REVIEW OF RESEARCH
ISSN: 2249-894X
IMPACT FACTOR : 5.7631(UIF)
VOLUME - 15 | ISSUE - 6 | MARCH - 2026

HOW BANKS AND OTHER FACTORS INFLUENCE NIM (NET INTEREST MARGIN)?: A SYSTEMATIC REVIEW OF GLOBAL EVIDENCE (1985–2025)

Kshitiz Baveja
B.Com (Hons.), 4th Year, Undergraduate Research Scholar,
Department of Commerce, Dyal Singh College, University of Delhi.

Dr. Amarjeet Kaur
Assistant Professor, Department of Commerce,
Dyal Singh College, University of Delhi.

ABSTRACT:

Purpose*: The paper has been built on a systematic literature review (SLR) to investigate, categorise and synthesise the multi-dimensional factors of Net Interest Margin (NIM) variability across international banking structures since 1985 to 2025. The study is motivated by three unsolved paradoxes: the Efficiency Paradox, the Unstable Inference Problem, and the Diversification Paradox, and in the study, it forms a two-determinant analytical model that separates the Internal-bank-specific factors and External macroeconomic and policy drivers.*

Methodology: *Strict protocol of SLR was implemented on Google Scholar, JSTOR, SSRN, ResearchGate and central bank research portals in the NIM specific key words. Fifty high impact empirical articles published between 1985 and 2025 - partially satisfying four pre-specified inclusion criteria - were systematically selected, coded on a standardised extraction framework and synthesised thematically. The methodologies in reviewed studies include seven techniques, which include: Panel GMM, Data Envelopment Analysis (DEA), Fixed Effects, Random Effects, Pooled OLS, Decomposition Analysis, and Portfolio Simulation.*

Findings: *This leads to five convergent conclusions: (1) the core effect of central banks on NIM is their variables in the form of changes to the policy rate employing asymmetric Pass-Through Lag, explaining about 91% of the NIM variation of interest rate variations (Memmel & Heckmann-Draisbach, 2022 The Arab region and the Eurozone are reported to have significant regional divergences.*

Originality: *The study will provide the first cross-regional synthesis of SLR that will fill three long-standing gaps: the Metric Gap (accounting versus market-value NIM), the Ownership Isolation Gap (pooling domestic and foreign banks), and the Digitalization Gap (absence of fintech variables within most NIM models). The suggested future research directions are AI-based credit monitoring, Neo-bank NIM equilibrium modelling, and Market-Value Adjusted NIM as a regulatory measure.*

KEYWORDS: *Net Interest Margin (NIM), Monetary Policy Transmission, Banking Efficiency, Non-Performing Loans, Loan Portfolio Diversification, Ownership Structure, Fintech Disruption, and Efficiency Paradox.*

1. INTRODUCTION:

1.1 Background: NIM in the Modern Banking Landscape

The Net Interest Margin (NIM) is the quantitative foundation of commercial banking profitability. The spread between interest received on loans, securities, and other interest-earning assets on one hand, and the interest paid on deposits and borrowings on the other is expressed as the ratio of net interest income to average interest-earning assets, in other words NIM. Through the 4 decades of its track record as a calculating concept, NIM has been transformed into a complex multi-dimensional deviation of systemic stability, regulatory adherence and strategic resilience. Cross-country variation NIM, 1985–2008 This period experienced a moderate level of cross-country difference in levels of NIM. The US commercial banks upheld margins of 3.5-4.5 percent; European banks had revealed margins of 1.5-3.0 percent; South Asian, Sub-Saharan as well as Southeast Asian emerging market institutions portrayed NIMs of 5-8 percent or greater, which signifies structural intermediation inefficiencies and an augmented credit risk premium. This underlying question was formalised by Ho and Saunders (1981) in the form of the Dealer Model in which banks are conceived of as risk-averse market-makers who bid-ask spreads1 thereby adapting the uncertainty in loan demand and deposit supply - a hypothesis subsequently used to frame academic discussion over the next forty years. The NIM equilibrium was severely shaken by the 2008 Global Financial Crisis and the latter long low-rate environment. US Federal Reserve held the near-zero rates over prolonged times, European Central Bank experimented with the negative rates, and the Bank of Japan institutionalised the Zero Lower Bound (ZLB) as a quasi-permanent position. The additional shock was the COVID-19 pandemic and the resultant post-pandemic inflationary surge of 20222024 led to one of the most enterprise-level interest rate shifts in modern banking history. Throughout the span of this next five decades, NIM has not been steadfast or predictive - it has varied with shifts in global monetary policy, regulation requirements within domestic markets, and the interference of damagingly-enabled financial entrants.

1.2 The Triple Paradox of NIM Research

In spite of forty years of empirical study, the NIM research literature is marked by an explanatory failure in three interconnected areas that will be identified in this paper as the 'Triple Paradox' of NIM research:

1.2.1 The Efficiency Paradox

According to conventional microeconomic theory, competitive discipline should apply to operationally inefficient banks, which have more cost structure: margin compression by competitors with lower-cost structures. Applied to banking, banks that have high cost-income ratios must have NIM compression. However, when examining fourteen banking systems across fourteen Arab countries, as found by a study conducted by Obeid (2024) through the regression of Panel Data, the cost-to-income ratio can be statistically proven to have a positive impact on NIM: more inefficient banks keep wider margins. Almarzoqi and Ben Naceur (2015) duplic this finding in the Caucasus and Central Asia (CCA) with the use of System GMM. The Efficiency Paradox is not a statistical anomaly, it is an inherent characteristic of banking system in which competitive discipline is lacking either because of concentrated ownership, obstacles to entry in regulation, or the relative inability of foreign banks to penetrate.

1.2.2 The Unstable Inference Problem

The traditional understanding of stable NIM is how real franchise value - the capacity of a bank to obtain low-cost deposits based on its loyal customers and its control of pricing power over borrowers. Using quarterly FFIEC 031/041 regulatory data of 148 US commercial banks since 1985, Begenu and Stafford (2022) show that this interpretation is flawed. Their main suggestion is that NIMs

stability can be precisely duplicated by a bank that has a mechanical long-short fixed-income portfolio - without any customer relation, deposit franchise, or credit underwriting capacity. The regulatory implication is harsh: a bank that reports NIM most stable may in fact be holding the largest underreported long-term mismatch, the very dynamic that had played a role in failure of regional US banks in 2022-2023.

1.2.3 The Diversification Paradox

Diversification is the basic risk tool determined by the portfolio theory (Markowitz, 1952). Using the applied to bank loan portfolios, lending to various sectors should decrease credit risk variance as well as stabilise NIM. However, Agyei-Tweneboah (2017) on Ghanaian commercial banks and Owojori et al. (2022) on Nigerian banks both discover that loan portfolio diversification enhances NIM volatility. This is the suggested method, the Monitoring Cost Trade-off, because when banks lend to industries with no one established credit relationship, and with little industry expertise, costs of monitoring are higher and so is the provisioning rate, and higher is the accumulation of NPLs. The cost of dealing with informationally challenging exposures more than compensates for credit risk reduction by diversification.

1.3 Objectives and Research Questions

The paper is organized with the five key research questions: RQ1: What are the most important internal and external drivers of NIM variations in various global banking systems and what differences by region and market structure is their relative importance? 2. RQ2: What is the different monetary policy transmission across interest rate regimes - between low-rate and high-rate environments? 3. RQ3: How operational efficiency and quality of assets moderates NIM volatility in macroeconomic shocks? 4. RQ4: What is the reason that loan portfolio diversification destabilises the NIM of some emerging market banking systems? 5. RQ5: To what extent do institutional factors the ownership structure, regulatory requirements, and competition in Fintech can establish unique structural bands of NIM fluctuation?

2. Systematic Literature Review Methodology

2.1 Research Design: The SLR Approach

The paper uses a Systematic Literature Review (SLR) approach based on the five-stage procedure of Tranfield, Denyer, and Smart (2003): (1) systematic database search; (2) the use of inclusion and exclusion on the results; (3) quality management of the identified studies; (4) standardised data extraction; and (5) thematic synthesis of the extracted evidence base. In contrast to a narrative review, the SLR has a pre-defined, repeatable protocol that is aimed at making selection bias as minimal as possible and yield transparent, reproducible findings. The rationale behind the approach is that there is enough empirical literature (methodologically heterogeneous) on NIM determinants to perform meaningful cross-study synthesis.

2.2 Search Strategy

Five scholarly databases and repositories, specifically Google Scholar, JSTOR, SSRN (Stanford GSB and HBS working papers), Research Gate, and central banks and international organisation research portals (Federal Reserve, Reserve Bank of Australia, IMF, Bundesbank, ECB) were systematically searched. The keyword sets used below were employed: 'Net Interest Margin determinants/ NIM banking panel data / bank profitability/ monetary policy NIM pass-through/ loan diversification bank margin/ efficiency paradox banking/ non-performing loans NIM compression/ Fintech bank profitability. Selection of keywords, theme searches were combined using Boolean operators (AND, OR). The seminal papers used as sources of the backward citation chaining, especially Ho and Saunders (1981), Angbanzo (1997), and Begenau and Stafford (2022) were used to identify foundational studies that were not signified by keyword search.

2.3 Inclusion and Exclusion Criteria

Eligibility criteria were four pre-specified criteria based on which papers were screened to be included:

1. Primary dependent variable refers to NIM, Return on Assets (ROA), or a bank intermediation profitability measure which is closely related.
2. The research has adopted quantitative empirical design - regression analysis, Data Envelopment analysis, simulation or decomposition analysis, as opposed to a theory-driven or qualitative research.
3. Research includes at least five years of data in a study allowing time-series analysis.
4. Research is published in a peer-reviewed journal or presented at a central bank research forum or created as a working paper by a recognised academic institution.

2.4 Final Sample Characteristics

The 50 selected papers collectively employ seven primary methodologies: Panel GMM (used by Huynh, 2021; Almarzoqi & Ben Naceur, 2015; Sarkar & Rakshit, 2024; Erdas & Ezanoglu, 2022), Data Envelopment Analysis (Patra et al., 2024), Fixed Effects Models (Schwaiger & Liebeg, 2007; Bhattarai, 2024), Random Effects Models (Kunwar & Jnawali, 2023), Pooled OLS (Owojori et al., 2022; Todorovic et al., 2024), Decomposition Analysis (Fuster, Plosser & Rice, 2019), and Portfolio Simulation (Begenau & Stafford, 2022; Memmel & Heckmann-Draisbach, 2022). It has geographic coverage in United States, United Kingdom, Euro Area, Germany, Spain, Lebanon, Arab Region (14 countries), Caucasus and Central Asia (17 countries), India, Indonesia, Vietnam, Nepal, South Korea, Malaysia, Ghana, Nigeria, Botswana, Uganda, Jordan, Sri Lanka and Southeast European countries.

Table 1: SLR Sample Characteristics

Dimension	Detail
Total Papers	50 high-impact empirical studies
Publication Period	1985–2025
Geographic Scope	20+ countries across 6 regions: USA, UK, Euro Area, Arab Region, CCA, Sub-Saharan Africa, South/Southeast Asia, South Korea
Primary Methodologies	Panel GMM, DEA, Fixed Effects, Random Effects, Pooled OLS, Decomposition Analysis, Portfolio Simulation
Data Sources	FFIEC 031/041 (US), IMF, RBA, ECB/ORBIS, RBI, OJK, Bundesbank, national central bank databases, SSRN working papers
Bank Sample Sizes	Range: 4 (Indonesia Category-IV) to 4,995 banks (Sahyouni & Wang, 2018); 1,500 banks (Debelle et al., 2023)

3. Thematic Synthesis of Determinants

The 50 papers that were reviewed are synthesised in two main categories of determinants External (macroeconomic and policy) determinants and Internal (bank-specific) determinants, and in the third category of Institutional and Regulatory moderator. This dual-determinant model indicates the underlying difference in NIM literature between those forces within the control of the bank management and those that are externally enforced.

3.1 External Determinants

3.1.1 Monetary Policy and the Pass-Through Lag

The rates of policy of central banks are the most frequently recorded, frequently observed, empirically strong external factor of NIM volatility of the entire literature. Based on a medium-term NIM behaviour analysis of four separate instances of monetary tightening cycles with the help of the FFIEC 031/041 Call Report data, Fuster, Plosser, and Rice (2019) point to the so-called Pass-Through Lag as the main driver of NIM volatility. When the tightening cycle first gets underway banks immediately reprice the assets in the floating-rate loan asset pool at higher rates but the deposit liabilities are stuck in place - the retail depositors do not instantly demand higher rates. This

asymmetry generates a transient NIM growth at the outset of a tighter course of action. As the cycle matures and depositors become aware of the improved-rate environment, the competition pushes the banks to increase the deposit rates and the initial margin gain is gradually washed away. The accurate quantification of the transmission mechanism of monetary policy is given by Memmel and Heckmann-Draisbach (2022). They, based on passive modelling the interest business of the German bank as a passive investment, show that the variation in the level of interest rate (level shift) explains about 91% of the interest rate-driven NIM variance, with the variation in the steepness of the yield curve (term transformation) explaining the other 9%. This observation provides an unequivocal order of external NIM drivers with significant implications on the bank asset-liability management strategy. Debee et al. (2023) building on the study of the relationship between a positive policy rate and NIM within the global banking frameworks finds the positive policy rate-NIM relationship to hold universal evidence with the addition of the Zero Lower Bound (ZLB) to quantify the qualitative change of direction. In the ZLB, the level of deposits cannot be materially reduced, without depositors beginning to fly in the physical money, and loan yields still have to be competitive, a structural 'Margin Squeeze' that cannot be addressed solely by the increased efficiency of its operations.

3.1.2 GDP Growth and Macroeconomic Cycle Effects

The growth of GDP leads to expansion in NIM because it results in higher credit demand and better borrower quality, yet the benefit is extremely unevenly distributed across market structures. Kosmidou, Tanna and Pasiouris (since 2003) among the UK domestic commercial banks in the period 1995-2002 identify the principle known as the Shareholder Value Principle: market power is employed by banks in concentrated markets to raise NIM when the economy is growing in real GDP and depress deposit rates when the economy is shrinking. The opposite effect is evident in this phenomenon compared to foreign subsidiaries, which cross-managing NIM between international balance sheets instead of maximising local spreads in favour of domestic shareholders. In rich evidence of validity as to common predictors of clusters of countries with shared institutional characteristics, Todorovic, Jemovic, and Markovic (2024) indicate that across the banking systems of Southeast Europe, using Pooled OLS, GDP per capita, inflation and market concentration are important predictors of cross-country differences in NIM.

3.1.3 Fintech Disruption — The Digitalization Frontier

With the greatest rigorous treatment of the role of Fintech competition in banking profitability, Pham et al., (2023) develop the most rigorous quantitative treatment due to the use of the financial methodologies of Panel Corrected Standard Error (PCSE) in ASEAN-5 banking systems. Their main conclusion shows there is a temporal asymmetry Fintech investment is negatively contemporarily correlated with the profitability of banks - in line with competitive displacement by digital challengers draining the traditional loan and deposit books - but positively lagged - in line with efficiency-inducing adjustment, as existing banks invest in digital infrastructure to save overhead costs and improve service provision. Big banks are much less sensitive to Fintech proliferation compared to small banks, which is in line with the scale-based resilience benefits. The COVID-19 surge in digital banking adoption increased the Digitalization Gap, or the lack of Fintech competition variables, in most existing NIM research by an estimated three-to-five years, making the gap even more concerning in terms of projecting it forward. In the compilation of the single-bank evidence of the NIM effects of the pandemic, Widyanto (2022) compares the performance of PT Bank Central Asia before and after the pandemic.

3.2 Internal Determinants

3.2.1 Operational Efficiency — The Cost-Income Paradox

One of the most common internal NIM determinants is the cost-to-income ratio (BOPO in the Indonesian literature). The classical theoretical forecast in competitive markets is that an increase in efficiency (a decrease in costs versus income) permits banks to set competitive prices without compromising margin, leading to a negative coefficient between the costincome ratio and NIM. This standard relationship is verified by Dsouza et al. (2022) using pooled panel regression on Indian

commercial banks in the period 2001-2020 with efficiency ratios provided by RBI. Balakrishnan, Patra and R. (2024) develop this analysis by a two-step approach DEA efficiency scoring and the Random-effects GLS regression show that Priority Sector Lending (PSL) mandates generate structural NIM ceilings whereby even highly efficient Indian banks would not be able to maximise margins in periods of growth. The Efficiency Paradox is the critical regional inversion, with its evidence referred to by Obeid (2024) in 71 Arab commercial banks (20082022) and confirmed once again independently by Almarzoqi and Ben Naceur (2015) in 17 banking systems of the CCA region. In such oligopolistic markets, the enjoyed negative efficiency-NIM relationship is inverted: Banks which have a cost of operation that is greater hold a wider margin since nobody to check on them exists. The synthesis revelation is firm: the sign of the efficiency-NIM correlation is contingent on the market structure. The studies, which coalesce banks in various competitive frameworks without incorporating a market structure interaction term, will yield biased and false estimations.

3.2.2 Asset Quality, NPLs, and the Interest Suspension Effect

NPLs squeeze NIM in two simultaneous ways. The first channel is the Interest Suspension Effect which occurs when a loan is recorded as a non-performing asset and according to accounting standards the loan is to receive no further accrual on the interest income on that asset, but the deposits used to finance the loan do not stop receiving the interest expense. The bank also loses income and also retains the cost of the liability associated. The most accurate quantified in their panel data study of Lebanese commercial banks1996-2009 is given by Hamadi and Awdeh (2012); with every 1 percentage point change in the ratio of their NPL, NIM is estimated to shrink by 12-18 basis points. This large impact suggests that in a banking system where NPLs worsen by 5-percentage points, which is a real-world stress case in cases of a credit crisis, the impact of this channel alone would be 60-90 basis points of NIM compression, without taking into consideration the macroeconomic consequences. Studying NPL determinants in G20 countries with Two-Step GMM, Erdas and Ezanoglu (2022) find a multi-period feedback mechanism: initial NIM compression causes Return on Equity, which leads to risk-taking to regain profitability, which leads to further NPL accumulation, further compressing NIM. This pro-cyclical dynamic stands out more in the emerging markets with little information infrastructure on credit.

3.2.3 Capital Adequacy — Risk Aversion and the Buffer Channel

Capital Adequacy Ratio (CAR) has two channels of influence on NIM. Heightened capital would decrease the risk premium implicit in the lending rates, as the risk absorption hypothesis anticipates, thereby decreasing NIM. The risk aversion channel suggests that more capitalised conservative banks will need wider margins to reflect their conservative lending stance. Almarzoqi and Ben Naceur (2015) discover that the risk aversion channel of the CCA region is most significant, whereas the Euro Area experience (Angori, Aristei, and Gallo, 2019) can claim that the regulatory capital requirements after the crisis have compelled banks to move to wider margins to replenish the capital buffer on retained earnings. The effects of CAR on NIM in Indonesian studies vary (Widana et al., 2021; Harimurti, 2022) as expected based on the context-dependence of their relationship.

3.2.4 Loan Portfolio Diversification — The Emerging Markets Paradox

The relationship which is the most intellectually disputed of the literature is the relationship between diversification and NIM. Huynh (2021), applying Two-Step System GMM to the situation of Vietnamese banks, concludes that diversification enhances returns with a moderating influence of market power: where the banks possess ample pricing power, the monitoring cost overruns of non-core lending can be recouped, thus making diversification profitable. This has a threshold implication: Diversification must be good at some magnitude of market power, and bad at other levels. The evidence of the African emerging market is quite contradictory. Both Agyei-Tweneboah (2017) on Ghanaian commercial banks and Owojori et al. (2022) on Nigerian banks conclude that sectoral diversification and decrease in credit risk without proportional decrease - the Monitoring Cost Trade-off.

3.2.5 Bank Size — Market Power versus Scale Economies

Bank size, often taken as the natural logarithm of total assets gives theoretically ambiguous NIM effects: a bigger bank might have scale effects, either increasing or decreasing margins (efficiency hypothesis) or market power which increases or decreases margins (market power hypothesis). Obeid (2024) identifies a positive size-NIM relationship of significance in the Arab region, which in turn, is a market power phenomenon. Similarly, Almarzoqi and Ben Naceur (2015) come to the same conclusion in the CCA systems. In Indonesia, several studies (Raharjo et al., 2014; Dwitanto et al., 2023) observe category-specific size effects, where the largest Volume-IV banks display different dynamics of NIM as compared to smaller institutions.

Table 2: Comprehensive NIM Determinant Matrix — Evidence from 50 Global Studies

Category	Variable	Expected Sign	Condition	Key Authors
External	Policy Rate	Positive (PT)	Asymmetric in ZLB	Fuster et al. (2019); Memmel & Heckmann-Draisbach (2022)
External	ZLB Dummy	Negative	Structural Margin Squeeze	Debelle et al. (2023); Peltola (2023); Gonçalves (2024)
External	GDP Growth	Mixed	Depends on market concentration	Kosmidou et al. (post-2003); Todorovic et al. (2024)
External	Inflation	Positive	Via nominal rate channel	Schwaiger & Liebeg (2007); Bustos-Contell et al. (2020)
External	Market Concentration (Lerner)	Positive	Market power hypothesis	Angori et al. (2019); Huynh (2021)
External	Fintech Penetration	Negative (ST)	Positive with lag (adaptation)	Pham et al. (2023); Widyanto (2022)
Internal	Cost-Income / BOPO	Negative / Positive*	*Positive in non-competitive markets	Dsouza et al. (2022); Obeid (2024); Almarzoqi & Ben Naceur (2015)
Internal	NPL Ratio	Negative	Via Interest Suspension Effect	Hamadi & Awdeh (2012); Erdas & Ezanoglu (2022)
Internal	Capital Adequacy (CAR)	Positive	Risk aversion channel dominant	Almarzoqi & Ben Naceur (2015); Angori et al. (2019)
Internal	Loan Diversification	Mixed	Destabilising in info-sparse markets	Agyei-Tweneboah (2017); Owojori et al. (2022); Huynh (2021)
Internal	Bank Size (log assets)	Mixed	Market power vs. scale context	Obeid (2024); Raharjo et al. (2014)
Internal	Loan-to-Deposit Ratio	Positive	Asset deployment efficiency	Harimurti (2022); Sahyouni & Wang (2018)
Institutional	Domestic Ownership	Higher sensitivity	No internal capital market buffer	Kosmidou et al. (post-2003); Frederick (2014)
Institutional	PSL Mandate (India)	Negative ceiling	Regulatory NIM compression	Patra et al. (2024); Dsouza et al. (2022)

4. Critical Discussion

4.1 Regional Divergences: Arab Region versus Eurozone

Among the most apparent empirical contrasts in the reviewed literature is the structural difference between NIM processes in the Arab world and the Eurozone - two banking environments which are fundamentally similar in terms of regulatory complexity and institutional depth, but generate

more radically different NIM patterns in almost all categories of determinants. Within the Arab region, Obeid (2024) records averages of 3.52-5.2% NIMs in 71 conventional commercial banks, in 14 countries in 2008-2022; 2-3 percentage points higher than the 1.52.5 range reported by Angori, Aristei, and Gallo (2019) in the Euro Area The difference in the spread persistently cannot be attributed to credit risk differentials, which could explain wider margins due to increased default compensation, but is rather because of competitive market structure differences. The Arab banking industry is defined by a high degree of concentration in ownership, a high level of state shareholding, a lack of foreign bank competition within some jurisdiction, and barriers to new entrants by regulators all of which makes the industry less competitive which would normally force excess margins. Its dire implication is the known Efficiency Paradox in the Arab region: the increased cost of operation comes with broader NIM since banks can shift inefficiency to consumers using increased spreads without misplacing market share. In the Eurozone, a contrary process is at work: an increase in competition, a process accelerated by the post-2008 re-plumbing of the banking industry in Europe and the gradual adoption of the BankingUnion has caused banks to internalize efficiency gaps, rather than attempting to pass them on to the customer. Angori et al. (2019) report that Eurozone banks with increased market power of the Lerner Index were increasingly able to sustain wider margins in the low-rate policies of the ECB, but that this level of protection was limited to Eurozone banks that operated in concentrated domestic markets as part of the larger Union framework. The evidence on Lebanon provided by Hamadi and Awdeh (2012) provides a valuable bridge case: the Lebanese banking system exists in the framework of the institutional context of the entire Arab region, but there are NIM dynamics that do not coincide with the markets of the Gulf Cooperation Council.

4.2 The Interest Suspension Effect — A Detailed Anatomy

The Interest Suspension Effect, which was initially quantified by Hamadi and Awdeh (2012) accurately in the Lebanese case, is both a directional and a highly heterogeneous in terms of degree, mechanism of NIM compression. To grasp its impact on NIM, it is vital to learn its anatomy to better understand the reasons behind NPL accumulation having disproportionally large effects on NIM compared to headline NPL ratios. The principle of the mechanism works in the following way. In case a borrower defaults on loan, the bank has to reclassify the asset as non-performing by the regulation. The bank should no longer earn interest income on the non-performing asset, i.e., that loan should no longer earn in the income statement under IFRS and most national accounting standards, although the contractual obligation to pay the interest technically exists. But the deposit or interbank borrowing which initially financed the loan will still generate interest expense. The bank is simultaneously losing the source of income on the asset and keeping the entire amount of the liability relating to it - an ideal illustration of the so-called negative carry which directly squeeches NIM. This effect is larger, with the level of NPL stock, the interest rate on defaulted loans contractually payable (loans in markets with weak creditor rights face a higher number of absolute income losses), the pace of provisioning (banks with weak creditor rights carry NPLs on the books longer, prolonging the income suspension), and the overall buffer of NIM available to the bank (banks already operating on thin margins have less resilience The feedback loop with multi-periods observed by Erdas and Ezanoglu (2022) when NPL accumulation is preceded by profit compression, which is pre-existing by expansion in the prior credit cycle indicates that the Interest Suspension Effect is a compounding process of the credit cycle, rather than a one-period shock. In markets with relatively strong credit enforcement the US and most Eurozone banking regimes - the Interest Suspension Effect is mitigated by shorter recovery periods and stronger recovery of collateral on defaulted assets. The impact is magnified in markets with lower legal institutions such as Lebanon, Ghana, Nigeria, Uganda since NPLs do not recover over a period, as they require longer on balance sheets, which leads to persistent income suspension, but not time-bound shock.

4.3 Ownership Structure and the Internal Capital Market Asymmetry

The macro-shock NIM sensitivity found larger between domestic and foreign-owned banks (25% difference), reported by Kosmidou et al. (post-2003) in the case of UK banks and supported by

Frederick (2014) in the case of Ugandan banks is one of the most policy-relevant results of the entire review. It is the internal capital market: foreign-owned bank subsidiary affiliates will have access to liquidity and capital facilities of their parent bank facilities across international borders, level out the costs of local financing during local stress. A domestic bank that is under the same level of stress has to take access to local money markets at high cost or dispose of assets, either of which tightens NIM. The systematic impact is that there is a structural weakness in the domestic banking systems to local macroeconomic shocks relative to the potential impact of the nominal foreign share ownership. This Ownership Isolation Gap (the methodological error of not isolating domestic and foreign-owned banks in the same regression, structurally) implies that big cross-country NIM studies can systematically underestimate the weakness of domestic banks, and overestimate the strength of the banking sector as a whole. This correction is simple in theory (add an ownership dummy which interacts with macroeconomic shock variables) but has not been done in a rigorous fashion across the literature.

4.4 The Synthetic Engineering Challenge and Its Limits

The most theoretically disruptive addition to the recent NIM literature is the finding by Begenau and Stafford (2022), that it is possible to mechanically reproduce NIM stability by fixing the portfolio of fixed-income holdings. The empirical implication, that stable accounting NIM must lead to questioning the balance sheet duration profiles, not blindly trusting that the trend and evidence of continued growth, is immediately applicable to the 20222023 US regional bank runs, where the banks with reporting stable NIMs were also the ones to carry unrealised losses on long-duration fixed-income books that were effectively being put through the Federal Reserve aggressive tightening cycle. Nevertheless, there are significant constraints in the Synthetic Engineering framework. It best applies to large commercial banks with complicated fixed-income portfolios; its explanatory power when applied to small community banks, based on actual deposit franchises, with institutions actually receiving zero-cost current accounts deposits by local clients, is far lesser. The true worth of CASA (Current Account Savings Account) deposit franchises, which the Begenau-Stafford framework might underestimate, is exactly that they can hold low funding costs on the move on and off interest rate cycles without having to actively manage an underlying portfolio. The thesis to which these conclusions lead is that synthetic stability and true franchise value are present simultaneously in the banking industry, and cannot be separated solely with the tool of NIM.

Table 3: Selected Key Literature — Findings, Support, and Identified Gaps

Author(s) & Year	Region / Data	Primary Finding	Key Contribution	Identified Gap
Begenau & Stafford (2022)	US, 148 banks, FFIEC 1985+	NIM stability achievable via fixed-income portfolio engineering independent of franchise value	Introduces Synthetic NIM concept; challenges Franchise Value theory	Potentially underestimates genuine CASA franchise value; focus limited to US large banks
Memmel & Heckmann-Draisbach (2022)	Germany, portfolio modelling	Interest rate level shift accounts for ~91% of NIM variance	Precise quantification of monetary transmission hierarchy	Assumes other NIM factors are time-constant; limited to low-rate environment
Hamadi & Awdeh (2012)	Lebanon, panel data 1996–2009	1% NPL increase compresses NIM by 12–18 basis points via Interest Suspension	Most precise quantification of Interest Suspension Effect in literature	Data ends 2009; misses 2019 Lebanese crisis; limited to small market
Debelle et al.	10 countries,	ZLB creates structural	Largest cross-	Confidential data

(2023)	1,500 banks	Margin Squeeze; policy rate positively correlated with NIM globally	country dataset; confirms ZLB as structural NIM threshold	limits reproducibility; short-run focus
Obeid (2024)	14 Arab countries, 2008–2022	Bank size and cost-income ratio positively affect NIM; Efficiency Paradox confirmed	Recent coverage including COVID-19; covers underrepresented Arab region	No significant GDP or NPL effect — potentially context-specific to Arab market
Almarzoqi & Ben Naceur (2015)	CCA, 17 countries, 1998–2013	Operating cost positively affects NIM; Efficiency Paradox replicated in CCA	Robust System GMM identification; Ho-Saunders model adaptation	Limited to high state-ownership CCA context; pre-Fintech era data
Patra et al. (2024)	India, DEA + GLS 2013–2022	PSL mandates create structural NIM ceilings; two-stage DEA superior to ratio-based efficiency	Most sophisticated Indian banking efficiency methodology in literature	Highly India-specific; PSL mechanism may not generalise to other regulatory regimes
Agyei-Tweneboah (2017)	Ghana, 18 banks, 2005–2014	Loan diversification increases NIM volatility via Monitoring Cost Trade-off	Key evidence from underrepresented African emerging market	Small sample; Ghana-specific informational environment
Pham et al. (2023)	ASEAN-5, 57 banks, 2017–2021	Fintech funding has negative contemporaneous but positive lagged effect on profitability	First rigorous ASEAN Fintech-NIM quantification with robustness testing	No evidence for Malaysia and Indonesia link; scope limited to ASEAN-5
Kosmidou et al. (post-2003)	UK domestic banks, 1995–2002	Shareholder Value Principle: concentrated markets amplify NIM during growth phases	Identifies Ownership Isolation Gap; isolates domestic bank dynamics	Pre-crisis data; may not reflect post-2008 regulatory dynamics

5. Conclusion and Recommendations

5.1 Summary of Core Findings

Five main empirical conclusions on the convergent cross-study findings of over 20 countries in six different geographic regions across 1985–2025 are retrieved with a systematic review of 50 high-impact empirical articles: 1. Monetary Policy Dominance: The equilibrium occurrence of policy adjustments by the central bank, which has a causal impact on NIM changes via the asymmetric Pass-Through Lag, is the most overwhelming external influence on NIM variations, which explains around 91% of interest rates-driven NIM variations (Memmel & Heckmann-Draisbach, 2022). The ZLB is a quantitative critical point in the relationship that shifts its direction in a quantitatively new way to produce a Margin Squeeze that the internal management is not able to affect by its own means. 2. Context-Dependent Efficiency Paradox: The sign of efficiency-NIM depends on market structure. Cases involving greater efficiency are linked with less NIM volatility in the competition markets. Higher costs of operation are found to be positively correlated with broadened margins in oligopolistic markets (Arab region, CCA) since there is lack of competitive discipline and transferring inefficiency to the consumers. 3. Synthetic NIM Stability: NIM stability relating to accounting is not a sound proxy of bank health or franchise value. Mechanically replicable is long-short fixed-income positioning of portfolio without any customer relationship, deposit franchise and credit underwriting capabilities (Begenau and Stafford, 2022). This observation would require additional balance sheet duration profile and deposit

beta dynamics analysis. 4. Conditional Diversification Effects: Diversification of loan portfolio is contextualized and could lead to instability. In emerging markets with information (Ghana, Nigeria) where NIM volatility is higher due to Monitoring Cost Trade-offs, dominating the diversification benefits, diversification increases NIM volatility. In diversifying markets where credit information infrastructures are strong, the desired risk reduction is achieved. 5. Ownership Structure Asymmetry: Local capital market access by domestic banks systematically generates 2025% higher NIM sensitivity to local macroeconomic shocks compared to foreign-owned subsidiaries that have access to internal capital markets. This two-step methodological Ownership Isolation Gap - mixing up these structurally different populations generates biased estimates understating domestic - estimates.

5.2 Research Gaps Identified

The trio of conceptually vital and practical research gaps arising out of this systematic synthesis are each indicative of an area of research where current evidence lacks sufficiently to be able to draw confident policy or managerial conclusions: The Digitalization Gap: The content of the literature represents by an overwhelming majority, pre-mass-market adoption of Fintech. In practically no existing NIM study, is digital competitor penetration as an independent variable systematically included with the degree of precision necessary to identify a causal relationship. This gap will increase over time as the process of Neo-bank and Fintech lenders taking over markets in terms of acquiring deposits and loan origination is accelerated by the COVID-19-induced digital adoption cycle. Future studies need to come up with standardised indexes of Fintech penetration that can be incorporated into multi country NIM frameworks. The Metric Gap: All 50 papers reviewed measure NIM by accounting-based definitions. A Begenau-Stafford analysis shows that this accounting-based method gives out false stability signals that are done systematically. A more accurate measurement of the health of banks and the exposure to interest rate risks would be a market-value-adjusted NIM - one that includes the effect of shifts in interest rates levels on the economic value of long-duration asset portfolios. Another frontier is the development of standardised market-value NIM measurements of regulatory reporting. The Ownership Isolation Gap: The merging of locally and foreign-owned banks even in large, cross-country samples continues to occur, in spite of well-documented evidence that ownership type does impose systematic, predictable differences in NIM response to domestic shocks. The populations should be further divided into separate groups in the future and the characteristics of NIM ownership should be modeled to be determined specifically in those areas where the ownership made of foreign employee and domestic employee is mixture and changing rapidly.

5.3 Future Research Directions

5.3.1 AI-Driven Credit Monitoring as a NIM Stabilisation Tool

The dawn of machine-learning systems of credit evaluation presents a potentially groundbreaking process of transforming the Monitoring Cost Trade-off creating the Diversification Paradox in the emerging markets. By having AI-based credit tools (which can generate credit results in sectors with no credit history by using alternative data sources (mobile payment patterns, social network data, supply chain records), banks can potentially extend sectoral diversification without internally experiencing the cost overruns of monitoring that are already destabilising NIM in information-sparse markets. Theoretical studies must be conducted in the future to demonstrate whether the monitoring trade-off is removed or minimized by AI-enhanced credit monitoring capacity, and whether this impact is widespread or is concentrated in fewer and larger technologically advanced institutions.

5.3.2 Neo-bank NIM Equilibrium Modelling

The current theoretical models of NIM establishment were like the Ho-Saunders Dealer Model, Theory of Financial Intermediation or the Synthetic Engineering framework that were all produced within the framework of the traditional brick-and-mortar commercial banking. The biggest fixed cost in the conventional bank cost structure is eliminated by neo-banks (bank with no physical branch networks only), which could result in a fundamentally different NIM equilibrium. There is a need to

research how Neo-banks can operate sustainably at NIMs which are below the historic minimum levels of the most efficient traditional banks, and whether their entry will permanently drive a NIM equilibrium downwards across the entire banking industry or just catalyze the efficiency-inducing movement of adopting digital infrastructure by established players.

5.3.3 Market-Value Adjusted NIM as a Regulatory Metric

The Begenau-Stafford Synthetic Engineering discovery has the regulatory implication that accounting-based NIM is an inadequate supervisory device to measure interest rate risk within bank portfolios. Further studies are to come up with and prove a Market-Value Adjusted NIM (MV-NIM) measure to include the unrealised gains and losses on the long-term fixed-income assets in the NIM calculation. This would have directly raised a red flag of the accumulation of the duration risks that led up to the 20222023 20222023 US regional bank failures. To establish standardised definitions of MV-NIM that are analytically sound and feasible operationally in the current regulation reporting framework, academic researchers must engage with regulators (Federal Reserve, ECB, and national banking supervisors) to work out these definitions in a standardised way.

5.4 Strategic Implications

5.4.1 For Commercial Bank Managers

The two-determinant framework offers a systematic foundation of differentiating between NIM drivers that are under the control of management (operational efficiency, positioning in the balance sheet, loan portfolio composition, credit risk management, macroeconomic cycles, entry of new competitors into the market) and elements that are imposed exogenously (policy rate movements, macroeconomic cycles, entrants into the competitive market). The Synthetic Engineering discovery has a cautionary connotation: portfolio engineering of banks, with a NIM approach, is capable of meeting quarterly reporting requirements whilst building up suppressed interest rate risk, which will be encountered during the next changeout of rate cycles. True franchise value, anchored in inexpensive, CASA deposit-based franchising, relationship-based credit evaluation, and operational productive efficiency is a more long-lasting source of NIM resilience than mechanical portfolio placement.

5.4.2 For Central Bank Policymakers

The Pass-Through Lag evidence overays that monetary tightening, cycles have asymmetric NIM impact among the banking industry not wholly represented by aggregate margin statistics. The fact that the effects of domestically-owned banks and foreign-owned banks are different suggests the policy transmission tests that will be conducted using aggregate NIM data will systematically report underestimating domestic banking sectors to tightening cycles. Ownership-disaggregated NIM surveillance must be integrated into the frameworks of Macroprudential surveillance, and duration profile analysis as well as the traditional NIM reporting should be included to give early notice of the silent accumulation of interest rates risk.

5.4.3 For Equity Analysts and Credit Rating Agencies

The fact that the manufacturing of accounting NIM that is stable can be made synthetically means that the NIM stability needs to provoke more attention to the time profile of the balance sheet of a bank instead of predetermined reliability of its competitive position. In particular, analysts must complement NIM trend analysis with: (i) an analysis of the unrealised securities portfolio gains/losses of the bank compared to regulatory capital; (ii) evaluation of deposit beta history - how fast the bank transfers policy changes to the depositors; (iii), ratio of floating-rate to fixed-rate loan assets - how fast the bank will reprice its assets during tightening cycles.

References

1. Agyei-Tweneboah, K. (2017). The effect of loan portfolio diversification on banks' risks and return: Evidence from an emerging market. ResearchGate.

2. Almarzoqi, R., & Ben Naceur, S. (2015). Determinants of bank interest margins in the Caucasus and Central Asia. IMF Working Paper, Middle East and Central Asia Department.
3. Almazari, A. A. (2014). Impact of internal factors on bank profitability: Comparative study between Saudi Arabia and Jordan. Journal of Applied Finance and Banking.
4. Angbanzo, L. (1997). Commercial bank net interest margins, default risk, interest-rate risk, and off-balance sheet banking. Journal of Banking and Finance, 21(1), 55–87.
5. Angori, G., Aristei, D., & Gallo, M. (2019). Determinants of banks' net interest margin: Evidence from the Euro Area during the crisis and post-crisis period. Sustainability (MDPI), 11(14), 3931.
6. Begenau, J., & Stafford, E. (2022). Unstable inference from banks' stable net interest margins. SSRN Working Paper, Stanford GSB and HBS. https://ssrn.com
7. Bekhet, H. A., Alsmadi, A. M., & Khudari, M. (2020). Effects of internal and external factors on profitability of Jordanian commercial banks. International Journal of Financial Research, 11(5).
8. Bhattarai, N. (2024). Effect of bank specific and macro-economic factors on net interest margin of Nepalese commercial banks. Journal of Nepal Rastra Bank.
9. Banchongsan, C., & Hayeong, L. (2024). Profitability of Korean banks: Impact of CAR and NIM. Asian Banking Research.
10. Bandaranayake, S., & Jayasinghe, P. (2013). Factors influencing the efficiency of commercial banks in Sri Lanka. Asian Journal of Finance & Accounting.
11. Bustos-Contell, E., Climent-Serrano, S., & Labatut-Serer, G. (2020). Changes in determinants of the interest margin in today's economy. Economic Research-Ekonomska Istraživanja, 33(1), 1283–1296.
12. Debelle, G., et al. (2023). The impact of interest rates on bank profitability: A retrospective assessment. Reserve Bank of Australia Research Discussion Paper.
13. Dsouza, S., Rabbani, M. R., Hawaldar, I. T., & Jain, A. K. (2022). Impact of bank efficiency on the profitability of the banks in India: An empirical analysis using panel data approach. International Journal of Financial Studies (MDPI), 10(2).
14. Dwitanto, A. R., Manurung, A. H., & Machdar, N. M. (2023). Determinants of net interest margin in Indonesian banking industry: The moderating role of central bank interest rate. Journal of Business, Management, and Social Studies.
15. Endri, E., Marlina, A., & Hurriyaturrohma. (2020). Impact of internal and external factors on the net interest margin of banks in Indonesia. Journal of Finance and Banking, 24(2).
16. Erdas, M. L., & Ezanoglu, Z. (2022). How do bank-specific factors impact non-performing loans: Evidence from G20 countries. Journal of Central Banking Theory and Practice, 11(2), 97–122.
17. Frederick, N. K. (2014). Factors affecting performance of commercial banks in Uganda: A case for domestic commercial banks. Research Journal of Finance and Accounting.
18. Fuster, A., Plosser, M., & Rice, T. (2019). Changes in monetary policy and banks' net interest margins: A comparison across four tightening episodes. FEDS Notes, Federal Reserve Board.
19. Gonçalves, M. C. de F. D. (2024). Bank's profitability in period of low and negative interest rates [Master's thesis]. European banking sector study.
20. Hamadi, H., & Awdeh, A. (2012). The determinants of bank net interest margin: Evidence from the Lebanese banking sector. Journal of Money, Investment and Banking, 23, 85–98. MPRA Paper No. 119121.
21. Harimurti, C. (2022). Analysis of internal factors affecting the net interest margin of conventional national private banks. Indonesian Banking Research.
22. Hidayat, A., Liliana, Gustriani, Shodrokova, X., & Hakim, M. N. (2024). COVID-19 pandemic: Impact on net interest margin of Indonesia banking industry. East African Scholars Journal of Economics, Business and Management.
23. Ho, T. S. Y., & Saunders, A. (1981). The determinants of bank interest margins: Theory and empirical evidence. Journal of Financial and Quantitative Analysis, 16(4), 581–600.
24. Huynh, T. L. D. (2021). Loan portfolio diversification and bank returns: Do business models and market power matter? Cogent Economics and Finance, 9(1).

25. Kosmidou, K., Tanna, S., & Pasiouras, F. (post-2003). Determinants of profitability of domestic UK commercial banks: Panel evidence from the period 1995–2002. Working Paper Series, Coventry University Business School.
26. Kunwar, B., & Jnawali, G. (2023). Impact of macroeconomic and bank-specific variables on the profitability of commercial banks in Nepal. Economic Journal of Development Issues, 35 & 36.
27. Kyei, K. A., Antwi, A., & Netshikweta, M. L. (2014). An attempt to model some risks in banking sector. Journal of Applied Business and Economics.
28. Lall, P. (2016). Managing net interest margin in small and large U.S. banks: Lessons from the 2007–2013 financial crises. Journal of Finance and Accountancy, 20.
29. Mandagie, Y. R. O. (2021). Analyzing the impact of CAR, NIM and NPL on ROA of banking companies. Indonesian Capital Market Review.
30. Mbekomize, C. J., & Mapharing, M. (2017). Analysis of determinants of profitability of commercial banks in Botswana. International Journal of Academic Research in Accounting, Finance and Management Sciences, 7(2).
31. McShane, R. W., & Sharpe, I. G. (1985). A time series/cross section analysis of the determinants of Australian trading bank loan/deposit interest margins: 1962–1981. Journal of Banking and Finance, 9(1), 115–136.
32. Memmel, C., & Heckmann-Draisbach, L. (2022). Banks' net interest margin and changes in the term structure. Deutsche Bundesbank Working Paper.
33. Mat Nor, A., & Ahmad, N. H. (2015). Impaired financing determinants of Islamic banks in Malaysia. Journal of Applied Business Research.
34. Obeid, R. (2024). Factors affecting net interest margin in the banking sector: Evidence from the Arab region. Journal of Governance & Regulation, 13(1).
35. Owojori, A., et al. (2022). Effect of loan portfolio diversification on risks and returns: A study of selected banks in Nigeria. NDIC Quarterly Journal.
36. Patra, S., Balakrishnan, A., & R., M. (2024). Loan portfolio management and bank efficiency: A comparative analysis. MDPI International Journal of Financial Studies.
37. Peltola, A. (2023). The impact of negative interest rate environment on bank profitability [Master's thesis]. Aalto University School of Business.
38. Pham, L. P., Hoang, S. D., Trang, L. N. T., & Ly, H. T. M. (2023). The effect of Fintech funding on bank profitability: A case of ASEAN-5. Journal of Hunan University (Natural Sciences), 50(4).
39. Puspitasari, E., Sudiyatno, B., Hartoto, W. E., & Widati, L. W. (2021). Net interest margin and return on assets: A case study in Indonesia. Journal of Asian Finance, Economics and Business, 8(4).
40. Raharjo, P. G., Hakim, D. B., Manurung, A. H., & Maulana, T. N. A. (2014). The determinant of commercial banks' interest margin in Indonesia: An analysis of fixed effect panel regression. Buletin Ekonomi Moneter dan Perbankan, 16(4).
41. Sahyouni, A., & Wang, M. (2018). The determinants of bank profitability: Does liquidity creation matter? Journal of Economics and Financial Analysis, 2(2).
42. Sarkar, S., & Rakshit, D. (2024). Bank-specific factors affecting the profitability of public sector banks in India: A dynamic panel approach. Bank and Bank Systems, 19(1).
43. Schwaiger, M. S., & Liebeg, D. (2007). Determinants of bank interest margins in Central and Eastern Europe. Oesterreichische Nationalbank (OeNB) Working Paper No. 133.
44. Setiawan, C., & Wisna, N. M. M. (2021). The determinants of net interest margin: An empirical study of Indonesia Category-IV Banks for the period of 2014–2017. Jurnal Manajemen Teori dan Terapan.
45. Sidabalok, L. R., & Viverita. (2011). The determinants of banks' net interest margin in Indonesia: A dynamic approach. Working Paper, University of Indonesia.
46. Susanti, S., & Budhidharma, V. (2024). Exploring proxies of net interest margin: A comparative analysis of Asian developed and emerging banking sector. Capital IQ Analysis, 7229 observations.
47. Todorović, A., Jemović, M., & Marinković, S. (2024). An analysis of the determinants of net interest margin of the banking sectors in Southeast European countries. Economic Research-Ekonomska Istraživanja.

48. Tranfield, D., Denyer, D., & Smart, P. (2003). Towards a methodology for developing evidence-informed management knowledge by means of systematic review. British Journal of Management, 14(3), 207–222.
49. Widana, I. W. D., Yasa, G. W., & Suaryana, I. G. N. A. (2021). Effect of CAR, NPL, and BOPO on NIM with ROE as a moderating variable. Jurnal Ilmiah Akuntansi dan Bisnis.
50. Widyanto, M. L. (2022). Comparative analysis of PT Bank Central Asia Tbk performance before and after the COVID-19 pandemic. East African Scholars Journal of Economics, Business and Management.