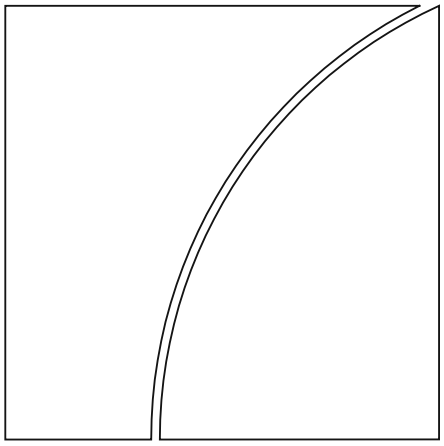


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Scenarios for future banking: implications for profitability, liquidity and solvency

by Christian Schmieder, Renzo Corrias and Oliver Wünsch

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Keywords: bank business models, digital banking, platform finance, financial stability, scenario analysis, sensitivity analysis

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Scenarios for future banking: implications for profitability, liquidity and solvency

Christian Schmieder, Renzo Corrias, Oliver Wünsch[1]

Abstract

Who will perform banking's core functions a decade from now, and how will risks and profitability evolve? Our framework structures expert judgement rather than forecasts. It examines how technology, regulation and consumer preferences could reshape banking models, focusing on profitability, liquidity and solvency. We classify 9,000 banks across more than 150 jurisdictions into three traditional business models and three emerging technology-based models. Across four scenarios, traditional banks retain roughly three-quarters of banking-system assets, while emerging technology-based models capture 3–27%, compared with about 3.5% under the trend baseline at the ten-year horizon. However, the technology-driven business models could contest roughly 40% of the revenue pool, increasing earnings volatility as fee and platform revenues replace net interest income. Digitalisation may also accelerate deposit outflows, increase reliance on data-driven risk assessment and weaken customer relationships. Regulation will influence the extent to which intermediation shifts between traditional banks and emerging bank models as well as non-bank providers. Solvency will depend on sustainable profitability, operational resilience and ecosystem dependencies. The framework identifies supervisory priorities that apply across all scenarios, alongside priorities and indicators specific to each scenario.

Keywords: bank business models; digital banking; platform finance; financial stability; scenario analysis; sensitivity analysis.

JEL classification: G21, G28, G32, O33

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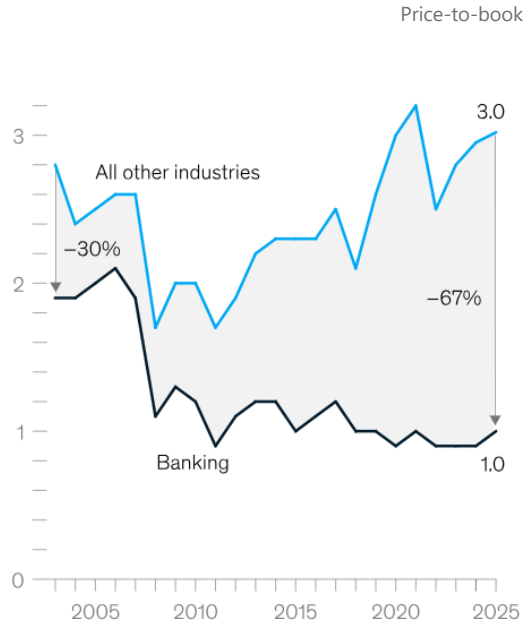
1. Introduction

The structure of banking is changing (CGFS, 2018; BCBS, 2024). Technology is lowering the cost of producing and distributing financial services; consumers expect digital, integrated, on-demand interfaces; non-bank intermediaries have grown into roughly half of global financial assets; and the regulatory perimeter is being redrawn for activities that combine banking with payments, commerce and decentralised technologies. Traditional incumbents nonetheless continue to dominate deposit intermediation and credit allocation. The question posed by this paper is not whether banks will be replaced; it is who will perform which of the functions in ten years, and what the resulting configuration implies for financial stability.

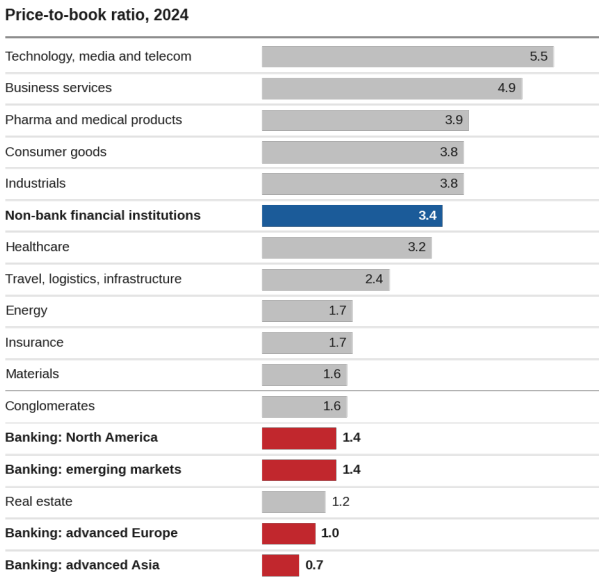
Three observations matter for our study, which is centred on the digitalisation of banking. First, bank price-to-book ratios fell sharply during the Great Financial Crisis (GFC) and, for the sector as a whole, spent the following decade well below pre-crisis levels, but with a regional dispersion that is itself informative, since US and emerging-market banks traded at a persistent premium to euro-area and Japanese peers throughout (Graph 1; Gambacorta et al, 2020; McKinsey, 2026). Because that dispersion reflects divergent market structures, funding models and rate environments rather than a common shock, the future of banking need not look the same everywhere. Second, emerging business models focussing on technology remain small in aggregate scale, under 2% of banking-system assets, yet already exert disproportionate pressure on competition, customer expectations and the speed of stress transmission (Buchak et al, 2018; Fuster et al, 2019). Third, the March 2023 failures of several US regional banks showed that vulnerabilities in interest-rate and liquidity-risk management can re-emerge as business models adapt, even within a substantially strengthened post-crisis framework (BCBS, 2024; Federal Reserve Board, 2023).

Banks' price-to-book ratios reflect uncertainties on future business models[1] Graph 1

A. Banks' price-to-book ratios have dropped sharply during the past 20 years



B. Recent banks' price-to-book ratios were very low in relative terms



[1] Average, excludes outliers and firms with negative price-to-book ratio. Based on ~15,000 publicly traded companies.

Sources: McKinsey (2025), BIS (2018); Gambacorta et al (2020).

We examine global trends through four scenarios combining technology, regulation, consumer preferences and macro-financial conditions (Section 3.2). Competition is an outcome of these forces.

Political, geopolitical and climate-related developments provide conditioning context, operating mainly through macro-financial and regulatory channels over the ten-year horizon.

The four scenarios span plausible configurations rather than forecasts (Table 1): *Slow transformation* preserves the post-GFC structure; *technology acceleration* expands digital services while the regulatory perimeter holds; *platform expansion* combines digital adoption with easier entry, separating customer relationships from bank balance sheets; and *political uncertainty* raises risk and funding premia, constrains cross-border scale and favours insured deposit-takers.

Four findings emerge.

- First, in every scenario, traditional banks retain roughly three-quarters of banking-system assets at the ten-year horizon; the emerging models reach 3–27% (Table 1), against about 3.5% on a trend-extrapolation baseline.
- Second, asset shares understate the reallocation of customer relationships and income. Payments, origination, distribution and advice can move to providers using a regulated partner's infrastructure, while deposit access can also shift to an external interface while the legal claim remains at a bank (Tables 2 and 3). Under platform expansion, new providers could therefore control a much larger share of origination than of assets (Section 4.2).
- Third, the location and speed of risk shift: profitability becomes more contested and earnings more volatile as net interest income gives way to fee and platform revenues; digital channels are removing a friction that historically stabilised funding - the time and effort required to move a deposit[2] - and with this, liquidity becomes confidence-sensitive as deposit stickiness falls and digital outflows accelerate, reducing the interval in which banks and supervisors can act between a funding event and a capital event; and solvency hinges on business-model sustainability and profitability, operational resilience and ecosystem dependencies.
- Fourth, we identify a large reallocation within the incumbent block: the retail and commercial archetype's share of global bank assets fell from 48% to 22% between 2005 and 2024 while universal banks rose from 35% to 67%. Technology plausibly accelerates it, because the fixed costs of cyber-hardening, cryptographic migration and model risk governance favour scale just as data-based risk assessment erodes the informational advantage of relationship lending.

[2] The consequence is not confined to new entrants: the March 2023 episode involved an established retail franchise with insured deposits and a long operating history.

The four scenarios at a glance: specifications and outcomes Table 1

Scenario	Configuration of structural forces	Emerging-model asset share, year 10	What characterises it
1. Slow transformation	Technology diffuses gradually; regulation and preferences broadly stable; benign macro	Low (<5%)	Post-GFC configuration persists; new providers remain complementary
2. Technology acceleration	Rapid technology adoption; regulatory perimeter holds; strong digital preference shift; benign macro	15-20%	Entrants scale in payments and retail banking; incumbent margins compress; the balance sheet largely stays with traditional banks
3. Platform expansion	Technology, accommodative regulatory regime and very strong consumer preferences all move together	20-30%	Banks still keep majority of the balance sheet but lose massively on customer relationships; four of five functions migrate (risk transformation stays with traditional banks)
4. Political uncertainty	Political unpredictability and regulatory tightening; flight to stability; stressed macro	About 3%	Investment horizons shorten and entrant funding dries up; insured deposit-takers regain ground; risk rises within every model

Source: Authors. Shares are central paths from the framework of Annex A and should be read as coarse magnitudes; see Section 5.1.

Four immediate policy priorities follow: review digital outflow assumptions; strengthen operational and third-party resilience; treat weak earnings as a solvency vulnerability; and improve data on emerging models. Moreover, we identify some measures contingent on the scenario (see section 5).

The framework formalises expert judgement: driver shifts and sensitivities are informed by empirical evidence but are not estimated. It provides internal consistency, traceability and sensitivity analysis, while the qualitative analysis of functions and risk location carries the policy interpretation. Annex A presents the mechanics, limitations and a worked example.[3]

The paper proceeds as follows. Section 2 classifies bank business models, documents current market shares and sets out how their profitability, liquidity and solvency profiles differ. Section 3 develops the structural drivers and the four scenarios. Section 4 reports results. Section 5 sets out policy implications; Section 6 concludes.

What this paper covers, and what it does not

The paper examines how digitalisation reallocates customer interfaces, credit origination and deposit relationships. Its classification covers some 9,000 institutions in 150 jurisdictions. Within this study on digitalisation effects, entrant competition is strongest in retail and small-business services, where functions can be unbundled and distribution rented without owning a balance sheet. In wholesale and large-corporate lending, private credit is a more prominent challenger than digital entrants (Box 3).

Digitalisation affects both funding and assets. Funding effects are more immediate and better documented, while data-based credit assessment changes asset allocation more gradually (Sections 3.2 and 4.2).

We exclude three developments from the projections: the wider migration to Non-bank financial intermediaries (NBFIs), including private credit (Graph 2 and Box 3); discontinuities in monetary infrastructure, such as widespread central bank digital currency (CBDC) adoption (Box 4); and forces whose main effects fall beyond ten years, including climate risk. Projected shares therefore describe reallocation within banking, whose weight in total intermediation may itself decline (Section 6.1).

[3] The framework is also implemented as a companion workbook, allowing users to vary driver shifts, sensitivities, baseline shares, feasibility bounds and the intensity parameter, in the spirit of supervisory business-model assessment tools (FSI, 2023): not to forecast, but to make a set of disciplined what-ifs available for policy discussion. The workbook is available on request.

2. Bank functions and business models: concept and evidence

2.1 Bank functions and the mapping to business models

Banks perform five core economic functions (Allen and Santomero, 1997; Levine, Loayza and Beck, 2000; Freixas, Laeven and Peydró, 2015):

- payment intermediation;
- deposit-taking and short-term funding;
- credit allocation and maturity transformation;
- risk transformation and management; and
- the provision of investment and advisory services.

These functions can be performed within a single integrated institution - the traditional universal bank - or unbundled across specialised providers, with banks retaining some and others migrating to non-bank intermediaries, technology firms or distributed networks. The taxonomy adopted here groups institutions by which functions they emphasise and how they fund them.

We distinguish six archetypes, which are shaped by a number of factors (Box 1), including regulation (Box 3): universal banks, retail and commercial banks, trading and investment banks, digital-only banks, platform and embedded providers, and decentralised finance (DeFi). The first three are well-established categories in the empirical literature (Roengpitya et al, 2017). The latter three are emerging models in a broader sense with shorter histories and more uncertain trajectories (Boot et al, 2021; Aramonte, Huang and Schrimpf, 2021). Table 2 maps the six archetypes to the five economic functions.

Functions performed by each business model[1] Table 2

Function	Universal	Retail / Commercial	Trading & Inv.	Digital-only	Platform / DeFi
Payments	Core	Core	Limited	Core	Core / emerging
Deposit-taking & short-term funding	Core	Core	Limited	Core	Limited / N/A
Maturity transformation & Credit allocation	Core	Core	Limited	Selective	Selective / via lending pools
Risk transformation	Comprehensive	Embedded	Core	Limited	Limited / algorithmic
Investment / advisory	Core	Limited	Core	Niche	Niche / DEX-based

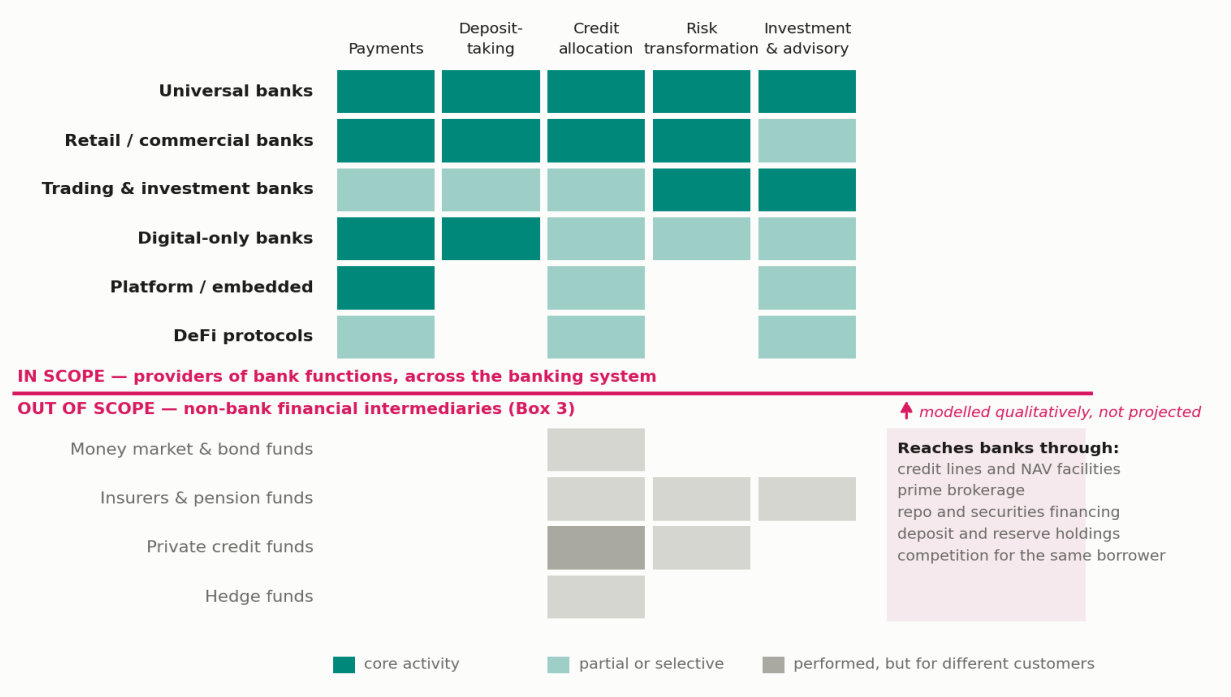
[1] "Core" denotes a defining activity; "limited" denotes minor exposure; "emerging" denotes activities still scaling. DEX = decentralised exchange.

Source: Authors.

Graph 2 maps the analytical perimeter by function. The six archetypes perform bank functions for bank customers, with or without a banking licence. Other NBFIs remain outside the projections; their funding, hedging and exposure links to banks are discussed in Box 3 and Section 4.7.

The perimeter of the analysis: which providers of which bank functions are modelled

Graph 2



Shading indicates whether a provider type performs the function for bank customers. The six archetypes above the line are modelled and span the banking system, wholesale activity included; the non-bank intermediaries below it are discussed in Box 3 and Section 4.7 but are not included in the projections. "Credit allocation" covers origination, pricing and maturity transformation; "risk transformation" the bearing of unexpected loss.

Source: Authors.

Box 1

Structural factors shaping bank business models

We consider five categories of structural factor. **Macro-financial conditions** - interest rates, economic growth, credit cycle, funding markets - drive earnings, asset quality and funding stability across all business models, with retail funded institutions more insulated than market-funded ones (Drechsler, Savov and Schnabl, 2017; CGFS, 2018). **Regulation** defines the perimeter and the cost of operating within it; post-GFC tightening reshaped the relative profitability of trading-intensive and credit-intensive activities and contributed to the rise of non-bank substitutes (eg Buchak et al, 2018). **Technology** - cloud, artificial intelligence (AI), distributed ledgers, application programming interfaces - lowers production and distribution costs but raises operational and cyber risks (Vives, 2019; BCBS, 2021). **Consumer behaviour** determines the demand-side feasibility of digital, platform and decentralised models; preference shifts are gradual in normal times but can reverse quickly under stress (Pousttchi and Dehnert, 2018; Federal Reserve Board, 2023). **Geopolitical and climate-related forces** operate over longer horizons but increasingly influence cross-border activity, asset quality and the regulatory agenda (FSB, 2023; NGFS, 2022).

These factors are not independent. Technology adoption is conditioned by regulation; consumer behaviour responds to both; macro-financial conditions amplify or mute structural pressures. The scenarios in Section 3.3 capture this co-movement through internally consistent configurations of driver intensities rather than independent variations.

2.2 Business model archetypes

Traditional models

Universal banks combine retail and commercial banking with capital-markets, asset-management and advisory businesses under one corporate structure. They benefit from internal scale and revenue diversification but face complexity costs and heightened supervisory scrutiny owing to their systemic footprint. Universal banks dominate among the world's largest banking groups, accounting for well-above 50% of the total assets of the top 100 largest banks globally, with particularly strong representation in the emerging economies.

Retail and commercial banks lend mainly to households and small and medium-sized enterprises. Their geographically concentrated, largely insured deposit funding supports net interest income and margin stability across the rate cycle (Drechsler, Savov and Schnabl, 2017, 2021). They remain numerous, although universal banks account for the largest asset share in our classification.

Trading and investment banks specialise in capital-markets activity, market-making, underwriting and advisory services. Funding used to be predominantly wholesale and highly sensitive to market conditions but has moved to a stronger deposit-base after the GFC; their revenues are fee- and market-driven and exhibit high cyclical variability. Post-GFC reforms have significantly reduced the size and risk-taking of this segment, particularly outside the United States (Boot and Ratnovski, 2016).

To classify individual banks into one of the above three traditional business models, we develop a new, purely quantitative multi-variate classification tree: for each of five granular business models (retail, commercial, wholesale-commercial, trading/investment, and universal) a set of threshold conditions is defined over 13 balance sheet and income ratios capturing asset composition, funding structure and income mix. A bank is assigned to the model for which it satisfies the largest number of conditions, and the five granular models are then mapped onto the paper's archetypes, with retail, commercial and wholesale-commercial banks jointly forming the retail/commercial archetype. To establish market shares (Table 4), we use the universe of bank-level data from FitchConnect for the last 20 years across more than 150 jurisdictions. Further information is provided in Annex B.

Emerging models

The emerging archetypes are defined by function rather than legal form. Licensed digital-only banks sit within the prudential perimeter, though scale and diversification vary widely. Platform providers and DeFi protocols generally lack deposit-taking licences, deposit insurance and central-bank access; they often rely on regulated partners to hold exposures.

We include platforms and DeFi because they contest bank customers and functions, even when legally classified as NBFIs. They can provide payments, origination, deposit access and advice while associated exposures or safeguarded funds remain at banks. Other NBFIs, discussed in Box 3, compete mainly for assets or provide funding and risk-bearing. The boundary is imperfect - for example, platforms may retain securitised receivables - but the functional taxonomy makes bank–provider dependencies visible. Box 2 explains the mechanics.

Digital-only banks and neobanks are fully digital deposit-takers with no branch network, leveraging mobile interfaces and data-driven customer acquisition. Their funding profile resembles retail banking but deposits are more concentrated, more digitally accessible and, as the March 2023 US regional bank failures indirectly illustrated, more confidence-sensitive in stress (Cookson et al, 2023). Under a broader definition, the segment reaches approximately USD 2 trillion as of end-2024, about 1% of global banking-system assets, which is the figure used as the central baseline in Table 4 (see Annex B for further information).

Platform and embedded providers integrate banking functions into broader digital ecosystems through application programming interfaces (Frost et al, 2019). By *platform* we mean, throughout this paper, a provider that owns the customer interface and distributes financial services produced elsewhere - earning

revenue from the customer relationship without holding the corresponding exposure. This is distinct from a banking-as-a-service partner bank, which holds the exposure but does not own the interface, and the distinction is the one that matters for where risk sits. Examples include banking-as-a-service providers, payments embedded in commerce platforms, and bigtech financial offerings. The model is most developed in Asia, where bigtech entry into payments and consumer credit has been particularly pronounced. As outlined in Annex B, we estimate total assets of slightly above USD 1 trillion for the segment, about 0.6% of global banking-system assets.

Platforms' asset shares understate their economic role (Graph 3). Assets consist mainly of settlement cash, receivables pending sale and intangibles; partner banks usually book the arranged credit. Liabilities include merchant float and stored-value or e-money balances. These are payables or safeguarded funds rather than deposits, although customers use them as money redeemable at par. They generally lack deposit insurance and are not captured as platform deposits in Table 4, leaving an important payment-related funding pool outside the reported measures.

Decentralised finance (DeFi) uses smart contracts on permissionless distributed ledgers to provide lending, trading and settlement services without traditional intermediaries (Aramonte, Huang and Schrimpf, 2021). Total value locked in DeFi protocols stood at roughly USD 125 billion at end-2024, with structural fragility driven by collateral-cycle dynamics and smart-contract vulnerabilities. The intermediation performed is of a distinctive kind: lending is overcollateralised and predominantly crypto-collateralised, so the economic function is closer to securities financing than to unsecured bank credit. Under a broader definition of underlying banking activities that includes fiat-backed stablecoin issuance, we estimate the market share at around 0.1% of global banking-system assets (Annex B).

Two asset pools must be distinguished. Crypto collateral is volatile and subject to pro-cyclical liquidation; fiat-backed stablecoin reserves consist mainly of short-term government paper, repo and bank deposits. Demandable claims include withdrawable liquidity-provider balances and stablecoin redemption claims, with differing contractual terms. Without deposit insurance or a lender of last resort, these structures can be fragile under stress (Graphs 3.B and 4).

The transmission channel to banks runs through the reserve leg rather than the crypto leg, and it runs in both directions. Stablecoin reserves are a source of deposit funding and a holder of short-term government paper, so growth in the segment adds a confidence-sensitive and highly concentrated depositor to bank balance sheets, while a redemption wave forces the sale of exactly the assets banks rely on for liquidity. That linkage, rather than the size of the sector, is why DeFi belongs in the analysis at 0.1% of banking-system assets, and why the stablecoin float indicator appears in Table 11.

Non-bank financial intermediaries have grown substantially during the past 20 years, with important implications for banks (Box 3), which will be discussed when setting out the broader conclusions of this study.

Box 2

What platform providers and DeFi protocols actually do

Both segments are commonly described by what they are not: not licensed, not deposit-funded, not inside the perimeter. This box describes what they are, since the analysis in Sections 3 and 4 turns on the mechanics rather than the labels.

Platform and embedded providers. The model separates the customer relationship from the balance sheet. A commerce platform, a mobile wallet or a bigtech application acquires the customer, holds the interface and the data, and arranges a financial service that a regulated institution books. In payments, the platform collects and settles, holding merchant and user float in the interval; in credit, it markets the product, scores the applicant on its own data, sets or influences the price, and passes the exposure to a partner bank, a securitisation vehicle or a credit fund; in deposits, it presents a partner bank's account inside its own interface. Revenue accrues as interchange, transaction and origination fees and as a share of the credit margin. Three consequences follow. The provider's own balance sheet stays small regardless of the volume intermediated. The regulated bank in the chain takes credit and funding risk on customers it did not select and cannot easily re-price. And the customer's perception of who their financial provider is attaches to the interface, which is what makes the relationship difficult for the balance sheet provider to defend or to monetise.

Assets and liabilities. Assets: cash and balances at partner banks, settlement receivables, retained instalment and merchant-advance claims, technology and acquired-customer intangibles. Liabilities: merchant and user payables, stored-value and e-money balances (redeemable at par on demand but safeguarded rather than insured), wholesale funding and securitisation against receivables, and equity. The stored-value pool is the item to watch: it is economically a deposit, is not counted as one, and carries none of the protections that make deposits stable.

DeFi protocols. A smart contract holds collateral and enforces terms without a balance sheet in the corporate sense; the protocol is the ledger and the rulebook rather than the intermediary. Lending pools accept deposits of crypto-assets from liquidity providers and lend them against over-collateralised positions, with interest set algorithmically by pool utilisation and liquidation triggered automatically when collateral value falls below a threshold. Decentralised exchanges match trades against automated market-maker pools rather than an order book. Fiat-referenced stablecoin issuers, which we include under a broad definition, are structurally different again: they issue a par-redeemable liability against a reserve of short-term government paper, repo and bank deposits, and function as the settlement asset for the rest of the system.

Assets and liabilities. Assets: posted crypto-collateral (volatile, pro-cyclical, largely self-referential) and stablecoin reserve assets (short-dated, conventional, held at or issued by the regulated system). Liabilities: liquidity-provider claims withdrawable subject to pool utilisation, par-redeemable stablecoin claims, and governance tokens that function as equity. There is no insured claim and no backstop anywhere in the structure. The connection to banking is not the lending activity but the reserve leg, which makes stablecoin issuers a concentrated and confidence-sensitive class of bank depositor and holder of short-term government securities.

2.3 Current market shares

Balance-sheet share, reported throughout, measures where exposures are held and is the most consistently available cross-country metric. It misses providers that acquire customers, assess risk and arrange loans booked elsewhere.

Income share captures the economics at stake. Acquisition, assessment and servicing can earn fees without funding or retaining a loan; the bank retains the funding spread net of expected losses and capital costs. Origination and distribution can therefore migrate with substantial income but little movement in assets. Comparable fee-pool and partnership data are unavailable; Graph 3.A illustrates the emerging models' greater reliance on fees.

Function share identifies who performs the activities in Table 2 and organises Sections 3.3 and 4.2. Platforms may provide payments, origination and advice while remaining largely absent from banking asset and income statistics.

Substitutability depends on licensing, loss-absorbing balance sheets and public backstops (Table 3). Payments, distribution, assessment and advice can rely on rented infrastructure and regulated partners. Deposit-taking remains licensed, but its customer interface is contestable. Banks' backstop-supported risk transformation is harder to replace because it combines all three requirements.

The projected 3–27% asset-share range thus understates potential changes in income and functions. The digital contest is concentrated in retail and small-business services; wholesale exposures are more bespoke and harder to separate from balance-sheet commitments, with migration chiefly towards private credit and capital markets (Box 3).

What each measure captures: functions, substitutability and where the economics sit Table 3

Function	Could a non-bank perform it?	Requirements to perform function	Visible in balance-sheet share?	Where the income sits
Payments	Yes, end-to-end	Access to rails, directly or through a licensed partner	No - float and fees, not assets	Interchange, FX and transaction fees: increasingly with the interface owner
Deposit-taking and short-term funding	Legally no; functionally contestable	A deposit-taking licence for the claim; only an interface for the relationship	Yes, for the claim only	Spread with the licence holder; relationship value with the interface owner
Credit allocation and maturity transformation	Origination and pricing yes; funding no	Data and distribution for origination; a funded balance sheet to hold the exposure	Only the funded leg	Origination fee and margin share to the originator; residual spread to the balance sheet
Risk transformation and management	No	Licence, loss-absorbing balance sheet and backstop access - all three at once	Yes, fully	Stays with the regulated balance sheet
Investment and advisory services	Yes	Conduct authorisation; no balance sheet	No	Fees, with the interface owner

Source: Authors. "Could a non-bank perform it?" asks whether the service can be delivered to the customer without a banking licence, a loss-absorbing balance sheet and backstop access; see Section 2.3.

Based on comprehensive analysis of available evidence, we find that traditional banks currently hold close to 98% of global banking-system assets (Annex B). As of 2024, universal banks accounted for approximately 66% of global banking assets (and 39% of institutions), retail and commercial banks for 22% (and 53% of the institutions) and trading and investment banks for 11% (6% of the institutions) (Table 4). Emerging models together hold less than 2% of the assets, but their growth rates are an order of magnitude faster than those of traditional banks (BIS, 2024; FSB, 2025), as further discussed in Annex B.

Regional differences are relatively contained and reflect regulatory structure, market depth, historical models, and consumer preferences. Asia shows faster adoption of platform-based models (FSB, 2019); Europe retains a strong universal banking structure (ECB, 2017); and North America shows a pronounced separation between large universal banks and non-bank platforms, alongside a concentration of trading and investment banking (Boot and Ratnovski, 2016; CGFS, 2018).

2.4 The shift already underway within traditional banking

The aggregate stability of the traditional block conceals a significant redistribution within it during the past 20 years. Applying the classification to the 2005–2024 panel, the retail and commercial archetype's

share of classified global bank assets fell from 48% in 2005 to 22% in 2024, while universal banks rose from 35% to 67%, crossing the 50% mark around 2013 (Annex B, Graph A1). In emerging markets, the universal share reached 80%; in advanced economies it rose from 33% to 55% while retail and commercial banking halved from 50% to 26%. The shift is one of concentration in assets rather than disappearance of institutions: retail and commercial banks remain slightly more than half of classified institutions globally.

Estimated global market shares by business model, end-2024[1] Table 4

Business model	Share of banking-system assets	Approx. value (USD trn)	Note
Universal	66%	125	Two-thirds of top-100 banks by assets
Retail / commercial	22%	42	High number of smaller, regional banks
Trading & investment	11%	21	Concentrated in US and UK
Digital-only / neobanks	1.0%	1.9	Rapidly emerging, but still relatively small
Platform / embedded	0.6%	1.15	Higher transaction-volume share
DeFi	0.1%	0.2	≈ USD 100–150 bn total value locked
Total banking system	100%	191	

[1] Emerging-model shares are necessarily approximate given data limitations. The total banking system assets are taken from FSB (2025), and represent the total assets for 29 large financial systems, for economies representing more than 90% of global GDP. The banking system denominator excludes NBFIs; see Box 3 for the broader perspective.

Source: Authors, based on the bank-level classification of traditional banks and the micro-data estimates for the emerging models, as outlined in Annex B.

This history provides an empirical reference for sizeable scenario reallocations and identifies mid-sized retail and commercial banks as especially exposed. Technology may reinforce consolidation within the incumbent block as well as competition from entrants (Section 3.2).

Box 3

The regulatory perimeter of banks and non-banks

Different bank business models face different regulatory treatment, with implications for competitive dynamics and financial stability. Traditional banks (especially internationally active banks) operate within the prudential banking perimeter, Basel III, subject to capital, liquidity and resolution standards (BCBS, 2010, 2024). Platform and embedded providers raise harder perimeter questions. Where banking functions are delivered through partnerships with regulated banks, prudential responsibility remains with the bank, but supervisory visibility into the consumer-facing entity can be limited (Frost et al, 2019). Where the platform itself becomes large enough to matter for financial stability, through transaction volumes, payment-system role, or concentrated technology dependency, the entity-based perimeter may need supplementing with activity-based requirements (FSI, 2023). DeFi sits largely outside the perimeter today; supervisory work emphasises that crypto-asset activities can replicate traditional financial functions while amplifying familiar vulnerabilities, supporting a "same activity, same risk, same regulation" principle where linkages to the regulated system exist (FSB, 2022, 2023).

A development running parallel to the digital and platform shifts analysed in this paper is the rising share of credit and financial intermediation provided by non-bank financial intermediaries (NBFIs). The broad NBFI sector (investment funds, money market funds, insurance companies, pension funds, hedge funds, private equity and private debt funds, and finance companies) grew from roughly 42% of global financial assets in 2008 to approximately half by the mid-2020s, with total global NBFI assets exceeding USD 230 trillion (FSB, 2025). Within this universe, several segments are particularly relevant for bank business-model dynamics: open-end bond funds and money market funds, which can amplify dash-for-cash episodes; insurance and pension funds, which have lengthened duration in the low rate environment; hedge funds, which provide leverage to capital markets and are material counterparties in repo and derivatives; and private credit funds, where global assets under management have grown from roughly USD 0.5 trillion in 2015 to USD 2.0–2.5 trillion in 2024–25 (IMF, 2024).

NBFIs are not modelled as business models inside the framework, and it is worth being precise about why, since two of our emerging archetypes - platform providers and DeFi - would themselves be classified as non-bank intermediaries on most definitions. The distinction we draw is not between banks and non-banks but between providers that contest bank functions for the same customers and a sector that interacts with banks through exposure rather than through competition for the customer. An investment fund, an insurer or a private credit vehicle competes with banks for the asset: it supplies credit to a borrower a bank might otherwise have financed, and it deals with banks as counterparty, client and funding source. It does not stand between a household and its current account. Platform providers and DeFi protocols do exactly that, and the intermediation they arrange mostly lands back inside the regulated perimeter: as an exposure on a partner bank's balance sheet, as safeguarded funds held at a bank, or as reserve assets held in bank deposits and short-term government paper. The boundary is not clean in every case: a platform that funds a receivables book through securitisation and retains the residual is behaving as a non-bank lender, and we say so where it arises.

Could NBFIs be brought inside the framework, and what would change? Mechanically the extension is not difficult. The framework needs three inputs per model: a baseline share, a vector of sensitivities to the drivers, and feasibility bounds, and all three are obtainable: aggregate NBFI assets are measured (FSB, 2025), and the sensitivities would be set by the same judgemental procedure used for the bank models. Three obstacles are more substantive. NBFIs are not one model: money market funds, open-end bond funds, insurers and pension funds, hedge funds and private credit differ in the sign as well as the size of their response to every driver, so a credible extension needs four to six additional archetypes and roughly doubles the sensitivity matrix. The adding-up constraint would have to be redefined over total financial assets rather than banking-system assets, which changes every share the paper reports. And the drivers would need re-specification, the regulatory driver in particular, since it would have to carry both margins described in Section 3.2 rather than the entry margin alone.

Three results would change, and the direction of each is predictable. First, the headline would read very differently: banks hold about half of the assets that NBFIs do, so "traditional banks retain at least three-quarters of banking-system assets" restated over the wider universe would describe a much smaller share of total intermediation. Second, Scenario 4 would partly reverse. A tightening of bank regulation looks pro-incumbent in a bank-only universe; in a wider one it may be a force that has historically pushed bank assets to non-banks, so a scenario that ends with regulated deposit-takers regaining ground within banking may end with banking losing ground overall. Third, and most interesting for the argument here, the risk transformation asymmetry would weaken without disappearing.

Private credit funds do bear credit risk on a maturity-transformed book, so the claim that risk transformation cannot migrate becomes the sharper claim that it can migrate only to vehicles funded with locked-up capital rather than demandable claims - which relocates the risk without creating a run. We regard the joint treatment of digital and non-bank displacement as the single most valuable extension of this work, and note it as such in Section 6.1.

2.5 Balance sheet structure, profitability, liquidity and solvency profiles

The six business models exhibit distinct characteristics on both sides of the balance sheet, associated with distinct risk profiles.

Income composition: Substantial differences exist between traditional and emerging models in income composition (Graph 3.A). Traditional retail and commercial banks remain predominantly net interest income driven, while trading and investment banks rely more heavily on fee and trading income. Digital-only banks broadly resemble simplified retail models but with a higher share of transaction-based fees. Platform and embedded banking, and DeFi, are predominantly fee-driven.

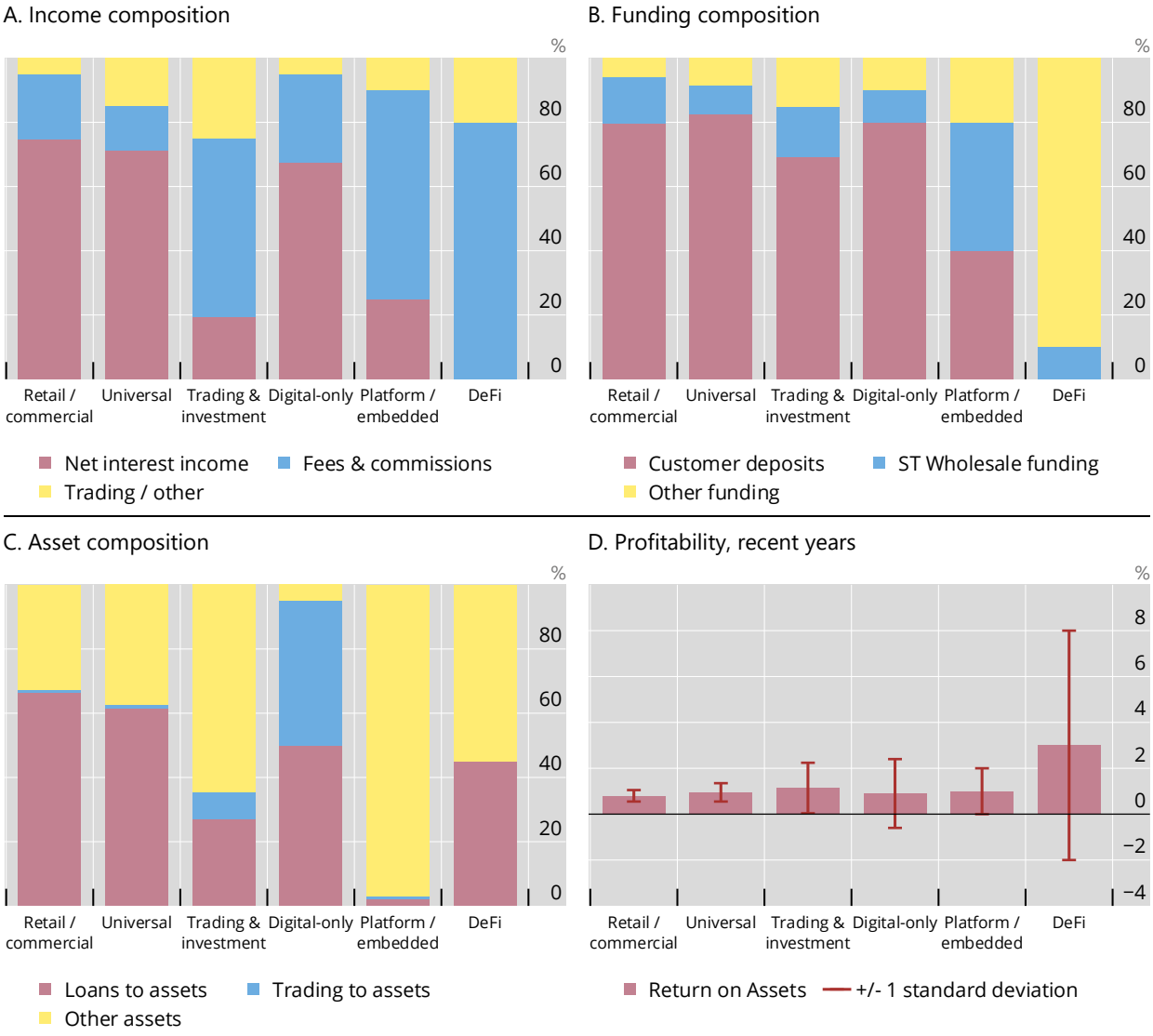
Funding composition: Retail and universal banks are largely deposit-funded; trading and investment banks depend more heavily on wholesale market funding (Graph 3.B), though that share has dropped sharply since the GFC. Digital-only banks' funding is converging towards retail-bank-like profiles; platform-based models exhibit mixed structures with substantially lower deposit shares; and DeFi relies on liquidity provision and collateral rather than deposits (Aramonte et al, 2021; Cornelli et al, 2024).

Asset composition: Traditional banking is geared towards lending, while digital models are geared slightly more towards cash and securities, plus receivables (platforms) and token reserves (DeFi) (Graph 3.C).

Profitability: Profitability dispersion is well documented in the panel literature (Graph 3.D): deposit-funded retail banks show stable, moderate returns; universal banks show diversified but more volatile earnings; and trading-intensive institutions show the highest mean returns and volatility (Roengpitya et al, 2017; ECB, 2017). Digital-only banks are still scaling, with returns held down by acquisition costs early on and improving with scale (Lund et al, 2021); platform and DeFi data remain limited but suggest upside potential paired with high volatility.

Composition of assets, funding and income

Graph 3



Sources: FitchConnect for traditional banks; digital-only: asset-weighted across the census of about 70 licensed digital-only banks in Annex B (end-2024 disclosures); Platform: PayPal; Mercado Pago, Ant Group disclosures; DeFi: DefiLlama and authors' estimates.

Business models differ systematically along three dimensions that shape their risk profile: how volatile their earnings are, how stable their funding is, and which risk dominates their solvency position (Table 5). Broadly, traditional models carry more credit and market risk, while emerging models are more exposed to operational, cybersecurity and reputational risk on account of their technology reliance (FSB, 2022).

On the traditional side, retail and commercial banks are primarily exposed to credit and interest rate risk; universal banks share that exposure to a lesser degree, given a more diversified business model; and trading and investment banks exhibit elevated market and liquidity risk, reflecting market-based intermediation and wholesale funding. On the emerging side, digital-only and platform-based models face heightened operational, cyber and compliance risk linked to technology dependence and third-party relationships (BCBS, 2021), while DeFi exhibits pronounced operational and liquidity risk from smart-contract vulnerabilities and pro-cyclical collateral dynamics (Aramonte et al, 2021). These are differences in the composition of risk rather than in its level, and Section 4 sets out what they imply for the system as the weights change.

Stylised profitability, liquidity and solvency profiles by business model Table 5

Business model	ROA volatility	Deposit / funding stability	Solvency profile
Retail / Commercial	Low	High (insured deposits)	Credit risk dominated
Universal	Moderate	Moderate (mixed funding)	Diversified
Trading & Investment	High	Low (wholesale-dependent)	Market-risk dominated
Digital-only / Neobanks	High	Moderate (confidence-sensitive)	Scale-dependent
Platform / Embedded	High	Low (fee-based, off-balance sheet)	Operational risk dominated
DeFi	Very high	Very low (no insured deposits)	Smart-contract / collateral risk

Sources: Authors based on FitchConnect, Roengpitya et al (2017), ECB (2017), Aramonte, Huang and Schrimpf (2021).

The liquidity dimension increasingly differentiates business models, and belongs here because of a feedback that the projections would otherwise leave implicit: a business model that is fragile under stress cannot compound market share through a stress episode. Funding fragility therefore acts as a ceiling on how far an emerging model can grow, which is why the platform expansion scenario requires a benign macro-financial path and why political uncertainty reverses the reallocation rather than merely slowing it.

Graph 4 separates run propensity - the demandability, insurance coverage and exit speed of liabilities - from loss on exit, determined by asset liquidity, margining and access to official support. The distinction matters because faster withdrawals need not cause the same losses across business models, and the two dimensions require different policy instruments.

Read this way, retail and commercial banks sit closest to the origin: insured claims, slow channels, liquid or eligible collateral, an available backstop. Universal banks lie slightly further out on both dimensions given partial reliance on market funding. Trading and investment banks are displaced principally *upwards*: their collateralised wholesale funding is not the most flight-prone in the sample, but daily margining and mark-to-market accounting mean that when it moves the capital consequence is immediate. Digital-only banks are displaced principally rightwards: their claims and backstop access are comparable to any retail bank - what differs is the speed of the channel through which those claims can be exercised. DeFi sits at the far corner of both dimensions, with redeemable collateral claims, instantaneous exit, pro-cyclical collateral dynamics and no lender of last resort.

Platforms often hold little runnable funding themselves but transmit withdrawals to partner banks. Graph 4 represents this dependency with an arrow: own-balance-sheet liquidity measures alone cannot capture the risk transferred through the customer interface.

Two stylised facts emerge for banks' liquidity and solvency profiles:

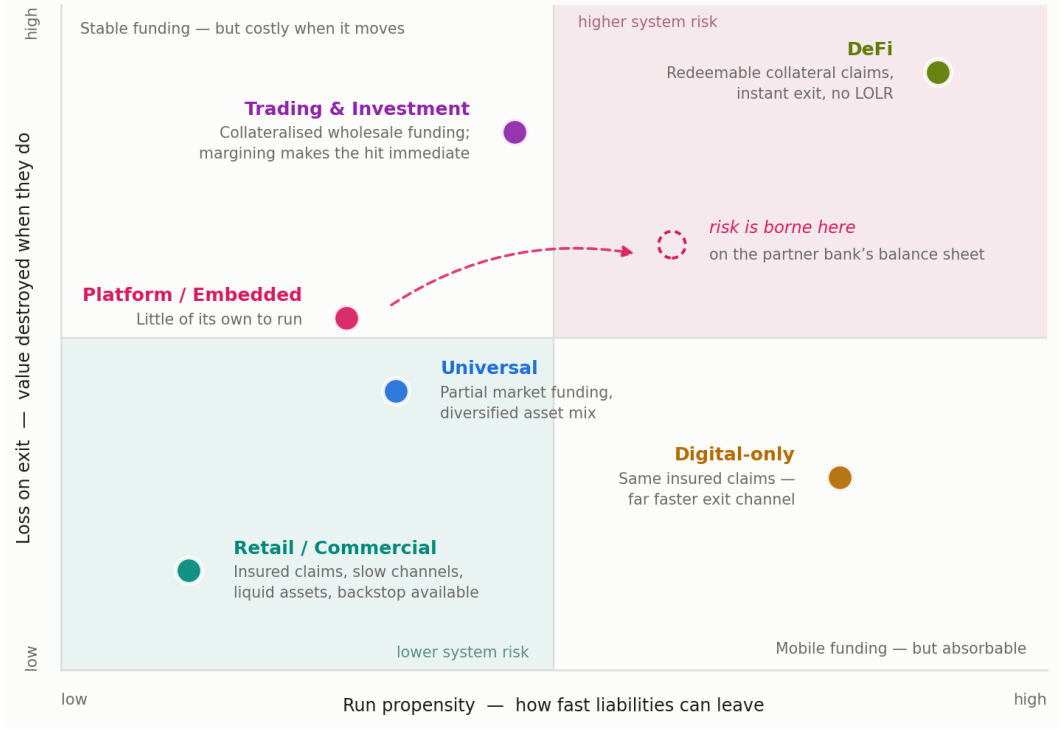
Traditional models. High deposit-funding share implies slow, more predictable outflow behaviour; access to central-bank liquidity provides shock absorption; credit risk remains the primary solvency driver, with liquidity stress materialising with a lag.[4]

Emerging and platform-based models. Greater reliance on market or confidence-sensitive funding implies faster outflows under stress; absence of direct lender-of-last-resort access (especially DeFi) means liquidity events can directly impair solvency; and operational and cyber channels can precipitate liquidity and solvency events simultaneously.[5]

[4] The empirical literature on the deposits channel of monetary policy emphasises that retail deposit market power generates margin stability that wholesale-funded institutions lack (Drechsler, Savov and Schnabl, 2017).

[5] Digital banking shifts the speed dimension: events that historically developed over days can unfold in hours, as both academic and supervisory analyses of the March 2023 US regional bank failures document (Cookson et al, 2023; Benmelech, Yang and Zator, 2023; Federal Reserve Board, 2023).

Liquidity profile characterisation of bank business models Graph 4



The horizontal axis is run propensity: the share of liabilities redeemable at par on demand and uninsured, combined with the operational speed of the exit channel. The vertical axis is loss on exit: the value destroyed when liabilities leave, which is low where assets are liquid or central-bank eligible and a backstop can interrupt the sequence, and high where exit forces distressed sales, triggers margining, or where no backstop exists. Both axes are ordinal; positions reflect the authors' judgement informed by Graph 3 and Table 5, not measured quantities. The arrow for platform and embedded providers indicates risk transmitted to the balance sheet of a partner bank rather than borne on their own.

Sources: Authors.

3. Structural drivers and four scenarios

3.1 Framework overview

We develop a forward-looking framework that links structural drivers to business-model dynamics and, ultimately, to profitability, liquidity and solvency outcomes. The framework has three components:

- A classification of banking business models into six archetypes (discussed in Section 2);
- Three structural drivers - technology, regulatory stance and consumer preferences (in two dimensions: digital convenience and stability) - operating within a macro-financial state, and conditioned by background forces, including political and geopolitical developments and climate-related risks; and
- Four stylised scenarios that combine these drivers into internally consistent configurations, enabling exploration of how market shares and risk profiles may evolve over the next ten years.

Conceptual framework Graph 5



Sources: Authors.

Graph 5 summarises the mapping: scenario shifts across five inputs combine with business-model sensitivities into relative viability scores and bounded market-share changes. Annex A.1 explains the mapping and limitations; Annex A.2 documents calibration. The exercise resembles supervisory scenario analysis (FSI, 2023), with a longer horizon and coarser instrument. NBFIs are discussed qualitatively in Box 3.

3.2 Structural drivers for the future of banking

Technology and regulation determine the cost and legal conditions for performing banking functions; consumer preferences determine adoption. Macro-financial conditions shape maturity-transformation profits, investment capacity and stress. We represent these forces through six inputs, separating digital convenience from stability preferences.

Technology. Technology acts on both sides of the balance sheet, and the two effects have different speeds and different beneficiaries. On the funding side, digital channels compress the time and effort required to move a deposit, which weakens the frictions that made retail funding sticky and, where a third party owns the interface, separates the depositor relationship from the deposit itself. On the asset side, the margin is informational: the extent to which creditworthiness and customer characteristics can be assessed from data trails rather than from a relationship (Berg et al, 2020; Fuster et al, 2019) - a mechanism developed in full below, in "the asset-side channel." Cutting across both sides is a cost and scale effect, set out separately in "entry costs and scale costs": falling production and distribution costs favour digital-native entrants, while the rising fixed costs of resilience and compliance favour the largest incumbents, squeezing the institutions in between.

Regulatory stance. Two margins can move differently. Easier entry through licensing, data access and partnership rules favours new providers (Buchak et al, 2018). The wider perimeter determines whether activity remains in banks: higher bank capital and liquidity requirements can shift lending to NBFIs, while comparable requirements on non-banks can reduce that incentive (Chernenko, Erel and Prilmeier, 2022; Acharya, Cetorelli and Tuckman, 2024). Our projections vary entry conditions across the six archetypes. Migration across the broader bank–NBFI boundary is discussed in Box 3 and Section 6.1. Regulatory tightening in the scenarios therefore means tighter entry conditions, not simply higher prudential requirements on banks.

Consumer preference for digital convenience. The relevant margin is willingness to move the primary financial relationship to an interface not operated by the institution that holds the deposit. A strong move would mean that, for a majority of retail and small-business customers, the interface rather than the balance sheet becomes the locus of the relationship: the customer's sense of who their financial provider *is* attaches to the front end (Pousttchi and Dehnert, 2018). This driver is the result of two demographic forces, separated below, that point in opposite directions.

Consumer preference for stability. This is the counterweight, and it can move much faster in the opposite direction. Under stress, insured deposits, familiar brands and physical presence regain value (Beltratti and Stulz, 2012). How much value they regain depends largely on the guarantees behind them, explicit and implicit: the strength of this driver is a function of deposit insurance coverage and limits, of access to central bank facilities, and of what customers believe would happen to an uninsured claim in a crisis, which is why the same nominal preference shift has different consequences across jurisdictions. The two consumer dimensions are kept separate because they are not the negatives of one another: the same household can prefer a digital interface and an insured balance sheet, and which preference binds depends on the state of the world.

Macro-financial conditions. The relevant margins are the level and slope of the yield curve, credit quality and access to funding markets. A benign move supports net interest income and internal capital generation across the system; a stressed move compresses both, with the effect concentrated in market-funded and pro-cyclical models (Drechsler, Savov and Schnabl, 2017).

Entry costs and scale costs. Technology lowers the cost of entering: core systems, onboarding, distribution and licence-dependent services can be rented. Operating at scale still requires substantial fixed investment in risk management, cyber defence, model governance and cross-jurisdiction compliance. Numerous small entrants can therefore coexist with advantages for the largest incumbents.

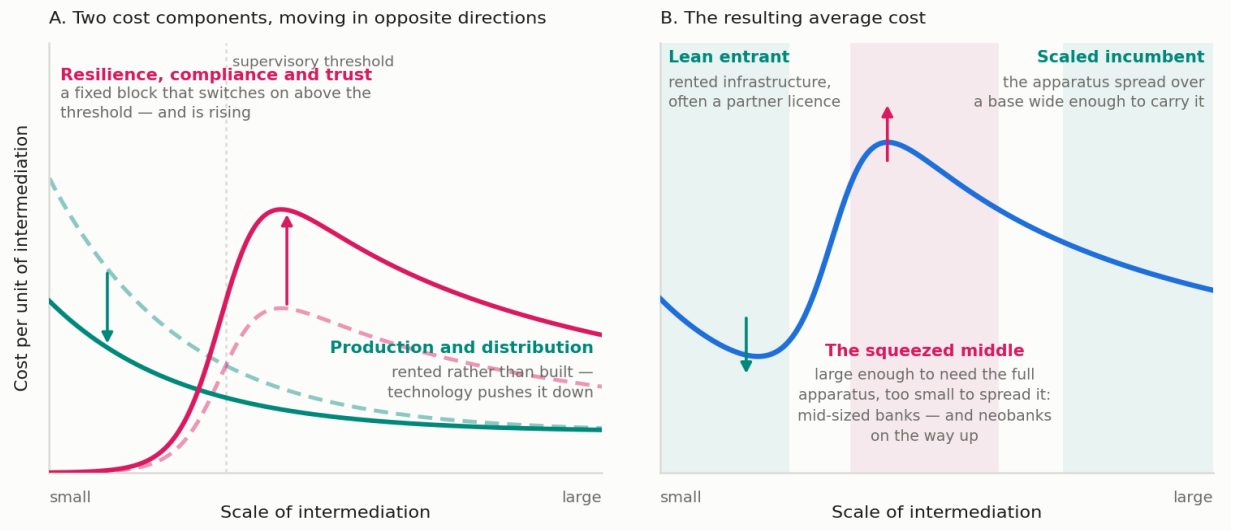
The result is a cost structure with two viable positions rather than one, illustrated in Graph 6. At small scale, a technology-based entrant on rented infrastructure and, often, a partner's licence can undercut incumbents. At large scale, an institution can spread the resilience and compliance block thinly enough to convert it into an advantage, since the credibility of that apparatus is what persuades customers and counterparties to entrust it with size. The uncomfortable position is in between - large enough to need the full apparatus, not large enough to spread it - which is where mid-sized traditional banks sit and where a successful neobank arrives as it grows; the observed consolidation within traditional banking (Section 2.4) is the same phenomenon from the incumbent end. Two implications follow for the projections: entry is not the constraint on the emerging models' market share, scaling is, and that constraint is regulatory and reputational rather than technological; and the pressure technology exerts on incumbents is felt as competition at the small end, opportunity at the large end, and a squeeze in the middle - the segment holding a substantial share of assets in most jurisdictions outside the United States.

The asset-side channel. The funding-side consequences of digitalisation are the more visible, and are treated at length in Sections 4.5 and 4.7; the asset-side consequences are slower and less documented but at least as important. Three implications relate to data-based credit assessment:

- **Reallocation:** where creditworthiness can be inferred from transaction, platform or payroll data, the informational rent from knowing the borrower is competed away and lending may migrate towards whoever holds the data. Hence, the lender may not be the institution holding the deposit, such as in the case of the fintech displacement in US mortgage and small-business lending (Buchak et al, 2018; Fuster et al, 2019; Jiang, Yu and Zhang, 2024). This development is bearing most heavily on the mid-sized banks identified in Section 2.4.
- **Extension:** thin-file borrowers become lendable, expanding credit at the margin with less history to calibrate loss against.
- **Correlation:** when many lenders use similar data and techniques, model error stops being idiosyncratic, producing losses concentrated in the same segments at the same time. This is a concentration neither borrower-level diversification nor conventional risk measurement are designed

to detect. The supervisory implication differs from the funding-side one: correlated model error calls for something closer to a model-diversity concern, in the family of questions supervisors already ask about common benchmark and index exposures - the asset-side counterpart to the liquidity findings, though one we do not model, since the framework allocates market share rather than loss distributions.

Technology lowers the cost of entry but raises the cost of scale — Graph 6



Stylised. Panel A shows the two components of the cost of intermediation and the direction in which technology has moved each; Panel B their sum. Axes are ordinal and illustrative; the figure represents the argument in the text and is not an estimate.

Sources: Authors.

Why consumer behaviour moves at all. Preferences are usually slow-moving, so a shift large enough to matter over ten years needs explaining. Two things do the work. The first is the **option set**: a customer who moves to a digital interface need not have come to prefer it; it is enough that a cheaper or more convenient option now exists and switching has become nearly costless, which is why this driver is coupled to technology and regulation rather than independent of them. The second is the **composition of the population**, which changes for two distinct reasons that point in different directions: cohort turnover and ageing, developed below. The counterweight is genuine preference change, moving in the opposite direction and much faster: under stress, a customer's revealed preference for insured, familiar and physically present institutions can shift within days, which is why the two consumer dimensions are modelled separately.

Cohort effects and ageing effects. The first is a **cohort effect**: channel preferences are formed early and travel with the cohort rather than changing as it ages - a customer who has never used a branch does not begin using one at sixty. This makes part of the digital shift a demographic ratchet, replacing a fraction of the least digital customers with the most digital each year regardless of what technology or banks do; the relevant cohorts are already born, making this driver more predictable than most others in the framework. The second is an **age effect**: what a customer needs changes with life stage regardless of cohort. Ageing shifts demand from credit towards decumulation and income products, from transaction services towards advice, and from feature-richness towards simplicity, reliability and fraud protection, while dampening credit growth in an ageing economy, with consequences for the profitability of maturity transformation (Imam and Schmieder, 2025).

On the *channel* - where the relationship lives - the cohort effect dominates and the movement is close to irreversible: an ageing population of digital natives is still a digital population, and the interface migration

continues even as the age structure shifts. On the *product mix*, the age effect dominates and moves the other way: demand tilts towards advice, protection and income, which are services in which established institutions and human channels retain an advantage, and away from the unsecured consumer credit and transaction volume on which the emerging models' economics currently depend. On *trust*, the two compound rather than offset, since older customers are both more loss-averse and more targeted by fraud, raising the weight the stability preference below should carry over the horizon.

For the scenarios, the digital-convenience driver is therefore strongly positive but concentrated on the interface, while the associated product opportunity is smaller in ageing advanced economies than adoption rates alone would suggest, and larger in younger emerging markets; one reason the scenarios need not play out identically across regions.

Competition is endogenous: technology and regulation govern entry, while customer switching determines its impact. Sensitivity coefficients encode these competitive effects; adding competition as an input would double-count them. Table 6 reports competitive pressure descriptively, alongside the drivers.

The relative weight of these forces varies over time (Table 6). Macro-financial conditions dominate across all horizons, since they transmit directly to profitability, liquidity and solvency through interest rates, asset quality and funding conditions. Regulation's influence is front-loaded differently: it acts on entry with a lag of years, so its effect on market structure peaks at the medium horizon even when the rule change is immediate. Technology matters materially from the short term via cost structures and resilience requirements, and becomes more decisive over longer horizons as its effects compound. Socio-economic trends gain importance over time because demographic change is slow and monotonic. Political and geopolitical developments are the least predictable in timing but can be highly significant when they occur, which is why we treat them as conditioning context rather than a driver with a scheduled path; climate risk's material impact is expected beyond the ten-year horizon. Competitive pressure, an outcome rather than a driver, is assessed to peak in the medium term before moderating amid regulatory convergence and consolidation.

Inter-temporal importance of structural factors (1 = highest, 0 = lowest) Table 6

Factor	Short-term	Medium-term	Long-term
Macro-financial conditions	1	1	1
Regulation	1	1	1
Technology	0.75	1	1
Socio-economic trends	0.5	1	1
(Geo-)political environment	0.5	0.75	1
Climate risk	0.25	0.5	1
Competitive pressure from digital and non-bank providers (outcome)	0.5	1	0.5-0.75

Competitive pressure is shown for description only: it is an outcome of technology, regulation and consumer switching, and is not one of the five drivers used in the framework.

Sources: Authors' judgement, drawing on CGFS (2018), FSB (2025), NGFS (2022).

3.3 Scenarios for future banking

We construct four scenarios that combine different trajectories for the structural drivers. Each scenario is stylised, internally consistent and intended to span a plausible range of outcomes. The scenarios are not predictions; they are used to illustrate how profitability, liquidity and solvency may shift as the relative importance of different business models changes.

Scenario 1: Slow transformation

- **What moves.** Technology diffuses gradually, regulatory frameworks evolve incrementally and consumer preferences shift slowly; macro-financial conditions remain benign.
- **How the functions are reallocated.** Little changes in substance. Banks retain all five functions; non-bank front-ends appear in payments but sit on bank rails, and origination remains overwhelmingly bank-based.
- **How incumbents and entrants relate.** Predominantly complementary. Entrants specialise in segments incumbents underserve and increasingly reach customers through partnership rather than direct competition; the banking-as-a-service relationship grows without displacing the balance sheet.
- **Balance sheet, revenue and risk at year 10.** Incumbent balance sheets and revenue structures look much as they do today, with modest fee growth and gradual margin compression. Emerging models grow from a small base in payments and niche lending. Risk remains where it is: credit-dominated for incumbents, operational for entrants. This scenario is closest to a continuation of the post-GFC trajectory, and is the benchmark against which the other three should be read.

Scenario 2: Technology acceleration

- **What moves.** Rapid digital adoption, advances in AI and falling marginal costs for digital platforms reshape the competitive field, while the regulatory perimeter holds and macro conditions stay benign.
- **How the functions are reallocated.** Payments migrate substantially to non-bank front-ends running on bank rails. Origination in consumer credit and small-business lending moves partially outside the perimeter, as data-based creditworthiness assessment displaces relationship-based assessment in exactly the segments where smaller banks have been strongest (Buchak et al, 2018; Fuster et al, 2019). Deposit-taking is contested at the margin but not displaced; risk transformation does not move.
- **How incumbents and entrants relate.** Competition and partnership simultaneously, and the mix differs by institution size. Large incumbents invest heavily in digital transformation and compete directly; mid-sized institutions increasingly become suppliers of balance sheet and licence to entrants that own the customer.
- **Balance sheet, revenue and risk at year 10.** Incumbent balance sheets are largely intact but their revenue composition shifts: net interest income is contested, fee income grows but is shared with distributors, and cost-to-income diverges sharply by technology scale. Emerging models reach an intermediate share of assets and a materially higher share of retail revenue. Risk shifts towards operational and confidence-sensitive funding channels across the system, not only in the new models.

Scenario 3: Platform ecosystem expansion

- **What moves.** Technology, regulation and consumer behaviour all align in favour of platform-based, asset-light models. Large technology firms embed financial services within broader ecosystems; open banking and permissive licensing lower barriers to entry (Frost et al, 2019).
- **How the functions are reallocated.** This is the scenario in which the asymmetry of Table 3 becomes visible. Payments migrate end-to-end in retail. Origination and pricing migrate. Investment and advisory services become platform-embedded. Deposit-taking formally remains with banks, but platforms intermediate access to it, so the customer's relationship is with the interface. Risk transformation stays where it is, because it cannot go anywhere else: it requires the balance sheet, the licence and the backstop.
- **How incumbents and entrants relate.** Incumbents become suppliers. Traditional banks retain their balance sheet roles but increasingly operate as regulated utilities behind user interfaces they do not control, competing with one another for platform distribution agreements rather than for customers directly.

- **Balance sheet, revenue and risk at year 10.** Bank balance sheets are close to their current size and composition; bank revenue is not. Net interest margins compress as platforms intermediate the deposit relationship, leaving the balance sheet provider materially less fee income than today's model implies. Emerging models reach around 27% of banking-system assets and a considerably larger share of retail banking revenue, which the asset measure does not capture. Risk becomes concentrated in the interaction between the two groups: operational dependency, partner concentration and confidence-sensitivity of funding intermediated by a third party. This is the most transformative of the four and the one that puts most pressure on the existing supervisory architecture.

Scenario 4: Political uncertainty

- **What moves.** Political and policy uncertainty rises and persists. The defining feature is not a single trend but a widening of the distribution of policy outcomes: contested and short-lived policy settlements, unpredictable regulatory and fiscal treatment of banks and of digital finance, sanctions and industrial-policy interventions, and, as one form among several, geopolitical fragmentation that reduces the scalability of cross-border banking models. Macro-financial conditions become more volatile, risk and funding premia rise, and consumers retreat towards safety and familiarity.
- **How the functions are reallocated.** The movement runs the other way. Payments re-domesticate onto national rails where cross-border arrangements become politically contingent; credit allocation returns to regulated balance sheets as the perimeter tightens and as unpredictable treatment makes partnership structures harder to underwrite; deposit-taking is reinforced by flight to insured claims. No function migrates outward, and some migrate back.
- **How incumbents and entrants relate.** Competition weakens and the field narrows, but the binding constraint on entrants is capital rather than customer preference. Uncertainty raises the hurdle rate on any investment with a long payback, and scaling a young franchise is exactly such an investment: growth equity and wholesale funding become scarce and expensive when policy outcomes cannot be priced, while the option value of waiting rises for incumbents too, so digital investment is deferred on both sides. Domestic retail and commercial banks regain prominence, while complex universal and trading banks face headwinds wherever fragmentation is the form the uncertainty takes. Emerging models expand slowly, as confidence, legal certainty and political support favour regulated, deposit-funded incumbents (FSB, 2025).
- **Balance sheet, revenue and risk at year 10.** Emerging models hold about 3% of assets, close to the trend baseline. But this is not a benign outcome: it is the scenario with the highest system-wide risk, because the deterioration is within every business model rather than between them. Earnings, asset quality and capital generation weaken across the board, with trading and investment banks and DeFi most exposed. It is also the scenario in which the regulatory driver is least predictable in direction, which is the point Section 3.4 takes up. And it is the clearest illustration of why market share is a poor summary statistic for financial stability.

Table 7a summarises the core driver configurations across the four scenarios, as relevant at the ten-year horizon.

Driver configurations across scenarios — Table 7a

Scenario	Technology	Regulatory stance	Consumer preferences	Macro-financial
1. Slow transformation	Gradual	Stable	Slow digital shift	Benign
2. Technology acceleration	Rapid	Stable	Rapid digital shift	Benign
3. Platform expansion	Rapid	Loosening	Very rapid shift	Benign
4. Political uncertainty	Moderate	Tightening / unpredictable	Stability preference	Stressed

Source: Authors.

For use in the projection framework, the qualitative configurations in Table 7a are quantified on a common intensity scale. The scale has no natural units since the five drivers are measured in incommensurable units, so it is defined instead by verbal anchors applied identically to every driver:

- **0:** no change in the driver's trajectory relative to the past five years.
- **±0.5:** a shift comparable in size to ordinary variation over a business cycle in the past two decades; for example, the swing in macro-financial conditions between 2019 and 2023.
- **±1:** a shift comparable to the largest sustained structural change observed in the post-GFC period; for example, the cumulative tightening of prudential regulation between 2010 and 2019, or the diffusion of mobile banking as the primary retail channel between 2015 and 2024.
- **±2:** a shift with no precedent in the sample period, at the outer edge of what we regard as plausible over ten years.

Standardised driver shifts ΔF across scenarios

Scale −2 to +2 Table 7b

Driver	S1 Slow transformation	S2 Tech acceleration	S3 Platform expansion	S4 Political uncertainty
Technology adoption	+0.3	+1.0	+2	+0.3
Regulatory stance (>0: loosening)	0	0	+0.8	−0.5
Consumer digital preference	+0.2	+1.0	+2	-0.5
Consumer stability preference	0	0	−0.3	+0.5
Macro-financial stance (>0: benign)	+0.5	+1.0	+0.75	−0.5

Sign conventions: regulatory stance positive = loosening, negative = tightening; macro-financial stance positive = benign, negative = stressed. ΔF is a dimensionless intensity index defined by the verbal anchors in the text (0 = no change relative to the past five years; ±1 = a shift comparable to the largest sustained post-GFC structural change; ±2 = at the outer edge of plausibility). The entries are judgemental and are not estimated.

Source: Authors' judgement.

Anchoring the scale in this way does not give ΔF units, and we make no claim that +1 for technology is quantitatively equivalent to +1 for regulation. What it does is impose a common discipline: the same verbal standard is applied when setting every entry, so that the relative intensities in Table 7b can be compared, challenged and, in the companion workbook, changed, with the consequences visible immediately. Table 7b reports the resulting shifts ΔF, with sign conventions given beneath the table.

Table 8 summarises how the five functions of Table 2 are reallocated at the ten-year horizon under each configuration. One row does most of the analytical work. Payments, credit origination, distribution and advisory services all move in at least one scenario; risk transformation moves in none, for the reasons given in Section 2.3. That asymmetry is why the market-share numbers remain high while the supervisory problem becomes harder: the function that stays is the one that carries the tail risk, and the functions that leave are the ones that carry the customer and the margin.

Reallocation of bank functions across scenarios, year 10 Table 8

Function	S1 Slow transformation	S2 Technology acceleration	S3 Platform expansion	S4 Political uncertainty
Payments	Banks, with non-bank front-ends	Largely non-bank front-ends on bank rails	Non-bank, end-to-end in retail	Banks regain; domestic rails
Deposit-taking and short-term funding	Banks	Banks, contested at the margin	Banks hold; platforms intermediate access	Banks, reinforced by flight to safety
Credit allocation and maturity transformation	Banks	Banks, with non-bank origination in retail and SME	Origination and pricing migrate; balance sheet stays	Banks; tighter perimeter
Risk transformation and management	Banks	Banks	Banks - the function that cannot migrate	Banks
Investment and advisory services	Banks and NBFIs	Digital advice scales	Platform-embedded	Banks and domestic NBFIs

Source: Authors. Cells state where the function is predominantly performed at the ten-year horizon, not the exclusive provider.

3.4 The regulatory reaction function: why the scenarios are not linear in scale

The projections hold regulatory stance exogenous, although regulation often responds to scale and stress. Money market funds after 2008 and stablecoins after 2022–23 illustrate how growth outside the perimeter can prompt authorisation, capital or reserve requirements.

Systemic importance, retail harm and incumbent competitive pressure can each trigger intervention. Platform expansion should therefore be read as a path without an endogenous supervisory response, with its 20–30% share range an upper-bound illustration rather than a central expectation.

A perimeter extension raises entrants' costs but can also confer legitimacy, deposit insurance and potentially central-bank access. Its net effect depends on whether their advantage is technological or regulatory. A useful extension would make the regulatory input respond to realised shares, using Table 11's indicators to flag thresholds. The present framework cannot determine that net effect.

4. Results

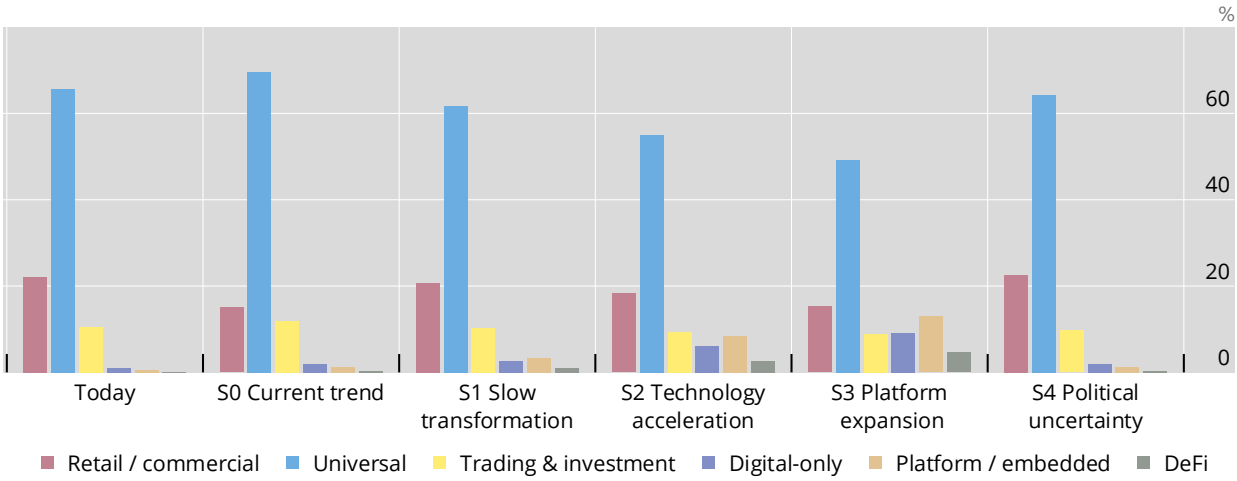
This section applies the sensitivity-based framework of Section 3 to assess how the four scenarios affect the market shares of the six business models, and how these shifts translate into changes in profitability, liquidity and solvency. The objective is illustrative, not predictive, as throughout the paper.

Throughout this section we track a common set of outcome dimensions: for profitability, the level and volatility of returns and the composition of income between net interest and fee sources; for liquidity, the stickiness of deposits, reliance on confidence-sensitive funding and sensitivity to digital outflow dynamics; and for solvency, capital adequacy, the dominant risk driver and the strength of the funding-to-solvency linkage. The full set of indicators and their definitions is given in Annex A.5 (BCBS, 2021; FSI, 2023). Because solvency risk is no longer solely a function of credit quality, as it increasingly depends on the stability of funding, the resilience of operational systems and the speed of information transmission, the three dimensions should be read jointly rather than in sequence.

4.1 Market share projections

Alongside the four scenarios, we construct a trend-extrapolation baseline ("S0") that extends recent growth rates of each business model linearly to year 10 (Graph 7). The purpose of this baseline is methodological, not predictive: linear extrapolation is not a credible long-run forecast, but it provides a useful external comparator against which to read the scenario projections. Divergence from it reveals the marginal contribution of structural change relative to a continuation of current dynamics.

Central market share projections at 10-year horizon — Graph 7



Sources: Authors, based on framework and calibration established in section 3.

4.2 What the shares mean: stock, flow and the division of labour

This section unpacks it in three steps: what a given share implies for the flow of new business, what division of labour between incumbents and entrants produces it, and what the measure still fails to capture.

Stocks adjust more slowly than new business. With an average asset life of five years and system growth of 3% annually, the illustrative transition from an initial 2% emerging-model share to 10% at year 10 implies about 15% of gross new origination in that year; 17.5% implies close to 30%, and the platform-expansion range of 20–30% implies roughly 45%. These calculations depend on turnover and transition assumptions rather than constituting separate projections. They show why stock-based supervision can detect shifts later than origination data; translating system-wide flows into retail and small-business shares additionally requires a segment-specific denominator.

What the division of labour looks like. Table 9 sets out, for each scenario, what each emerging model actually does at the ten-year horizon and who holds the resulting risk. Three distinctions do most of the work. The first is between *distributing* a product, *originating* it (selecting and pricing the borrower) and *retaining* the exposure; these separate cleanly, and the scenarios differ mainly in how far the first two travel. The second is between digital-only banks, which are licensed and therefore do retain risk, and platforms, which mostly do not. The third is the direction of DeFi's involvement, which shifts from a crypto-native niche towards the settlement and collateral layer rather than towards credit provision.

For digital-only banks, the trajectory is towards doing conventional banking on a lower cost base rather than something different. Under slow transformation they remain concentrated in payments, current accounts and unsecured consumer lending. Under technology acceleration and platform expansion they move into traditional credit in earnest, and by year 10 the larger institutions resemble mid-sized retail banks with better technology and a worse deposit franchise - holding the assets, carrying the credit risk, and distinguished mainly by how their funding behaves (Section 4.5). Under political uncertainty the

segment's growth stalls, because a flight to insured, familiar institutions is precisely what a young franchise cannot supply.

Platforms mainly distribute under slow transformation and political uncertainty. Under technology acceleration, they increasingly score, price and service loans booked by partner banks. Platform expansion also shifts deposit relationships and allows licensed subsidiaries to retain some exposures, while other loans move to credit funds (Box 3). A single loan may thus be originated by a platform, funded by a bank and ultimately held by a fund, challenging supervisors' view of the complete chain.

DeFi remains peripheral to unsecured lending in these scenarios. Its expanding role is in settlement and collateral: under platform expansion, tokenised deposits, securities collateral and fiat-backed stablecoins enter mainstream financial chains, creating reserve and operational exposures for banks. Political uncertainty sharply constrains this activity.

What the market-share metric still misses. It does not capture the stored-value and settlement float described in Section 2.2, which is a deposit substitute of growing size that appears in no deposit statistic. It does not capture origination flow, which as shown above runs well ahead of the stock. It does not capture the share of the customer relationship, which determines pricing power and medium-term profitability. And it does not capture risk that has been transferred rather than retained: an exposure originated by a platform and booked by a bank raises the bank's asset share, not the platform's, even though the selection decision, and therefore much of the credit risk, sits with the platform. Read strictly, an asset-share measure records the location of funding. The scenarios in this paper are about the location of everything else.

The division of labour at the ten-year horizon: who does what, and who holds the risk Table 9

	S1 Slow transformation	S2 Technology acceleration	S3 Platform expansion	S4 Political uncertainty
Emerging-model asset share (Table 1)	Below 5%	15–20%	20–30%	About 3%
Implied share of new origination, year 10	Below 10%	Around 30%	Around 45%	About 3%
Digital-only banks: what they do	Payments, accounts, unsecured consumer credit	Full-service retail and SME banking at scale	As S2, but customer reached through platform interfaces	Growth stalls; funding premium rises
Digital-only banks: traditional credit business	Marginal; mortgages and secured SME lending rare	Substantial; loan books resemble mid-sized retail banks	Substantial, but originated through third-party channels	Marginal
Platforms: distribute, originate or retain?	Distribute only	Distribute and originate; partner bank retains	Distribute, originate and price; retention begins via licensed subsidiaries	Distribute only; partnership structures contract
Platforms: who holds the credit risk	Bank	Bank, on a selection it did not make	Mostly bank; a growing minority to platform subsidiaries and credit funds	Bank
DeFi: role	Crypto-native niche	Stablecoin settlement grows; lending stays crypto-collateralised	Tokenised collateral and stablecoins enter mainstream settlement chains	Sharp contraction
Where the risk to banks arises	Limited	Credit risk on originated exposures; operational dependency	Origination-to-balance-sheet chains; partner concentration; stablecoin reserve leg	Macro-financial stress within every model

Implied origination shares are arithmetic given the asset-share paths of Table 1, system growth of 3% a year and an average asset life of five years; see Section 4.2. Cells describe the predominant pattern, not the exclusive one.

Sources: Authors.

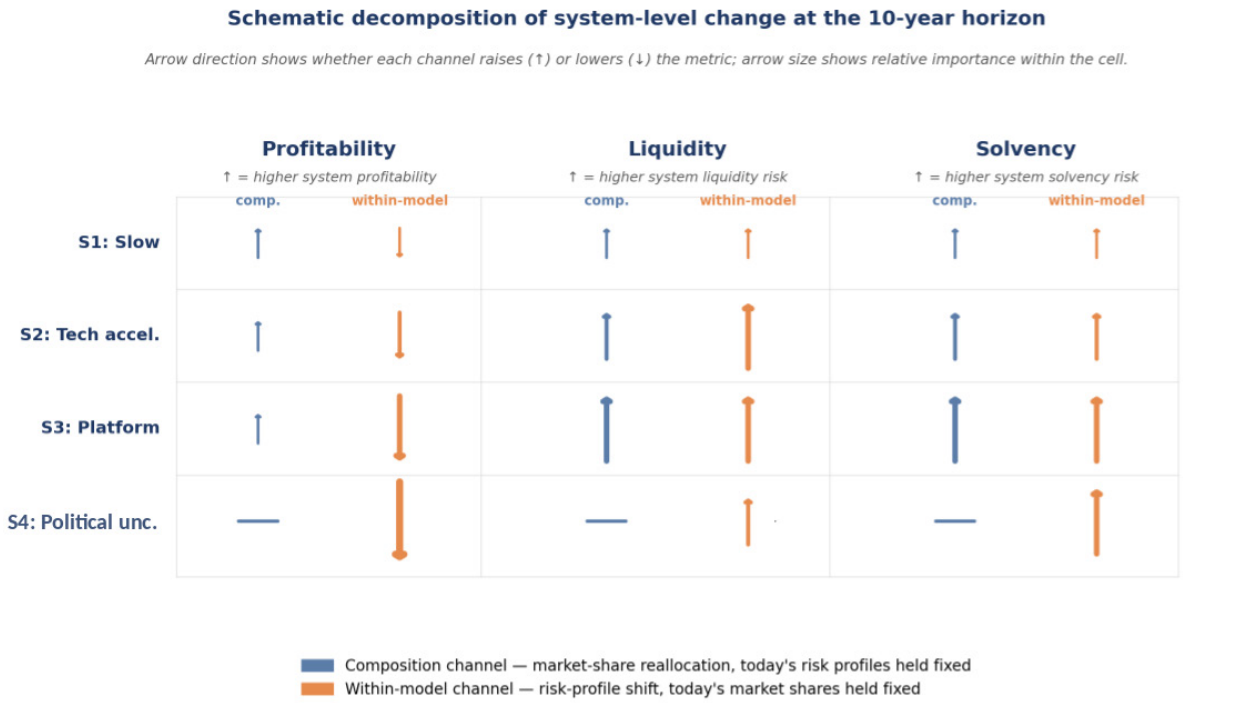
4.3 Profitability, liquidity and solvency: a two-channel view

The market-share projections in Graph 7 reshape three aggregate financial stability metrics (system profitability, liquidity and solvency) through two qualitatively distinct channels. The first is a *composition channel*: as activity migrates between business models, the system-level metric shifts mechanically because each model contributes its own risk profile to the aggregate. A banking system in which platform, digital only and DeFi models hold around 27% of assets (scenario 3, platform expansion) has a different risk fingerprint from one in which they hold 1-2% (today's situation), even if no individual bank's behaviour changes. The second is a *within-model channel*: the same scenarios that drive share reallocation also alter each business model's own risk profile. Retail banks under technology acceleration are not the retail banks of today: their depositors are more digitally responsive, their net interest income is contested by platform distributors and their operational dependencies extend further into the technology stack.

The distinction matters for policy. Where the composition channel dominates, supervisory attention should follow the migration of activity: into emerging models, the perimeter, and banks' connections to the platforms and non-banks that increasingly perform parts of intermediation. Where the within-model channel dominates, the more urgent task is reinforcing the resilience of existing business models against changed external conditions: recalibrating liquidity assumptions, deepening operational and cyber preparedness, and ensuring that capital and earnings frameworks reflect the new risk environment. Most

scenarios involve both channels; the relative weights vary by metric and by scenario in ways that the rest of this section sets out qualitatively, with Graph 8 (a directional summary) providing supporting structure.

Implications for system-wide profitability, liquidity and solvency — Graph 8



The composition channel captures the mechanical effect of market share reallocation while holding each business model's risk profile at today's level. The within-model channel captures changes in each model's own risk profile under the scenario, holding market shares at today's level. Arrow sizes are meant to illustrate indicative magnitudes.

Sources: Authors.

4.4 System-wide profitability

The composition channel for profitability is small and ambiguous. High-margin platform and embedded models gaining share mechanically raise the system average, since fee-based, capital-light economics tend to out-earn traditional intermediation; but the gains accrue from a small base, and even under platform expansion the composition contribution to system ROA is probably a few basis points (Graph 3.D). Where composition matters more is in the structure of revenue: as activity migrates towards fee, transaction and platform income, bank earnings shift away from net interest income towards more volatile and cycle-sensitive streams (Roengpitya et al, 2017; ECB, 2017).

The within-model channel is more consequential and accounts for most of the projected decline. Three mechanisms operate. The deposits channel that has given retail and commercial banks margin stability across the rate cycle (Drechsler, Savov and Schnabl, 2017, 2021) weakens as digital channels compress pass-through frictions and entrants compete for low-cost funding; net interest margins could compress by 20–40 basis points under platform expansion, concentrated where platforms intermediate the relationship while banks hold the asset. Customer relationship migration then redistributes rents within the value chain, leaving the balance sheet provider materially less fee income than a vertically integrated model implies. And cost-to-income diverges as digital-native providers reach scale economies that incumbents, carrying legacy distribution and compliance costs, cannot match (Lund et al, 2021; Vives, 2019).

Two implications follow. Profitability deteriorates more where structural forces are activated than where shares merely reallocate, because within-model compression is the stronger channel; and macro stress

amplifies that channel, since under political uncertainty system ROA falls not because shares move but because every model earns less. Internal capital generation weakens across the system, with consequences for solvency taken up in Section 4.6.

4.5 System-wide liquidity

System-level liquidity risk rises in every scenario, but the balance between the two channels shifts. Under platform expansion they are roughly equally important; under technology acceleration the composition channel is smaller; under political uncertainty it is essentially silent. Each implies a different mechanism, and supervisory priorities should follow accordingly.

The composition channel reflects migration towards models with weaker funding stickiness. Today's retail and commercial banks rest on deep, geographically anchored deposit bases supported by insurance and the frictions of branch banking. Digital-only banks are deposit-funded but attract more mobile and price-elastic customers: the convenience that lets them grow also lowers the cost of leaving. Platform and embedded models depend on transaction flows, partner relationships and ecosystem confidence rather than core deposits, and DeFi sits at the extreme, with collateral-based funding, no lender-of-last-resort access and very high confidence sensitivity (Aramonte, Huang and Schrimpf, 2021). As these models gain share, the system's weighted-average funding stickiness falls before any individual model changes behaviour.

The within-model channel is the more pervasive one: digital channels are reshaping the funding behaviour of every business model, not only the new ones. March 2023 showed that an established retail franchise with insured deposits and a long history could experience outflows at speeds previously associated only with wholesale-funded institutions (Cookson et al, 2023; Benmelech, Yang and Zator, 2023; De Cos, 2026). The mechanism is general: where mobile banking is the default channel, information shocks move balances almost instantaneously, and the friction of queuing at a branch, which is a real, if rarely acknowledged, stabiliser, has gone. Under technology acceleration and platform expansion this intensifies across all models; under political uncertainty share changes contribute almost nothing, but funding stress migrates across the system as wholesale-funded, market-funded and retail institutions face outflow pressure simultaneously.

Two points follow for policy, developed in Section 5.1: liquidity supervision cannot be handled by bringing emerging models inside the perimeter alone, since incumbent funding behaviour is itself changing; and branch-era LCR and NSFR calibrations become progressively less reliable as digital outflow speeds rise system-wide (BCBS, 2024; De Cos, 2026).

4.6 System-wide solvency

System-level solvency risk rises in every scenario, and the decomposition draws a clean policy contrast. Technology acceleration and platform expansion are composition-driven solvency stories: activity migrates towards models with thinner regulated balance sheets, weaker loss-absorbing capacity and more concentrated operational dependencies. Political uncertainty is overwhelmingly a within-model story: macro stress impairs earnings, asset quality and confidence across every model, however shares are distributed.

Four shifts drive the composition channel. Regulated balance sheet capacity per unit of intermediation falls, because platform and embedded models distribute services that once sat on bank balance sheets while the regulated bank retains only the required capital backing. Loss-absorbing capacity is less well established for models untested through a full credit cycle and calibrated on short, atypical histories. Operational and cyber risk becomes more material as activity moves to providers dependent on cloud infrastructure and a small number of platform providers, where failure can propagate into a stability event with no credit losses at all (BCBS, 2021). And the resolution toolkit is less mature for platform and DeFi

models. Together these can raise system-level solvency risk even where no institution appears more leveraged.

The within-model channel captures the exposure of every model to macro stress and to faster propagation from liquidity to solvency. Under political uncertainty, weaker growth, higher funding premia and deteriorating asset quality erode earnings and capital generation across the system, with trading and investment banks and DeFi most exposed. Beyond political uncertainty a broader change applies to all scenarios: as funding becomes more confidence-sensitive and operational events more consequential, the lag between a liquidity event and a solvency event compresses from weeks to days or hours. Liquidity and solvency, traditionally separable supervisory concerns, are becoming tightly coupled (BCBS, 2024).

The two channels call for different responses, set out in Sections 5.1 and 5.2: composition-driven risk for forward-looking perimeter, authorisation and resolution policy, and within-model risk for stress testing that captures macro-financial transmission model by model, including the bank–non-bank interconnections of Section 4.7.

4.7 Risk transmission and system-wide stability

Sections 4.4 to 4.6 examined the level of profitability, liquidity and solvency. This section turns to how stress *propagates*, a dimension the static decomposition cannot capture but that the same scenarios make material. Where traditional deposit-funded banks dominate, stress transmits slowly, through earnings, asset quality and gradual funding pressure, contained by buffers and central-bank access. As digital, platform and decentralised models gain share, transmission becomes faster and more nonlinear: confidence shocks trigger rapid outflows, operational disruptions hit several sectors at once, and technology-provider dependencies magnify events that would once have been contained. Balance sheets may look lighter while system fragility rises, because risk moves faster and through less familiar channels (Aramonte, Huang and Schrimpf, 2021; BCBS, 2024).

Three features deepen the shift.

- *Speed*: information and funding move almost instantaneously, so events that once developed over days unfold in hours (Cookson et al, 2023).
- *Complexity*: platforms connect banking, payments, commerce and social functions, creating channels through which an operational failure at a non-bank provider cascades into financial stress.
- *Concentration*: network effects produce winner-take-most dynamics, so stress at a dominant platform creates concentrated exposures that a more fragmented structure would not.

A further dimension runs through bank–non-bank interconnections. Although NBFIs are not modelled (Box 3), bank linkages through credit lines, subscription and NAV facilities, prime brokerage, repo and securities financing let stress originating outside the perimeter reach bank balance sheets (Acharya, Cetorelli and Tuckman, 2024; IMF, 2024). The channel is most pronounced under sharp macro-financial deterioration (Scenario 4) or rapid platform-driven repricing of credit risk (Scenario 3), and is largely invisible in bank-centric stress testing. Table 10 summarises relative business-model performance across scenarios: traditional banks remain central in every plausible future, but the location and pace of risk shift markedly, and financial-stability concerns move from balance sheet vulnerabilities towards combined profitability, operational, liquidity and ecosystem risks.

Risk characteristics of business models across scenarios Table 10

Business model	S1 Slow transformation	S2 Tech acceleration	S3 Platform expansion	S4 Political uncertainty
Retail / Commercial	Stable, low risk	Lower margins, resilient	Pressured but anchored	Relative winner
Universal	Diversified, resilient	Adaptive, moderate risk	Pressured but adaptive	Mixed; systemically robust
Trading & Investment	Cyclical, volatile	Higher activity, higher risk	Volatile	Strongly challenged
Digital-only	Gradual improvement	Rapid growth, volatile	Strong growth	Confidence-sensitive
Platform / Embedded	Complementary	Expands, higher volatility	Major beneficiary	Contraction, higher risk
DeFi	Marginal, highly volatile	Grows from a very small base	Fastest relative growth, structurally fragile	Sharp contraction

Source: Authors.

5. Policy implications

5.1 What holds in every scenario

Four policy response measures do not depend on the scenario.

- *Liquidity assumptions*. The outflow rates underlying LCR and NSFR calibrations were built on funding behaviour observed under traditional, branch-based banking. March 2023 showed they no longer bound the observable distribution, as Section 4.5 sets out. Accounting for the new normal is an important element from a supervisory perspective.
- *Operational and third-party resilience*. Concentration of core banking, cloud and payment infrastructure among a small number of providers creates single points of failure whose consequences do not depend on how market shares evolve. Third-party dependencies and the attack surface both grow as reliance on cloud providers, fintech partners aRnd technology vendors deepens. Continued development and consistent implementation of operational resilience frameworks across jurisdictions remains a priority (BCBS, 2021).
- *Earnings as a solvency variable*. Retained earnings are the primary source of capital for most banks, so weak and volatile profitability is a solvency vulnerability directly rather than a precursor to one. The prolonged post-GFC European experience showed this in slow motion; March 2023 showed it differently, where an unrealised-loss problem became a capital problem only once funding pressure forced recognition. Supervisory business-model assessment is the instrument that connects the two (FSI, 2023).
- *Data*. Statistical frameworks designed around traditional banking do not adequately capture digital banking, platform finance, DeFi or the bank–non-bank interface, and they do not capture them at the frequency at which these activities move. Priorities include expanded collection covering these activities, higher frequency to match the speed of digital markets, and cross-border information sharing to track the activities of global platforms. This is the precondition for everything in Section 5.2: a contingent policy cannot be triggered by a marker that is not measured.

5.2 Potential policy measures contingent on scenarios

Other potential policy measures depend on the evolving scenarios, and could be costly, distortionary, or both, if imposed prematurely, ie their justification does depend on which direction the system takes. For each, Table 11 identifies an indicator observable today that would signal it is becoming relevant. The

purpose of identifying the scenarios in advance is to allow the preparatory work, including the legal analysis, the data collection, the supervisory capability, to be done now, so that the measure can be deployed when the marker moves rather than after the fact.

Potential monitoring metrics conditional on scenarios

Table 11

Indicator	Signals	Pre-positioned response
Elevated outflow rates within a few days in stress episodes	All	Update of outflow assumptions and supervisory reaction protocols
Deposit pass-through speed and beta, by channel	S2, S3	Intraday outflow monitoring; scenario-specific update of outflow assumptions and supervisory reaction protocols, regulatory perimeter
Share of new retail current accounts opened through digital banks and non-bank interfaces	S2, S3	Perimeter review for platform and embedded providers
Share of new bank lending originated by emerging business models and through third-party channels	S3	Consolidated view of origination-to-balance-sheet chains
Concentration of banking-as-a-service partner-bank relationships	S2, S3	Single-point-of-failure assessment; contingency for partner failure
Non-bank licence applications and approvals	S3	Authorisation-standard review
Stablecoin float relative to system deposits	S3	Perimeter and reserve-asset requirements
Cross-border interbank claims and dispersion of funding sourcing and premia	S4	Group wide liquidity and solvency management (Home-Host issues)

Source: Authors. S1–S4 denote the scenarios of Table 1.

The regulatory perimeter will require continued reassessment so that similar risks are treated consistently across institutional forms (FSI, 2023). Perimeter questions are particularly acute for platform and DeFi activities: which activities should fall within the regulatory perimeter; how should entities that combine banking with other functions be treated; and whether activity-based regulation should complement entity-based approaches (FSB, 2022). Liquidity requirements calibrated on historical outflow rates, and capital requirements built around credit risk, may also need updating for digital-era dynamics and the operational and cyber risks more prominent in emerging models (BCBS, 2021, 2024).

Revisiting resolution arrangements for entities that perform bank functions without a bank balance sheet is an important element under technology acceleration and platform expansion. Where a provider owns the customer relationship, the origination decision and the servicing chain but holds none of the exposure, its failure is not a bank failure yet it interrupts banking services to its customers and leaves the partner bank holding an exposure it did not originate. Existing recovery and resolution frameworks are built around the entity that holds the balance sheet, and the preparatory work (mapping which customer relationships would need to be transferred, and to whom) must be done before the failure, not during it.

Cross-border and host-country supervisory arrangements are relevant under political uncertainty, and in the opposite direction from the other three. If policy divergence and geopolitical tension reduce the scalability of cross-border models, the binding question becomes host-country self-sufficiency in liquidity and capital, and the cost is paid in efficiency. Preparing for it means understanding, now, which groups would be most affected by a shift towards subsidiarisation and what that would do to their funding costs and their capacity to lend.

Access to central bank facilities for digital-only banks at scale are relevant under technology acceleration and platform expansion. A deposit-taker whose funding can leave at digital speed is precisely the

institution for which a backstop is most valuable and least likely to be usable in time. Eligibility criteria, collateral pre-positioning and the operational capacity to draw at short notice are questions that can be settled while the segment is small, and cannot be settled once it is not.

As fintech activities scale, the potential for macro-financial spillovers increases, including algorithmic procyclicality, cross-sector contagion and altered monetary-policy transmission. The bank–non-bank nexus also warrants supervisory attention: bank linkages to NBFIs through credit lines, prime brokerage, repo and securities financing create channels through which risks taken outside the regulated perimeter can re-enter it (Acharya, Cetorelli and Tuckman, 2024; IMF, 2024).

5.3 What changes about supervision itself

More broadly, prudential policy should focus not only on the institutional form of intermediaries but also on the economic functions they perform and the system-wide channels through which vulnerabilities propagate. A banking system that is more technologically advanced may also be one in which stress travels faster and across more complex networks.

As funding becomes more confidence-sensitive and operational events more consequential, the interval between a liquidity event and a solvency event compresses from weeks of deteriorating funding before fire sales and capital impairment, to days or hours. That is a statement about supervisory reaction time, and it has consequences that recalibration alone does not address: the frequency at which key indicators are observed, the degree to which interventions are pre-positioned rather than assembled under pressure, and the extent to which resolution options are prepared before they are needed. A supervisory system calibrated to act on quarterly data in a system that moves in hours is mis-specified regardless of how well its individual requirements are set.

6. Conclusions

Our framework models the future structure of banking through the interaction of technological change, regulation, consumer preferences and macro-financial conditions. These forces will not affect all institutions equally: they reshape the relative position of different business models and the channels through which profitability, liquidity and solvency risks emerge. This paper has classified banking into six representative archetypes, identified the structural drivers most likely to affect them, and evaluated how four alternative scenarios may reshape market shares and financial-stability outcomes over the next decade.

- First, traditional banks remain dominant under every plausible scenario. Deposit intermediation, credit allocation and access to the official monetary system confer structural advantages that are hard to replicate, including under the most distinctive innovation expansion scenario ("*Platform ecosystem expansion*").
- Second, asset dominance coexists with contestable customer relationships, pricing and fees. Technology acceleration and platform expansion separate these functions increasingly from the banks retaining the exposures.
- Third, structural change redistributes risk rather than eliminating it. As digital, platform and decentralised models gain ground, exposure shifts from credit intermediation towards operational dependence, confidence-sensitive funding, cyber risk and faster liquidity transmission. A more digital and modular system may be more efficient without being more stable (see also Boot et al, 2021).
- Fourth, the sharpest competitive pressure falls inside the incumbent block. The consolidation that took the retail and commercial archetype from 48% to 22% of global bank assets between 2005 and 2024 is larger than the incumbent-to-entrant reallocation we project in three of four scenarios, and

technology plausibly accelerates it: resilience costs favour scale while data-based credit assessment erodes the advantage of relationship lending.

- Fifth, liquidity and solvency are converging in time. Deposit reactions and fund reallocations accelerate across all business models, compressing the interval available for supervisory intervention and tying solvency more closely to business-model sustainability, earnings volatility and infrastructure dependencies. Traditional capital metrics remain essential but capture a declining share of total system risk.

6.1 Caveats and future research

The scenarios are stylised judgements, not forecasts. Driver shifts and sensitivities are not estimated, and viability scores have no natural units. A common rescaling leaves results unchanged, but rescaling individual inputs does not; projected shares are coarse magnitudes (Annex A.1). CBDC discontinuities (Box 4) and the wider NBFI sector (Box 3) remain outside the projections.

The central limitation is the denominator: traditional banks' continued dominance refers to banking assets, not all financial intermediation. Migration to NBFIs, especially in wholesale and large-corporate lending, may reduce that denominator's relative importance. Joint modelling of banks and NBFIs is therefore a priority; Box 3 discusses the required extension.

Future research could deepen the framework through regional calibration, more granular empirical work on digital funding dynamics (BCBS, 2024), formal panel-based estimation of the business-model–risk relationships described in Section 4 (building on Roengpitya et al, 2017; Buchak et al, 2018) and closer modelling of linkages between banks, platforms and non-bank finance - including through private-credit channels (IMF, 2024).

Banks are likely to retain a central balance-sheet and backstop-supported role, while customer relationships, pricing, distribution and associated income become more contestable. Resilience requires supervision that follows these functions and their dependencies, and prepares for several directions of change.

Box 4

CBDCs and their interaction with bank business models

The potential introduction of central bank digital currencies (CBDCs) could alter deposit structures, payment systems and liquidity dynamics. The design of CBDCs (direct versus two-tier models, caps on balances, remuneration) determines their impact (Brunnermeier and Niepelt, 2019; Niepelt, 2024).

Two-tier models, in which commercial banks distribute CBDCs rather than central banks dealing directly with consumers, preserve banks' role in customer relationships and credit intermediation, mitigating disintermediation risk (Bindseil, 2020). Direct models may intensify competition in payments and low-value deposits, particularly affecting retail banks.

Implementation varies across jurisdictions. China's e-CNY is among the most advanced; Sweden's e-krona pilot reflects concerns about declining cash usage and financial stability; the Bahamas Sand Dollar is a fully launched CBDC; and the United States and euro area are taking a more cautious approach, studying risks including disintermediation, monetary policy implications and privacy (ECB, 2023).

Within the framework, CBDCs operate through the regulatory and competitive driver channels with intensity varying across scenarios. Widespread adoption in Scenario 3 could further accelerate platform-induced disintermediation of traditional deposit funding; in Scenarios 1 and 4 the effect is muted by gradual or two-tier implementations. Stablecoins represent a parallel channel of digital money creation that is being addressed through enhanced regulatory frameworks (Gorton et al, 2022).

Thinking about the unthinkable: discontinuities the framework cannot produce

The projection framework of Annex A is built on bounded adjustment, an adding-up constraint and a fixed set of archetypes. Those properties are what keep it disciplined, and they also guarantee that it can only ever produce continuous reallocation among the six models it starts with. Discontinuities of a different kind are excluded by construction rather than judged implausible, and it is worth naming the two that would matter most.

Balance-sheet capture. A large platform or stablecoin issuer acquires, or is granted, a deposit-taking licence at scale in a major jurisdiction. The platform stops distributing and starts intermediating, and the archetype boundary on which this paper is built dissolves. The supervisory question changes from "how do we see into the partnership?" to "how do we supervise a deposit-taker whose parent is not a financial institution?", a question with few precedents and no settled answer. This is the discontinuity most directly reachable from Scenario 3, and the marker for it is the licence-application indicator in Table 11.

A cryptographic or cyber discontinuity. A successful attack on a widely used cryptographic primitive, or on a shared core-banking or cloud dependency, damages confidence in digital channels broadly rather than at one institution. The interesting feature is that this runs *against* every other scenario in the paper: it would favour scale, physical presence and insured deposits simultaneously, and no configuration of the five drivers can generate it, since the drivers are specified to move the system towards or away from digitalisation rather than to discredit it. Migration to post-quantum cryptography is the observable preparation, and its cost is one of the scale effects identified in Section 3.2.

Both belong with the discontinuity discussed in Box 4. In each case the appropriate response is not to model the event but to ask which current arrangements would fail if it occurred - which is a different exercise from the one this paper performs.

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Annex A: The sensitivity-based projection framework

A.1 The sensitivity-based market share projection framework

Projecting market-share evolution under structural change requires a framework that links scenario-specific driver shifts to business-model outcomes transparently and tractably. The extremes are unattractive: a purely qualitative narrative leaves the size of effects unspecified and resists testing, while a fully calibrated structural model of competition between heterogeneous intermediaries - with endogenous prices, demand and entry - would need data and identifying assumptions that do not exist for models with short and atypical histories. Mechanical trend extrapolation is no better, since it embeds a single scenario and ignores the discontinuities that motivate the exercise. We therefore adopt an intermediate, sensitivity-based approach: each business model has a different exposure to the five drivers, and driver intensity varies across scenarios (Tables 8a, 8b); combining the two yields a relative viability score, mapped through a bounded adjustment mechanism into ten-year market-share paths with plausibility ranges.

The framework has six steps; a worked example is provided in Annex A.6.

- **Step 1 - Specify the business-model set and current market shares (baseline, Section 2).**
- **Step 2 - Identify the structural drivers (Section 3.2)** and their scenario-specific shifts (Table 7b).
- **Step 3 - Calibrate sensitivity coefficients** for each business model–driver pair (Annex A.2).
- **Step 4 - Compute composite relative viability scores** for each business model under each scenario (Annex A.1).
- **Step 5 - Translate scores into bounded market-share adjustments** subject to adding-up and feasibility constraints (Annex A.1).
- **Step 6 - Map projected shares to profitability, liquidity and solvency outcomes** using the transmission mapping (Annex A.3).

Formal specification

Let $i \in \{1, \ldots, N\}$ index business models (N = 6: retail/commercial, universal, trading & investment, digital-only, platform/embedded, DeFi). Let $k \in \{1, \ldots, K\}$ index structural drivers (K = 5). Let $s \in \{1, \ldots, S\}$ index scenarios (S = 4). The market share of model i at the start of the projection horizon is $s_{i,0}$, with $\Sigma_i\, s_{i,0} = 1$. The change in driver k under scenario s is $\Delta F_{k,s}$, on the standardised −2 to +2 scale. The sensitivity of model i to driver k is $\beta_{i,k}$, calibrated from empirical evidence and expert judgement (Annex A.2).

The relative viability score for model i under scenario s is:

$$V_{i,s} = \Sigma_k\, \beta_{i,k}\, \Delta F_{k,s}$$

Viability scores are translated into bounded market-share adjustments subject to feasibility bounds:

$$\Delta s_{i,s} = (\bar{u}_i - s_{i,0})\, g(V_{i,s}) \text{ if } V_{i,s} \geq 0$$

$$\Delta s_{i,s} = (s_{i,0} - \ell_i)\, g(V_{i,s}) \text{ if } V_{i,s} < 0$$

where ℓ_i and $\bar{u}_i$ denote lower and upper feasibility bounds for business model i (reflecting balance sheet, regulatory and demand constraints), and g(V) = tanh(λ V) is a saturating function with intensity parameter λ calibrated to deliver plausible aggregate adjustments. The tanh function caps the adjustment between −1 and +1 of available headroom, so no business model can break through its feasibility bounds regardless of how favourable the scenario.

Projected market shares are then obtained as:

$$s_{i,s} = s_{i,0} + \Delta s_{i,s}\ , \text{subject to } \Sigma_i\, s_{i,s} = 1$$

The adding-up constraint is enforced via proportional normalisation: after computing the unnormalised $\Delta s_{i,s}$, shares are rescaled so that they sum to one. This ensures that gains for one model are matched by offsetting losses elsewhere, and that no model can capture an implausibly large share of the system.

Plausibility ranges

The sensitivities in Table A1 are central values. The evidence reviewed in Annex A.2 pins down their signs and relative ordering much more firmly than their size. To show how much the projections depend on size, we rerun the framework with every sensitivity set at half (low) and one and a half times (high) its central value. This gives a low, central and high ten-year path for each business model in each scenario. Because all sensitivities are scaled together, this is equivalent to varying λ by ±50% (Annex A.1). The ranges therefore capture uncertainty about how strongly the drivers act, not about their relative weights, which Annex A.4 examines separately.

The ranges are narrow where the drivers move little and widen as scenarios become more intense. For the aggregate emerging-model share at year 10, they are about ±1 percentage points under slow transformation and political uncertainty, about ±4 points under technology acceleration (Annex A.6), and about ±5 points under platform expansion.

These are not confidence intervals. They show how far the results move under an alternative but still plausible calibration. They say nothing about how likely any outcome is, and they exclude uncertainty about the scenario configurations themselves (Table 7b), which is larger.

Choosing the intensity parameter λ

The intensity parameter λ scales the magnitude of market-share shifts; it is calibrated once against external evidence and held fixed across scenarios. Three anchors converge on $\lambda \in [0.10, 0.20]$. First, the post-GFC banking-sector reallocation of approximately 10–15 percentage points over a decade provides a historical analogue for the magnitude of strong-scenario reallocation (CGFS, 2018; Roengpitya et al, 2017). Second, central forecasts for digital and platform banking under strong digitalisation put aggregate emerging-model shares at 15–25% by year 10 (Lund et al, 2021, McKinsey, 2025). Third, the diagnostic rule that the maximum viability score in the strongest scenario should map to $g(V) \approx 0.4–0.7$ - meaningful movement without saturation - is satisfied in the same range. We use $\lambda = 0.15$ as the default.[6]

What the framework delivers - and what it does not

The approach has three attractions and one cost. It is transparent: every outcome traces back to a stated driver shift and a stated sensitivity, both in tables rather than buried in code. It is disciplined: feasibility bounds and an adding-up condition rule out the unbounded extrapolation that produces most implausible projections of this kind. And it is cheap to interrogate: a reader who disputes an assumption can change it and see the effect, which a narrative does not allow and a structural model makes expensive. The cost is that prices, demand and strategic responses are not endogenised, so the paths are conditional on the assumed driver configuration rather than equilibrium outcomes.

Against that, one caveat dominates: the framework is a formalisation of expert judgement. Neither the driver shifts ΔF nor the sensitivities β are estimated - they are set by the authors, informed by the literature where relevant estimates exist and by judgement where they do not, and that literature constrains the sign and rough ordering of the coefficients far more tightly than their magnitudes. Formalism carries a specific risk: notation and decimal points can make judgement look like measurement. Three consequences follow.

The viability score has no interpretable magnitude. V is a weighted sum of dimensionless index numbers; +2.6 is not 2.6 of anything. It is an ordering device, and the ordinal content - the ranking of models within

[6] The companion Excel file includes a diagnostic block reporting the maximum |V|, the implied g(V) and a sensitivity table of Scenario 3 outcomes at λ values from 0.05 to 0.50.

a scenario and of scenarios for a given model - is what the framework delivers. The cardinal content enters from outside through λ, calibrated against observed post-GFC reallocation and independent adoption projections. In effect the framework determines who gains and in what order; the external anchors determine how much reallocation there is in total.

The results are invariant to some rescalings but not others. Multiplying every ΔF, or every β, by a constant c multiplies every V by c, and since λ is calibrated to external targets rather than assumed, recalibrating it to λ/c leaves every projected share unchanged - working on a −10 to +10 scale would change no result. Differential rescaling is not innocuous: multiplying the sensitivities of one driver, or of one business model, while leaving the others fixed changes the viability ordering, and no single λ undoes it. The relative weights in Table A1, not the units of the scale, are the substantive assumptions of this paper.

The outputs should be read at the precision the inputs support, which is coarse. We report shares to the nearest percentage point and discuss them in ranges; the difference between 21% and 23% under a given scenario is not information the framework contains, whereas the difference between roughly 3% and roughly 20%, and the reasons for it, is. Annex A.4 reports how far results move when parameters are varied, and the companion workbook allows any of them to be changed directly.

A.2 Calibration of sensitivity coefficients

Calibration of the sensitivity coefficients β_{i,k} draws on a mix of empirical estimates from the literature and expert judgement. The calibration follows several principles: digital-native models exhibit high positive sensitivity to technological progress, while traditional models exhibit lower or negative sensitivity; regulatory loosening favours emerging models and weakens incumbents (with the sign mirrored for tightening); consumer preference shifts toward digital favour emerging models while stability preferences during stress favour traditional banks; and macro-financial stress disproportionately affects market-funded and pro-cyclical models. Each driver maps onto one or more empirically observable sensitivities, summarised below.

Interest-rate sensitivity (NIM and ROA)

Traditional retail and commercial banks typically benefit from higher policy rates through wider net interest margins, with the strength of the channel governed by deposit pass-through, asset duration and credit quality (Drechsler, Savov and Schnabl, 2017). Universal banks also benefit, but less strongly, owing to more diversified income structures. Trading and investment banks are less clearly favoured: valuation losses on securities portfolios and weaker market activity may offset gains from higher rates. Digital-only banks show more limited rate sensitivity given the composition of their assets and liabilities, although their interest income has been gradually growing.

Funding-stress sensitivity

As illustrated in Graph 5, funding stress sharply differentiates business models. Retail and commercial banks have the most stable deposit base, partly given deposit insurance, and exhibit the strongest resilience to outflows. Universal banks are somewhat more exposed to market-sensitive funding. Trading and investment banks are highly exposed to wholesale funding shocks. Digital-only and platform-based models are more vulnerable to confidence-sensitive outflows owing to digital-channel speed and convenience, as documented for the March 2023 US regional bank failures (Cookson et al, 2023; Benmelech, Yang and Zator, 2023). DeFi remains structurally fragile, lacking stable deposits and official liquidity backstops (Aramonte, Huang and Schrimpf, 2021).

These ranges incorporate lessons from the March 2023 US regional bank stress, where social media and mobile banking accelerated outflows beyond assumptions used in standard LCR calibrations (BCBS, 2024). Outflow rates for digital-only and platform models are calibrated higher than historical averages for traditional retail banks, reflecting the speed and convenience of digital withdrawal channels.

Technology and cost elasticities

Digital-only and platform models benefit most from technology adoption, particularly through scale economies and low marginal distribution costs. Traditional banks can also improve efficiency but bear substantial fixed costs from legacy systems, organisational complexity and regulatory compliance (Lund et al, 2021). Industry analyses suggest cost-to-income ratios for digital-only banks improve by approximately 5–10 percentage points per doubling of customer base once scale thresholds are reached. For platform models, marginal costs of additional services are extremely low given API-based delivery (Berg et al, 2020). For traditional models, technology investments typically reduce cost-to-income by 1–3 percentage points over a 5-year horizon, with substantial heterogeneity across institutions.

Regulatory sensitivity

More stringent prudential or conduct requirements tend to favour incumbents by reinforcing barriers to entry and raising compliance burdens for challengers (Buchak et al, 2018). They may, however, disproportionately affect trading-intensive and wholesale-funded activities (Boot and Ratnovski, 2016). Regulatory accommodation reverses the pattern, benefiting digital and platform-based entrants, especially when licensing, data access and outsourcing frameworks become more permissive. In the framework we use the convention that positive regulatory stance corresponds to loosening; the sensitivities in Table A1 are therefore signed accordingly (positive for emerging models, negative for incumbents).

Consumer preference sensitivity

Consumer preferences evolve gradually but can shift rapidly during crises. In benign times, convenience, lower costs and digital integration attract customers to new providers; data trails from digital interaction also support more granular credit assessment (Berg et al, 2020). In stress, trust, deposit insurance and branch access become far more valuable (Beltratti and Stulz, 2012). Demographics play a role: ageing populations may demand safer, slower-growing financial services, rebalancing toward deposit-based models. We calibrate consumer-preference sensitivities along two dimensions - preference for digital convenience (favouring digital-only and platform models) and preference for stability/trust (favouring deposit-funded incumbents).

Macro-financial sensitivity

Business models differ in their cyclical exposure. Trading and investment banks are highly pro-cyclical: market-making, M&A and underwriting revenues collapse under stress, and valuation losses on securities portfolios compound the effect (Boot and Ratnovski, 2016). DeFi is also highly pro-cyclical, with collateral cycles and crypto-asset price dynamics amplifying stress episodes (Aramonte, Huang and Schrimpf, 2021). Platform and embedded models are pro-cyclical through transaction volumes and partner activity. Digitalonly and universal banks are moderately pro-cyclical. Retail and commercial banks are the least pro-cyclical, with deposit insurance, credit-cycle smoothing through provisions and central-bank backstops dampening sensitivity to macro shocks (Drechsler, Savov and Schnabl, 2017).

Summary: the calibrated sensitivity matrix

Combining the calibrations above yields the central values in Table A1. Higher (more positive) values indicate that a positive intensity of the driver is favourable for the model; negative values indicate that the driver, as it strengthens, erodes the model's relative position. The coefficients are normalised on the sensitivity of digital-only banks to technology, set to 1.0, and every other entry should be read relative to that benchmark. As set out above, only the relative pattern carries information: the sign of each entry, the ordering of models within a column, and the ordering of drivers within a row. Table A1 is the most consequential set of assumptions in the paper and the one readers should interrogate first; it interacts with the scenario configurations of Table 7b to produce the viability scores underlying the results in Section 4.

Calibrated sensitivity matrix β_{i,k}

(central values; positive = favourable for business model) Table A1

Business model	Technology	Regulatory stance (loosening)	Consumer digital preference	Consumer stability preference	Macro-financial (benign)
Retail / Commercial	+0.2[1]	−0.5	−0.3	+1.0	+0.3
Universal	+0.5[2]	−0.4	−0.1	+0.6	+0.5
Trading & Investment	+0.3	+0.6	−0.2	−0.2	+1.0
Digital-only	+1.0	+0.4	+1.0	−0.3	+0.6
Platform / Embedded	+1.2	+0.6	+1.2	−0.6	+0.8
DeFi	+1.0	+1.0	+0.7	−1.0	+1.0

Sign conventions: regulatory stance positive = loosening; macro-financial positive = benign. Coefficients are dimensionless and judgemental, not estimated. They are normalised on the sensitivity of digital-only banks to technology (= 1.0); only the relative pattern is meaningful. Results are invariant to a common rescaling of the matrix but not to rescaling of individual rows or columns (Annex A.1). The magnitude of aggregate reallocation is set separately, by the intensity parameter λ.

[1] This figure masks dispersion among the very different institutions in this segment, including by size.

[2] This figure could also be higher for the larger, internationally-active banks, but increasing it to 0.7, for example, does not alter the projected market shares much (at below 0.5%).

Source: Authors.

A.3 Transmission to profitability, liquidity and solvency

Once projected market shares are obtained, the framework translates them into changes in aggregate profitability, liquidity and solvency by combining the model-specific risk profiles documented in Section 2.6 with the new market-share weights. Each business model has a distinct pathway from earnings pressure to liquidity strain to solvency, with traditional models exhibiting slower, sequential propagation and emerging models exhibiting faster, more direct propagation.

Aggregate profitability under scenario s is:

$$\Pi_s = \Sigma_i \, s_{i,s} \, \pi_i(scenario_s)$$

where $\pi_i(\text{scenario}_s)$ is the projected ROA of model i under the macro-financial conditions of scenario s (Table A2 maps each sensitivity to the channel through which it transmits), drawing on the interest-rate, fee income and cost considerations in Annex A.2. Aggregate liquidity risk is similarly determined qualitatively as a weighted sum of model-specific funding-stress sensitivities, and aggregate solvency risk integrates earnings volatility, capital ratios and the funding-to-solvency feedback loop.

Formally the decomposition is $\Delta M_s = \Sigma_i \, (s_{i,s} - s_{i,0}) \cdot m_{i,0} + \Sigma_i \, s_{i,0} \cdot (m_{i,s} - m_{i,0}) + \Sigma_i \, (s_{i,s} - s_{i,0})(m_{i,s} - m_{i,0})$, where the first term is the composition contribution, the second the within-model contribution and the third a small interaction. The per-model risk profiles used here are illustrative, anchored in the sensitivitybased discussions in Annex A.2. A qualitative discussion is provided in Section 4.4 for profitability, Section 4.5 for liquidity and Section 4.6 for solvency.

Mapping sensitivities to transmission channels Table A2

Sensitivity	Primary channel	Implication for transmission
Interest-rate semi-elasticity	Solvency / profitability (NIM and valuation)	Rate shocks affect earnings and capital generation; for trading-heavy models, valuation losses tighten liquidity via margining.
Deposit outflows under stress	Liquidity first	Funding runs raise liquidity stress, force asset sales or central-bank reliance, and become solvency-relevant via fire-sale losses.
Regulatory tightening	All three (depends on binding constraint)	Higher capital requirements reduce leverage; tighter liquidity metrics re-price funding and shrink maturity transformation.
Cost-to-income scale elasticity	Solvency / profitability	Operating leverage determines whether digital models can profitably scale; weak profitability slows growth and market share.
Income volatility / non-interest income	Solvency, with liquidity feedback	Higher earnings volatility implies higher buffers; in stress, volatility correlates with market-funding fragility.

Source: Authors.

A.4 Empirical anchors and robustness

The framework integrates findings from several strands of literature. Roengpitya et al (2017) document how balance sheet composition defines profitability and risk characteristics in the panel of large banks. CGFS (2018) analyses structural changes in banking after the GFC. Boot et al (2021) clarify which fintech aspects are genuinely novel relative to earlier waves of innovation; Vives (2019) provides a synthesis of the digital-disruption literature. Beltratti and Stulz (2012) document that banks with more traditional, depositfunded business models performed better in the GFC. Behavioural assumptions about deposit flight in digital environments draw on post-mortem studies of the March 2023 US regional bank failures (Cookson et al, 2023; Benmelech, Yang and Zator, 2023). Fintech-driven displacement effects in specific segments - most prominently US mortgage lending - have been substantial where regulatory and technological conditions were favourable (Buchak et al, 2018; Fuster et al, 2019; Jiang, Yu and Zhang, 2024).

Robustness has been assessed in three dimensions. First, the sensitivity ranges in Annex A.2 are deliberately wider than typical point estimates in the literature, reflecting tail uncertainty and, in particular, the short histories of the emerging models. Second, the bounded adjustment mechanism with the adding-up constraint ensures that no single model can converge on the whole system within the projection horizon, regardless of how favourable the scenario or how high the calibrated sensitivities. Third, we verify the invariance properties set out in Annex A.1: rescaling the entire ΔF and β system by a common factor, with λ recalibrated against the same external anchors, reproduces the central paths exactly - an analytical property of the mapping rather than a numerical finding - whereas rescaling individual rows or columns does not. That asymmetry is the practical expression of the point made in Annex A.1: the relative weights in Table A1, not the units of the scale, are the substantive assumptions. Varying λ by ±50% is equivalent to the uniform scaling behind the plausibility ranges in Annex A.1; varying individual β values by ±50% one at a time shifts central paths by less than ±2 percentage points at the 10-year horizon. The qualitative findings - the ordering of scenarios, the persistence of traditional dominance, and the direction of the shift in where risk sits - survive these variations; the individual percentages do not, and are not intended to.

Empirical anchoring and a route to estimation

The framework's qualitative findings are consistent with panel evidence linking business-model characteristics to risk outcomes. Deposit-funded models tend to show more stable profitability and lower funding stress; fee-intensive and trading-oriented models show higher earnings volatility and stronger sensitivity to macro-financial shocks (Roengpitya et al, 2017). Beltratti and Stulz (2012) document that banks with more traditional, deposit-funded business models performed better in the GFC. Drechsler, Savov and Schnabl (2017) document the deposits-channel that gives retail-funded models margin stability across the rate cycle. Fintech-driven displacement effects in specific segments - most prominently US

mortgage lending - have been substantial where regulatory and technological conditions were favourable (Buchak et al, 2018; Fuster et al, 2019; Jiang, Yu and Zhang, 2024). Berg et al (2020) document the informational advantages digital interactions provide for credit assessment.

A natural empirical extension would estimate panel regressions of the form:

$$Risk_{it} = \alpha_i + \gamma_t + \beta_1\, BusinessModel_{it} + \beta_2\, Macro_t + \beta_3\, (BusinessModel_{it} \times Macro_t) + \varepsilon_{it}$$

where Risk is one of profitability, liquidity or solvency metrics; BusinessModel is captured by proxies (deposit-funding share, loans-to-assets, fee-income share, digital-channel intensity); Macro captures the macro-financial environment; and the interaction term tests for differential responses across business models. Combined with the framework's calibrated sensitivities, formal estimation would narrow the plausibility ranges around the projected paths, and would replace part of the judgement embedded in Table A1 with estimated coefficients and provide tests of the differential-sensitivity hypothesis underpinning the framework. We leave this for future work.

A.5 Outcome metrics

To compare how alternative scenarios affect financial resilience, we track a common set of profitability, liquidity and solvency indicators. The choice reflects both the economic functions banks perform and the risk channels that supervisory frameworks seek to address (BCBS, 2021; FSI, 2023).

Profitability metrics

- **Net interest margin (NIM) sensitivity to interest rates** - how earnings respond to a given change in policy rates, conditioned by deposit pass-through, asset duration and credit quality.
- **Fee and commission income share** - an indicator of business-model orientation and exposure to fee-cycle volatility.
- **Cost-to-income ratio** - a measure of operating efficiency and capacity to absorb margin compression.
- **Return on assets (ROA) and earnings volatility** - level and stability of returns, affecting internal capital generation and market confidence.

Liquidity metrics

- **Deposit stability** - the stickiness of retail and wholesale deposits, varying with customer type, insurance coverage and digital access.
- **Wholesale funding reliance** - share of funding from capital markets, interbank sources and other confidence-sensitive liabilities.
- **Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR) proxies** - regulatory liquidity metrics signalling short-term and structural resilience.
- **Sensitivity to digital outflow dynamics** - potential for accelerated withdrawals in stress driven by mobile and online banking, as illustrated by the March 2023 US regional bank failures (Cookson et al, 2023; BCBS, 2024).

Solvency metrics

Profitability and solvency are intertwined. Retained earnings are the primary source of capital for most banks, so weak or volatile profitability is itself a solvency vulnerability - a point illustrated by the prolonged post-GFC European experience and, differently, by March 2023, where an unrealised-loss problem became a capital problem only once funding pressure forced recognition. The metrics are listed separately for exposition; they should be read jointly with those above.

- **Regulatory capital ratios and buffer adequacy** - size and quality of loss-absorbing capital relative to risk-weighted assets and leverage.
- **Credit and market risk sensitivity** - exposure to borrower defaults and to valuation shifts in securities and derivatives portfolios.
- **Operational and cyber risk proxies** - qualitative and quantitative indicators of technology-related vulnerabilities (BCBS, 2021).
- **Funding-stress to solvency linkage** - extent to which a liquidity event can erode capital through forced asset sales, margin calls or confidence loss.

These metrics reflect the fact that solvency risk is no longer solely a function of credit quality: it increasingly depends on the stability of funding, the resilience of operational systems and the speed of information transmission.

A.6 Worked example: from driver shifts to market-share paths

To make the framework concrete, we walk through the calculation for one scenario (Scenario 2: Technology Acceleration) and one business model (digital-only banks). The same logic applies to all 24 business-model × scenario combinations and produces the projection tables in Section 4.

Step 1: Specify the driver shifts

From Table 7b, under Scenario 2: ΔF_tech = +1.0, ΔF_reg = 0, ΔF_digital = +1.0, ΔF_stability = 0, ΔF_macro = +1.0.

Step 2: Apply the calibrated sensitivities

From Table A1, for digital-only banks: β_tech = +1.0, β_reg = +0.4, β_digital = +1.0, β_stability = −0.3, β_macro = +0.6.

Step 3: Compute the viability score

$$V_{digital, S2} = (1.0)(1.0) + (0.4)(0) + (1.0)(1.0) + (-0.3)(0) + (0.6)(1.0) = +2.6$$

This is strongly positive, reflecting that Scenario 2 activates precisely the drivers to which digital-only banks are most favourably exposed. The number itself has no units and no magnitude interpretation (Annex A.1): it is informative only relative to the scores of the other five models under the same scenario.

Step 4: Translate score into market-share adjustment

Digital-only banks start at $s_{i,0} \approx 1\%$ of banking-system assets. The upper bound at the 10-year horizon ($\bar{u}_i$) is set at 20%, reflecting balance sheet capacity and demand constraints. With $\lambda = 0.15$:

$$g(V) = \tanh(0.15 \times 2.6) \approx 0.37$$

$$\Delta s_{digital, S2} \approx (0.20 - 0.01) \times 0.37 \approx +7pp$$

Step 5: Apply the adding-up constraint

After computing analogous adjustments for all six business models, the sum typically deviates from 100%. We rescale proportionally to enforce the adding-up constraint, which pulls the central digital-only projection from a raw value of about 8% down to about 6%, with offsetting reductions in retail, commercial and universal banks.

Step 6: Sanity check

Finally, we verify that the projected paths satisfy qualitative feasibility constraints: balance sheet capacity (digital-only banks reaching 6% of a ~USD 191trn system would be equivalent to roughly USD 11trn of assets, a substantial but not implausible expansion at the global level); regulatory feasibility (consistent with continuation of broadly stable licensing); and demand-side feasibility (consistent with observed adoption curves for mobile banking and embedded payments). Where feasibility constraints bind, we cap the projection accordingly.

Aggregating across emerging models (digital + platform + DeFi), Scenario 2 yields ~17% emerging share at 10 years, with a plausibility range of approximately ±4 percentage points reflecting calibration uncertainty. The same six-step procedure produces the projected market-share paths reported in Section 4 (Graph 8). The companion Excel workbook makes the framework fully transparent and reproducible.

Annex B: Derivation of market shares

A. Market shares for traditional banks: a rule-based, bank-level approach

The market shares of the three traditional archetypes are estimated bottom-up from the universe of the bank-level vendor dataset from FitchConnect, using bank-year observations. *Building upon the literature, we develop a new, purely quantitative multi-variate classification tree*: for each of the five granular business models - retail, commercial, wholesale-commercial, trading, and universal - a set of threshold conditions is defined over thirteen balance sheet and income ratios capturing asset composition (residential mortgage, corporate, consumer and interbank lending relative to total assets; loans to assets; trading securities to assets), funding structure (loans to customer deposits; customer deposits in total funding; money-market and short-term funding; wholesale funding) and income mix (net interest income and fee income relative to net income; fee income relative to net interest income). A bank is assigned to the model for which it satisfies the largest number of conditions, and the five granular models are then mapped onto the paper's archetypes, with retail, commercial and wholesale-commercial banks jointly forming the retail/commercial archetype. The thresholds are set by expert judgement, informed by the typical business-model characteristics documented in the literature (Roengpitya et al, 2014, 2017; ECB, 2017; Farnè and Vouldis, 2017), accounting for the metrics' distribution function, but the assignment itself involves no discretion: it is mechanical, reproducible, and re-applied to every bank in every year.[7] Classification is therefore dynamic - a bank whose balance sheet structure changes migrates to another category - so the resulting shares capture both the reallocation of assets across banks and the transformation of business models within banks. A comparison with the business model classification used by FitchConnect, which are not disclosed to the public, yields a similar overall picture, which is reassuring.

Market shares of traditional models, 2005–2024

Applied to the 2005–2024 panel, the classification documents a pronounced structural shift within traditional banking (Graph A1). Globally, universal banks' share of classified assets roughly doubled from 35% in 2005 to 67% in 2024, crossing the 50% mark around 2013, while the retail/commercial archetype declined from 48% to 22%, and trading and investment banks fluctuated without trend, from 16% in 2005 - peaking at close to 20% on the eve of the Great Financial Crisis (GFC) - to 11% in 2024. The decline of the retail/commercial archetype conceals a sharp compositional change within it: the wholesale-commercial model, which alone accounted for 38% of global classified assets in 2005, collapsed to under 4% by 2024, as the GFC and the subsequent regulatory reforms rendered wholesale-funded lending structurally unattractive. Deposit-funded commercial and retail banks partially absorbed this migration - their combined share roughly doubled to 19% - but the dominant destination was the universal model. This is the bank-level counterpart to the well-documented post-crisis shift from wholesale towards retail funding and towards diversified income (Roengpitya et al, 2017; CGFS, 2018), captured here as migration of banks across classification cells rather than as within-cluster drift.

The aggregate trend combines quite different regional dynamics.

- In advanced economies, the retail/commercial archetype halved from 50% of classified assets in 2005 (of which more than four-fifths was the wholesale-commercial variant) to 26% in 2024, while universal banks rose from 33% to 55%, overtaking retail/commercial in 2012 and crossing 50% in the mid-2010s. The trading and investment share in advanced economies is markedly cyclical rather than trending - peaking at 21% in 2007, falling through the post-GFC deleveraging to a trough of 11% in 2022, and rebounding to 20% by 2024 - reflecting the sensitivity of trading-book values and the flip-prone position of capital-markets-intensive banks near the classification boundary.

[7] For equal ranks, we assign banks in this order: Retail, Commercial, Trading, Wholesale Commercial, Universal.

- In emerging markets, the universal model dominates far more strongly: its share rose from 53% in 2005 to 80% in 2024 (peaking at 84% in 2021), driven by the large diversified banks of China and other major EMEs, while trading-oriented banking nearly disappeared (13% to about 1%) and the retail/commercial archetype settled around 19%. The emerging-market sample itself grew from roughly 11% of classified global assets in 2005 to almost half in 2024 - so the global rise of the universal archetype reflects both within-region migration and the growing weight of universal-bank-dominated emerging markets.

Number of banks by model

The bank-count perspective reveals a very different structure from the asset shares and underlines the size asymmetry across archetypes. Retail and commercial banks are numerous but small: they account for slightly more than half of classified institutions globally (and over 60% in advanced economies) but only 22% of assets, whereas universal banks - roughly 40% of institutions by 2023, up from 36% in 2005 - hold two-thirds of assets, and trading and investment banks are a small and shrinking population (7–10% of institutions, declining over the sample). The number of classified banks worldwide (reflecting largely data availability) rose from about 6,200 in 2005 to a peak of roughly 9,300 in 2022, with the increase concentrated in commercial and universal banks and, regionally, in emerging markets; the count of wholesale-commercial banks fell by about a quarter over the same period, mirroring the asset-share collapse of that model. Within advanced economies, the divergence between count and asset shares has widened steadily: the retail/commercial archetype's share of institutions has remained close to 60% even as its asset share halved, indicating that the migration towards the universal model has been led by the largest institutions - consistent with the observation that two-thirds of the world's fifty largest banks operate as universal banks.

Rule-based classification of traditional bank business models

For each bank-year, threshold conditions are evaluated on thirteen ratios, and the bank is assigned to the granular model with the highest number of satisfied conditions (Table B1). The thresholds, set by expert judgement based on the business-model characteristics established in the literature, are:

Rule-based classification of traditional bank business models					Table B1
Ratio	Retail	Commercial	Trading	Wholesale-comm.	Universal
Residential mortgage loans / total assets	>15%	>5%	<10%	<15%	>10%
Corporate & commercial loans / total assets	<20%	>12%	<12%	>12%	>9%
Other consumer & retail loans / total assets	>4%	<15%	<8%	<15%	>3%
Loans to banks / total assets	<13%	<19%	>9%	>9%	<19%
Loans / total assets	>55%	>55%	<44%	>40%	>50%
Loans / customer deposits	<100	<100	<66	>60	<150
Trading securities & FV-through-income / total assets	<0.1%	<1%	>4%	<8%	>0.1%
Customer deposits / total funding (excl. derivatives)	>67%	>60%	<75%	<53%	>60%
Deposits, money-market & short-term funding / total funding	<10%	<15%	>15%	>15%	<20%
Wholesale funding / total funding & capital	<10	<10	>10	>20	<30

Net interest income / net income	>4.15	>2.27	<2.27	>2.27	>1.62
Fee income / net income	<2.37	<1.8	>1	<1.8	<2.37
Fee income / net interest income	<50%	<75%	>50%	<250%	<150%

Source: Authors

The five granular models are aggregated to the paper's archetypes as follows: retail, commercial and wholesale-commercial → Retail/Commercial; universal → Universal; trading → Trading & Investment.

Properties and validation. Three properties of the rule are worth stating. First, it is purely quantitative and fully reproducible: given the input ratios, the assignment involves no discretion, in contrast to cluster-analytic approaches (Roengpitya et al, 2014, 2017; Farnè and Vouldis, 2017) whose outcomes depend on the estimation sample, and the concept applied by vendors (such as FitchConnect), which is not disclosed. Second, it is dynamic: banks are reclassified annually, so the shares capture business-model migration - including the two dominant migrations of the sample period, out of the wholesale-commercial cell after the GFC and into the universal cell throughout. Third, the granular cells map transparently into the literature: the retail, wholesale-funded commercial and trading cells correspond closely to the three clusters of Roengpitya et al (2014), and the direction of the post-crisis migration found here (towards deposit funding and diversified income) matches their panel evidence, which serves as an external validation of the rule. Moreover, the shares are broadly in line with those disclosed by FitchConnect, especially for the more recent years.

Three caveats apply.

- First, threshold sensitivity: because assignment is discrete, banks near thresholds can flip categories from one year to the next, and flips of very large institutions produce visible jumps in regional shares.
- Second, coverage: the classified sample is used for shares, while Table 4 levels are anchored to the FSB aggregate; the residual between the sample and the FSB perimeter (small unrated banks, cooperative networks reporting only at apex level) is allocated proportionally.
- Third, the trading and investment share in advanced economies is cyclical by construction - trading-book values and boundary flips of capital-markets-intensive banks move the share by several percentage points across the cycle - so point-in-time values (e.g. the 2022 trough of 11% vs 20% in 2024) should be read jointly with the 2005–2024 path rather than as trend.

Market share outcomes (latest numbers, regional breakdown)

Asset shares (classified sample)	**2005**	**2015**	**2024**
Global - Retail/Commercial	48%	35%	22%
Global - Universal	35%	56%	67%
Global - Trading & Investment	16%	9%	11%
Advanced economies - Retail/Commercial	50%	36%	26%
Advanced economies - Universal	33%	52%	55%
Advanced economies - Trading & Investment	17%	12%	20%
Emerging markets - Retail/Commercial	33%	32%	19%
Emerging markets - Universal	53%	65%	80%
Emerging markets - Trading & Investment	13%	3%	1%
Number of banks (classified sample)	**2005**	**2015**	**2023**

Global - Retail/Commercial	3,331	5,057	4,799
Global - Universal	2,238	2,395	3,788
Global - Trading & Investment	626	604	623
Global - Total	6,195	8,056	9,210

B. Market share for digital-only banks

The market share is estimated bottom-up from an institution-level census, covering roughly 70 licensed, branchless banks operating as independent groups, drawing on annual reports and regulatory disclosures, and yields – for the ***narrower definition of the segment*** – total assets of approximately USD 1 trillion at end-2024, equivalent to about 0.5% of global banking-system assets. The segment is highly concentrated as the fifteen largest institutions account for roughly three quarters of the total assets and predominantly Asian: close to 60% of aggregate assets sit with China's internet banks (WeBank, MYbank and the other licensed private banks), Japan's internet banks (Rakuten Bank and SBI Sumishin Net Bank) and Korea's three internet-only banks led by KakaoBank, with Europe and the Americas contributing broadly equal shares of the remainder. Notably, most of the large Asian institutions are affiliated with technology or financial ecosystems rather than standalone challengers, which blurs the boundary with the platform/embedded archetype and matters for the transition dynamics discussed in Section 4.

Under a ***broad definition*** that additionally includes branchless US "direct banks" predating the fintech wave (Ally, Discover, American Express National Bank, Synchrony, USAA and peers, jointly USD 0.8 trillion) and the digital-only subsidiaries of incumbent groups (such as Marcus, Chase UK and Openbank, jointly USD 0.15 trillion), the segment reaches approximately USD 2 trillion, or about 1% of global banking-system assets, which is the figure used as the central baseline in Table 4.[8]

Scope and definitions. The census includes institutions meeting three criteria: (i) a banking licence (or an equivalent charter, including US industrial bank charters); (ii) a branchless, digital-first distribution model; and (iii) operation as an independent group rather than as a consolidated subsidiary of an incumbent bank. Institutions are assigned to one of six categories: (A) core digital-only banks satisfying all three criteria; (B) US "direct banks", ie branchless deposit-takers predating the fintech wave; (C) digital-only subsidiaries of incumbent groups; (D) US partner ("banking-as-a-service") banks hosting fintech deposit programmes; (E) non-licensed fintech deposit front-ends; and (F) brokerage-affiliated deposit banks. The narrow estimate comprises category A only; the broad estimate adds categories B and C. Categories D, E and F are reported as memo items and excluded from all totals: partner banks and brokerage banks are classified under the traditional archetypes in any bank-level dataset, and counting non-licensed front-ends would double count deposits already held at partner banks.

Data and conventions. Institution-level total assets are taken from annual reports, quarterly earnings disclosures, and regulatory filings (FDIC call reports for US institutions; disclosures collated by national authorities, including the HKMA, MAS, OJK, BSP for jurisdictions with licensed virtual/digital bank regimes), with the population identified from regulator licence lists and the digital-bank surveys of the BIS/BCBS. The reference date is end-December 2024; for Japanese banks reporting on a March fiscal year, December 2024 interim disclosures are used where available. Local-currency figures are converted at end-December 2024 exchange rates. Group aggregates are used for jurisdictions with many small licensees (Hong Kong SAR, Singapore, Indonesia, the Philippines); these jointly account for less than 5% of the core total.

[8] Non-licensed deposit front-ends such as Chime are deliberately excluded from the asset count, as their customer balances are held on the balance sheets of chartered partner banks and would otherwise be double counted against the retail/commercial archetype; the same consolidation logic requires that incumbent digital subsidiaries, where included, be deducted from their parents' archetype. On a deposits basis the core census corresponds to roughly USD 0.8-0.9 trillion, well above figures frequently cited in industry sources, which typically capture only Western neobanks.

Total assets of large digital-only banks by country (USD billion)

Country	Narrow definition (category A)	Broad Definition (Categories A-C)
United States	94	1,032
China	259	259
Japan	247	247
United Kingdom	100	125
Korea	81	81
Russia	51	51
Brazil	25	75
Hong Kong SAR	30	30
Spain	0	21
Germany	21	21
Australia	10	17
Singapore	10	10
Netherlands	9	9
UAE	9	9
Indonesia	7	7
LatAm other	4	4
Philippines	2	2
Total	1,010	2,001

Core (category A) assets total USD 1,010 billion, of which Asia at 58%, Europe 18%, the Americas 17% and other regions 7%. The fifteen largest institutions hold approximately three quarters of the total. Adding categories B (USD 838 billion) and C (USD 153 billion) yields the broad estimate of USD 2,001 billion. Against the FSB-based denominator of USD 191 trillion, the narrow and broad definitions imply asset shares of 0.5% and 1.0% respectively.

Scope	Assets (USD bn)	Share of global bank assets
Narrow (core digital-only, cat. A)	1,010	0.5%
Broad (A + US direct banks + incumbent digital subsidiaries)	2,001	1.0%
Memo: BaaS partner banks (cat. D)	39	Belong to Retail/Commercial
Memo: non-licensed front-ends (cat. E, deposit balances)	12	

C. Market share for platform-based / embedded finance

For the platform/embedded archetype, balance sheet data are scarce by the very nature of the business model, and the market share is instead derived from credit-flow data in the BIS fintech and big tech credit database (Cornelli et al (2020, 2023)). Documented lending flows of USD 572 billion (big tech) and USD 223 billion (fintech) in 2019, with big tech credit exceeding USD 700 billion in 2020, are extrapolated to 2024 using segment-specific growth assumptions, implying a combined origination flow in the order of USD 2 trillion. Converting flows to stocks with tenor assumptions that reflect the short maturity of big tech credit yields a gross outstanding stock of roughly USD 1.7 trillion, or about 0.9% of global banking-system assets.

The gross figure, however, is an upper bound which substantially overstates the assets actually held on platform balance sheets, because most platform-originated credit resides elsewhere in Table 4. A sizeable share of big tech credit is originated through licensed digital banks that are already counted in the neobank census (WeBank, MYbank, KakaoBank, Rakuten Bank), a further share is facilitated onto partner banks' balance sheets, a model reinforced in China by the joint-lending rules introduced after 2021, and most marketplace (fintech) lending is funded by banks and institutional investors rather than retained by the platforms. Netting out these overlaps (assumed to be about 50% of the total) leaves an on-platform balance sheet stock in the order of about USD 0.85 trillion, or about 0.5% of global banking-system assets.

Given the dynamic nature of the business, and the uncertainty of the estimates, Table 4 reports a share of 0.6%. The gross stock, ie the combined origination flow, the economic footprint of platform-based finance in origination, distribution and payments, is a multiple of its balance sheet share, which is precisely the balance sheet-light property that defines the archetype.

Cross-checks and caveats. Three triangulation points are available: the fintech-lending data collected from participating jurisdictions in the FSB Global Monitoring Report (since the 2024 report, under the G20 Data Gaps Initiative); disclosed loan books and technical-service ("co-lending") volumes of major platform lenders (Ant Group, Mercado Libre, Rakuten, Kakao, Grab/Sea financial arms); and central-bank estimates for China, where big tech credit is roughly 2% of the domestic credit stock. Three caveats apply. First, the extrapolation from the 2019/20 anchors should be replaced by actual values when the updated BIS database vintage is incorporated. Second, the boundary with the digital-only archetype is intrinsically blurred, since the largest "big tech lenders" operate through licensed digital banks; the deduction structure makes this allocation explicit and adjustable rather than resolving it definitively. Third, the archetype's payments and distribution activities, which dominate its economic relevance, are not captured by credit data at all; the transaction-volume memo in Table 4 addresses this only partially.

D. Market shares for decentralised finance (DeFi)

The DeFi estimate is the only Table 4 entry that can be built entirely from public micro data: total value locked (TVL) is observable protocol by protocol through open aggregators, of which DefiLlama is the de facto standard. Aggregate TVL stood at roughly USD 125 billion at end-2024 – between a 2021 cycle peak of about USD 177 billion and the trough of the 2022/23 crypto winter – equivalent to only about 0.06% of global banking-system assets. Headline TVL, however, is a poor proxy for bank-like intermediation. Around 40% of it sits in liquid staking and restaking protocols, which represent claims on blockchain consensus rewards rather than credit intermediation, and whose receipt tokens are frequently re-deposited elsewhere, inflating gross figures. Restricting the count to intermediation-like functions of collateralised lending (USD 30-35 billion), decentralised-exchange liquidity (USD 15-20 billion) and the collateral backing crypto-native stablecoins yields an intermediation-relevant stock of roughly USD 55–65 billion, or about 0.03% of global banking-system assets.

The main definitional judgement is the treatment of fiat-backed stablecoins, which are economically the closest crypto analogue to banking: their issuers create deposit-like, par-redeemable liabilities against a reserve portfolio of short-dated government paper and bank deposits. Including their outstanding stock of roughly USD 200 billion at end-2024 would raise crypto-based "banking-like" intermediation to approximately USD 0.25-0.27 trillion, or somewhat above 0.1% of global banking-system assets, which is the upper end reported in Table 4. As with the platform archetype, the balance sheet share understates the activity footprint: stablecoins settled transaction values in the tens of trillions of US dollars in 2024, and the sector's significance for the scenarios in Section 3.3 derives less from its current size than from its growth rate, its volatility and its potential coupling with tokenised traditional finance.

Data. The estimate is built from protocol-level total value locked (TVL) reported by DefiLlama, an open aggregator covering several thousand protocols across all major blockchains, accessible via a public API that permits full reproduction at any reference date. Two of the aggregator's methodological settings matter for the estimate and should be stated when the figures are refreshed: (i) the default treatment that excludes double counting of liquid-staking and restaking receipt tokens re-deposited in other protocols, which should be retained; and (ii) the exclusion of borrowed amounts from lending-protocol TVL, so that the lending figure measures posted collateral/deposits rather than gross exposures. TVL valuations move mechanically with crypto-asset prices; the reference date (end-December 2024) should therefore be reported alongside the figure, and the cyclical context noted on aggregate TVL peaked near USD 177 billion in November 2021, collapsed in 2022-23, and stood at roughly USD 125 billion at end-2024.

Mapping TVL to bank-like functions. Headline TVL is not an assets concept in the accounting sense and includes activities with no banking analogue. The estimate therefore maps protocol categories to intermediation functions. Collateralised lending protocols (Aave, Compound, Morpho, Spark and peers; USD 30-35 billion at end-2024) perform credit intermediation, though of a distinctive kind: lending is overcollateralised, and outstanding debt is predominantly stablecoin-denominated against crypto collateral, so the economic function resembles securities financing more than unsecured bank credit. Decentralised-exchange liquidity pools (USD 15-20 billion) correspond to market-making/trading rather than credit intermediation and are included in the intermediation-relevant aggregate for comparability with the trading-bank archetype, an allocation that can be varied. Liquid staking and restaking (40% of headline TVL) are claims on consensus rewards with no direct banking analogue and are excluded. Crypto-native stablecoin collateral (MakerDAO/Sky and peers) is included, as it backs the issuance of deposit-like liabilities. The resulting intermediation-relevant stock is USD 55-65 billion, or 0.03% of global banking-system assets.

Treatment of fiat-backed stablecoins. Fiat-backed stablecoin issuers (Tether, Circle and smaller peers) are not DeFi protocols, but they perform the most bank-like function in the crypto ecosystem: issuing par-redeemable, deposit-like liabilities against a reserve portfolio concentrated in short-dated government securities, bank deposits and repo. Their outstanding stock of roughly USD 200 billion at end-2024 can therefore be presented either within this archetype (upper-bound variant, bringing the total to USD 0.25-0.27 trillion, 0.13% of global banking-system assets). Two considerations argue for a memo treatment: the

reserve assets are held with traditional custodians and money-market instruments, placing the credit and liquidity transformation largely inside the traditional system; and prospective regulatory regimes (e.g. payment-stablecoin legislation) may formalise these entities as narrow-bank-like issuers distinct from DeFi proper.

Uncertainty, cross-checks and caveats. The DeFi figures are the most volatile in Table 4: month-to-month TVL swings of ±20% are routine, driven by both flows and valuation effects, which argues for reporting rounded ranges rather than point estimates. Cross-checks include the FSB's crypto-asset market monitoring, the BIS analyses of DeFi's structural features (Aramonte, Huang and Schrimpf (2021)), and, for the stablecoin component, issuer attestations and reserve reports. Three caveats apply. First, TVL measures collateral posted, not risk borne; leverage built through recursive borrowing means economic exposures can exceed TVL within the same reported total. Second, the perimeter between DeFi and centralised crypto intermediaries (exchanges, custodians) is not captured by TVL at all; the archetype as defined in this paper is confined to on-chain protocols. Third, the sector's relevance for the projection horizon lies less in its current 0.03-0.13% share than in its interaction with tokenisation of traditional assets, which could re-route activity from other archetypes; this is treated in the scenario analysis rather than the baseline.