1

Introduction

Banks play a vital role in economic development by providing credit to businesses and private households. Their lending and investment activities on the asset side are financed by debt or equity capital. Proportionally to the total assets, equity capital has experienced a major change since the nineteenth century. By 1850, for example, the balance sheets of banks in the United States consisted of about 40% equity capital. The figure dropped to 7% in 2000. Similar declines can be observed in countries such as Switzerland and the United Kingdom. Before and during the 2007/2008 financial crisis, some global banks held as little as 2–5% equity capital in their balance sheets.[1]

The decrease of equity capital in proportion to the total assets is a remarkable change in how banks have funded their activities since the emergence of modern banking in the nineteenth century. However, a high level of debt does not come as a surprise. A commercial bank's key function is granting loans and receiving deposits, and customer deposits are considered debt capital. Thus, funding a bank with 'other people's money' is in the very nature of banking. Nonetheless, a certain level of capital is essential for individual banks, and for the financial system as a whole. It serves as an absorber of losses and can affect a bank's default probability. Moreover, a sufficient amount of capital induces trust for creditors. Consequently, adequate capital is – among other factors – important for financial market stability.

Capital adequacy has become a widely discussed issue in the aftermath of the 2007/2008 financial crisis. The suggestions by academics, regulators, and politicians in response to the question of 'how much capital is enough?' have ranged from one-digit percentages to 100%. The variety of opinions is underlined by arguments that promote financial market stability on the one hand, and potential adverse economic effects via reduced credit supply on the

[1] See Chapter 6.

other. The latter claim is often based on the argument that equity capital is more expensive than debt capital. Prominent advocates of substantially higher capital requirements include Anat Admati and Martin Hellwig, Eugene Fama, and John Cochrane.[2] Moreover, many economists argue that capital requirements were too low before the 2007/2008 crisis, and that large international banks that defaulted would have survived the crisis with higher capital ratios.[3]

Inherent to the disagreement over capital adequacy are diverging opinions on the role and relevance of capital in banking. From a historical perspective, the assessment of capital/assets ratios is even more complex. Analysing capital/assets ratios without considering a broad set of factors – ranging from the economic, political, and regulatory environment to the risks of bank assets – is misleading. Additionally, the significance of these factors has changed over the past two centuries, resulting in evolving perceptions of what constitutes adequate capital.

Imagine a bank in 1880 primarily focusing on lending to a few railway and industrial companies in an environment without a deposit insurance scheme and a central bank as a 'lender of last resort'. The same bank in today's world, now with a well-diversified loan portfolio, deposits insured, and the ability to discount securities with the central bank in a crisis, might even have the same capital/assets ratio as in 1880. However, this bank's probability of surviving a crisis might differ greatly between 1880 and today. Similarly, a decline of the capital/assets ratio from 10% to 5% over 140 years does not necessarily reflect a more fragile financial system on an aggregated level, nor more risk appetite on the single bank level. It might simply result from different economic, political, and regulatory realities.

This book goes beyond displaying ratios over two centuries by addressing the significant shifts in the environment of banks. Firstly, it traces the role of capital at the beginning of commercial banking in the United States, the United Kingdom, and Switzerland during the late eighteenth and nineteenth centuries. Capital adequacy has been debated since the beginning of banking, and bankers often relied on rules of thumb and conventions when determining their bank's capital. Secondly, banks' contribution to the financing of World War II led to a balance sheet expansion in banking and fundamentally changed how capital adequacy was measured. This was

[2] Anat R. Admati and Martin Hellwig, *The Bankers' New Clothes: What's Wrong with Banking and What to Do about It* (Princeton: Princeton University Press, 2014); Marie-Astrid Langer and Michael Rasch, 'Interview with Eugene Fama – Banken brauchen mindestens 25 Prozent Eigenkapital', *Neue Zürcher Zeitung*, 9 November 2013; John H. Cochrane, 'The Grumpy Economist: Equity-Financed Banking', *The Grumpy Economist*, 2016: http://johnhcochrane.blogspot.com/2016/05/equity-financed-banking.html (accessed 22 February 2017).

[3] Charles A. E. Goodhart, 'Lessons for Monetary Policy from the Euro-Area Crisis', *Journal of Macroeconomics*, 39 (2014), 378–82; Andrew G. Haldane and Vasileios Madouros, 'The Dog and the Frisbee', *Speech Presented at the Federal Reserve Bank of Kansas City's Jackson Hole Economic Policy Symposium*, 2012.

the starting point for comparing capital to assets that were adjusted by the risk they posed. Thirdly, the banking crises of the 1930s, 1970s, and 1980s led to the introduction of statutory capital requirements, culminating in the uniform Basel I framework in 1988. Lastly, the 2007/2008 financial crisis and more recent banking instability emphasise that more regulation and higher capital requirements do not necessarily increase banking stability. Following the gradual evolution of the perception of capital over two centuries demonstrates that informal and formal capital requirements were continuously adapted. Regulatory frameworks, particularly the regulation of capital, are path dependent. Reforms that tried to eliminate the weaknesses of the existing banking regulation rather than a fundamental reassessment of regulation aimed at increased banking stability were the norm. With a historical narrative on the role and relevance of capital, this book contributes to the ongoing discussions about financial market stability, banking regulation, and capital requirements. While speaking to present-day debates, the book is rooted in historical context.

1.1 THE SCOPE OF THIS BOOK

This book focuses on the role of bank capital in the United States, the United Kingdom, and Switzerland during the nineteenth and twentieth centuries. The nineteenth century marked a period when many larger commercial banks were established to finance industrial companies, infrastructure, and trade. The main scope is the period leading up to the Basel Accord in 1988 (Basel I). The Basel Accord harmonised the definitions, measurement approaches, and requirements for bank capital on an international level. The book, therefore, follows three loose threads – the perception and role of capital in three countries – until they become one in the late 1980s. An epilogue covers the post-Basel experience from 1988 to the present.

This book does not constitute an in-depth analysis with a global perspective over two centuries. Instead, the research focuses on particular countries, events, periods, and banks. Emphasis is given to commercial banks, broadly defined as financial intermediaries with the primary functions of receiving capital in the form of deposits, granting loans, and investing money, as well as providing services to facilitate the settlement of financial obligations. In terms of legal forms, the focus is on joint-stock banks, as joint-stock banks require a share capital. However, joint-stock banks vary to a large degree in terms of their assets. Moreover, many large banks have developed from 'pure' borrowing and lending/investing activities in the nineteenth century to global universal banks in the twenty-first century, also providing investment banking, asset management, and private banking services. Pure investment (or merchant) banks, private banks, and other financial service providers are not considered in the book.

Geographically, the book covers the three relevant financial centres.[4] The United Kingdom[5] and the United States represent the major financial centres of the nineteenth and twentieth centuries. Switzerland, with its financial hubs in Geneva in Zurich, became an internationally important financial centre in the 1960s and was home to large commercial banks.[6]

The three countries differ in various dimensions: The United Kingdom and the United States are traditionally market-based financial systems, whereas the Swiss system is a typical example of a bank-based financial system.[7] Moreover, the countries differ regarding the regulation and supervision of banking and have different legal traditions (common law versus civil law). The United States certainly offers the richest bank regulation and supervision history among the three countries. A variety of regulatory and supervisory systems emerged during the period of early American banking (until 1837), the free banking era (1837 to 1863), and the national banking period (1863 to 1913). Additionally, the United States has a long history of measuring capital adequacy during the nineteenth century, as banknotes were often limited to a certain multiple of capital, which at the same time constitutes a capital requirement. However, a formal and legally binding minimum capital ratio on the federal level has existed only since the 1980s.

In the United Kingdom, approaches towards regulating banking were taken between the 1820s and the 1870s. From 1844 to 1857, the Joint Stock Bank Act of 1844 enacted a statutory capital requirement for banks. However, this proved to be a short and relatively unimportant intermezzo of banking regulation. Instead, the United Kingdom opted to regulate not banks but,

[4] For an overview of the hierarchy of international financial centres, see Youssef Cassis, 'International Financial Centres', in *The Oxford Handbook of Banking and Financial History*, ed. Youssef Cassis, Richard S. Grossman, and Catherine R. Schenk, Oxford Handbooks (Oxford: Oxford University Press, 2016); Youssef Cassis, *Capitals of Capital: A History of International Financial Centres 1780–2005* (Cambridge: Cambridge University Press, 2006).

[5] The United Kingdom, consisting today of England, Wales, Scotland, and Northern Ireland, was a space of banking markets with different characteristics that developed independently for most of the nineteenth century. Scottish joint-stock banks, for example, had a longer tradition than English joint-stock banks, as they were already allowed to establish before 1826. Moreover, the capital levels of Scottish banks were higher than that of English banks. Thus, the book distinguishes between English and British banks. When considering the nineteenth century, it usually specifically refers to English banks. Once the (English) Big Five banks become the dominant banks in the United Kingdom, the narrative switches to a broader geographical space. On the differences of Scottish and English banking, see Thomas Joplin, *An Essay on the General Principles and Present Practice of Banking in England and Scotland*, 2nd ed. (Newcastle upon Tyne: Printed and published by E. Walker, 1822), p. 30; James William Gilbart, *The Principles and Practice of Banking* (London: George Bell & Sons, 1873).

[6] Youssef Cassis, 'Introduction: The Weight of Finance in European Societies', in *Finance and Financiers in European History, 1880–1960*, ed. Youssef Cassis (Cambridge: Cambridge University Press, 1992), pp. 1–13 (p. 7).

[7] For an overview of bank-based versus market-based financial systems, see Franklin Allen and Douglas Gale, *Comparing Financial Systems* (Cambridge, MA: MIT Press, 2000).

more broadly, companies.[8] It was not until 1979 that the Banking Act introduced statutory banking regulation in the wake of Britain's secondary banking crisis.[9]

Switzerland's first attempts at banking regulation were taken on a regional (cantonal) level from the 1860s onwards. The Federal Banknote Act, introduced in 1883, stipulated minimum capital requirements for note-issuing banks. The Great Depression led to the introduction of the Federal Law on Banks and Savings Banks (Banking Act) in 1934, thereby establishing the first statutory capital requirements in Switzerland on the federal level.

The three countries also vary in their tradition of bank supervisory practice. In the British system, the Bank of England (BoE) supervised banks informally and without a legal mandate until 1979. In Switzerland, the banking legislation of 1934 established the Federal Banking Commission (FBC) as a banking supervisory agency, which later became the Financial Market Authority (FINMA). In the United States, state and federal bank supervisory agencies existed, depending on the period. The three most important federal bank supervisors are the Office of the Comptroller of the Currency (OCC, created 1863), the Board of Governors of the Federal Reserve (FED, 1913), and the Federal Deposit Insurance Corporation (FDIC, 1933).

In summary, these three countries offer three interestingly different cases: a system with a long tradition of supervising bank capital with several bank supervisors already in the nineteenth century (United States), a system based with a strong emphasis on informal supervision and statutory banking legislation only after 1979 (United Kingdom), and a system of statutory legislation with statutory capital requirements after 1934 (Switzerland).

The starting point of the research period varies, depending on the country. The first English joint-stock banks were established in the late 1820s, after the enactment of the Country Bankers Act in 1826. Before 1826, the Bubble Act of 1720 prohibited the formation of joint-stock companies without royal charters. This distinctive regulatory setting led to the emergence of hundreds of small partnership banks (private and country banks) during the second half of the eighteenth century.[10] The new joint-stock model became the dominant legal form of banks in England from the mid-nineteenth century onwards. Joint-stock banks grew in number, size, and geographic scope, reaching a peak of 110 individual banks in England in 1885.[11] A rapid consolidation known as the

[8] The shift towards corporate law instead of banking law was marked by the Company Acts in 1879, 1908, 1929, and 1967.

[9] For an overview of these regulatory developments, see Mark Billings and Forrest Capie, 'Transparency and Financial Reporting in Mid-20th Century British Banking', *Accounting Forum*, Financial accounting: Past, present and future, 33.1 (2009), 38–53.

[10] For an overview of the evolution of the UK bank population in the long run, see Ranald Cattanach Michie, *British Banking: Continuity and Change from 1694 to the Present* (Oxford: Oxford University Press, 2016), p. 31.

[11] Banks located in Wales are also included.

Amalgamations Movement followed, with the number of banks dropping to twenty-six by 1918. The concentration process led to the emergence of five large banks, the so-called 'Big Five': Barclays, Lloyds, Westminster, Midland, and National Provincial. Barclays and Lloyds still exist today. Parts of the former Big Five also transferred into HSBC and the NatWest Group.[12]

In Switzerland, economic development rather than a regulatory change triggered the establishment of joint-stock banks. Towards the end of the eighteenth century, the savings banks were the first to emerge alongside the existing private banks. It was only in the 1850s that the first large joint-stock banks were established after the model of the French Crédit Mobilier to finance infrastructure, trade, and industry. Besides providing loans for larger projects and financing firms as the 'steam engines of credit',[13] joint-stock banks were also active in the underwriting business.[14] This group of banks became known as the 'big banks'. By 1918, Switzerland counted eight large joint-stock banks.[15] Severe losses in the Great Depression reduced the number of big banks to five. The 1990s was another period of rapid market consolidation in Swiss banking, leaving only UBS and Credit Suisse. In 2023, UBS took over Credit Suisse.

The banking market's structure in the United States fundamentally differed from the United Kingdom and Switzerland. The US system was marked by a decentral organisation, different regulatory levels (state versus federal) and a large number of small banks. Throughout the free banking period (1837 to 1863), regulation and supervision were left to the individual states, and banks could obtain a charter and enter the market freely if they could raise a certain amount of capital. By 1860, about 1,600 state banks existed, and almost every bank issued banknotes.[16] From 1863, banks could charter as national banks,

[12] Barclays was incorporated in 1896 as Barclay and Company, Limited and was previously a private bank. Lloyds was incorporated in 1865 as Lloyds and Company. Westminster was established in 1834 as London and Westminster Bank. It merged in 1909 with the London and County Bank and 1918 with Parr's Bank. National Provincial was established in 1833 as National Provincial Bank of England and merged in 1968 with Westminster to become NatWest. NatWest was integrated into the Royal Bank of Scotland in 2000 and renamed as the NatWest Group in 2020. Midland was established 1836 and was acquired in 1992 by HSBC.

[13] Handels- und Gewerbe-Zeitung, 'Die grossen Unternehmungen der Westschweiz', *Handels- und Gewerbe-Zeitung* (Zurich, 26 April 1856), pp. 189–90 (p. 190).

[14] See, for example, Albert Linder, *Die schweizerischen Grossbanken*, Beiträge zur schweizerischen Wirtschaftskunde (Bern: Stämpfli & Cie, 1927); and Adolf Jöhr, *Die schweizerischen Grossbanken und Privatbankiers* (Zurich: Polygraphischer Verlag, 1940), pp. 13ff.

[15] Schweizerischer Bankverein SBV, Basel; Schweizerische Kreditanstalt SKA, Zurich; Schweizerische Volksbank SVB, Bern; Bank Leu, Zurich: Eidgenössische Bank, Zurich; Schweizerische Bankgesellschaft SBG, Winterthur; Basler Handelsbank, Basel; Comptoir d'Escompte de Genève CEG, Genf.

[16] Howard Bodenhorn, 'State Banks – Number, Assets, and Liabilities: 1834–1896, Table Cj149-157', in *Historical Statistics of the United States, Earliest Times to the Present*, ed. Susan B. Carter, Scott Sigmund Gartner, Michael R. Haines, et al. (New York: Cambridge University Press, 2006): http://dx.doi.org/10.1017/ISBN-9780511132971.

creating a dual-banking system. The number of banks reached about 10,000 by the late 1890s and peaked at around 20,000 in the early 1920s.[17]

The roots of the large commercial banks in the United States reach back to the eighteenth and nineteenth centuries. The first commercial banks were founded in the 1780s. The Bank of North America was created in 1781, the Bank of Massachusetts and Alexander Hamilton's Bank of New York in 1784. The Bank of New York is the oldest among the old New York City–based banks. Other important banks from New York City include the City Bank of New York (1812, now BNY Mellon) and Chase National Bank (1877, now JP Morgan). Especially the latter merged with some of the largest New York banks during the twentieth century, among them the Manhattan Company (established 1799), the Chemical Bank (1823), Hanover Bank (1873), and Manufacturers Trust (1905).[18] JP Morgan Chase and Citigroup are still among the four largest banks in the United States. The other two 'Big Four' banks currently are Bank of America and Wells Fargo.[19]

This book uses bank-level data from major banks in the United States, the United Kingdom, and Switzerland, as well as data on nationally aggregated levels provided by bank supervising agencies, national statistical offices, and central banks. Banks' balance sheet data was obtained from printed sources such as historical and academic publications, newspapers, magazines, and banks' annual reports.

The existing literature in fields which most typically deal with banks' capital structure, such as corporate finance, does usually not address the historical evolution of capital ratios.[20] Other strands of literature, such as that on

[17] *Historical Statistics of the United States. Colonial Times to 1970*, ed. United States Bureau of the Census, 1975, Series X580.

[18] The Bank of New York merged in 2007 with the Mellon Financial Corporation to become BNY Mellon. City Bank merged in 1955 with the First National Bank. It was formally renamed Citibank in the 1970s and became Citigroup in 1998. Chase National Bank merged with the Manhattan Company in 1955, with the Chemical Bank (founded in 1823) in 1996, and with JP Morgan in 2000 to become JP Morgan Chase. The Hanover Bank merged with the Manufacturers Trust Company in 1961 and Chemical Bank in 1991.

[19] Federal Deposit Insurance Corporation, 'BankFind Suite: Find Institution Financial & Regulatory Data': https://banks.data.fdic.gov/bankfind-suite/financialreporting (accessed 11 April 2022).

[20] Two exceptions with long-run empirical analyses are Allen N. Berger, Richard J. Herring, and Giorgio P. Szegö, 'The Role of Capital in Financial Institutions', *Journal of Banking & Finance*, 19.3 (1995), 393–430; and Anthony Saunders and Berry Wilson, 'The Impact of Consolidation and Safety-Net Support on Canadian, US and UK Banks: 1893–1992', *Journal of Banking & Finance*, 23.2 (1999), 537–71. Key theories on capital structures include the seminal paper by Modigliani and Miller (Franco Modigliani and Merton H. Miller, 'The Cost of Capital, Corporation Finance and the Theory of Investment', *The American Economic Review*, 1958, 261–97), the trade-off theory (Franco Modigliani and Merton H. Miller, 'Corporate Income Taxes and the Cost of Capital: A Correction', *The American Economic Review*, 1963, 433–43; Merton H. Miller, 'Debt and Taxes', *The Journal of Finance*, 1977, 261–75; Alan Kraus and Robert H. Litzenberger, 'A State-Preference Model of Optimal Financial Leverage', *The Journal*

banking crises, financialisation, or discussions of regulation and financial market stability, frequently refer to the relative decline of capital over time but often fail to elaborate on the historical context in which these changes occurred.[21] Within the discipline of financial history, a few contributions provide a more thorough analysis of bank capital. Grossman provides data for twelve countries from 1834 to 1939.[22] Moreover, the author discusses capital and capital regulation in his book on the history of banking in the industrialised world.[23] Jordà, Richter, Schularick, and Taylor provide the broadest dataset on capital/assets ratios, covering seventeen advanced economies from 1870 to 2015.[24] Billings and Capie published the most detailed analysis of bank capital, focusing on British banks from 1920 to 1970.[25] For Switzerland, Amrein discusses the evolution of capital ratios from 1874 to 2014.[26] A broader set of financial history publications cover the topic of capital in banking indirectly. Such publications are often concerned with banking and financial stability, banking regulation, or the role of banks within the economy. Turner, for example, discusses crises and stability in British banking, and also covers the role of capital. Similarly, Bordo, Redish,

of Finance, 28.4 (1973), 911–22), the pecking order theory (Stewart C. Myers and Nicholas S. Majluf, 'Corporate Financing and Investment Decisions When Firms Have Information That Investors Do Not Have', *Journal of Financial Economics*, 13.2 (1984), 187–221), the signalling theory (Stephen A. Ross, 'The Determination of Financial Structure: The Incentive-Signalling Approach', *The Bell Journal of Economics*, 8.1 (1977), 23–40 (p. 23)), and the market timing theory (Deborah J. Lucas and Robert L. McDonald, 'Equity Issues and Stock Price Dynamics', *The Journal of Finance*, 45.4 (1990), 1019–43; Robert A. Korajczyk, Deborah J. Lucas, and Robert L. McDonald, 'Equity Issues with Time-Varying Asymmetric Information', *The Journal of Financial and Quantitative Analysis*, 27.3 (1992), 397–417).

[21] See, for example, Admati and Hellwig, *The Bankers' New Clothes*.

[22] Richard S. Grossman, 'Other People's Money: The Evolution of Bank Capital in the Industrialized World', in *The New Comparative Economic History: Essays in Honor of Jeffrey G. Williamson*, ed. Jeffrey G. Williamson, T. J. Hatton, Kevin H. O'Rourke, and Alan M. Taylor (Cambridge, MA: MIT Press, 2007). See also Richard S. Grossman, *Unsettled Account: The Evolution of Banking in the Industrialized World since 1800*, Princeton Economic History of the Western World (Princeton NJ: Princeton University Press, 2010), pp. 145ff. The analysed countries are Australia, Belgium, Canada, Denmark, Finland, Germany, Italy, Japan, Norway, Sweden, the United Kingdom, and the United States.

[23] Grossman, *Unsettled Account*.

[24] Òscar Jordà, Björn Richter, Moritz H. P. Schularick, and Alan M. Taylor, 'Bank Capital before and after Financial Crises', in *Leveraged the New Economics of Debt and Financial Fragility*, ed. Moritz Schularick (Chicago: The University of Chicago Press, 2022), pp. 116–33.

[25] Mark Billings and Forrest Capie, 'Capital in British Banking, 1920–1970', *Business History*, 49.2 (2007), 139–62. See also Forrest Capie and Mark Billings, 'Profitability in English Banking in the Twentieth Century', *European Review of Economic History*, 5.3 (2001), 367–401, for a discussion of profitability in English banking.

[26] Simon Amrein, 'Eigenmittel der Schweizer Banken im historischen Kontext', in *Krisenfeste Schweizer Banken? Die Regulierung von Eigenmitteln, Liquidität und 'Too big to fail'*, ed. Armin Jans, Christoph Lengwiler, and Marco Passardi (Zurich: NZZ Libro, 2018), pp. 87–116.

and Rockoff compare the financial stability of Canada and the United States, discussing capital too.[27]

However, bank capital and its relevance in a historical context seldom take centre stage. Moreover, most publications refer to the same time series covering capital/assets ratios on a nationally aggregated level. These time series are often obtained from different sources and then assembled. Additionally, key aggregates, such as capital, total assets, or even banks as entities, are often defined differently from one country to another.

1.2 THE ROLE AND RELEVANCE OF CAPITAL IN BANKING

Capital in banking is a source of trust. Since the emergence of commercial banks in the nineteenth century, two roles are usually attributed to bank capital. The first is the loss absorbency function. This function relates directly to paid-up share capital and reserves, which should cover a bank's unexpected losses.[28] The second function of capital is the guarantee function. A high level of equity capital in a bank induces trust for creditors. Without trust, creditors (i.e. depositors) withdraw their funds. In the most extreme case, a bank run leads to immediate illiquidity. A high level of capital can increase the trust of stakeholders in a bank. However, various other elements can also provide trust for creditors, or even replace capital entirely in its role as a facilitator of trust.

The elemental form for providing trust in banking are guarantees. A guarantee for a bank confirms that liabilities are secured by a substantial degree in case of losses. Historically, three entities often provided such guarantees and thus induced trust in banking: the state through regulation (i.e. capital requirements, safety nets, explicit or implicit guarantees by governments), the shareholders (i.e. by the extent of their liability), and the bank itself (i.e. by choosing the degree of risk of its business model and its capital policy). One may even argue that paid-up capital is entirely unnecessary in the presence of trust-inducing guarantees and reserves for unexpected losses. In fact, history provides many cases of banks without share capital. Thus, a simple numerical leverage ratio cannot answer the ubiquitous question of how much capital is adequate in banking. It depends on the factors facilitating the trust and loss absorbency functions of capital. Moreover, there is not one optimal set of distribution of the guarantee function among the government, shareholders, and a bank's management that makes a banking market less prone to bankruptcy. This book aims to outline the various environments in which banks operated throughout the last two centuries – and the relevance of capital over time.

[27] Michael D. Bordo, Angela Redish, and Hugh Rockoff, 'Why Didn't Canada Have a Banking Crisis in 2008 (or in 1930, or 1907, or . . .)?', *The Economic History Review*, 68.1 (2015), 218–43 (pp. 238–9).

[28] Unexpected, because provisions are made for expected losses.

Bank balance sheets are unlike the balance sheets of any other company. A specificity of commercial banks is that a substantial part of their funding is usually collected from depositors. Firms in the non-financial sector often depend to a more significant degree on funding from banks and investors. Even among banks themselves, balance sheet structures vary substantially, depending on their business model. For example, the type of credit and its duration varies from bank to bank. Whereas the joint-stock banks in the United Kingdom and the United States focused more on short-term investing, their counterparts in Switzerland engaged in long-term investments at an early stage. Thus, understanding the structure of a balance sheet is crucial for recognising the risks involved in banking and the role of capital. Moreover, measuring capital requires a consistent definition of capital and balance sheet items such as deposits or total assets. Such definitions are even more important in a historical context. Current accounting and regulatory views on capital shape our relatively uniform understanding of capital. In the past, however, the definition of capital varied.

1.2.1 Defining Capital

Figure 1.1 shows a simplified commercial bank balance sheet. The asset side summarises a company's investments, whereas the liability side shows how it finances its operations. In this simple accounting view, equity capital consists of three elements: shareholders' capital, reserves, and retained earnings. Companies can raise shareholders' capital by issuing shares. Equity capital refers to the book value of equity capital. The nominal (book) value and the market value of equity capital can deviate substantially, depending on investors' expectations.

The (disclosed) reserves stem from two sources: Banks can attribute a part of the annual profit to the reserves. Moreover, banks often issue shares at a price above the nominal value of the share. The share premium (agio) is allocated to the reserves. Reserves can also be released – for example, to absorb losses.

Assets	Liabilities
Cash	Due to banks
Money market, bills of exchange, drafts	Due to customers, cheques
Due from banks	Bonds
Due from customers	Bills of exchange
Mortgages	General provisions
Financial investments	Other debt
Tangible assets	
Other assets	*Equity capital*
	• *Share capital*
	• *Reserves*
	• *Retained earnings*
Total assets	**Total liabilities**

FIGURE 1.1 Simplified balance sheet of a bank

Finally, the retained earnings consist of the profit remaining after reserves are allocated and dividends are distributed to shareholders.

Two types of capital were common historically but not visible in a bank's public balance sheet: undisclosed (hidden) reserves and unlimited or extended shareholder liabilities. Hidden reserves constitute an issue when measuring capital based on public balance sheet data, as the actual capital might exceed the disclosed amount of capital. A second form of capital is shareholder liabilities. The potential loss of a shareholder is (nowadays) limited to the initial investment. However, shareholders are subject to potential losses above their investment in a system of extended or even unlimited liability. All three countries – the United Kingdom, the United States, and Switzerland – provide examples of extended or unlimited shareholder liabilities in the past.

Historically, the understanding of what capital is varied across time and geography. A crucial step towards a uniform understanding of capital in banking was the Basel Accord of 1988. In 1988, the Basel Committee on Banking Supervision (BCBS) at the Bank of International Settlement (BIS) published a framework for measuring capital adequacy. The framework – known as Basel I – became a global standard, and its guidelines were translated into many national banking regulations.

The most evident example of varying national traditions in capital definitions is mezzanine capital, such as subordinated debt or preferred equity. Such hybrid forms of capital represent claims on the asset side that are senior to common share capital. Historically, subordinated debt became a crucial funding source in the second half of the twentieth century. In the United Kingdom, subordinated debt was used almost interchangeably with share capital and reserves until the 1980s. The BoE did not even differentiate the different capital forms in its official statistics and classified subordinated debt (called 'loan stock') as a part of equity capital. Swiss banks could use subordinated debt for regulatory purposes as part of the required capital after 1981. In the United States, some federal bank supervisory agencies have also allowed banks to use subordinated debt for capital requirements since the 1960s.

Another example of varying capital definitions were general provisions (or general loan-/loss reserves). A bank creates provisions if it expects a loss. In contrast to general reserves, general provisions are created for a specific, anticipated future loss. It is the expectation of using the provision which characterises it as debt rather than equity capital.

The BCBS responded to the heterogeneity in capital definitions by defining two capital tiers. Tier 1 consisted of share capital and disclosed reserves. Other forms of capital, such as hidden reserves, revaluation reserves, general provisions, and hybrid forms of capital, were assigned to the supplementary Tier 2 capital.[29] Since 1988, the definitions of capital have been further

[29] Basel Committee on Banking Supervision, *International Convergence of Capital Measurement and Capital Standards (Basel I)*, 1988, pp. 5–6.

broadened, incorporating new types of capital instruments. The main categories used under the latest Basel framework (Basel III) are Common Equity Tier 1, Additional Tier 1, and Tier 2 Capital.[30]

1.2.2 Assets, Liabilities, and the Risk of Insolvency and Illiquidity

Banks allocate their funds to various investments on the asset side, the safest being simple cash holdings. Cash is stable in value in the absence of inflation and is also liquid. If the share of cash increases, a bank's overall risk does not increase. This level of safety, however, comes with a price, as cash does not yield any interest. Other assets in a bank's balance sheet may be government or corporate bonds, stocks from companies, or lending to other banks. Their characteristics differ widely: some are easy to sell even in crises (hence very liquid); others are not. Some assets are subject to substantial price fluctuations; others are relatively stable. In other words, they pose different risks, which are rewarded with a risk-adjusted return if markets are efficient.

On the liability side, commercial banks finance themselves via deposits from customers, loans from other banks or central banks, or bonds. These balance sheet items on the liabilities side are considered debt capital. The difference between total assets and debt capital is considered equity capital.

A particular type of bank is a note-issuing bank. Its currency in circulation is a liability. In systems with a note-issuing monopoly, the central bank is the only bank with such liability. However, in systems with several or numerous note-issuing banks in the past, banknotes often constituted a substantial share of these banks' liabilities, in some cases proportionally more relevant than deposits.

The different maturities of assets and liabilities pose various risks that can lead to illiquidity or insolvency. Illiquidity describes what happens when depositors or other short-term creditors call in their funds immediately and the bank cannot sell off assets in due time to cover these withdrawals. Managing such a maturity mismatch of assets and liabilities results from a bank's basic economic function as a financial intermediary, accepting deposits and providing loans. Even the mere threat of possible illiquidity might trigger bank customers to demand their deposits in cash. Thus, customers are incentivised to be first in line in such a case.[31] Therefore, even stable banks can face bank runs triggered by a ripple of fear caused by neighbouring banks falling into trouble.

A bank is insolvent if the total assets are equal to or smaller than the liabilities. Losses – for example, on loans – diminish a bank's equity capital.

[30] Common Equity Tier 1 consists of common shares, share premia, retained earnings, and disclosed reserves. Additional Tier 1 consists, for example, of contingent convertible bonds (CoCo bonds). Tier 2 Capital consists, for example, of subordinated debt. For detailed definitions, see Basel Committee on Banking Supervision, *Basel III: A Global Regulatory Framework for More Resilient Banks and Banking Systems*, 2010.

[31] Douglas W. Diamond and Philip H. Dybvig, 'Bank Runs, Deposit Insurance, and Liquidity', *Journal of Political Economy*, 91.3 (1983), 401–19.

However, disentangling insolvency and illiquidity in a crisis is often difficult. Illiquidity occurs when creditors question solvency. Furthermore, once creditors initiate a bank run, it further weakens a bank's capital base if it is forced to sell assets below market prices, thus realising losses. A distinction between liquidity and solvency is often made through the use of different time horizons: a bank is liquid if it can settle debts by a fixed due date and solvent if it can settle debts in due course.[32] Therefore, solvency and liquidity are crucial for a bank's stability.

1.2.3 Measuring Capital Adequacy: A Brief Historical Overview

Assessing the size of capital in absolute terms provides little information as it neglects the size or risk of a bank. Therefore, comparisons with balance sheet items are necessary. Historically, bank capital was often compared with five aggregates: banknotes, deposits, total liabilities, total assets, and risk-weighted assets. Dividing the capital by these aggregates leads to five capital ratios, which provide the basis for discussing capital adequacy.[33] The capital ratios increase if the equity capital grows and total assets, risk-weighted assets, deposits, or liabilities are held constant. The book uses the capital/assets ratio as the primary ratio to assess capital adequacy, as it is unaffected by changing balance sheet structures and asset risk over time.

One of the first capital ratios used in banking was the one comparing banknotes with capital for note-issuing banks. The roots of such ratios can be traced back to old note-issuing banks in Europe, such as the BoE, and were frequently used among note-issuing banks in the United States from the late eighteenth century. Among commercial banks in the United Kingdom and Switzerland that did not issue banknotes, the capital/deposits ratio was the standard measure. Early references to the capital/deposits ratio can be found in James William Gilbart's *A Practical Treatise on Banking* (1827). In the United States, capital/deposits ratios became more popular towards the end of the nineteenth century once deposits replaced banknotes as the primary liability of banks.

Broader ratios comparing capital with total liabilities or total assets have become more popular with the increasing heterogeneity of bank balance sheets. By the 1930s, it was evident that the extent of capital should reflect a bank's risk on the asset side, but actual methodologies to implement it were missing. An example of a first crude approach with two different asset classes and varying capital requirements is provided by the Swiss banking legislation of 1934.

[32] Jack Revell, *Solvency and Regulation of Banks: Theoretical and Practical Implications*, Bangor Occasional Papers in Economics (Bangor: University of Wales Press, 1975), pp. 12–17.

[33] The terms 'solvency' and 'capital adequacy' were and still are often used. In the 1950s and 1960s, 'solvency' was more commonly used in the United Kingdom, whereas 'capital adequacy' was the usual term in the United States. Revell, *Solvency and Regulation of Banks*, p. 12.

However, the accelerator towards more sophisticated capital requirements was the Second World War: rising government debt levels guided bank supervising agencies in the United States into the future of capital adequacy. War-related financing initiated a rapid expansion of deposits and total assets among banks in many countries. Federal bank supervisors in the United States realised that banks had started to fail to meet the informal capital requirements. Careful not to weaken the crucial role of banks in government financing, bank supervisors resorted to a new capital adequacy ratio. The capital/risk-assets ratio deducted cash and government securities from total assets, as bank supervisors argued that such investments posed no risk. This was the initial step towards a risk-adjusted view when measuring capital. More sophisticated risk-weighting methodologies followed this first crude approach. The Board of Governors of the Federal Reserve in the United States developed what was probably the most advanced and earliest methodology in the pre-Basel I-era: its 'ABC formula' of the 1950s. By the 1980s, various other countries also used risk-based capital requirements; among them were major countries such as France (from 1979), Switzerland, the United Kingdom (1980), and Germany (1985).[34] The Basel Accord of 1988 (Basel I) harmonised the varying approaches towards risk-adjusted capital measurements internationally.

The Basel II requirements of 2004 refined the risk-weighted approach and addressed the various deficiencies of Basel I.[35] One of the most severe changes was probably that proprietary risk-weighting models were also allowed. This gave large banks leeway in assessing the risks and, depending on those, the size of their capital buffers. In the area of credit risk, for example, banks could also use the so-called 'internal rating-based approach'.[36] Finally, the Basel III requirement in 2010 also introduced a non-risk-weighted measure: the leverage ratio.[37]

1.3 BOOK OUTLINE

Chapter 2 describes the evolution of capital/assets ratios in Germany, the United States, the United Kingdom, and Switzerland from the nineteenth century to the present. The capital/assets ratio is chosen to outline the increased leverage in the banking systems over time. A closer analysis of capital ratios in the United States, the United Kingdom, and Switzerland shows that these ratios must be

[34] In 1985, seven out of the nine European countries that were members of the Basel committee had already adopted risk-weighted approaches. Daniel K. Tarullo, *Banking on Basel: The Future of International Financial Regulation* (Washington, DC: Peterson Institute for International Economics, 2008), p. 41.

[35] Basel Committee on Banking Supervision, *Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework*, 2004.

[36] Basel Committee on Banking Supervision, *Basel II*, pp. 48–112.

[37] Basel Committee on Banking Supervision, *Basel III Leverage Ratio Framework and Disclosure Requirements*, 2014.

assessed carefully, and comparisons across countries are difficult in specific periods. Firstly, the capital/assets ratios used by the academic literature usually consider paid-up capital and disclosed reserves only. However, the total liability of shareholders can go beyond the paid-up capital. For certain periods or types of banks, there was even an unlimited liability of shareholders, which influenced the level of capital/assets ratios. Secondly, accounting standards allowed the extensive build-up of hidden reserves in the United Kingdom and Switzerland. The chapter shows that the capital strength of banks, considering hidden reserves and shareholder liabilities, is often underestimated by published figures. Thirdly, the underlying definitions used to construct time series data have varied, sometimes even with regards to the financial institutions that were considered as banks and thus were included in such statistics – or not. The academic literature comparing capital/assets ratios on an international level often neglects such issues. Thus, a historical narrative discussing the long-run evolution of capital in banking is crucial. Additionally, the chapter analyses structural changes in the assets of British, Swiss, and US banks using the Basel I framework of 1988 for a historical simulation.

The remaining chapters are arranged chronologically. Chapter 3 deals with the emergence of commercial banking in the United Kingdom, the United States, and Switzerland for the period leading up to the First World War. The First World War marks a fundamental change in the financial system, ending the first wave of globalisation and the classical gold standard. The chapter emphasises the role of the early banking literature in shaping the ideas of what adequate capital meant in numbers. Moreover, the chapter looks at individual banks in all three countries and how they determined the size of their capital. In Switzerland, simple rules of thumb such as the 1:3 capital/deposits ratio were surprisingly persistent, while the English banks – holding much shorter maturities on their asset side – abandoned such strict guidelines from very early on. In the United States, capital ratios were considered from the very beginning of banking. The chapter argues that the decentral or central organisation of the banknote issuance was an important determinant for the relevance of capital in the respective countries.

Chapter 4 focuses on the period of the two World Wars. Both wars led to substantial declines in capital/assets ratios in the United Kingdom, the United States, and Switzerland. The chapter shows that three drivers had a severe impact on the capitalisation of banks. Banks held high shares of the total government debt, which led to an expansion of balance sheets. At the same time, high inflation ratios devalued the paid-up capital of banks. Moreover, formal and informal constraints restricted banks from issuing capital in wartime.

The Second World War, in particular, had long-lasting effects on the evolution of banks and their capital. The United Kingdom had already entered a period of cheap money during the 1930s, and the control of capital issuances after 1939 reinforced the financial repression of the banks. The BoE

conducted the country's monetary policy with the aim of securing demand for government debt. In this role, the BoE was an informal supervisor controlling the banks through liquidity ratios. As the research shows, British banks wanted to increase their capital during and after the Second World War but were prevented from doing so by the BoE.

The Swiss banks operated in a regulated but much more liberal framework. The 1930s led to the emergence of a formal supervisor and banking legislation, but (compared to their British counterparts) banks had substantially more leeway in making their own decisions. There was no widespread recapitalisation after the Second World War, as was the case after 1918. On the one hand, the big banks were still restructuring themselves due to the Great Depression – a process that had come to a halt due to the war. On the other hand, there was also a genuine feeling that the business models of banks would no longer require that much capital.

The belief in informal guidelines was much more pronounced in the United States than in the other two countries. By the mid-1930s, the United States already had three federal bank supervisory agencies – the OCC, the FED, and the FDIC – which all had developed opinions on how capital adequacy was assessed. At the core was a capital/deposits ratio of 10%. However, the rapidly growing government debt in banks' balance sheets overturned this convention, leading to the first risk-adjusted measurements for capital and triggering the development of new measurement approaches that became the forerunner of the Basel I guidelines.

Chapter 5 analyses the relationship of crises and regulation after the Second World War in the case of the United States and the United Kingdom, and after 1934 in Switzerland. The post–World War Two period is marked by high growth, the globalisation of banking, and a trend towards a harmonised framework for banking regulation. The Basel Accord in 1988 resulted from a gradual evolution towards risk-weighted assets models. However, the path towards Basel I was different in all three countries. When minimum capital ratios were introduced in Switzerland in 1935, most banks were indifferent, either because their capital surpassed the minimum requirements or because, having just found themselves in the middle of a crisis, they lacked bargaining power. This indifference changed towards the end of the 1950s. With the balance sheets of Swiss banks rapidly expanding, the regulation of capital through capital ratios suddenly became a bottleneck for growth. The regulatory framework was developed collaboratively, and the capital requirements were relaxed. Swiss banking could not have grown to such an extent without these changes.

The United Kingdom lacked the experience of a solvency crisis during the 1930s, resulting in the capital in banking becoming an almost irrelevant topic. It took until the secondary banking crisis in 1973/1974 for banks' regulation and supervision to finally be reconsidered.

The United States did experience a deep banking crisis in the 1930s but introduced statutory capital requirements only in the 1980s, following increased domestic banking instability and the threat of potentially high losses from the Latin American debt crisis. In contrast to Switzerland, the various US banking supervisors first had to go through a process of internal harmonisation of banking supervision and regulation from the 1970s.

As the chapter shows, there were also commonalities among the three countries in the pre-Basel period. All countries developed risk-based capital adequacy frameworks. Banks in all three countries grew rapidly, and in some cases, capital ratios limited the growth of banks. Moreover, banks actively participated in shaping their regulatory environment, albeit to different degrees within the three countries.

Chapter 6 provides an epilogue covering the development from Basel I to Basel III and reflections on the evolution of capital regulation in the long run. Both capital requirements between the 1990s and 2020 and the leveraging of the banking sector have been covered by many authors in the wake of the 2007/2008 financial crisis. Particular emphasis is given to the divergence of risk-weighted and risk-unweighted capital ratios among large, global banks – most of which have their roots in the nineteenth century. The chapter finishes with a call for a reassessment of banking regulation. In a historical perspective, regulatory frameworks are highly path dependent and are seldom fundamentally reconsidered with the aim to increase financial stability. Moreover, once we accept a certain degree of instability in modern banking, the focus should be on who covers losses and how significant such losses can potentially be without the involvement of the public.