support causal claims. In applied settings, disaggregation of funding and loan mixes, inclusion of asset-quality variables, robust errors, and nonlinearity tests are practical extensions. Well-documented, periodically

refreshed panel regressions embedded in management dashboards can convert these relationships into decision-relevant signals that guide pricing, funding, and cost initiatives in a coherent way.

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