Bank regulation and supervision: from local to global to local

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Lecture prepared for the Advanced Finance Course at ETH Zurich
27 May 2025

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Outline

A. Introduction

Thank you for inviting me to give this lecture on banking regulation and supervision today. It is a pleasure to be here.

I am speaking at a university that is deeply rooted in engineering and science, which may seem far removed from the work of the Basel Committee. But in many ways, we share a similar focus: trying to design systems that are robust, resilient and able to withstand stress whatever the source.

Stress may be generated within the system itself (endogenous) or may originate from outside the system (exogenous). What we can be sure of is that we will never predict all the sources of stress or their severity, and nor will we fully understand how stress reverberates through the system, which depends on so many factors and including individual behavioural responses. Building resilience in banks and the banking system more generally therefore relies on multiple factors, including good governance and risk management practices, capital, liquidity and operational resilience to withstand shocks.

My lecture today will review the evolution of regulation and supervision and the role of the Basel Committee. I will start with a recap of why we regulate and supervise banks, and the role of capital and liquidity. I will then explain why the Basel Committee was set up, and the role it serves in promoting global financial stability. I will then conclude by discussing some of the lessons learned from recent bank failures and stress events.

In preparing this presentation with my colleagues, we realised that to cover all these topics in detail would require a whole course, rather than one lecture. So, my plan is to touch the surface on most issues and occasionally drill a little deeper.

So, let's start with the basics.

B. The basics

What makes banks' "special" and why are they regulated?

There is an extensive literature on what banks do that makes them special and the role of regulation, which I won't attempt to cover. For the purposes of today's lecture I will loosely refer to banks as entities that take deposits and offer loans and other core financial services (eg payments).[1] Whether banks and banking are still one and in the same in today's digitalised and evolving financial system is a separate question, as banking type services are increasingly provided by a range of non-bank

[1] More extensive definitions of banks include entities that provide the following functions: the provision of liquidity and payment services; asset transformation (asset quality, maturity and currency denomination); managing risks; monitoring and information processing; resource allocation; and a transmission mechanism for monetary policy implementation. See for example Freixas and Rochet (1997) and Federal Reserve Bank of Minneapolis (1982). The uniqueness of banks as an institutional form for providing such services stems from their ability to reduce transaction costs; provide liquidity insurance and reduce various asymmetric information problems (see Freixas and Rochet (1997) and Diamond (1996)).

players.[2] For our purposes, the key factor is the combination of both taking deposits, which are payable on demand, and making loans. Or, to put it differently, maturity transformation and credit intermediation.

Given these core services, almost every financial transaction that individuals or businesses conduct involves banks directly or indirectly. So, if a bank fails, it can cause major disruption by cutting off the ability of individuals and businesses to engage in essential transactions, such as accessing their savings, drawing on credit or making payments. Even with the existence of deposit insurance schemes, a delay in being able to access funds can have major repercussions for the affected parties.

History has shown that banking crises are often painful. There have been over 150 systemic banking crises around the globe since 1970. The costs from these crises have been significant. While estimates vary considerably, Laeven and Valencia (2018) estimate median cumulative output losses of around 35% of GDP for high-income economies over a three-year period, while BCBS (2010a) estimate a median cumulative output loss of 65% across a range of studies. In many ways, we are still dealing today with the scars from the Great Financial Crisis (GFC) of 2007-2008.

The costs of banking crises go beyond just the impact on GDP. The use of fiscal support in response to banking crises has historically increased public debt by over 20% of GDP for the median crisis (Borio et al 2023). Baron et al (2024) further show that bank stocks experience large permanent declines.

The combination of high leverage (relative to non-financial corporates) and a heavy reliance on short-term funding means that banks can come under pressure quickly due to external shocks or if counterparties lose confidence in their viability. A quick (and non-exhaustive) count suggests that since the GFC, there have been at least 15 episodes of financial market stress (Table 1), most of which were exogenous in nature.[3]

Given the significant cost and disruption that can occur from bank failures and the failure of the market to appropriately internalise these costs, significant government safety nets (including access to central bank funding) have been introduced over time to protect small depositors and lower the likelihood and impact of bank failures.

In turn, and in part to guard against incentives to exploit such public safety nets, banks around the globe are regulated.[4] Some of these regulations focus on issues such as the fair treatment of customers, so-called conduct of business regulations, while others focus on reducing the probability and cost of bank failures, referred to as prudential regulation. In this lecture I will focus on the main tools of prudential regulation – capital and liquidity ratios.

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[2] See for example BCBS (2024a).

[3] It is not possible to summarise in appropriate detail the stress events and their implications in a single table. The main point of the table is to emphasise the frequency with which such extreme events seem to occur and our inability to predict them.

[4] For a more detailed explanation of the rationale for bank regulation, see for example Freixas and Rochet (1997).

Table 1: List of financial market stress events since the GFC

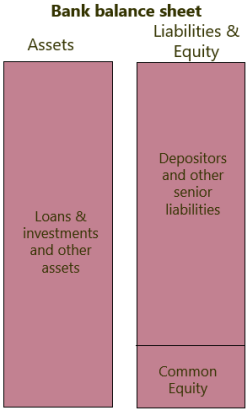
Event / date	What happened	Implications
Equity flash crash: May 2010	Sudden, deep drop in US equities triggered by algorithmic trading	Need for circuit breakers and oversight of high-frequency trading. Market liquidity spillovers across numerous markets.
Sovereign debt crisis: 2010-2012	European countries, especially Greece, faced debt sustainability issues	Importance of fiscal discipline and coordinated policy in currency unions. Importance of assessing and mitigating risks from bank-sovereign nexus.
Taper tantrum May: 2013	Bond yields spiked after Fed hinted at reducing QE	Importance of clear central bank communication. Role of USD funding and cross-border spillovers for bank lending.
Treasury flash crash: Oct. 2014	US Treasury yields dropped sharply intraday without clear cause.	Highlighted liquidity risks in even the most liquid "risk-free" markets. Spillovers across markets. Importance of market structure and monitoring.
Swiss Franc de-peg: Jan. 2015	SNB removed CHF peg to euro, causing severe currency volatility	Risks of defending fixed exchange rates; importance of hedging. Limitations of reliance on models / historical data for capturing tail events.
Brexit: June 2016	UK voted to leave EU, leading to global market turmoil	Political risk can have major financial implications. Importance of tail risks.
Money market fund reforms: Oct. 2016	US reforms led to large asset shifts among fund types	Regulatory changes (even when needed) can cause abrupt market adjustments.
VIX spike: Feb. 2018	Volatility index surged amid equity sell-off; inverse VIX products imploded	Misuse of volatility-linked products can lead to rapid losses. Reputational risk for banks selling related products.
Repo spike: Sep. 2019	Overnight repo rates spiked due to liquidity mismatch	Need for robust short-term funding mechanisms. Liquidity shocks can propagate quickly across the financial system. Even the safest securities can experience liquidity issues.
Covid-19: March 2020	Pandemic triggered global economic shock and "dash-for-cash"	Fragility of interconnected systems in response to global shocks. Liquidity pressures spillover.
Treasury flash event: Feb. 2021	US Treasury yields jumped sharply amid inflation fears	Market expectations can shift rapidly with macroeconomic signals. Market liquidity risk to banks from NBFI / structural shifts.
War in Ukraine: Feb. 2022	Russian invasion caused commodity and equity volatility	Geopolitical events can create global systemic shocks. Limitations of models / historical data for management of tail events.
UK LDI: Sep. 2023	Gilt yields surged, stressing pension funds using LDI strategies	Importance of managing leverage and liquidity risk in long-dated assets. Opaque / highly levered NBFI trades and interconnections with banks.
Banking turmoil: 2023	Collapse of regional US banks and Credit Suisse crisis	Importance of governance and risk management (eg interest rate risk and liquidity); effective supervision; robust regulation; and cross-border cooperation. Increased speed of bank runs. Issues around complexity of capital instruments.
Tariff spike: April 2025	Global markets reacted to renewed trade tensions and tariff announcements	Trade policies / uncertainty impact financial markets. Unwinding of opaque / highly levered NBFI trades can spillover to other markets and banks.

What is capital?

Common equity – going concern capital

Before defining capital, it's worth spending some time considering its principle building block: common equity.

The common equity of any company is the difference between its assets (ie what it owns or is owed) and its liabilities (ie what it owes). Another name for the common equity of a company is its "net assets".



For a bank, the assets will include the various loans that it has made, as well as its investments in financial instruments, such as bonds and stocks, deposits at central banks, cash held in vaults, the buildings it owns etc. A bank's liabilities will include the amounts that it owes to depositors and other funders, such as the holders of bonds that the bank itself has issued.

Defining common equity as the difference between assets and liabilities means that a balance sheet will always balance.

If you have some background in accountancy, maybe you know that you can break down common equity into various sub-components, for example: paid-in share capital, retained earnings, other comprehensive income etc. But this detail is not so important when trying to understand the role that common equity plays in bank regulation. It's simpler just to view common equity as the amount left over when you take assets and subtract liabilities.

So why is common equity important?

If a bank has positive amounts of common equity, it means that its assets exceed its liabilities. What it owns exceeds what it owes. This is important because it means that if the bank is able to monetise its assets at face value (for example, by letting loans be repaid and/or by selling assets), it will have enough cash to repay all of the depositors and other funders to which it owes money, and still have some money left over. The left-over money is the property of the shareholders of the bank. Common equity can therefore be understood as the shareholders' residual claim on the assets of the company after taking account of the claims of other funders.

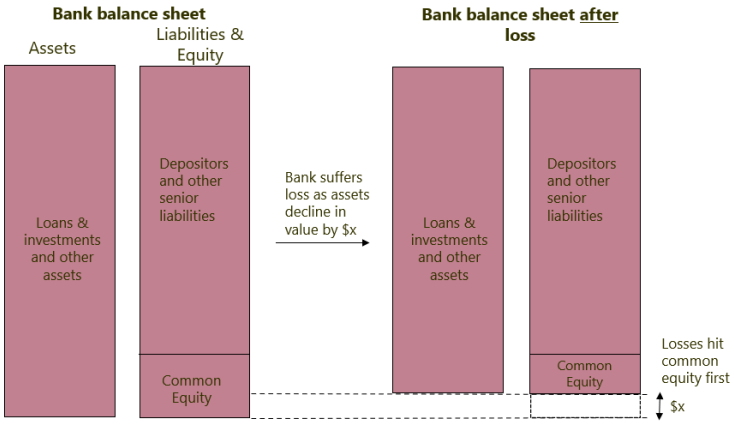
Positive equity, therefore, implies that there are enough assets to satisfy the claims of the funders of the bank, such as depositors. In contrast, negative equity means that the assets are insufficient to satisfy these claims.

If depositors suspect the bank may have negative equity, they have a very strong incentive to request repayment of their deposits. The earlier they do this, the more likely they are to be paid

in full. This is the fundamental underlying incentive that causes a bank run; depositor race to get out before the bank is closed and the remaining depositors are forced to suffer a loss as the remaining assets are insufficient to repay them in full.

The ability of the bank to convert its assets into cash to repay deposits is determined by their "liquidity", a topic I will come to later. With positive amounts of common equity, depositors and other funders can be comfortable that assets are sufficient to cover their claims and will, in theory, be happy to continue funding the bank. That is, the bank can remain a going-concern. For this reason, common equity is often referred to as "going-concern" capital.

Before moving on from common equity, I would like to describe briefly the way in which it absorbs losses. This is a key and often misunderstood topic. It is only by understanding this loss absorbency mechanism that you can truly appreciate the limitations of other types of non-equity capital.



Banks make a profit when their assets grow relative to their liabilities, causing the common equity to increase. Banks make losses when their assets fall relative to their liabilities, causing the common equity to decrease. An example of the latter would be when a bank has made a loan, but the borrower fails to repay it, and so the bank writes off the loan. The write-off means the bank's assets decline and its equity declines by the same amount. Common equity, therefore, absorbs losses by reducing the shareholders' residual claim whenever an asset is written off or otherwise declines in value. It also does the same whenever the liabilities of the bank increase in value.[5]

There are a couple of key points to note here:

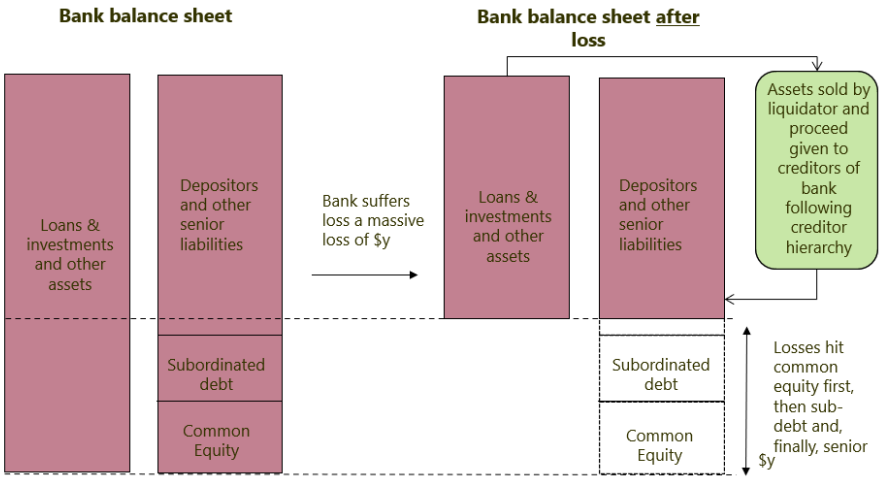
- First, common equity is the first form of funding to bear a loss, and it does so instantaneously. There is no supervisory or bank management decision to be made about when, whether, or how it absorbs a loss.
- Second, because common equity moves up whenever a bank makes a profit and decreases whenever it makes a loss, the investors in common equity (ie the common shareholders), are accustomed to seeing their claim adjust with the fortunes and misfortunes of the bank. It may be a surprise to them if the bank makes a sudden unexpected loss, but if it does, it won't be a surprise to them that it is their equity claim that bears the loss.

[5] More broadly, common equity provides banks with shock-absorbing capacity (Borio et al, 2020).

These features are unique to common equity, and I'll return to them when I address the subject of hybrid capital instruments.

Subordinated debt – gone concern capital

There is a second main category of capital that I would like to briefly review, which is subordinated debt. Subordinated debt is just like any other form of debt, except it has one feature that it shares with common equity. That feature is that, as its name suggests, it absorbs losses before the depositors and other senior funders of the bank. Let's just consider for a moment how it does this.



When a bank fails and a liquidator is appointed to sell its assets and repay the liabilities, the liquidator must follow the "creditor hierarchy". In the simplified picture shown, this means the money raised from selling assets will first be used to repay the depositors and other senior funders. Only if they are repaid in full will any remaining funds be used to repay the claims of the subordinated debt holders. And only if they are repaid in full will any remaining funds be distributed to the common shareholders. By agreeing to be paid out only after senior creditors have been paid in full, the subordinated debtholders offer a layer of protection. They absorb losses in liquidation before depositors and senior creditors take a loss.

A few key points to note here:

- First, common equity is also subordinated. It therefore is both loss absorbent on a going and gone concern basis.
- Second, normal subordinated debt requires a process of liquidation for it to absorb a loss, something that may not be credible for a large systemically important bank. This suggests that for such banks, there may need to be other mechanisms to ensure subordinated debt can absorb losses.[6]

[6] For example, under Basel III, all capital instruments must be able to fully absorb losses at the so-called point of non-viability (PONV). For subordinated debt and hybrid capital – encompassing Additional Tier 1 and Tier 2 capital – the PONV condition requires eligible instruments to be capable of being converted into common equity or written off. The trigger for the conversion/write-off is the earlier of: (i) a decision that a write-off, without which the bank would become non-viable, is necessary as determined by the relevant authority; and (ii) the decision to make a public sector injection of capital or equivalent support. See BCBS (2011) for more.

- And third, the process of liquidation can involve substantial costs, which include both administrative costs and losses that arise through the fire-sale of assets. These often mean that the total amount of money that can be raised from selling the assets of the bank is substantially less than the value of the assets on the balance sheet at the time of failure.

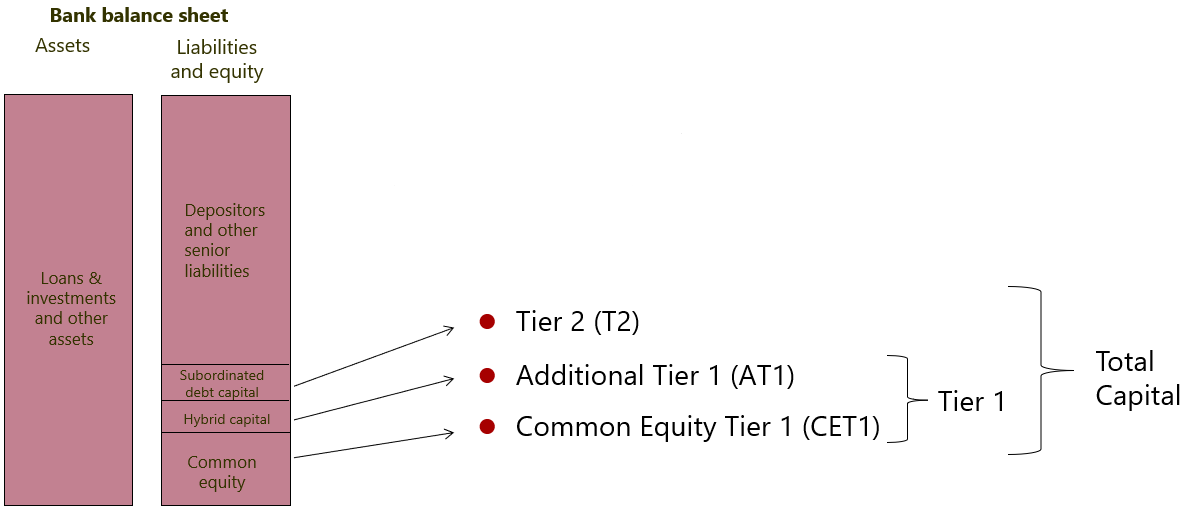
Hybrid capital

There is a third category of capital, hybrid capital, that I will only mention briefly at this point – the annex provides further details on the design of these instruments. Hybrid capital is basically a form of subordinated debt funding that shares some features of common shares. For example, unlike standard subordinated debt, a typical hybrid capital instrument:

- is perpetual, by which I mean that like common shares it does not have a maturity date; and
- enables the bank to cancel the interest payments due on the instruments, similar to the ability of the bank to cancel dividend payments on common shares.

Some classes of hybrid capital have features that require them to be written-off or converted to common shares at a specified trigger event, which results in the creation of new common equity on the balance sheet of the bank, as the liability of the capital instrument gets extinguished (if liabilities go down, equity goes up).

In theory, these features of hybrid capital make the instruments similar to common equity in certain respects and enable them to absorb losses on a going concern basis. I will return to how this theory works in practice later in this lecture, but for now I will just highlight one key point. Although hybrid capital instruments share some feature of common shares, they do not automatically absorb losses as and when they occur, as is the case for common equity. Hybrid capital loss absorption depends on an active decision or trigger event, which is a significant difference to common equity.



Capital summary

I started by asking what is capital? Capital is funding that protects the other funders of a bank, most notably depositors, by bearing losses ahead of them. It can be divided into "going-concern" capital, such as common equity, and "gone-concern" capital, such as subordinated debt. The former absorbs losses whilst the bank remains a going-concern. The latter only absorbs losses after failure. And hybrid capital is a form of subordinated debt that includes features that, in theory, enable it to absorb losses on a going concern basis.

The name that banking regulators give to the forms of capital that are designed to absorb losses on a going concern basis is Tier 1 capital. Tier 1 capital is composed of common equity, called Common Equity Tier 1 (CET1), and hybrid capital, called, imaginatively, Additional Tier 1 (AT1). Tier 2 is the name that regulators give to capital that only absorbs losses in a gone concern situation.

In order to be recognised as CET1, AT1 or T2, the shares and instruments need to meet certain criteria specified through banking regulations and are also subject to various deductions and adjustments. These criteria and adjustments are an interesting topic but are beyond the scope of this lecture.

So after that quick run through the basics of regulatory capital, I'll now turn to the topic of liquidity.

What is liquidity?

Liquidity can be defined as having cash when you need it. For a bank this would include meeting repayments to liability holders (eg depositors) and providing funds to clients (eg drawdowns of loan commitments or credit cards). Liquidity can be generated from the assets side of the balance sheet (eg by selling assets) or from the liability side of the balance sheet (raising funds through additional borrowing).

The liquidity of an asset can be defined as the ease with which the asset can be converted into a means of payment, typically cash. By cash I mean both physical cash and deposits at the central bank (an asset on the commercial bank's balance sheet, known as reserves, which is used to make payments between banks). An asset is considered to be liquid if it can be rapidly converted to cash (eg through sale or repo) with no loss of value. Typically, for an asset to be liquid, there needs to be a deep and active market in which the asset can be traded. By contrast, an asset that takes a long time to convert to cash (eg a long-term loan) or can only be converted to cash in the short-term by selling it at a discount to its fair value, is illiquid.

The liquidity of a bank's assets is an important consideration in banking regulation and supervision, because all things being equal, a bank that has more liquid assets will be better placed to cope with repayment requests from depositors.

If a bank receives a request for repayment from a depositor and has sufficient cash to meet that request, then they can simply make the payment. The balance sheet of the bank contracts in size, but the level of common equity remains unchanged.

As a side note here, most withdrawal requests to banks do not come in the form of a physical cash withdrawal. Instead, they come in the form of a request to transfer an amount from the deposit account of the customer to the deposit account of the person or business they wish to

pay. When the recipient's account is in another bank, the bank transfers its own deposits at the central bank to the deposit account that the receiving bank has with the central bank. The impact on the balance sheet is the same as I have described for the cash withdrawal case, ie assets and liabilities both fall by the same amount and the balance sheet gets smaller with the equity of the bank unaffected.

But under the current system of "fractional reserve banking", where banks are not required to fully match customer deposits with cash and central bank reserves, the bank may not have sufficient of these assets to satisfy the withdrawal request of the depositor. In this case, the bank needs to either: (i) sell some of its assets to convert them into cash; or (ii) borrow cash.

If a bank has lots of liquid assets, such as government bonds or highly rated corporate bonds, it should be able to sell these at market value. This will convert one asset on the balance sheet, eg a bond, to an equally sized cash asset. The depositor can now be repaid as before. If, however, the assets that the bank sells are illiquid, the bank wanting a quick sale may not be able to realise their full face value.

If the assets are sold at less than their face value on the balance sheet of the bank, then the sale means that assets decline in value, and equity, the residual, also declines. This is an important point to note. A liquidity stress event for a bank can result in losses as it sells assets below face value to meet redemption requests from depositors, leading to an erosion of its capital base. This can set in train a downward spiral in which liquidity stress leads to losses and lower capital, which in turn frightens depositors into making withdrawals, which leads to further liquidity stress.

Banks could avoid liquidity stress by matching, one-for-one, the maturity of their liabilities with the maturity of their assets. For example, all demand deposits could be matched by cash or central bank reserves (ie a "full-reserve banking model") and all one-year term deposits could be matched by one-year loans etc. But this would fundamentally change the nature of modern banking, which engages in maturity transformation. Banks typically take (or create[7]) deposits that have a very short-term legal maturity (such as demand deposits), and make loans that have much longer maturities. In the extreme, a bank that funded itself entirely with demand deposits would not be able to make any term loans if it was required to keep liquid assets equal to its deposits.

The sale of liquid assets is one way for a bank to raise cash when needed. Another way is for the bank to borrow cash. A common way for banks to do this is to use the "repo" market. This is a market in which participants temporarily sell assets for cash, with the agreement that they will buy those assets back in the near future. It is a form of collateralised borrowing, because if the bank does not repurchase the asset it has sold, the recipient of the asset can sell the asset to recoup the money it lent to the bank.

The liquidity of assets is therefore not only determined by the ability to sell the assets at market value, but also the ability to use the assets as collateral to borrow cash.

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[7] While banks do take deposits of cash and use the cash received to make loans, the process of loan and deposit creation in modern banking does not require a deposit of cash. That is, if a bank decides to make a loan to a customer, it can simply and simultaneously create a deposit in the customers' account (increasing the bank's liabilities) and recognise the loan on its balance sheet (increasing the bank's assets). See for example, McLeay et al (2014).

How much capital is enough?

I have outlined, in broad terms, definitions for capital and liquidity, but how much capital and how much liquidity should banks have? Let's start with capital. One way to approach this question is to say that a bank needs to hold capital above a certain percentage of its leverage ratio exposure (which combine assets and off-balance sheet items). The Committee does this via its leverage ratio standard. The leverage ratio of a bank is calculated as its Tier 1 capital divided by a measure of its assets and the Basel Committee's leverage ratio standard requires this ratio exceeds 3%. For a bank that only just meets this threshold, the leverage ratio standard means that the bank can suffer a 3% decline in the value of its assets before all of its going-concern Tier 1 capital, is wiped out.

$$Leverage\ Ratio\ requirement: \frac{Capital}{Leverage\ Ratio\ Exposure} \geq 3\%$$

A leverage ratio requirement adjusts the dollar amount of capital that a bank needs to hold based on its balance sheet size. This has the benefit of simplicity, but it is not very risk sensitive. Two banks that are the same size will get the same capital requirement, even if the assets of one of the banks are considerably riskier than the assets of the other bank.

To address this problem, banks can be required to maintain capital at a certain percentage of risk-weighted assets. Under this risk weighting approach, assets that are considered to be higher risk get a higher risk weighting. This risk-based capital requirement is the main type of capital requirement set by the Basel Committee. Broadly speaking, the Committee provides two options for banks to calculate risk weighted assets: a standardised approach, in which standardised risk weights are specified through regulation for classes and sub-classes of assets, and an internal models approach, where banks can use their own estimate of certain risk parameters (such as probably of default (PD) and loss given default (LGD) to determine the applicable risk weight.

The risk-weighted assets (RWAs) of a bank are, therefore, the regulatory measure of the risks to which the bank is exposed. The risk that the Committee is trying to capture when it specifies RWAs is not the expected loss on assets, ie the normal average losses that a bank would be expected to incur each year on its exposures. Such expected losses should be covered by the bank's accounting provisions. Instead, capital is calibrated to cover unexpected losses. The main sources of risk that capital requirements attempt to capture can broadly be categorised as: (i) credit risk; (ii) market risk; and (iii) operational risk.

$$Risk\ based\ capital\ requirement: \frac{Capital}{RWAs} \geq 8\%$$

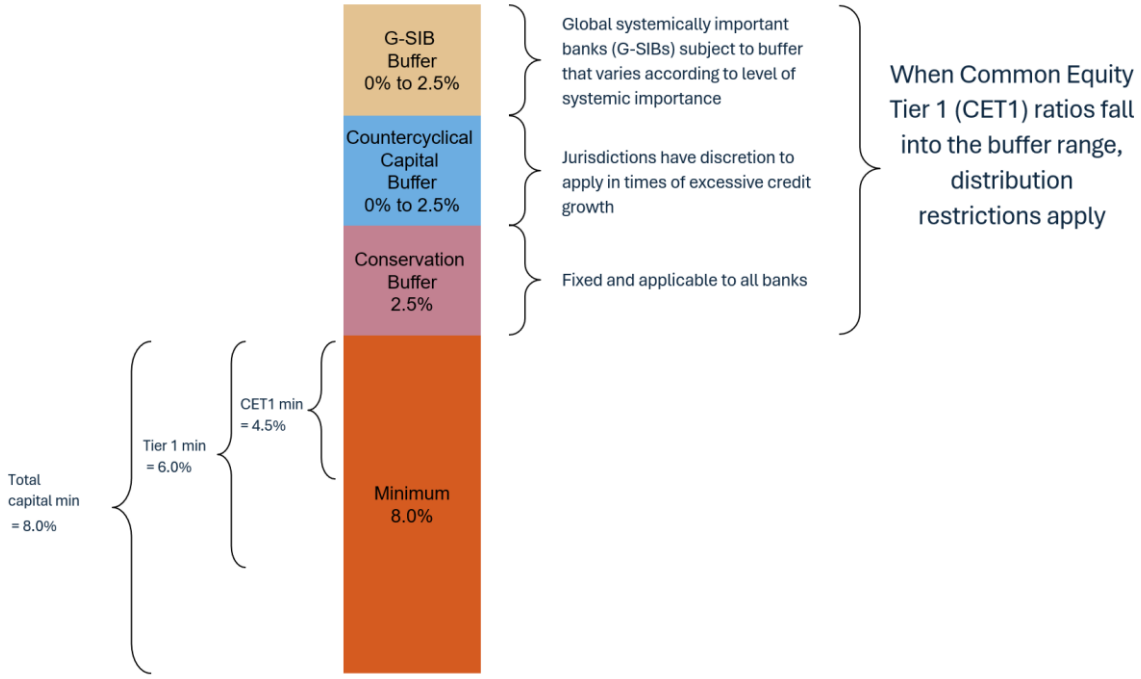
To illustrate using a simple example. Assume a bank has made a 100 CHF residential loan with a risk weight (RW) of 30%. The capital requirements on such a loan would, assuming the minimum capital requirements above, be:

- Leverage ratio minimum capital = 3% x 100= 3 CHF
- Risk-based minimum capital = 30% x 100 x 8% = 2.4 CHF

In this example, the leverage ratio requirement is more binding than the risk-based requirement. At a minimum, the bank would be required to fund this loan with 3 CHF in Tier 1 capital (the remaining 97 CHF can be funded by debt – ie money the bank has borrowed).

These capital requirements are a simplification. In reality there are separate capital requirements for CET1, Tier 1 and Total capital, which can: (i) vary over time based on the extent to which a jurisdiction has in place a countercyclical capital buffer requirement (CCyB); (ii) differ when a particular bank is subject to additional requirements due to it being designated a global (or domestic) systemically important bank (G-SIB or D-SIB); or (iii) differ due to additional requirements put in place through the supervisory process (which is generally known as Pillar 2 requirements).

The chart below shows the range of minimum capital requirements for CET1 (4.5%), Tier 1 (6.0%) and Total Capital (8%), along with the CET1 buffer requirements which comprise a capital conservation buffer (2.5%), CCyB buffer (0 to 2.5%) and a GSIB buffer (0 to 2.5%).

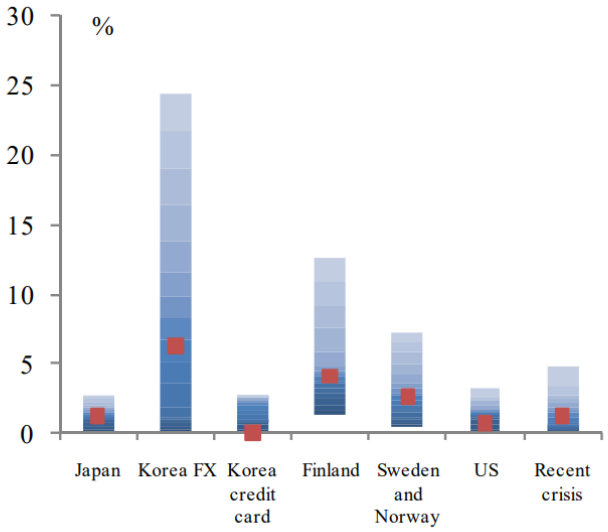


The process for calibrating capital requirements is as much art as science. Put differently, there are some fairly "objective" considerations, but ultimately judgment, and one own's risk tolerance level, are needed to decide on a calibration with regard to:

- How much unexpected losses may a bank incur in going- and gone-concern situations?
- How much lending / providing financial services a bank is expected to provide in stress as a going concern?

Subject to important caveats, to withstand losses and maintain a reasonable level of lending growth, the capital needed has been estimated to be between 7% to 12% of RWA – see graph below (BCBS, 2010). These estimates are based on loan growth assumptions derived from historical growth rates of GDP, monetary aggregates, and bank lending in each country, along with assumptions about the share of new lending funded by capital. It should be noted that there is considerable room for judgment in making assumptions about lending growth. While a partial reduction in lending growth after excessive growth periods may be necessary or desirable, ideally such reductions should be driven by a reduction in loan demand rather than a contraction in the supply of lending due to bank de-leveraging.

Cumulative peak losses as a percentage of RWAs at the start of the crisis[a]



(a) Each shaded band shows 5 percentage points of the distribution across banks between the 5th and 95th percentiles. Square shows median. Negative results suggest that the bank made a profit during the period. The countries (and number of banks) included in the "recent crisis" sample are Australia (1), Canada (2), France (3), Germany (4), Japan (4), Korea (3), the Netherlands (4) Switzerland (2), UK (2) and the US (10).

Source: BCBS (2010b).

Another approach is to take a top-down perspective and compare the macroeconomic benefits of capital requirements (reduced probability / impact of banking crises and impact on GDP) with the costs (higher lending spreads / impact on GDP). A review of the literature (see table below) suggests that optimal capital requirements range from a CET1 to risk-weighted assets ratio of 10%, to a Tier 1 to risk-weighted assets ratio of around 20%.

These estimates are not inconsistent with the existing Basel III requirements plus buffers for systemically important firms, which require a CET1 to risk-weighted assets ratio of around 10%, with Tier 1 and total capital ratios set above it.

Optimal Capital Requirements

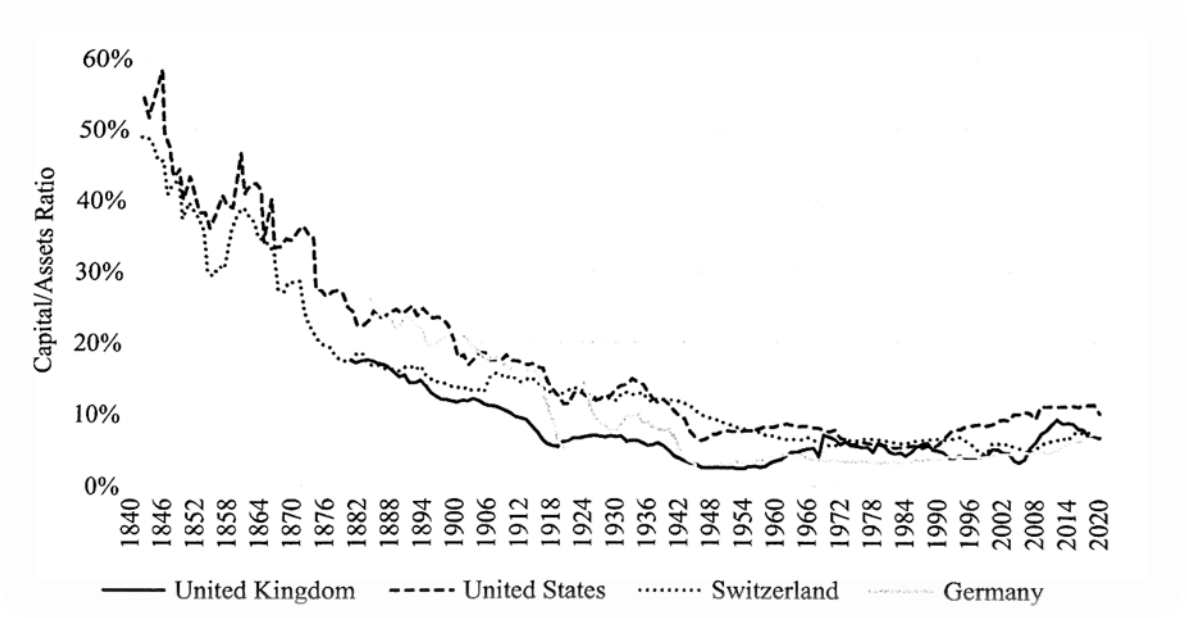
	LEI (2010)	Miles et al (2013)	Yan et al (2012)	Martinez-Miera and Suarez (2014)	Nguyễn (2014)	Mendicino et al (2015)
Definition of capital	Tier 1	Tier 1	CET1	Tier 1	Tier 1	Total capital ratio
Optimal capital requirement (% of RWAs)	13	16–20	10	14	8	12–16

Source: BCBS (2019).

A third approach to calibration is take a longer-term view and consider where current calibrations stand in the historical context. Banks and banking have after all been around for a lot longer than bank regulation. The following three charts provide some perspective:

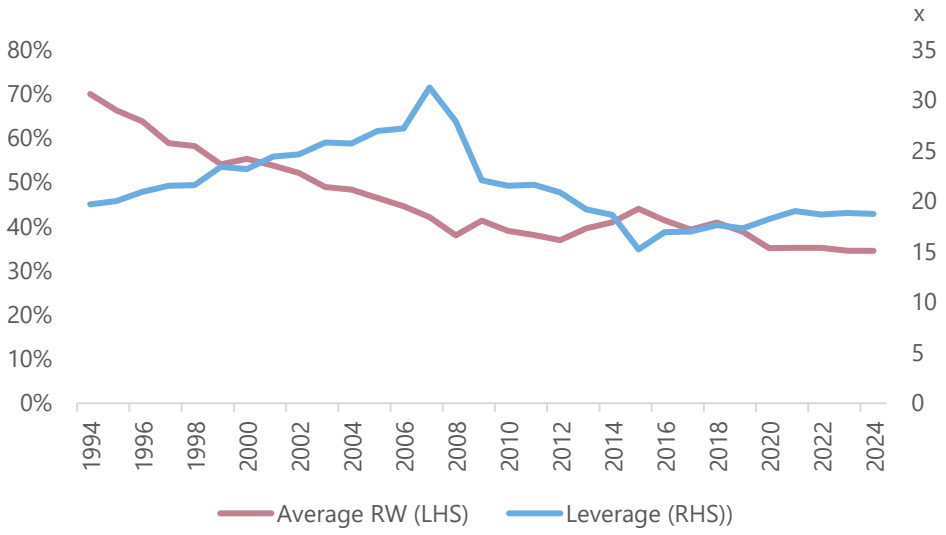
- when one takes a long-term view of capital ratios, there has been a clear and notable decline in banks' leverage ratios over the past 180 years, though with a recent uptick following the GFC. Put differently, banks have increasingly relied on debt to finance their assets over the past nearly two centuries;
- since the introduction of the risk-weighted asset framework there has been a steady decline in average risk weights among the largest internationally active G-SIBs, while leverage (the inverse of the leverage ratio) has over the past 40 years been through a steep cycle – rising sharply before the GFC and then contracting abruptly. At face value, looking solely at banks' reported RWAs would suggest that banks have become "safer" during this period. But the GFC and other stress episodes suggest that it is perhaps the calculation of banks' RWAs – including most notably those that are internally modelled by banks – that have contributed to the decline. The Basel III standards seek to enhance the robustness and risk sensitivity of RWAs; and
- the introduction of internal models-based estimates of RWA has led to a persistent divergence between model-based estimates of RWAs and those based on regulatory imposed standardised risk weights. The Committee's analysis and other academic studies have documented that much of this difference in risk weights cannot be attributed to differences in underlying risk characteristics. One of the primary objectives of the Basel III framework is to address this unwarranted variability in RWAs and thereby provide for a level playing field across banks and jurisdictions.

Capital/ assets ratios, 1840-2020



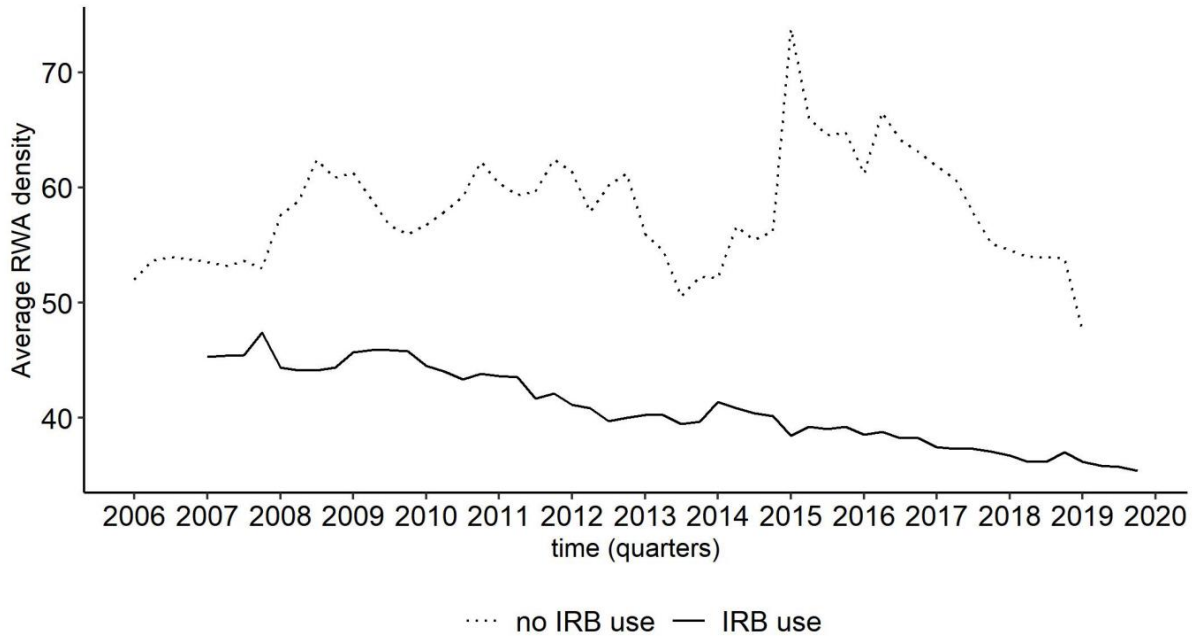
Source: Amrein (2025)

G-SIBs' average risk weights (RW) and leverage: 1994 - 2024



Source: The Banker and authors' calculations. Unbalanced sample of 21 G-SIBs based on the 2024 G-SIB list (FSB, 2024).

Comparing banks mean RWA based on use of internal ratings based (IRB) approaches



Source: Böhnke et al, (2024).

How much liquidity is enough?

Liquidity requirements for banks can also be set in a risk-based manner. One way the Committee does this is through its Liquidity Coverage Ratio (LCR). Under the LCR standard, banks are required to hold an amount of High-Quality Liquid Assets (HQLA) that exceeds an estimate of the total net cash outflows over a 30-day period. This, in theory, should allow a bank to survive a moderate period of stress for 30 days before it runs out of highly liquid assets to monetise to satisfy cash outflows. It is important to note here that, given the maturity transformation role that banks perform, no bank would be able to survive when a very large percentage of depositors simultaneously withdraw their funding.

The LCR covers a short-term, 30-day, period of liquidity stress. But liquidity problems can be longer-term in nature. For example, if a bank has a book of loans with an average maturity of one year and has funded these loans with wholesale funding with a maturity of six months, it is exposed to the risk that it will need to repay the wholesale funders in six months and may not be able to find any replacement funding. This type of liquidity mismatch would not be caught by the 30-day horizon of the LCR.

As such, the Committee also requires banks to meet its Net Stable Funding Ratio (NSFR). This standard takes a longer-term perspective and requires banks to maintain a stable funding profile in relation to the composition of their assets. The NSFR is defined as the amount of available stable funding relative to the amount of required stable funding. This ratio should be equal to at least 100% on an ongoing basis. “Available stable funding” is defined as the portion of capital and liabilities expected to be reliably available over the one-year time horizon considered by the NSFR. The amount of “required stable funding" of an institution is a function of the liquidity characteristics and residual maturities of the various assets held by that institution.

$$LCR: \frac{Stock\ of\ High\ Quality\ Liquid\ Assets\ (HQLA)}{Total\ net\ cash\ outflows\ over\ the\ next\ 30\ calender\ days} \geq 100\%$$

$$NSFR: \frac{Available\ amount\ of\ stable\ funding\ (ASF)}{Required\ amount\ of\ stable\ funding\ (RSF)} \geq 100\%$$

International liquidity requirements are relatively new compared to capital standards. As such, they have been subject to much less research and analysis than that related to the calibration of capital requirements. Some of the studies cited above that examine the macroeconomic costs and benefits of capital requirements also include liquidity standards, but they do not conclude with an "optimal" liquidity calibration range. As a result, the calibration of liquidity standards has been more reliant on historical experience and expert judgement. Most recently, the Committee has highlighted the potential implications of the increased speed of bank runs, observed during the March 2023 banking turmoil, for the design and calibration of its liquidity standards (see BCBS (2023) and BCBS (2024b)).

Having taken you through some of the fundamentals of capital and liquidity regulation, I'd like to turn now to the issue of global standards. In particular, why do we need global standards and what role does the Basel Committee play in this process.

C. Why global standards?

The origin of the Basel Committee[8]

The Basel Committee was established by the central bank Governors of the Group of Ten countries at the end of 1974 in the aftermath of serious disturbances in international currency and banking markets, most notably the failure of Bankhaus Herstatt in West Germany. Bankhaus Herstatt failed due to significant losses resulting from its foreign exchange trading activities, much of which occurred through its Luxembourg based banking subsidiary. Its failure demonstrated both the significant cross border impacts that can occur when an internationally active bank gets into trouble, and the need for supervisors to cooperate and coordinate to ensure that there are no gaps in the supervision of such groups. Also, this issue of cross border impacts of failure was growing in importance as banking systems around the world increasingly engaged in international activities, including through offshore financial centres.

And so, in 1974, the G10 Governors established the Basel Committee, headquartered at the Bank for International Settlements in Basel, with the aim of enhancing financial stability by improving the quality of banking supervision worldwide, and to serve as a forum for regular cooperation between its member countries on banking supervisory matters. The Committee's first meeting took place in February 1975, and meetings have been held regularly three or four times a year since. Since its inception, the Basel Committee has expanded its membership from the G10 to 45 institutions from 28 jurisdictions.

At the outset, one important aim of the Committee's work was to close gaps in international supervisory coverage so that: (i) no banking establishment could escape supervision; and (ii)

[8] The section draws heavily on the material on the Basel Committee website.

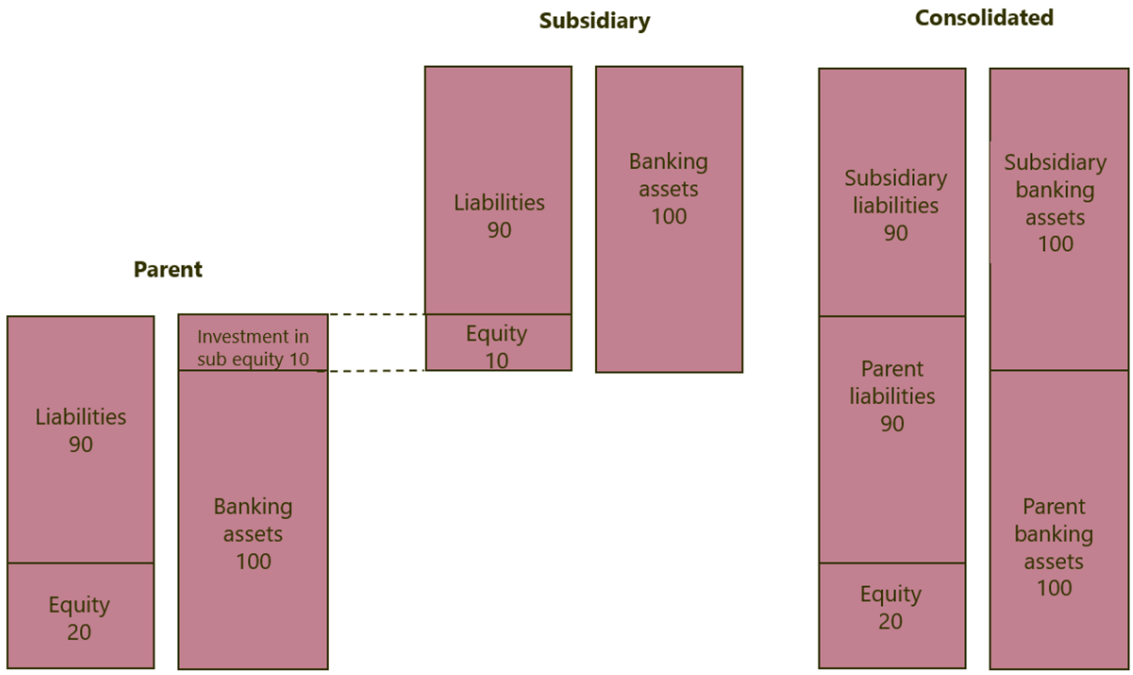
supervision would be adequate and consistent across member jurisdictions. A first step in this direction was the paper issued in 1975 that came to be known as the "Concordat". The Concordat set out principles for sharing supervisory responsibility for banks' foreign branches, subsidiaries and joint ventures between host and parent (or home) supervisory authorities. The Concordat has been revised and re-issued since, with the aim of improving cooperation and the cross-border flow of prudential information between banking supervisors.

The Concordat provided the basis for supervisory cooperation to avoid gaps in the supervision of internationally active banks. But, how do you effectively supervise an internationally active banking group, especially if the constituent parts of the group are subject to vastly different national rules and regulations?

Early on in the implementation of the Concordat, the Governors recognised the principle that banking supervisory authorities cannot be fully satisfied about the soundness of individual banks unless they can examine the totality of each bank's business worldwide through the technique of consolidation. One of the strongest arguments in support of the need for consolidation, was to prevent something called "double gearing" or "double leverage" or, as I prefer, "double counting" of capital. It's worth spending a moment to understand double counting of capital and how consolidation prevents it.

Consolidated supervision

The best way to understand the double counting issue is through a simple example. And here a picture helps to demonstrate the problem.



Consider a parent bank that has equity of $20 and deposits of $90, ie $110 of funding in total. The parent bank invests $100 of this funding in normal banking assets (eg loans to customers) and the remaining $10 in the equity of a banking subsidiary. You can see the balance sheet of this parent bank in the left-hand side of the diagram. The banking subsidiary in this example has $10 of

equity, all of which is owned by the parent, and also takes $90 of deposits. This gives the subsidiary $100 of funding, which it invests in $100 of banking assets. The balance sheet of the subsidiary is shown in the middle of the diagram.

If you look at the balance sheet of the parent bank and the balance sheet of the subsidiary bank, you could be forgiven for thinking that the total equity supporting the two entities is $30, consisting of the $20 equity of the parent and the $10 equity of the subsidiary. But this calculation misrepresents the equity available to the group.

To illustrate the problem, consider what would happen if the subsidiary bank made some bad loans and had to write-off $10 of its assets and thus caused the subsidiary's equity to be wiped-out. The knock-on consequence of this would be that the parent bank's investment in the subsidiary would also decline by $10 (from $10 to zero), and its own equity would also decline by $10 as a result. A single loss of $10 in the subsidiary, leads to a reduction of equity of $10 in the subsidiary *and* $10 in the parent.

What is happening here is that when we just add together the equity in the parent and the subsidiary we are "double counting" equity. The reason for this is that when we calculate the equity of the parent, we are giving recognition to its investment in its subsidiary. But this investment in the subsidiary *is* the equity supporting the risks of the subsidiary. So to recognise it as both equity supporting the risks of the subsidiary and as an asset on the parent bank's balance sheet when determining the equity supporting the parent bank is double counting.

This brings us to one of the two available solutions to the double counting problem: deduction. When calculating the equity available to support the risks of the parent bank, we can simply deduct its investments in the equity of its subsidiaries, recognising that these deducted amounts represent capital supporting the risks of the subsidiaries.

In the example above, the equity supporting the parent would then be calculated as $20 minus $10, which equals $10. Under this approach, the total equity supporting the banking group is therefore $10 supporting the parent, and $10 supporting the subsidiary, making $20 in total.

But there is another way to address the double counting issue, which is consolidation. When a consolidated balance sheet is prepared, intra-group transactions are removed from the consolidated balance sheet. In this example, the consolidated balance sheet is shown on the right-side of the diagram. By looking at the consolidated balance sheet you can see that the equity supporting the group is now the correct amount of $20.

So, if consolidation and deduction can both address the double counting problem, which approach should be used by supervisors? A 1978 paper by the Basel Committee addresses this issue.[9] In this paper the Committee noted that consolidation has some significant advantages, in particular it:

- allows the supervisor to set the same capital requirement for all risks in the group, no matter where they are located;
- removes incentives for banks to establish subsidiaries in countries with lower capital standards; and

[9] BCBS (1978). See also McPhilemy and Vaughan (2016).

- allows a better measurement of large exposures and exchange rate and country risks.

For these reasons, the Committee concluded that "the capital adequacy and risk exposure of banks and their affiliates can most satisfactorily be monitored by supervisory authorities on the basis of consolidation of risk assets."

There are, however, two important points that I would like to note about this conclusion.

The first is that the Committee acknowledged in the paper an important shortcoming of consolidation. Consolidation shows the capital available in the group as a whole. It does not show how that capital is distributed within the group. For example, you could have a very well capitalised subsidiary, with a thinly capitalised parent. If supervisors just look at the consolidated picture, they may miss the undercapitalisation of the parent. It was for this reason that the Committee stated in the paper that consolidation is a "supplement to and not a substitution for other supervisory techniques" and that for certain purposes "supervisory authorities would also need to continue to monitor the parent on its own." I mention this point because it has some relevance to the lessons from the March 2023 banking turmoil.

The second point I wanted to make is the move towards consolidated supervision had some far-reaching implications. Back in the 1970s, the actual capital requirements that applied to banks varied considerably between jurisdictions, as did the forms of capital eligible to meet those requirements. To supervise groups and assess their solvency on a consolidated basis meant that supervisors of internationally active banks were faced with the difficult task of aggregating these various differing requirements. This task would be made considerably easier if there was a more harmonised approach across jurisdictions to the definition of regulatory capital and regulatory capital requirements.

Facilitating consolidated supervision was, therefore, one of the many factors that led to the development of the original Basel Capital Accord, which is what I will turn to next.

Basel I, II and III

Basel I: the Basel Capital Accord

In the early 1980s, the onset of the Latin American debt crisis heightened the Committee's concerns that the capital ratios of the main international banks were deteriorating at a time of growing international risks. Backed by the G10 Governors, Committee members resolved to halt the erosion of capital standards in their banking systems and to work towards greater convergence in the measurement of capital adequacy. This resulted in a broad consensus on a weighted approach to the measurement of risk, both on and off banks' balance sheets.

There was strong recognition within the Committee of the overriding need for a multinational accord to strengthen the stability of the international banking system and to remove a source of competitive inequality arising from differences in national capital requirements. Following comments on a consultative paper published in December 1987, a capital measurement system commonly referred to as the Basel Capital Accord was approved by the G10 Governors and released to banks in July 1988.

The 1988 Accord, which would later come to be referred to as Basel I, called for a minimum ratio of capital to risk-weighted assets of 8% to be implemented by the end of 1992. Ultimately, this

framework was introduced not only in member countries but also in virtually all countries with active international banks. In September 1993, the Committee issued a statement confirming that G10 countries' banks with material international banking business were meeting the minimum requirements set out in the Accord.

The Accord was always intended to evolve over the next decade. It was updated in various ways to address risks other than credit risk, which was the focus of the original 1988 Accord. Most notably, in January 1996, following two consultative processes, the Committee issued the Amendment to the Capital Accord to incorporate market risks (the Market Risk Amendment), to take effect at the end of 1997. This was designed to incorporate within the Accord a capital requirement for the market risks arising from banks' exposures to foreign exchange, traded debt securities, equities, commodities and options. An important aspect of the Market Risk Amendment was that banks were, for the first time, allowed to use internal models (value-at-risk models) as a basis for measuring their market risk capital requirements, subject to strict quantitative and qualitative standards.

Basel II: the new capital framework

In June 1999, the Committee issued a proposal for a new capital adequacy framework to replace the 1988 Accord. This led to the release of a revised capital framework in June 2004, which was amended and reissued in a consolidated form in June 2006. Generally known as "Basel II", the revised framework comprised three pillars:

- Pillar 1: A set of minimum capital requirements covering credit risk, market risk and operational risk. Under Basel II, banks were allowed, subject to supervisory approval to calculate these capital requirements using their own internal models.
- Pillar 2: This is the supervisory review of banks' risks and capital adequacy, designed to be broader in scope than the risks captured in Pillar 1.
- Pillar 3: This is a set of disclosure requirements designed to strengthen market discipline and encourage sound banking practices.

The new framework was designed to improve the way regulatory capital requirements reflect underlying risks and to better address the financial innovation that had occurred in recent years. The changes also aimed at rewarding and encouraging continued improvements in risk measurement and control.

Basel III: responding to the 2007-09 financial crisis

Even before Lehman Brothers collapsed in September 2008, the need for a fundamental strengthening of the Basel II framework had become apparent. The banking sector entered the financial crisis with too much leverage and inadequate liquidity buffers. These weaknesses were accompanied by poor governance and risk management, as well as inappropriate incentive structures. The dangerous combination of these factors was demonstrated by the mispricing of credit and liquidity risks, and excess credit growth.

Responding to these risk factors, the Basel Committee issued Principles for sound liquidity risk management and supervision in the same month that Lehman Brothers failed. In July 2009, the Committee issued a further package of documents to strengthen the Basel II capital framework, notably with regard to the treatment of certain complex securitisation positions, off-balance sheet

vehicles and trading book exposures. These enhancements were part of a broader effort to strengthen the regulation and supervision of internationally active banks, in the light of weaknesses revealed by the financial market crisis.

But these enhancements were quick fixes to address clear shortcomings with the Basel II framework that had been exposed by the financial crisis. The Basel Committee and its oversight body, the Group of Governors and Heads of Supervision (GHOS), realised that a more fundamental update was needed. And so, in December 2010, the Committee published the first phase of Basel III, to be phased-in between 2013 and 2019. This first phase of Basel III revised and strengthened the three pillars established by Basel II, and extended the framework by introducing:

- stricter requirements for the quality and quantity of regulatory capital, in particular reinforcing the central role of common equity
- an additional layer of common equity - the capital conservation buffer - that, when breached, restricts payouts to help meet the minimum common equity requirement
- a countercyclical capital buffer, which places restrictions on participation by banks in system-wide credit booms with the aim of reducing their losses in credit busts
- a leverage ratio - a minimum amount of loss-absorbing capital relative to all of a bank's assets and off-balance sheet exposures regardless of risk weighting
- liquidity requirements - a minimum liquidity ratio, the Liquidity Coverage Ratio (LCR), intended to provide enough cash to cover funding needs over a 30-day period of stress; and a longer-term ratio, the Net Stable Funding Ratio (NSFR), intended to address maturity mismatches over the entire balance sheet
- additional requirements for systemically important banks, including additional loss absorbency and strengthened arrangements for cross-border supervision and resolution

From 2011, the Committee turned its attention to improvements in the calculation of capital requirements. The risk-based capital requirements set out in the Basel II framework were expanded to cover:

- in 2012, capital requirements for banks' exposures to central counterparties (initially an interim approach, subsequently revised in 2014)
- in 2013, margin requirements for non-centrally cleared derivatives and capital requirements for banks' investments in the equity of funds
- in 2014, a standardised approach for measuring counterparty credit risk exposures, improving the previous methodologies for assessing the counterparty credit risk associated with derivatives transactions
- in 2014, a more robust framework for calculating capital requirements for securitisations, as well as the introduction of large exposure limits to constrain the maximum loss a bank could face in the event of a sudden failure of a counterparty
- in 2016, a revised market risk framework that followed a fundamental review of trading book capital requirements (updated again in 2019)
- a consolidated and enhanced framework for disclosure requirements to reflect the development of the Basel standards

The Committee completed its Basel III post-crisis reforms in 2017, with the publication of new standards for the calculation of capital requirements for credit risk, credit valuation adjustment risk and operational risk. The final reforms also include a revised leverage ratio, a leverage ratio buffer for global systemically important banks and an output floor, based on the revised standardised approaches, which limits the extent to which banks can use internal models to reduce risk-based capital requirements. These final reforms address shortcomings of the pre-crisis regulatory framework and provide a regulatory foundation for a resilient banking system that supports the real economy.

A key objective of the revisions was to reduce excessive variability of RWAs. At the peak of the global financial crisis, a wide range of stakeholders lost faith in banks' reported risk-weighted capital ratios. The Committee's own empirical analyses also highlighted a worrying degree of variability in banks' calculation of RWAs. The revisions to the regulatory framework seek to restore credibility in the calculation of RWAs by enhancing the robustness and risk sensitivity of the standardised approaches for credit risk and operational risk, constraining internally modelled approaches and complementing the risk-based framework with a revised leverage ratio and output floor.

D. Some lessons from crisis episodes

A fractional reserve banking system that relies on leverage and maturity mismatch is inherently prone to instability. To counteract such instability, a wide range of supporting structures are put in place, such as minimum standards for risk management, capital and liquidity regulations, depositor protection schemes, bank supervision and access to central bank funding. These supporting structures seek to maintain the benefits of asset transformation and credit creation that the fractional reserve system provides, while limiting the costs of instability. While effective, such supporting structures are not perfect and a zero-failure regime is neither the objective nor the outcome.

As I noted at the start, shocks to the banking system have been frequent over the past two decades. The most recent significant stress episode that was generated from within the banking system is the March 2023 banking turmoil. There has already been a lot published as to the causes and implications of that event, including the Basel Committee's own analysis of these events.[10]

So rather than focus on recent events, in this section I will draw some general lessons from crisis episodes over the past 20 years. The issues are divided into two broad categories: (i) the failure to identify or appropriately measure the problem; and (ii) the failure to act. The list of issues is by no means exhaustive, is very brief and somewhat subjective. Read through any post-mortem of bank failures and you will see these issues arise repeatedly.

[10] See for example: BCBS (2023. 2024b).

Failure to identify or appropriately measure the problem

There are many reasons why banks (and supervisors) may fail to identify or appropriately measure risks.

- ***Poor incentive structures*** are typically at the centre of failures to identify emerging risks. This typically involves remuneration practices that are linked to short-term growth or the volume of business that do not have appropriate regard for risk. And when things go bad, there is usually limited capacity to claw-back the remuneration paid to those who benefitted from the excessive risk-taking.
- Short memories and a belief that ***"this time is different"*** often also play a role (Reinhart and Rogoff, 2011). This problem typically follows a relatively long period of tranquillity which is incorrectly attributed to a belief that new technology (models or sophisticated risk management) has tamed the risks of the past. Invariably, there is some trigger that reveals the true magnitude of the accumulated risks, which then unravels and causes widespread financial and economic losses.
- ***Complex and opaque instruments, products and business models*** have repeatedly featured in bank failures. The GFC is a prime example where subprime mortgage risk was packaged up into complex instruments (through securitisations, collateralised debt obligations (CDOs), which were then repackaged into "CDOs squared") that were not well understood and gave a false sense of risk. When the model assumptions underlying the products (particularly around the correlation of defaults) were revealed to be false, large losses materialised and contagion spread through the financial system. Complexity of the products was overlooked and replaced by ***group think and a herd mentality***. Banks, market participants and supervisors missed the build-up of risk and relied too heavily on models that ultimately failed. Other examples include the failure of Long-Term Capital Management (LTCM) where complexity, opacity and the heavy use of derivatives masked the true risk of LTCM to its counterparties (see Jorion (2000) and Lowenstein (2000)).
- Related to the issue of complexity and opacity are situations where ***the build-up of risk concentrations and interconnections are not recognised or fully appreciated*** before it is too late. What seems like diversification on the surface, ends up being heavy concentration of banks' exposures to a common risk driver. The GFC again provides a good example, where what was sold as diversified exposure to US mortgage risk end up being highly concentrated exposure to subprime mortgages and excessive reliance on the risk assessments of credit rating agencies and credit enhancements provided by insurance companies. Similarly, the recent failure of US regional banks in 2023 highlighted the risk build up due to concentrated exposures to crypto and venture capital sectors (both on the asset and liability side of the balance sheet).
- ***Regulatory and supervisory weaknesses*** have also resulted in a failure to identify the build-up of risk. At the most basic level this often occurs because of inadequate data, risk metrics and analysis. And sometimes, stuff just gets missed. This applies to the examples noted above at a micro level but also the failure to identify the build-up of risk at the macro level. That is, there is often a failure to recognise the true build-up of leverage in the system due to a combination of excessive reliance on internal models and complex capital instruments that have failed to provide loss absorbing capacity when needed. More generally, failures of bank internal risk management to appropriately identify risks is

typically also related to failures of governance. And failures of bank governance are also typically attributed, at least partly, to failures of supervision to identify weaknesses.

Failure to act

While appropriately identifying a risk is critical, it does not necessarily mean that it will be appropriately addressed. From the supervisory side, perhaps the most significant weaknesses (at least recently) have been the failure to act rather than the failure to diagnose the problem. The general public rarely sees the result of effective supervisory interventions, either because of confidentiality reasons or because one never knows what would have been the outcome from the counterfactual (non-intervention). In financial stability, success is an orphan.

Bearing this in mind, there are at least three broad reasons why supervisors may fail to act.

- The ***regulatory cycle*** plays a significant role in the intrusiveness of regulation and supervision. It should not be a surprise that regulation is strengthened after banking failures. As I recounted earlier, the extensive revamp of the global bank regulatory framework occurred after the GFC and culminated in the extensive set of reforms known as Basel III. While memories of bank failures and their devastating social and economic effects are fresh in the minds of the public and politicians, regulators have a period of time to enact substantial reforms. Similarly, supervision is emboldened and is more likely to intervene rather that ***"wait-and-see"*** what happens. However, over time, as memories of banking crises fade, and public and political priorities switch to a greater focus on other objectives, bank lobbying becomes more effective, the pendulum swings back and regulation and supervision becomes more constrained. Where we are in the regulatory cycle clearly has an impact on the likelihood and forcefulness of supervisory intervention.
- A second reason for inaction is the lack of ***legal power to act***. The supervisory power to act, and to take actions independently based on supervisory judgement and analysis is a fundamental building block of effective supervisory intervention. The legal power to act, however, can vary substantially over time and vary across jurisdictions. In some cases, intervention will be based on whether a set of defined legal thresholds have been met and be subject to extensive legal challenge. This typically leads to less intervention. In other cases, intervention is more discretionary, judgemental and part of a process of back and forth between a bank and supervisor. In such cases, escalations to the courts are likely to be less frequent and supervisory interventions more frequent.
- A third factor which drives supervisory inaction is a ***lack of willingness*** to act. This can arise due to many reasons such as: a supervisory culture that is excessively timid; lack of supervisory confidence in the underlying data and analysis which leads to a quest for better data and information which never materialises; and a lack of confidence that the supervisory institution will support intervention. In addition, there will always be cases characterised by a high degree of uncertainty where a judgement call is made, that with hindsight, turns out to be wrong.

E. Conclusions

I started by explaining why we regulate banks, outlined the basics of capital and liquidity regulations, gave a brief history of the development of the Basel Framework, and finally discussed at a very high level how things can go wrong. Bank regulation and supervision has evolved over time. It began with a natural focus on domestic risks to local legal entities. As banking became more international, regulation and supervision responded by widening its focus to take into account global risks to consolidated banking groups. But ultimately, individual jurisdictions need to implement local laws and take local actions. To be effective, the design and operation of these laws and actions must recognise the global nature of banking business, bank interconnections and the global transmission of risks. When it comes to bank regulation and supervision, we must be both global and local in nature.

Annex: Additional Tier 1 (AT1) capital instruments in the capital framework

The crisis surrounding Credit Suisse demonstrated that investors and markets did not fully internalise the various trigger events that could lead to loss participation of AT1 instruments, even though the Basel Framework contains explicit language on those trigger events and Pillar 3 disclosure requirements,[11] and despite contractual documentation clearly highlighting the corresponding risk factors of such instruments. In addition, the fact that CS continued to make expensive replacement issuances AT1 to avoid negative signalling effects and to pay a substantial amount of discretionary interest on these instruments (alongside dividend payments for common shares), despite the fact that it was reporting losses over several consecutive quarters, raises questions about the ability of such instruments to absorb losses on a going-concern basis.

While many jurisdictions issued supervisory guidance or restrictions related to the selling of AT1 instruments to retail investors, the recent turmoil suggests that even relatively sophisticated investors were still uncertain about how, at which point in time, and in which order their holdings would participate in losses in certain jurisdictions. This, in turn, may indicate either that investors are not prepared to accept the loss-absorbing hierarchy of such instruments (which can see them absorbing losses before common shareholders are wiped-out), or that the rules on AT1 instruments may be too complex and/or opaque so as to be appropriately reflected in AT1 market prices.

The diagram below provides an overview of the potential design features of AT1 instruments, as stipulated in the Basel Framework. The flexibility built into the Basel Framework has resulted in varying practices across jurisdictions, added to complexity and as noted above contributed to some confusion among investors.

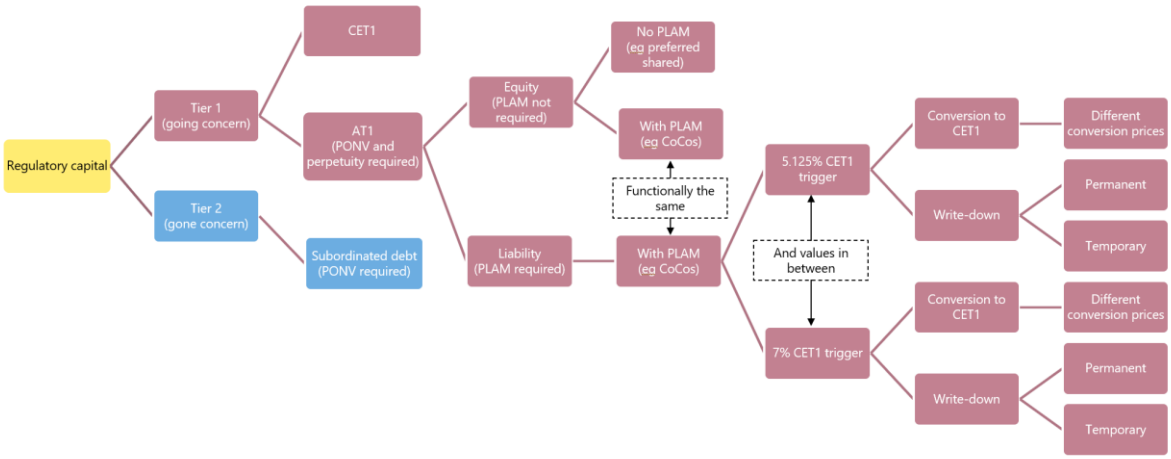
Following the diagram from left to right:

- AT1 is a form of hybrid capital that sits between CET1 and Tier 2 capital. Within the capital framework it is considered "going concern capital".
- AT1 capital must be contractually perpetual (though in practice the instruments are often "called" earlier – ie repaid to investors and re-issued). The instruments must also contain a clause known as the "point of non-viability" or PONV clause. This clause is triggered when a bank is judged to be non-viable. The PONV clause is also required for Tier 2 (gone concern capital).
- AT1 can be accounted for as equity or a liability. If it is accounted for as a liability then it must include a Principal Loss Absorption Mechanism (PLAM). If it is accounted for as equity then such a mechanism is not required (as is the case for preference shares in certain jurisdictions).
- Instruments with a PLAM are often called Contingent Convertible Debt Obligations (CoCo's).
- CoCos have a CET1 capital ratio trigger. In the Basel Framework the minimum value for this trigger is set at 5.125%. That means if a banks CET1 ratio hits this level, the instruments would automatically be converted into equity, either through being written-down or by

[11] Namely in CAP10.11(11) and (16)

being converted to common shares. But, the trigger can be set at higher levels and some jurisdictions have set it as high as 7% CET1.

- Where a CoCo has a writedown feature, the writedown can be permanent (AT1 holders losses are permanent) or temporary, subject to certain conditions.
- Where a CoCo converts to common shares when the trigger is hit, a conversion price is also stipulated (eg $X of AT1 converts to Y shares, where Y may vary depending on the share price at the time of conversion).



Source: Authors' elaboration.

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