



Department of Economics and Finance  
Bachelor's Degree Program in Economics and Business  
Course of Corporate Finance

***“The Collapse of Silicon Valley Bank: A  
Reminder of the Fragility of the Banking  
System”***

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ACADEMIC YEAR 2022-2023

*To my beloved family, cherished grandparents, dear relatives, and treasured friends*

*Whose unwavering support has been a constant presence*

*During this remarkable journey.*

## Index

<b>Introduction</b> .....	<b>4</b>
<b>Chapter One</b> .....	<b>6</b>
<b>1.1 The Banking System</b> .....	<b>6</b>
1.1.1 Objectives and functions of banks .....	6
1.1.2 Classification of banks .....	7
1.1.3 The concept of maturity transformation .....	10
1.1.4 Bank's balance sheet .....	12
1.1.5 Globalization and offshore banking: Trends and challenges .....	13
<b>1.2 The Role of Central Banks</b> .....	<b>16</b>
1.2.1 Goals of central banks: Examining objectives and mandates .....	17
1.2.2 Monetary policy: Main tools .....	18
1.2.3 The transmission mechanism of monetary policy .....	20
1.2.4 The role of central banks during financial crises .....	23
<b>Chapter Two</b> .....	<b>26</b>
<b>2.1 Monetary policy during and after Covid</b> .....	<b>26</b>
2.1.1 The response of CBs during the pandemic: Measures and strategies .....	26
2.1.2 Effects of monetary policy: An analysis of the impacts .....	28
2.1.3 From QE to QT .....	29
2.1.4 Current state of monetary policy: Assessing the present landscape .....	30
<b>2.2 Risk management</b> .....	<b>32</b>
2.2.1 Types of risks .....	32
2.2.2 Siloed approach vs. Enterprise Risk Management .....	33
2.2.3 Government safeguards against financial fragility .....	34
<b>2.3 The collapse of Silicon Valley Bank</b> .....	<b>36</b>
2.3.1 The root causes of the crisis: Investigating factors and triggers .....	37
2.3.2 The response of the Federal Reserve .....	38
2.3.3 An analysis of SVB's vulnerabilities .....	39
2.3.4 Held-to-maturity vs. available-for-sale securities .....	40
2.3.5 The findings of the Fed on the SVB case .....	41
<b>Chapter Three</b> .....	<b>44</b>
<b>3.1 Credit Suisse rescue deal</b> .....	<b>44</b>
3.1.1 The role of Additional Tier 1 bonds .....	45
3.1.2 The wipeout of AT1s: A breach of the hierarchy of claims .....	46
<b>3.2 JPMorgan's acquisition of First Republic Bank</b> .....	<b>49</b>
3.2.1 Renewed concerns over the "Too Big to Fail" .....	49
<b>3.3 A US accounting rule reform? Book value vs. fair value</b> .....	<b>51</b>
<b>3.4 US and Europe: Structural differences with respect to the crisis</b> .....	<b>52</b>
<b>3.5 The future of the banking sector: Analysis of the current environment and potential directions</b> .....	<b>53</b>
<b>Conclusion</b> .....	<b>56</b>
<b>Bibliography:</b> .....	<b>58</b>

# Introduction

The banking system plays a pivotal role in the global economy, serving as the backbone of financial intermediation and promoting economic growth. The great financial crisis of 2008 exposed the vulnerabilities and flaws inherent in the banking system, highlighting the importance of the credit channel for the international economic order and the pressing need for effective risk management and regulatory oversight. Despite efforts to strengthen safeguards and improve governance, the events of 2023 have once again underlined the fragility of the banking system. This thesis investigates the recent collapse of Silicon Valley Bank, shedding light on the root causes of the crisis and examining its implications for the broader banking sector.

Chapter 1 provides a comprehensive overview of the banking system, explaining the core functions performed by these financial institutions and giving an outline of the different types of banks constituting the financial sector. Notably, significant emphasis is placed on the concept of maturity transformation, which represents the mainstay of banks' business. By means of the asset-liability mismatch, banks are able to transform short-term liquid liabilities into long-term illiquid investments. The effectiveness of such a system is conveyed through the lenses of Douglas W. Diamond and Phillip H. Dybvig, whose research on the banking system and on the risk of bank runs has earned them the Nobel Prize in Economics in 2022. The business model of banks is further investigated through the analysis of a standard balance sheet, which helps better understand the sources of funding and the way in which money is subsequently employed. The phenomena of globalization and offshore banking are also discussed, with the aim of gaining a deeper understanding of the increasing global interconnectedness and its implications for the reach of financial crises. Within the context of financial turmoil, the focus transitions to the chief role assumed by central banks. Precisely, the latter section of the chapter delves deep into the implementation of monetary policy, exploring the wide array of tools available to CBs and the mechanism by which these policies are transmitted to the real economy. Lastly, the oversight role of central banks is discussed, considering some major vulnerabilities and risks routinely scrutinized by financial regulators.

The second chapter starts by exploring the monetary policy adopted in the wake of the Covid-19 pandemic. The response of central banks and its global economic implications are scrutinized, highlighting some notable differences with respect to the great financial crisis. After discussing the transition from quantitative easing to quantitative tightening, the focus shifts to the current economic outlook, encompassing the evolution of the yield curve and the recent interest rate hikes announced by the Federal Reserve and European Central Bank. Furthermore, the chapter considers the role of risk management, providing an overview of the primary risks faced by banks, distinguishing between a siloed approach and Enterprise Risk Management, while also examining the main safeguards implemented by governments to address financial fragility. Finally, the collapse of Silicon Valley Bank is examined. The last part of the chapter serves as an in-depth analysis of the fundamental catalysts of the crisis and the prompt response of the Fed. The assessment of SVB's vulnerabilities and the evaluation of its investment strategies, particularly the choice between held-to-maturity and available-for-sale securities, offer important insights into the main factors that contributed to the institution's demise.

Having explained how Silicon Valley Bank paved the way for a banking crisis, Chapter 3 examines the unfolding of the most recent events following the failure of the Californian institution, investigating the acquisitions of Credit Suisse and First Republic, respectively bought by UBS and JPMorgan. The chapter explores the role played by AT1 bonds in Credit Suisse's rescue deal and the implications of their wipeout, highlighting potential breaches of the hierarchy of claims. The renewed concerns over the "Too Big to Fail" problem in light of JPMorgan's acquisition of First Republic are also discussed, emphasizing the potential systemic risks associated with large financial institutions. Additionally, the ongoing debate surrounding a potential reform of US accounting rules is addressed, presenting arguments from both sides regarding the book value versus fair value dispute. Moreover, a brief examination of the structural differences between the banking sectors in the United States and Europe with respect to the crisis is proposed. Finally, the chapter comes to a close by reflecting on the banking industry's future course while taking into account the lessons learned from recent crises and considering the challenges that still lie ahead.

# Chapter One

## 1.1 The Banking System

Banks are financial institutions that facilitate the intertemporal consumption choices of individuals and businesses by acting as intermediaries between savers and lenders. As monetary financial intermediaries (MFIs), they play a pivotal role in the economy by mobilizing savings and allocating them to borrowers. Although banks perform multiple activities, their main practice consists in collecting deposits from people who have money but do not need it right away and simultaneously making loans to those who have liquidity needs. Deposits can be available *on demand*, as in checking accounts, or with some restrictions, as in savings and fixed accounts. Depositors and borrowers can be households, enterprises, and governments.

Besides traditional deposits, the money market and the capital market represent two other sources of funding. In fact, banks can exploit the interbank lending channel or decide to issue bonds, stocks, and commercial papers. Banks rely on a variety of income sources, as they charge fees on payment transactions and financial advice and generate revenue from investing in securities. Nevertheless, loans represent the primary source of revenue and, more precisely, the interest rate spread between the rate charged by the bank on borrowers and the rate paid out to depositors.

The role played by banks in today's economy and for the stability of the global financial system is crucial. The fact that these institutions are so important but at the same time are linked to ruinous crises makes them subject to strict regulations and puts them under continuous scrutiny.

### *1.1.1 Objectives and functions of banks*

Why do banks exist, and what is their societal value? Much research has been done on the fundamental role that banks play for households and firms. These financial intermediaries exist because they provide an efficient way to channel savings toward investments.

Douglas Diamond reasons that the added value provided by banks through the lending channel is that loans are more valuable within the banking relationship compared to if they were to be carried out on the outside (The Committee for the Prize in Economic Sciences in Memory of Alfred Nobel, 2022). This insight comes from the concept of *Cost of Credit Intermediation* (CCI) and the key function of *delegated monitoring* played by financial intermediaries. Depositors can be seen as investors who have delegated their investment decisions to a bank. In turn, the bank invests in projects and monitors the borrowers on behalf of depositors. Banks are effectively incentivized to monitor their borrowers, as banks' depositors, by holding debt, could force banks into bankruptcy (The Nobel Committee, 2022).

Alongside the lender-borrower matching and the reduction in aggregate monitoring costs, another benefit is given by banks' ability to provide liquidity. By means of *maturity transformation* (which will be lengthily discussed later in the chapter), financial intermediaries are able to transform short-term liquid liabilities, namely deposits, into long-term illiquid investments, loans, and others.

It must be noted that the services provided by intermediaries are pivotal for connecting lenders and borrowers, and the various financial crises that we have experienced throughout history show that banks' failures resulted in an increase in the costs of intermediation, thus causing credit to become expensive or unavailable. It is the disruption of the beneficial screening and monitoring services provided by banks that explains the long-lasting effects of financial crises on the real economy, according to Bernanke (The Nobel Committee, 2022).

### *1.1.2 Classification of banks*

Banks can be categorized based on the services they provide and the clientele that they target.

#### *Retail Banks*

Retail banks provide financial services to the public, targeting consumers rather than businesses. Individuals turn to retail banks mainly to store their money in a safe place and possibly earn interest on it through checking and savings accounts. They can also access other services, such as credit cards, loans, and mortgages. Certainly, a function of chief importance consists in providing credit,

which allows households to obtain loans and purchase large-scale items such as cars and houses. By granting liquidity, retail banks contribute largely to the functioning of the economy.

Depositors' funds form the basis of the banking business model, as they finance the lending activities. As most banks do in fact, retail banks compensate their depositors with interest and use part of the funds to lend to other customers or to invest in securities. The profit derives from the interest rate spread between the higher rate charged to borrowers and the lower one paid out to depositors. Moreover, fees charged on additional services and the income earned on investments contribute to the bottom line of the banks' income statement.

### *Commercial Banks*

Similarly to retail banks, commercial banks accept deposits from the public, offering checking and savings accounts, and use them to finance their lending activities. The main difference relies on the two distinct customer bases that these two intermediaries address. Retail banks focus on consumers, whereas commercial banks provide services to corporate customers and businesses. As a result, they are generally bigger in scale and have a wider geographical reach.

Moreover, the term "commercial bank" is frequently used to distinguish those financial institutions that provide only conventional banking services from those that engage in capital market activities. The latter ones are referred to as "investment banks" and are going to be covered next. Such a distinction was remarked by the enactment of the Glass-Steagall Act, a federal law that precluded commercial banks from engaging in investment banking activities, but it was later repealed in 1999.

### *Investment Banks*

Investment banks act as intermediaries between investors, who are looking for profit opportunities, and corporations, which instead require funds to run and grow. They offer advisory services in the negotiation and structuring of mergers and acquisitions (M&A) as well as help institutional clients with the underwriting of securities, i.e., raising capital by means of stocks and bonds. In addition, they accompany businesses willing to go public through the IPO process.



Alongside the two key areas of underwriting and M&A advisory, investment banks also engage in trading activities and asset management. Differently from retail and commercial banks, they do not accept deposits and rely primarily on capital market financing, namely stocks and bonds. To prevent conflicts of interest between the corporate-advisory area and the brokering department, an information barrier known as *Chinese wall* is established, aimed at avoiding the exchange of information between the divisions.

### *Private Banks*

Private banks specialize in providing personalized banking, investment, and other financial services to high-net-worth individuals, with the main ones being wealth and portfolio management, tax planning, and investment advice. Differently from retail banking, the approach undertaken is more personal and tailored around the specific needs of the clients, and the clientele is rather restricted, mainly composed of wealthy individuals satisfying the required high minimum account balance, which ranges from hundreds of thousands to millions of dollars.

### *Cooperative Banks*

Credit unions, or cooperative banks, are a type of financial institution that is owned and run by its members. They provide traditional banking services to their members who also control and run the bank, with an equal say on the bank's decisions.

### *Central Banks*

A central bank is a public financial institution that manages the currency of a country and its foreign exchange reserves. It is vested with supervisory and regulatory powers and has the role of overseeing commercial banks and ensuring the stability of the whole financial system. The main responsibility revolves around the implementation of monetary policy, which consists in the control of the supply of money in the economy through tools such as interest rates, open-market operations, and reserve requirements.

Central banks collaborate closely with financial institutions and governments to accomplish the objectives outlined in their mandates because they play a critical role in preserving the stability of the financial system and fostering economic growth. In the majority of countries, they are

institutionally independent from political interference despite their collaboration with governmental authorities. Due to their chief importance in the macroeconomic scenario of the last two decades and for the scope of this thesis, their role, features, and the tools in their hands will be further discussed and analyzed later on in this chapter.

The categorization done thus far helps us understand the multiple functions that banks perform as well as the ways in which they respond to the needs of individuals and enterprises. However, these distinctions are becoming ever more blurred and are not as relevant as they were in the past, when banks used to specialize in specific activities. The emergence of global banks brought most of the financial institutions to serve as both commercial and investment banks, as well as provide other services such as wealth management and insurance (*bancassurance*).

### 1.1.3 *The concept of maturity transformation*

One of the inherent features of financial intermediation is found in the concept of maturity transformation, sometimes referred to as *asset-liability mismatch*. With this practice, short-term liquid deposits are transformed into long-term illiquid assets, i.e., bank loans and investments. Whenever long-term interest rates are higher than short-term ones, that is to say, when the economy features an upward-sloping yield curve, the maturity mismatch enables banks to profit off the spread.

However, the risk is represented by the possibility of banks widening the asset-liability mismatch excessively in order to boost their interest rate margin. A steep yield curve may make such a practice particularly attractive, but the high exposure to interest rate risk it entails could end up being harmful for both the individual institution and the entire financial system. In fact, simply raising interest rates by the central bank would be enough to hurt banks' bottom lines by raising their funding costs, depreciating their fixed-rate investments, and reducing their profit margins. The interest rate risk exposure can be managed by structuring the balance sheet so as to make rates of banks' assets flexible or to reduce the bank's maturity profile, for instance by resorting to wholesale funding, a short-term form of debt (Paul, 2020).

The maturity transformation role of banks has been the subject of research by Douglas W. Diamond and Phillip H. Dybvig, who, along with Ben Bernanke, were awarded the Nobel Prize in Economics in 2022. The two laureates demonstrated that having an institution that finances long-term investments with short-term funding is the most effective system, but at the same time, it entails an inherent vulnerability: bank runs. Then, how can such a system work? The key insight is that although depositors want their money to be accessible on demand, it is unlikely that they will all demand liquidity at once. By collecting funds from different savers and diversifying across many loans, banks are thus able to invest in long-term projects (earning high returns) and simultaneously provide liquidity to depositors (The Nobel Committee, 2022).

We can look at the balance sheets of financial intermediaries to get a better understanding of the concept of liquidity creation. The liability side consists of the funds gathered by the bank and used to run the institution. The bank is thus able to meet the demand of those depositors who need liquidity with the money of the long-term savers who do not need cash at the same time. On the asset side instead, banks diversify the pool of loans and investments and monitor them on behalf of savers through the so-called “delegated monitoring” function. All of this makes it possible to use safe and liquid deposits to finance riskier and illiquid loans.

However, if on the one hand the role of maturity transformation is key for society, the Diamond-Dybvig model demonstrates on the other that financial institutions are vulnerable to self-fulfilling runs. If depositors demanded their money back all at once, a bank would be unable to satisfy all requests because of a lack of cash. The sale of assets to raise additional money is not always an option because long-term investments, if liquidated early, would lead to a depreciation in their value and cause losses for the financial institution. Especially under heavy financial distress or during an economic downturn, the bank could be forced to *fire sale* its assets, implying their quick liquidation at a heavily discounted price. Even the mere fear of a bank run could potentially lead depositors to run to the bank and withdraw their savings, due to the “first-come, first-serve” nature of demand deposits. This feature, also referred to as the *sequential service constraint*, exacerbates the phenomenon leading to a self-fulfilling spiral, as depositors are aware of the fact that banks will honor savers’ demands only as long as there are still funds available (The Nobel Committee, 2022).

### 1.1.4 Bank's balance sheet

<b>Assets</b>	<b>Equity and Liabilities</b>
Cash	Short-term debt
Lending	Deposits
Financial assets	Financial liabilities
Fixed assets	Long-term debt
	Equity
Off-balance sheet (contingencies received)	Off-balance sheet (contingencies given)

Figure 1: Stylized bank balance sheet. Keiding, H. (2017). *Economics of Banking*. Bloomsbury Publishing.

The functioning of a financial intermediary can be better understood by looking at its balance sheet (*figure 1*), which provides a snapshot of the institution's financial position.

We start from the liability side, which depicts the main sources of funding. The biggest part is represented by the deposits that the bank collects from savers. They can be of different kinds, namely checking, savings, and fixed deposits, which differ in terms of purpose, interest paid out, and ease of withdrawals. An additional source of funding is then constituted by borrowings from the Central Bank, such as bank refinancing operations, and by borrowings coming from the interbank market.

The asset side, on the other hand, depicts how a bank employs the funds collected from savers and shows the sources of income of the institution. In order of liquidity, we find cash and cash equivalents (including bank reserves), loans made to households, businesses, and institutions, investments in securities such as bonds and stocks, and lastly fixed assets.

The third element is the bank's equity, also referred to as *net worth*. It corresponds to the difference between assets and liabilities and consists of Tier 1 and Tier 2 capital, two types of capital reserves that differ qualitatively. The former layer includes shareholders' equity and retained earnings, and it is an indicator of the bank's financial health. The latter, which is less secure, includes

subordinated debt and loan loss reserves. Together, Tiers 1 and 2 provide a buffer against potential losses and allow financial intermediaries to continue running their operations as long as equity is positive. If instead the equity were to be negative, the value of liabilities would be higher than that of assets, thus implying the bank's insolvency.

Some additional items worth paying attention to are the ones labeled "off-balance sheet". These are assets and liabilities over which the bank does not have a direct claim; instead, they are owned or claimed by a third party. As the name itself suggests, they are not recorded on the balance sheet but are disclosed in the accompanying notes to the financial statements, according to the accounting rules put in place. On the one hand, such items allow the bank to maintain solvency ratios, as they do not appear on financial statements, on the other hand, however, they could mislead investors and hide potential risks. Letters of credit and loan commitments are examples of these items.

Off-balance sheet activities became particularly common as a result of the increasing complexity of banking activity and the advent of new financial instruments and practices (Keiding, 2017), first and foremost securitization, which gave rise to the so-called "originate-to-distribute" banking system. This process consists in pooling many assets, such as loans, and repackaging them in the form of interest-bearing securities that can be sold to investors. As a result, the loans disappear from the books of the bank; however, there might still be some obligations, such as payment guarantees, that have to be taken into consideration (Keiding, 2017).

#### *1.1.5 Globalization and offshore banking: Trends and challenges*

The banking industry has experienced a wave of globalization in recent decades, which has fueled the growth of offshore banking. This practice, which entails establishing banking operations outside of the nation where a bank's headquarter is located, was promoted by an ever-increasing global financial integration. The reasons for the international expansion of financial intermediaries are multiple: avoidance of domestic regulations (e.g., reserve requirements) and taxes; search of new business opportunities; risk diversification; attainment of economies of scale; willingness to

accompany clients in their international expansion; and political motives (José María Álvarez et al., 2016).

A bank can expand internationally either by means of cross-border lending or by opting for the establishment of a physical presence. In the latter case, the choice of the legal structure is crucial, since based on that, the financial institution will know what regulations it will have to abide by. A branch does not have a legal personality and depends directly on the parent bank. On the one hand, it benefits from the coordinated management, but on the other, it carries a high risk of contagion due to the fact that losses are transmitted directly to the parent. A subsidiary, instead, is legally independent and has limited liability. Its degree of autonomy depends on the level of centralization of the bank's business model. However, greater autonomy implies greater costs.

Banks can choose one of the two models, or alternatively, a mixture of both, depending on several factors. A bank implementing a centralized business model, for example, would probably opt for an expansion through branches, thus retaining more control, while in a decentralized one it is more likely to experience an expansion through subsidiaries. Moreover, taxation is always considered, with the branch model being preferred in high-tax countries due to the flexible legal structure that makes it easier to move profits to the part of the bank located in countries with lower taxation. Finally, country risk is another factor of relevance: in cases of countries with high macroeconomic risk, the subsidiary form is preferred for its limited liability and the potential to mitigate any possible contagion to the parent bank (José María Álvarez et al., 2016).

The Great Financial Crisis of 2008 served as the turning point between two phases of the internationalization phenomenon that affected the banking sector: one of continuous growth, and one of stagnation and even contraction. Efficiency and financial stability are trade-offs, but up until 2008, the advantages were greater than the disadvantages. On the one hand, increased bank presence globally increases sector competition, which lowers intermediation costs and improves the sector's overall quality. However, international banks, particularly those operating through branches, served as transmitters of the 2008 crisis, spreading the global financial crisis to the real economies of numerous nations (José María Álvarez et al., 2016). The interconnectedness of the banking industry, which resulted from globalization, thus contributed to the spread of the crisis

and brought turmoil well beyond US borders. Meanwhile, from the crisis onward, the trend reversed. Several factors explain the retreat of global banks from certain regions, for instance, political and social stability and the pursuit of a more efficient allocation of scarce resources, but first among all regulations, with stricter capital and liquidity requirements being cited as the main reasons for pulling out of specific areas (José María Álvarez et al., 2016).

Overall, it is necessary to remark that, despite the slight decline in banking internationalization after the global crisis, subsidiaries and branches have become a fixed component of the financial sector, hence the need for the alignment of regulations across countries in order to better cope with possible future catastrophes.

## 1.2 The Role of Central Banks

Among the different types of banks previously analyzed, the ones in which we are the most interested for understanding the economic setting and the monetary policy implemented in the last few years are central banks.

CBs are public institutions that manage the currency of a country or a group of countries and control the quantity of money in circulation by implementing monetary policy. They are called to promote economic growth and ensure the stability of the banking system during financial turmoil. The majority of them also supervise individual banks and act as regulatory authorities to prevent phenomena such as bank runs from happening. What distinguishes them from other banks is the fact that they possess a monopoly on the issuance of cash and can increase or decrease the monetary base according to the economic environment. Households and firms cannot access the funds of central banks, as they provide services uniquely to governments and financial institutions. They act in fact as the "government's bank" and the "banks' bank". For what regards the ownership, it ultimately depends on the country they operate in, with most central banks being at least partially owned by the government. The degree of independence from political power is instead determined by the legal and institutional frameworks established by national governments.

The central bank put under the spotlight the most is the United States Federal Reserve System, commonly referred to as the Fed. Its primary role is dictated by the powerful currency that it manages: the USD. The widespread use of the dollar in international transactions makes the Fed a key player in the world economy, with its actions potentially having a significant impact on global financial markets. The Fed is organized in a decentralized structure that blends both private and governmental characteristics. As the name itself suggests, it is not a single central bank, whose concept was in fact rejected by the framers of the Federal Reserve Act of 1913 (Board of Governors of the Federal Reserve System, 2021), but rather a system with three key entities: a central Board of Governors, which is an independent agency of the federal government; 12 Reserve Banks with a decentralized operating structure; and the Federal Open Market Committee (FOMC).



The equivalent of the Fed in the Eurozone is represented by the European Central Bank (ECB), responsible for setting monetary policy and maintaining price stability in the euro area. While it directly addresses only the 19 countries that have adopted the euro as their currency, it is owned by all 27 EU countries, with each of them being a shareholder of the ECB's capital. This is because the ECB's monetary policy decisions can have spillover effects on non-euro countries within the European Union.

Despite structural differences, the Fed and ECB are both intended to be independent from political power. The idea is that attention should be placed on what is best for the economy in the medium term without being influenced by short-term political considerations. They also share similar goals and tools at their disposal, which they use to accomplish their individual objectives and which will now be examined in depth.

### *1.2.1 Goals of central banks: Examining objectives and mandates*

Although the objectives pursued are similar, the Fed and the ECB differ slightly in terms of their mandates. The Fed, as stated by the Federal Reserve Act of 1913 and the later amendment, is mandated to conduct monetary policy “so as to promote maximum employment, stable prices, and moderate long-term interest rates” (Federal Reserve Board, 2021). Due to the fact that moderate long-term interest rates naturally arise from the first two goals, this set of functions is often referred to as a “dual mandate”, where maximum employment and price stability are the two primary objectives concurrently pursued.

Differently from the US, in the EU greater emphasis is put on the concept of price stability, with the ECB not having a dual mandate like the Fed but having one primary objective, low inflation indeed, subject to which secondary objectives are pursued. The Treaty on European Union mentions among these secondary goals “economic and social progress and a high level of employment and to achieve balanced and sustainable development” (Art. 2 TEU).

With respect to the common goal of price stability, both the Fed and the ECB aim to maintain a rate of inflation below but close to 2% over the medium term, so as to control inflation and simultaneously avoid deflation.

### *1.2.2 Monetary policy: Main tools*

As previously remarked, the primary responsibility of central banks consists in defining and implementing a country's monetary policy, through which objectives such as price stability and full employment can be reached. The term "monetary policy" refers to the set of tools that central banks have at their disposal to manage the supply of money circulating in the economy for the purpose of achieving specific macroeconomic goals and ultimately of promoting economic growth. The actions taken by CBs to increase the supply of money and give a boost to the economy are part of an *expansionary* or *accommodative* monetary policy, while those aiming at reducing the availability of credit and at cooling an overheated economy are part of a *contractionary* or *tightening* monetary policy.

#### *Open-market operations*

The first powerful instrument in regulating the supply of money is represented by open-market operations, which consist in buying and selling government securities, mostly bonds. Let's suppose that a country is going through a recession, and the central bank wishes to encourage borrowing and spending to spur the economy. One way to do it is by purchasing treasuries from banks; by doing this, the CB injects cash in the economy, increasing the liquidity of the commercial banking system and thus allowing banks to lend more. Bonds' prices spike as a result of the greater demand, bringing down interest rates, because of the inverse relationship between the two. The final outcome is an easing in the availability of credit, a drop in interest rates, and an encouragement of spending and investments. If, on the other hand, a country is experiencing high inflation, the CB would do the opposite, which means selling government securities. By offering them for sale to financial institutions, the CB would exchange them for cash, thus reducing the reserves of commercial banks and, in turn, their lending capacity. As a consequence, the availability of credit would shrink and interest rates would go up, encouraging saving and helping combat inflationary pressures.

### *Discount rate*

Another tool of chief importance for the implementation of monetary policy is the discount rate, which is the interest rate at which the CB lends money to commercial banks. A decrease in the rate results in an increase in banks' borrowing and, consequently, a rise in money supply and credit availability. The cheaper credit for commercial banks is mirrored in a lower rate charged by commercial banks on customers and businesses, which leads to greater borrowing and spending and represents a stimulus for the economy. Oppositely, when the CB raises the discount rate, it becomes more expensive for commercial banks to borrow money, and hence they become less prone to lending to customers. The outcome is a contraction in money supply and credit and a slowdown in economic activity.

### *Reserve requirements*

Reserve requirements are another tool that central banks have to control the supply of money. Commercial banks are required by law to retain some of their funds in reserve, either as cash or as deposits at the CB. These requirements provide a cushion for unexpected deposit withdrawals and liquidity shocks and are part of a vast regulatory framework by which banks have to abide. The higher the reserve requirements, the lower the amount of money that banks can lend out and thus the lower supply of money in the economy. Reserve requirements were among the tools exploited by central banks in dealing with the Covid-19 crisis.

### *Unconventional tools*

The tools analyzed heretofore are defined as *conventional* and are the most common ones used by central banks. However, during a deep recession or a financial crisis, these monetary tools are insufficient for addressing the challenges faced by an economy. As short-term nominal interest rates approach the *zero lower bound*, conventional policies such as open-market operations become ineffective as short-term rates cannot be lowered further. Additionally, the economy risks falling into the *liquidity trap*, a situation in which individuals prefer having liquidity over any form of debt, thus renouncing to make loans and ending up hoarding cash. In such a situation, a new form of monetary policy is needed, which goes by the name "unconventional". By implementing unconventional policies, central banks aim to reduce long-term interest rates in order to restore

households and firms' confidence in the economic outlook and encourage them to invest in long-term projects.

The first form of unconventional monetary policy is known as *quantitative easing* (QE) and has been at the center of the central bank's actions during the great financial crisis and the Covid-19 pandemic. Similar to conventional open-market operations, QE consists in buying securities from banks and other financial institutions, hence causing a rise in their price, a drop in their yield, and an expansion of the money supply. The main difference with open-market operations relies on the type of assets purchased, which in the case of QE are long-term, such as mortgage-backed securities. This is because the objectives are different: while conventional policies target short-term rates, unconventional ones target longer-term rates.

Forward guidance is another tool used, whereby CBs communicate their intentions on future monetary policies to the public and financial markets with the aim of guiding households' behavior and influencing their expectations on the future economic outlook. Central banks' credibility is crucial in order for this policy to be effective.

Another way to incentivize banks to lend out their excess reserves is to set negative interest rates, which implies charging financial institutions for depositing their money in the CB. In this way, banks are pushed to lend out more and to invest in assets, thus bringing down their yields, with the goal being to influence individuals' spending decisions and help restart the economy.

If instead central banks want to inject money directly into the real economy, bypassing financial intermediaries, they could resort to the so-called "helicopter money". This tool can be viewed as a direct way to boost the economy and provide people and businesses with more cash in their hands, all without increasing the government's debt. Nevertheless, such a practice could form the basis for asset price bubbles, moral hazard, and ultimately financial instability.

### *1.2.3 The transmission mechanism of monetary policy*

Let us now delve into the analysis of how changes in monetary policy implemented by the central bank are transmitted to the real economy. The transmission mechanism of monetary policy refers to the several channels through which decisions about official interest rates affect economic activity and inflation. The complexity of the system, the multiplicity of variables, and the time lag between the implementation of a policy and its observed effects highlight the difficulty and uncertainty that surround CBs’ policy-making decisions. *Figure 2* clearly illustrates how such a mechanism functions.

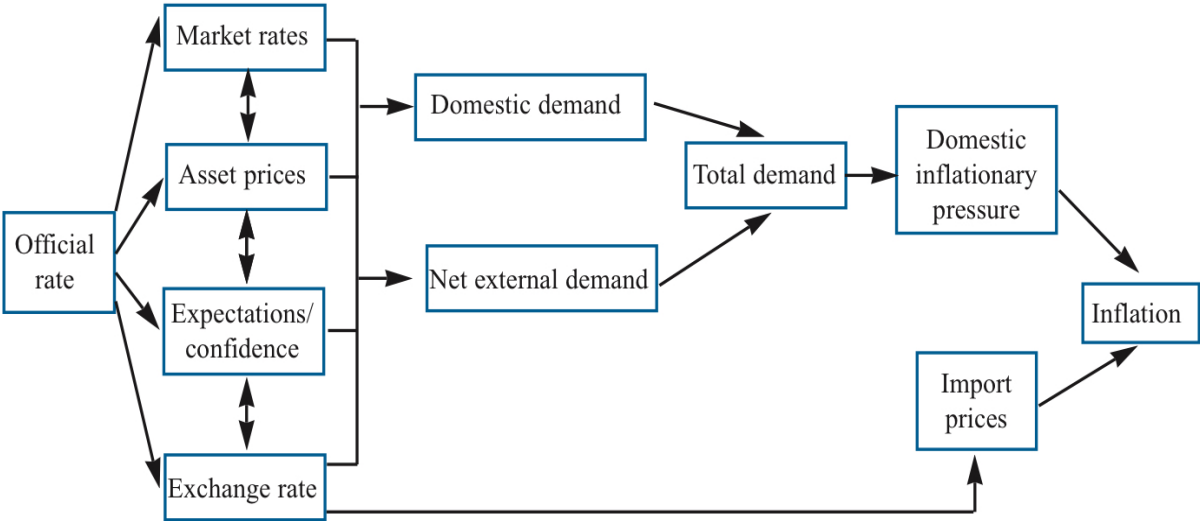


Figure 2: Monetary policy transmission mechanism. Bank of England. (1999). *The transmission mechanism of monetary policy*.

As previously remarked, the central bank is vested with the power to determine a specific interest rate, and this derives from the fact that it possesses a monopoly on the issuance of base money. For this reason, the CB can choose the price at which to lend *high-powered money* to private sector institutions. A change in the official rate is transmitted immediately to the money market, where other short-term rates such as those on interbank deposits are adjusted, usually by the same amount as the policy change. Banks follow suit by tweaking the rates charged to their customers and those offered to savers. It is important to remember that the rates we are referring to are short-term (assuming a conventional monetary policy), while long-term ones are influenced by expectations of the future path of interest rates.

Policy changes affect asset prices as well. If, for instance, interest rates were to rise, the present value of any given future income stream would drop because of the now larger discount factor.

Expectations about the future course of real activity in the economy are another channel for the transmission of monetary policy, even though they come with a high degree of uncertainty. Public perception is affected, among other things, by the monetary policy stance, which guides the expectations of economic agents, particularly with respect to inflation. In this setting, the credibility of a central bank plays a primary role.

The exchange rate represents the last channel through which monetary policy is communicated through the financial market. The relative value of two currencies determines the exchange rate, which is influenced by both domestic and international monetary conditions. However, maintaining everything else constant, an unexpected fall in the domestic rate would drive investors to put their money in deposits denominated in foreign currency due to their relatively higher return, thus causing a depreciation of the domestic currency. On the contrary, a rise in interest rates would lead to an appreciation of the currency in the domestic country.

We now shift our attention from financial markets to the real economy to consider how changes in interest rates, asset prices, expectations, and exchange rates affect the spending behavior of households and firms. Individuals are affected in three ways: (i) they face new interest rates on their savings and debts, hence the disposable income of savers and borrowers changes; (ii) their financial wealth is altered as a result of changes in asset prices; (iii) exchange rate adjustments make the relative price of goods and services consumed relatively more or less expensive (Bank of England, 1999).

Let us consider an increase in interest rates. The cost of funding for holders of floating-rate mortgages will increase, forcing them to spend less on other goods and services. Moreover, the value of their house, as well as any other asset, decreases. This is because as the cost of financing gets higher, the demand for housing drops, and prices eventually follow suit. Also, houses are used as collateral for loans, so their lower net worth will make it harder for individuals to borrow from banks. These effects will not be felt only by individuals holding mortgages or other forms of debt

or wealth. In fact, higher interest rates will make returns on savings higher for everyone, thus incentivizing the postponement of consumption, and they will lead to a shift from home-produced goods to the relatively cheaper ones produced abroad. Overall, while it is true that interest rate changes have redistributive effects between borrowers and savers, the impact on the aggregate economy appears to be a reduction in spending (in the case of an increase in interest rates) or an increase in spending (in the case of a decrease in interest rates) (Bank of England, 1999).

Firms are impacted in a similar manner. Especially those relying on bank borrowings will now incur higher costs of funding and will require new projects to yield higher returns in order to compensate for the higher costs, making it less likely for businesses to invest. Besides being costlier, loans will also be harder to obtain due to the drop in prices of the collateral assets. In conclusion, the overall effect on aggregate spending will be a reduction in GDP.

#### *1.2.4 The role of central banks during financial crises*

As previously mentioned, central banks hold supervisory and regulatory powers over the commercial banking system. Especially in the wake of financial and banking crises, the actions and measures taken by CBs have drawn the public's attention. The main concern of CBs is to avoid that a financial crisis is transmitted to the real economy through the channels just analyzed, and in order to prevent this from happening, the primary duty is to restore calm in financial markets and ensure the flow of credit. By preventing the collapse of financial institutions, CBs aim to stop market panic from affecting the real economy.

The high toll paid after the Great Financial Crisis led to a shift in monetary policy, from a "clean up after the bubble" stance to a "lean against the wind" approach (Corbo, 2010). The aim is now to deter the formation of asset price bubbles and prevent any possible crisis from happening, rather than waiting for the crisis to unfold before acting. The Fed and other central banks have long supervised the commercial banking system to make sure that individual financial institutions act in a prudent and sound manner without taking excessive risks in their function of maturity transformation. This traditional supervisory approach, defined as *microprudential*, helps prevent single banks from failing. However, the 2007-09 financial crisis exposed flaws in the system and

in the regulatory framework, which led to new reforms and the adoption of a new supervisory stance known as *macroprudential* (Corbo, 2010). The focus is now on the financial system as a whole, as the approach aims to examine how the actions of one institution affect others and the system overall.

In their oversight role, CBs examine four types of vulnerabilities and risks: (i) asset valuations and risk appetite; (ii) leverage in the financial system; (iii) funding risk; (iv) borrowing by businesses and households (Federal Reserve Board, 2021).

Excessive asset valuations can form the basis for market instability, as inflated prices could be symptoms of excessive risk-taking and leverage buildup. The steep rise in house valuations preceding the great financial crisis is a clear example of how this type of vulnerability proves to be potentially detrimental for the whole economy. For this reason, CBs endeavor to prevent asset price bubbles from forming and ultimately bursting, but judging whether an asset is overvalued or not is often a difficult task.

Leverage is another element closely monitored, as it has the potential to have a multiplier effect on the transmission of negative shocks in the system and the broader economy. Financial institutions with a level of debt significantly higher than that of equity are more exposed to economic downturns and are at greater risk of fire sales and bank runs.

Another vulnerability is represented by the possibility of a bank not being able to fulfill its financial obligations towards creditors. Such a situation could involve even a healthy institution if all depositors were to demand liquidity at the same time, causing a bank run. This risk is a direct consequence of the maturity transformation function that we have lengthily discussed previously in the chapter.

Lastly, CBs are concerned with excessive credit provided to businesses and households. In this circumstance, the risk would run backwards, from the real economy to the financial markets. It might be the case that highly indebted individuals and enterprises are not able to withstand a



negative shock such as a rise in interest rates; the possibility of them not repaying financial intermediaries could potentially cause a vicious cycle.

The regulatory structure gives special consideration to those financial institutions whose interactions with financial markets and the real economy are such that, during economic downturns, they could lead to financial instability. They are referred to as *systematically important financial institutions* (SIFIs), and within the macroprudential framework, they are subject to enhanced supervision and additional regulations, such as countercyclical capital buffers, capital and liquidity requirements, and stress tests. All these policies and regulations will be discussed in detail in the next chapter, when we analyze the risk management practices set up within the banking system.

# Chapter Two

## 2.1 Monetary policy during and after Covid

The Covid-19 pandemic has been an unprecedented crisis due to its global scale and wide impact, which were felt through every sector of the economy all over the world. Its outbreak led to a generalized abrupt halt in economic activity. Demand for goods dropped because of social distancing and lockdowns, and the fall was exacerbated by a reduction in income for many workers. Businesses were forced to slow or stop production, the risk of loan defaults increased, and ultimately, the general uncertainty hindered the functioning of financial markets.

Central banks were called upon to take extraordinary measures to mitigate the effects of the market crash and restore stability in the real economy. The tools exploited the most were unconventional, with measures such as large-scale asset purchase programs and forward guidance being the mainstays of the monetary policy implemented. If on the one hand, these actions have contributed to the stabilization of financial markets and the restart of economic activity, on the other, the massive injection of money into the economy during the whole period has fueled a sharp increase in prices and has contributed to the underpricing of risk.

Therefore, the main challenge of the last year has been the unwinding of all measures previously taken, a decision driven mainly by the increasing level of inflation that we have been experiencing lately. The difficulty lies in the potential for such a downsizing to create financial market turmoil and destabilize the real economy.

### *2.1.1 The response of CBs during the pandemic: Measures and strategies*

It is well known that during a financial crisis the primary role of CBs is to ensure the smooth functioning of the financial system so as to support the credit flow to households and businesses. The defining feature of CBs' actions during the pandemic, which instead was first and foremost a health crisis, was that they did not stop at the conventional role of lenders of last resort, but they went ahead and provided liquidity directly to the private non-financial sector (Cavallino & De

Fiore, 2020). For instance, widely used *funding-for-lending schemes* offered banks liquidity at advantageous terms, conditional on loan extensions to small and medium-sized enterprises.

The Covid-19 crisis brought about complementary responses from monetary and fiscal authorities. On the one hand, loan guarantees and fiscal backstops assisted CBs' actions. On the other, through the implementation of monetary policies, predominantly quantitative easing (QE), governments were able to keep borrowing costs low, facilitating the implementation of significant fiscal stimulus measures while mitigating the burden of debt servicing and containing the expenses associated with fiscal expansion.

Without doubt, the Great Financial Crisis served as a model for the rapid intervention of central banks around the world. The policies implemented during the pandemic were similar to those adopted in 2008, their size and pace, however, were unprecedented. The economic environment in which monetary authorities moved was different as well. In fact, during the pandemic, central banks had less room to cut interest rates because, especially in developed countries, they were already close to zero; as a result, they relied more heavily on unconventional tools. In less than a month, in fact, interest rates were cut to reach the zero lower bound, except for the euro area and Japan, where they were already in negative territory since before the outbreak of the pandemic. Moreover, while liquidity support for the financial sector was significant in 2008, it had a more limited role during the pandemic, when the main support went towards the real economy. This is reflected by the difference in nature of the two crises, with the former hitting the financial sector first and later propagating to the real economy, and the latter featuring the reverse course (Cavallino & De Fiore, 2020).

Due to the limited extent of interest rate cuts, monetary policy mainly revolved around asset purchase programs, commonly referred to as “quantitative easing”. With the aim of stimulating credit flows and ultimately boosting economic activity, central banks have enlarged their balance sheets through the purchase of treasuries from banks and other financial institutions. In 2020, for instance, the ECB launched the Pandemic Emergency Purchase Programme (PEPP), which increased its balance sheet by €1.7 trillion, contributing to a total amount of €9 trillion in 2022 (Claeys, 2023). Such measures were taken by developing countries as well, many of which

implemented APPs for the first time ever, even if with a limited size and duration (UN DESA, 2022).

### *2.1.2 Effects of monetary policy: An analysis of the impacts*

The measures undertaken seem to have reached the goals set, with an increase in market liquidity and an ease in financial conditions. The increased demand for securities such as long-term bonds led to a drop in interest rates. Consequently, the price of other assets increased as well, raising the wealth of households and firms. It is true, however, that there have been some redistributive effects, with wealthier individuals benefiting more from the increase in equity prices. In fact, rich households generally invest much more in financial assets with respect to other groups; hence, they registered stronger price gains from the beginning of the pandemic. Another drawback was that investments did not increase as expected because most commercial banks responded to the reserve injection by rebalancing their portfolios into less risky assets, like government bonds, as opposed to making loans to the real economy (UN DESA, 2022). Furthermore, according to Occhino (2020), the overall effectiveness of QE was limited by the fact that bank reserves were much larger in 2020 than in 2008, thus implying a smaller direct effect of an increase in bank reserves on the liquidity premium.

As anticipated, the set of expansionary policies eventually resulted in an underpricing of risk, with many assets experiencing distorted and inflated prices. The ones that have risen the most are, without doubt, global equities. For instance, in March 2020, the Standard and Poor's 500 index rose by roughly 80% (UN DESA, 2022). Contributing to the inflationary pressures were also the supply-side bottlenecks and the Russia-Ukraine conflict. In such an economic scenario, one of the most feared risks has been, without doubt, an abrupt shift in policy stance, with tightening policies potentially having a huge impact on financial markets, from the burst of asset price bubbles to potential bankruptcies.

The challenge is now represented by scaling back the programs and the other expansionary measures undertaken in the last few years. Central banks cannot increase their balance sheets forever; on the contrary, they now need to shrink them through the implementation of quantitative

tightening. The difficulty lies in the risk of withdrawing the stimuli too quickly or waiting too long. The abrupt rise in interest rates could put public finances under pressure, especially those of highly indebted countries, such as Italy, which would encounter higher debt servicing costs. This is exactly the economic environment we are living in right now.

### 2.1.3 From QE to QT

The first step towards the unwinding and withdrawal of the monetary stimulus programs is represented by *tapering*. This term refers to the period of gradual reversal from an expansionary to a *hawkish* monetary policy as the maturing assets previously acquired by CBs are redeemed. This strategy does not entail losses for the central bank, but the downside is represented by the fact that the balance sheet shrinking happens at most at the pace of asset redemption. Especially in the case of a fast economic recovery, relying on tapering is not an option, and CBs need other strategies in order to sterilize the liquidity created by QE.

There are two main strategies through which CBs can exit quantitative easing. The first one involves quantitative tightening, which implies shrinking the CB's balance sheet by selling its assets and, in turn, reducing the monetary base. This strategy, however, entails large capital losses for the bank. In fact, the assets accumulated by the CB during the expansionary policy period yield low returns compared to the higher ones provided by the liabilities newly issued within the quantitative tightening setting. As long as the assets are not sold, such losses are unrealized and do not appear on the balance sheet. If, however, the central bank were to sell its assets, then the losses would materialize and could potentially threaten the bank's solvency. Additionally, a large sale could hamper the stability of those assets' markets.

The second strategy, on the other hand, avoids these risks by leaving the asset side of the CB's balance sheet unchanged and adjusting only the set of liabilities. This alternative approach consists in neutralizing part of the excess liquidity by issuing new interest-bearing liabilities via reverse repos or by giving out high payouts on excess reserves until assets are redeemed, as suggested by Bernanke (2009). The strategy proposed by the former chair of the Fed does not entail the huge capital losses that balance sheet shrinking would otherwise imply, but it carries the burden of high

interest payments on the liabilities, even if not such as to imperil the CB’s solvency (Tanaka, 2019). In fact, the interest rates need to be well above the market rate for the policy to be effective in absorbing the excessive monetary base, so that commercial banks are incentivized to switch funds from H to L rather than providing new credit, as shown in *figure 3*.

Before the exit, $t < 0$		At the exit, $t = 0$	
Assets ( $A$ )	Monetary Base ( $H$ )	Assets ( $A$ )	Monetary Base ( $H$ )
			Liabilities ( $L$ )
	Capital ( $K$ )		Capital ( $K$ )

Figure 3: CB’s balance sheet before and after the exit from QE. Tanaka, A. (2019). How can a central bank exit quantitative easing without rapidly shrinking its balance sheet? Central Bank Review.

2.1.4 Current state of monetary policy: Assessing the present landscape

In March 2023, the European Central Bank started its quantitative tightening to unwind its portfolio of assets that were acquired during the previous decade's quantitative easing policy. The most noticeable manifestation of the restrictive monetary policy was the 325 basis point (bps) increase in ECB policy rates between July 2022 and May 2023, which was the first increase since 2011 and the biggest cumulative increase since the ECB was founded in 1999 (Claeys, 2023). Besides the willingness to go back to a lean balance sheet and demonstrate that QE was only a temporary policy, the implementation of quantitative tightening has been justified by the need to steepen the now inverted yield curve, as shown in *figure 4*.

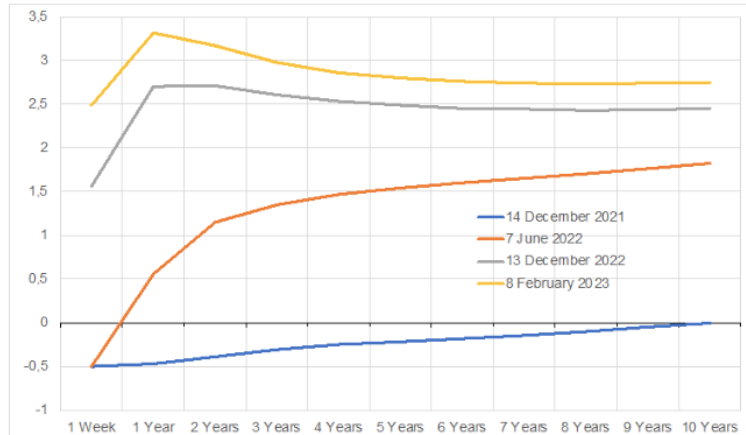


Figure 4: Evolution of the euro risk-free yield curve since end of 2021 (in % per annum). Claeys, G. (2023, March). Finding the right balance (sheet): quantitative tightening in the euro area.

We are now almost at the end of the interest rate hikes dictated by central banks. The latest increase announced by the Fed brings its benchmark federal-funds rate to a range between 5% and 5.25%, up from zero in March 2022 (Timiraos, 2023). The 10<sup>th</sup> consecutive rate increase seems to be the last one of this rapid series, as Federal Reserve officials signaled that the tightening monetary policy might be over. The ECB followed suit and raised its key interest rates by a quarter of a percentage point. Although the rise is half the 50 basis points move announced in March, the eurozone inflation level is still around 7%, 2% higher than the US one, and well above the medium-term objective of the ECB (Michael, 2023). This is why the European Central Bank is not considered to be done with its series of rate hikes yet.

## 2.2 Risk management

The most basic concept of finance is probably the fact that risk and return are directly related and that every investment decision entails some kind of risk. Risk management refers to the practice through which a bank or business organization identifies and analyzes risks and decides to act accordingly. Risk management practices are particularly relevant in the banking sector, as credit intermediation plays a crucial role in the functioning of the economy. History has shown the potential consequences that poor risk management practices can cause, with the global financial crisis of 2008 representing the most striking example and, as we will see shortly, the collapse of Silicon Valley Bank too.

### 2.2.1 *Types of risks*

There are many types of risks that a bank must manage.

#### *Credit Risk*

Credit risk is the risk of loss due to the failure of a borrower to repay a loan or honor another predetermined financial obligation in accordance with agreed-upon terms. It is the biggest risk for banks, and it includes the possibility of default on payments like mortgages, credit cards, and other securities. Because of the intrinsic nature of banking, credit risk is embedded in the sector, and banks cannot completely eliminate this risk. There are, however, several ways through which financial institutions can mitigate credit risk, for instance, through diversification, credit analysis, collateral requirements, and risk-based pricing.

#### *Liquidity Risk*

Liquidity risk is the risk that financial assets cannot be traded quickly enough without having an impact on their market price. This risk could greatly endanger banks since their inability to provide cash to their customers could lead depositors to rush and withdraw their funds all at once, causing a bank run. Mismanagement of the asset-liability mismatch, overreliance on short-term sources of funds, concentration of illiquid assets, and loss of confidence in the institution are just a few of the drivers of liquidity risk.



### *Operational Risk*

Operational risks concern the day-to-day issues that a bank is confronted with, from cybersecurity breaches to employee errors and frauds to IT system breakdowns. These risks can lead to capital losses and a fall in customer trust, thus damaging the reputation of a bank.

### *Market Risk*

Market risk, also referred to as systematic risk, refers to the possibility of losses due to factors affecting the overall performance of investments in capital markets. Such factors include economic downturns, political instability, pandemics, and other disasters. Differently from idiosyncratic risks, market risk cannot be eliminated through diversification but can be hedged with derivatives. The most common types of market risks are interest rate risks, exchange rate risks, equity risks, and commodity risks.

### *2.2.2 Siloed approach vs. Enterprise Risk Management*

There are two main approaches to risk management: the traditional one and ERM.

Traditional risk management is considered to be reactive, as it tends to respond to incidents that have already occurred and focuses on the avoidance of their reoccurrence. We talk about a *siloed approach* because the procedure focuses on individual business units or departments, identifying and tackling risks on a case-by-case basis. When implementing this practice, each business unit analyzes and treats its own risks and reports them to the CEO later on.

*Enterprise Risk Management (ERM)*, on the other hand, is proactive, as it aims to prevent risks from occurring in the first place. It consists in a wider and holistic analysis of risks, which are evaluated from the perspective of the entire organization in a unified framework. It is a top-down strategy that considers cross-departmental risks and their overall effect on the organization as a whole. This novel approach provides managers with a better understanding of the firm's risks, but in order for it to be effective, strong communication and coordination between different divisions are needed. After the great financial crisis, regulatory authorities put stress testing at the forefront

of company-wide risk assessment activities; this emphasized the significance of a thorough risk identification, which does not include only financial risks, but all the ones to which an enterprise is exposed (World Economic Forum, 2020).

### *2.2.3 Government safeguards against financial fragility*

Besides putting up and implementing an appropriate and reliable risk management framework, a financial institution also needs to comply with the vast set of rules and practices put in place by regulators. The great financial crisis has proven how detrimental the disruption of public trust in the banking system is for the economy as a whole. In the aftermath of 2008, many government safeguards were enforced, all aimed at preserving the stability of the financial system.

Deposit insurance is the first piece of this safe net. It aims at protecting bank depositors from losses caused by a bank's inability to repay its obligations. In the United States, deposits are insured by the Federal Deposit Insurance Corporation (FDIC) up to \$250,000, while in the European Union, the threshold lies at €100,000. By insuring deposits up to a certain level, governments try to avoid bank runs caused by small depositors. This measure, however, is not effective when most of the deposits involved are much larger. This is exactly what happened to Silicon Valley Bank, as we will see shortly.

Reserve and capital requirements are an additional part of the regulatory framework. Banks are required to keep a certain level of reserves, either as cash or deposits with the central bank, so as to have a cushion to protect themselves from extraordinary liquidity demands. A safe level of capital is another requirement needed to ensure that a bank has a buffer to absorb unexpected losses without becoming insolvent. Both reserve and capital requirements help to maintain confidence in depositors and avoid crises, as they allow banks to better weather financial shocks.

In the wake of the great financial crisis, stress tests have become an increasingly important regulatory tool used to determine whether a bank is able to withstand adverse economic or financial conditions. This practice consists in the simulation of multiple scenarios, such as a rise in interest rates, a recession, a rise in the inflation level, or an equity market crash. If an institution does not

perform well in a determined scenario, regulators can require the institution to take corrective actions, such as increasing the level of reserves or the capital requirements for that specific bank. A related tool is backtesting, a method used to assess how well a model would have performed ex-post. While stress testing constructs scenarios based on hypothetical data, backtesting compares the predictions of the model or system previously constructed with the actual historical data. Such a practice allows banks to evaluate whether their models are accurate enough or if adjustments are needed.

If all these measures fail to avoid a financial crisis, central banks and governments could step in. Among the many roles that CBs can perform, there is that of lender of last resort. This term refers to the function of central banks in providing additional liquidity to institutions that are undergoing financial distress and are at risk of becoming insolvent. The provision of liquidity allows banks to fulfill withdrawal requests and reassure depositors. Failing all else, the government may organize the purchase of a failing bank, either directly or by favoring the purchase by healthier institutions. The problem of government intervention lies in the fact that the money used for the bailout of the bank is taxpayers' money, and for this reason bailouts are highly controversial.

All these safeguards against financial fragility have played a key role in the story of Silicon Valley Bank's failure, and we will now see how.

## 2.3 The collapse of Silicon Valley Bank

The month of March 2023 was characterized by widespread concerns regarding the stability of the banking system. The event that sent ripples through the global banking industry was the collapse of SVB, the third-largest failure of a US bank, after Washington Mutual in 2008 and First Republic in 2023.

Silicon Valley Bank, a subsidiary of Silicon Valley Bank Financial Group, was a commercial bank founded in 1983 and headquartered in California, which grew to become the 16<sup>th</sup> largest bank in the United States (see *figure 5*).

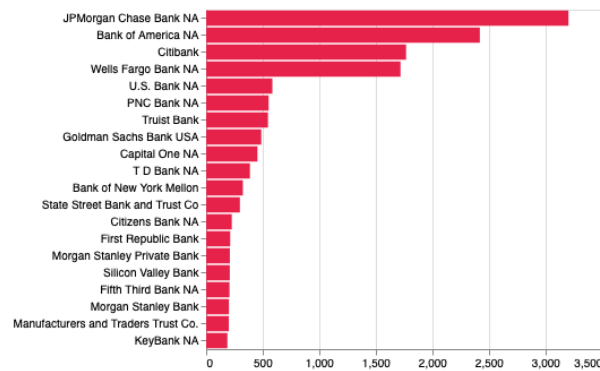


Figure 5: Largest 20 US commercial banks by total assets (\$ billion) at the end of 2022. Economics Observatory. (2023, April).  
*Why did Silicon Valley Bank fail?*

The majority of its clients came from the technology and life science sectors, with almost half of US venture-backed technology and healthcare companies having their financial needs met by SVB. The bank's failure unfolded in just a couple of days, and for this reason, it is considered by many the quickest bank run in history.

It all started on March 8, when Silicon Valley Bank announced a \$1.8 billion loss on its bond portfolio and the decision to sell stocks in order to raise \$2.25 billion. As a consequence, its rating was downgraded by Moody's. On the following day, as the market opened, the stock of SVB Financial Group crashed, with other banks' valuations experiencing a steep drop as well. SVB customers attempted to withdraw their funds, for a total of \$42 billion. Trading was halted for SVB's stocks, and, as regulators were not able to find a buyer for the bank, Silicon Valley Bank

was put under the receivership of the Federal Deposit Insurance Corporation (FDIC), and it was announced that insured deposits would have been made available by the following Monday. In the following days, federal regulators announced emergency measures in response to SVB's failure and allowed customers to recover all funds, including those uninsured.

### 2.3.1 *The root causes of the crisis: Investigating factors and triggers*

Although the fall of SVB took just a few days, the roots of the bankruptcy have to be searched for a few years ago, beginning with the pandemic. During the Covid-19 crisis, while most of the economy was experiencing a significant slowdown, many tech companies underwent a period of growth, driven by the increase in demand for digital services. As tech companies enjoyed greater profits, they started depositing more money in banks. Silicon Valley Bank was on the frontlines of the money influx due to the fact that most of its clients were high-tech companies. From 2019 to 2021, the bank's assets grew from \$71 billion to over \$211 billion (Board of Governors of the Federal Reserve System, 2023). *Figure 6* shows how the increase in deposits at SVB resulted in a rise in its share price, from \$150 in March 2020 to \$730 in January 2022.



*Figure 6: SVB share price (US \$), 2018-2023. Economics Observatory. (2023, April). Why did Silicon Valley Bank fail?*

As any bank would have, SVB invested a large portion of the funds obtained, and it did so heavily on long-term US government bonds, which were considered very safe. However, if, on the one hand, long-term bonds are a safe investment, on the other hand, they are susceptible to interest rate risk. SVB poured billions into bonds during the pandemic when interest rates were close to zero.

The abrupt spike in rates dictated by the monetary policy of the Fed, in line with other central banks around the world, caused SVB's bond portfolio to lose significant value. The reason lies in the now higher interest rates, which make newly issued bonds more appealing to investors compared to the ones purchased by SVB during the pandemic, when interest rates were low. Although the losses were unrealized and hence did not materialize as long as SVB held the assets until maturity, the considerable number of withdrawals forced the bank to sell part of its long-term assets. The end of the tech boom from the end of 2021 onwards, in fact, resulted in many of SVB's clients drawing down their deposits, thus reducing the bank's reserves. The main reason behind the withdrawals lay in the unfavorable economic environment of the tech industry, with a decrease in profits, tighter funding conditions, and necessary cost-cutting measures, first and foremost layoffs. The correlation between SVB and the tech sector can be clearly noticed by the fact that the subsequent decline in the bank's share price occurred at the same time as the collapse in the share prices of US tech companies (Economics Observatory, 2023).

In order to raise money so as to fulfill depositors' requests, SVB announced the emergency sale of part of its bond portfolio, which resulted in significant losses. This announcement, together with the plan for a balance sheet restructuring, was perceived negatively by depositors, who rushed to the bank and tried to withdraw a total of \$42 billion, leading to the insolvency of SVB. The bank's stocks plummeted 60%, and, similarly, the stocks of other banks experienced a sharp decline, thus bringing panic to financial markets.

### *2.3.2 The response of the Federal Reserve*

The immediate response of the US government contained the concerns of a widespread contagion and featured guarantees on all deposits of SVB's customers. The fear was that, if SVB account holders were not able to recoup the money deposited at the bank, they would have struggled to pay their employees, and the financial shock would have quickly rippled through the real economy. Thus, the intervention aimed to prevent any potential crisis in the banking sector from spreading to the rest of the economy.

Due to the fact that people started perceiving other banks as potentially having liquidity problems as well, the Federal Reserve preemptively acted by unveiling a new program that allowed banks to borrow funds backed by government securities in the case in which depositors were to rush and demand back their deposits because of the fear of a domino effect. This prevented the risk for banks of being forced to sell government bonds early and at a huge loss because of market conditions.

Concerns remain, however, for the technology sector, as the primary bank of reference for risky startups and tech companies collapsed. This situation is further exacerbated by the deterioration of economic conditions, especially for the tech sector, which, after the pandemic, experienced a decline in stock valuations and is now undergoing a venture capital funding drought because of the restrictive monetary policy.

Right after the fallout of SVB, doubts regarding the CBs' monetary policy stance arose. Many believed that the fear of a worsening of financial stability caused by such a rapid interest rate hike would have led central banks to review their decisions and stop raising rates. This, however, was not the case, as we have seen that, shortly after, the Fed and other central banks announced a further increase in rates.

### *2.3.3 An analysis of SVB's vulnerabilities*

So, how did SVB become the protagonist of one of the largest bank failures in the history of the United States? The reasons behind the bank's vulnerability must be sought in two factors: (i) the high proportion of uninsured deposits, as shown in *figure 7*, and (ii) the large proportion of deposits invested in hold-to-maturity securities (Economics Observatory, 2023).

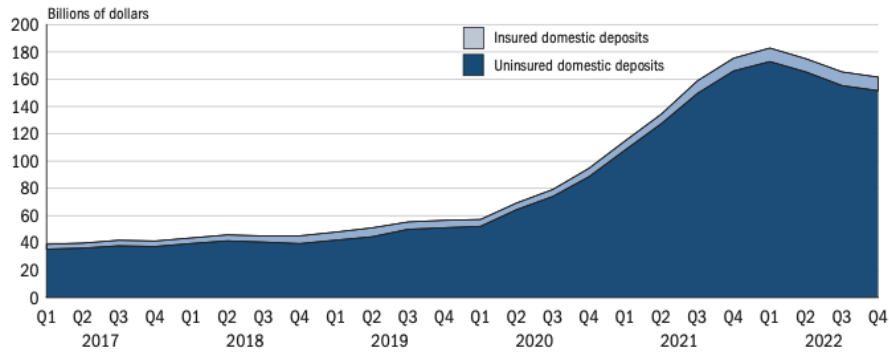


Figure 7: SVB deposit insurance coverage. Board of Governors of the Federal Reserve System. (2023, April). Re: Review of the Federal Reserve’s Supervision and Regulation of Silicon Valley Bank.

As anticipated, most of SVB’s deposits came from high-tech companies and thus were well in excess of the \$250,000 deposit insurance upper limit dictated by the FDIC in the United States. Although deposit insurance is a guarantee and serves as a deterrent for a bank run caused by small depositors, when the deposits involved are much higher than the upper limit covered by insurance, this measure does not stop big account holders from withdrawing their funds.

The second vulnerability is represented by the hold-to-maturity (HTM) securities in which SVB invested half of its assets. In the quest for yields in a period of very low interest rates, SVB invested in a \$120 billion portfolio of highly rated government-backed securities, of which \$91 billion were fixed-rate mortgage bonds carrying an average interest rate of 1.64% (Franklin et al., 2023). While the yield was slightly higher than that of short-term government debt, it locked the cash away for 10 years and contributed to the increase in the duration of the portfolio.

As soon as the rates rose, the value of the portfolio fell by \$15 billion, an amount almost equal to SVB’s total capital. These losses were realized once cash reserves and short-term liquid securities were exhausted and SVB was forced to sell a portion of its bond portfolio early. The combination of these two vulnerabilities led to the perfect storm for the bank as soon as depositors became aware of these flaws.

#### 2.3.4 Held-to-maturity vs. available-for-sale securities



Let us now discuss the nature of SVB's investments and examine the second factor that contributed to the institution's vulnerabilities. When banks purchase securities, they decide in advance whether they will hold the assets until maturity or not. Based on this choice, the securities will be denominated as *held-to-maturity (HTM)* or *available for sale (AFS)*, and they will differ as to how they will be treated from an accounting point of view. HTM securities are not marked to market, which implies that they are recorded at their original purchase cost and that any change in the market value does not affect the company's income statement. On the contrary, AFS assets are reported at fair value, making their value not constant, but rather allowing it to fluctuate over time and reflect the change in market valuation. While HTM securities provide safe, long-term investments, which are not subject to news events or industry trends, they have limited upside potential and effectively lock away the money invested for the period elapsing from the investment decision until the asset's maturity. This is why, investors who are looking for the potential of higher returns and have a greater risk appetite prefer AFS securities.

Through 2020, around three-quarters of banks' securities portfolios were held as AFS, bringing unrealized gains of \$38 billion across banks' AFS portfolios (Rubinstein, 2023). However, when interest rates started to rise after having been sitting on mark-to-market gains on their securities portfolios for a long time, many financial institutions reclassified their securities as HTM, recognizing the losses upfront but protecting their balance sheets from further losses as bond prices continued to fall. As rates went up, the unrealized losses of SVB snowballed from 0 to \$16 billion, well exceeding the \$11.8 billion of tangible common equity that supported the bank's balance sheet and consequently making the institution, on a marked-to-market basis, technically insolvent (Rubinstein, 2023). Tapping into its held-to-maturity securities portfolio was not an option, as the sale of a single bond would have triggered the whole portfolio being marked to market, which the bank didn't have the capital to cover. Instead, in order to shore up its balance sheet, SVB sold \$21 billions of available-for-sale securities and later announced a balance sheet restructuring to cover the \$1.8 billion loss. As it is well known, however, the capital raise never got done.

### 2.3.5 *The findings of the Fed on the SVB case*

On April 28, the Fed published the *Review of the Federal Reserve's Supervision and Regulation of Silicon Valley Bank*, the first official report on SVB's failure. The long-awaited document attributed the responsibility of the failure to the bank's management, but it also blamed the lessening of restrictions and oversight that resulted from the deregulation enacted by the US Congress in 2018. The report highlights four key factors that contributed to the bank's failure.

Firstly, SVB's Board of Directors and management failed to manage the risks faced by the bank. The lack of diversification among clients and the heavy reliance on uninsured deposits exposed Silicon Valley Bank to both rising interest rates and slowing activity in the technology sector. The combination of the two eventually materialized in early 2023. Moreover, the bank failed its own liquidity stress tests and lacked feasible contingency funding plans. In such a scenario, the board put short-run profits above effective risk management. Indeed, compensation packages for senior managers were tied to immediate gains, thus failing to adequately consider a sound risk management framework.

Secondly, supervisors did not recognize the importance of SVB's vulnerabilities as the bank grew significantly. The announcement of Moody's downgrade, in fact, came only in March 2023.

Thirdly, when supervisors identified the vulnerabilities, they did not put in place measures to ensure the quick fixing of the flaws within Silicon Valley Bank. Indeed, regulations provided a long transition period for the adjustment of SVB so as to meet the heightened standards. Overall, the supervisory approach focused on the continued cumulation of supportive evidence, and the first supervisory finding was issued only in November 2022 (Federal Reserve Board, 2023).

Lastly, over the same period during which SVB underwent rapid growth, there was a shift in the stance of supervisory policies, with a general ease of regulatory requirements and oversight over the banking system. In 2018, the Economic Growth, Regulatory Relief, and Consumer Protection Act (EGRRCPA) amended the Dodd-Frank Act, which had been enacted right after the great financial crisis. The amendment raised the minimum asset threshold for the application of enhanced prudential standards from \$50 billion to \$250 billion. This exempted SVB from stress

tests and tougher capital and liquidity requirements, which are now being blamed for being at the root of the banking crisis.

These four factors became evident as soon as the hawkish environment shaped by the CBs' monetary policy showed up. The rising rates impacted SVB in two complementary ways, with a decline in both deposits and in the value of long-term securities, which resulted in pressure on earnings and significant losses.

If, on the one hand, the review exposed flaws in the risk management practices of SVB and the regulatory framework, on the other, the Fed does not consider the precarious position of Silicon Valley Bank as representing the state of health of the entire banking system. In fact, in the review, SVB was defined as an “outlier” within the US banking system, described instead as “sound and resilient, with strong capital and liquidity”. What made the Californian bank an anomaly was: (i) the extent of its highly concentrated business model; (ii) the high interest rate risk; and (iii) the high level of reliance on uninsured deposits (Federal Reserve Board, 2023).

An important consideration was also given to the velocity with which the bank run developed. “The combination of social media, a highly networked and concentrated depositor base, and technology may have fundamentally changed the speed of bank runs” (Federal Reserve Board, 2023). Social media, in fact, allowed for the instantaneous spread of worries among depositors, while technology enabled account holders to withdraw their money with just a click.

# Chapter Three

The fallout from Silicon Valley Bank sparked fears of a domino effect within the banking system, starting in the US and eventually spreading elsewhere. SVB will probably be remembered as the emblem of the 2023 banking crisis, but it is just a piece of the puzzle. In fact, two other banks failed in just a few days in March, namely Silvergate Bank and Signature Bank. Moreover, two other important financial institutions became protagonists of government-brokered deals: Credit Suisse, which was acquired by UBS, and First Republic Bank, which was sold to JPMorgan Chase.

## 3.1 Credit Suisse rescue deal

The European bank that made the headlines the most was Credit Suisse, a global investment bank headquartered in Zürich, Switzerland. The Swiss institution, as of 2022, had SFr1.3 trillion in assets under management, making it the second largest bank in Switzerland, and for this reason it was regarded as a systematically important institution. At the time of the SVB collapse, the bank was already in a fragile position due to the several scandals and controversies of which it had become the protagonist in the last few years. The market panic coming from the US worsened its already precarious position.

On March 15, 2023, the Saudi National Bank, Credit Suisse's largest investor, ruled out the possibility of investing additional money in the institution. Although the main argument behind this decision seemed to be the reluctance to go above the 10% ownership threshold for regulatory reasons, the announcement was perceived by many as a vote of non-confidence, and, as a consequence, its stock declined by roughly 30% in one day. The Swiss National Bank decided to intervene by providing a SFr50 billion liquidity backstop in the form of an emergency line of credit. Despite the liquidity provision, however, daily withdrawals totaled 10 billion francs, and credit default swaps spiked, thus showing investors' concerns about the bank's risk of insolvency. UBS, the other major Swiss investment bank, was then ordered by regulatory authorities to plan an acquisition of Credit Suisse. The so-called "trinity", composed by the Swiss National Bank, the Swiss Financial Market Supervisory Authority (FINMA), and the minister of finance, reportedly

told Credit Suisse “You will merge with UBS and announce Sunday evening before Asia opens. This is not optional” (Morris et al., 2023).

A merger between the two biggest Swiss banks had been rumored for a long time, but the Swiss government had always been committed to a two-bank model. The change of stance was due to the public anger that arose after the great financial crisis, when UBS was rescued with taxpayers’ money rather than acquired. Indeed, as the deal was reached, the Swiss finance minister emphasized that the transaction was not a bailout but rather a “commercial solution” (Morris et al., 2023). In exchange for a bank whose reputation had been tarnished by several public scandals and lawsuits, UBS tried to find the best possible deal. At first, they were willing to offer \$1 billion in stock for the whole group, about SFr0.25 a share, far below the SFr1.86 closing price of that week. UBS ultimately boosted its offer to \$3.25 billion in stock, but negotiated to obtain more support from the state, including a SFr100 billion liquidity line from the Swiss National Bank and a government loss guarantee of up to SFr9 billion, in case of losses extending beyond the first 5 billion, which would have been borne by UBS (Morris et al., 2023). Additionally, FINMA announced that SFr16 billions of Credit Suisse’s additional tier 1 (AT1) capital bonds would have been written off in an attempt to instill greater confidence in the bank’s equity investors.

The quick acquisition was driven by the high pressure coming from global regulators, who were demanding fast and decisive actions to stop panic spreading in the markets. The need for a swift agreement led the Swiss government to introduce emergency legislation to strip shareholders of the right to vote on the deal. Such a choice, along with the cancellation of AT1 bonds, undoubtedly drew criticism and, as we shall see in a moment, resulted in legal actions.

### *3.1.1 The role of Additional Tier 1 bonds*

Additional Tier 1 bonds, or AT1s, are part of a group of capital bank securities known as Convertibles, or “CoCos”. They are bonds issued by a bank that contribute to the total level of capital to be held, as required by regulators. They are seen as the riskiest form of debt and, for this reason, are expected to yield high returns. Today, the size of the AT1 market is around \$260 billion (World Economic Forum, 2023).

This class of debt is designed to take losses when institutions are under stress and was introduced in the aftermath of 2008 as regulators established new and higher capital requirements for financial institutions. Their yields are higher than those of other forms of bank debt and similar corporate bonds, but they are also the first in line for losses should the bank run into trouble. They have become part of the vast regulatory framework designed to ensure that financial institutions are able to withstand severe economic environments without having to call on public money for bailouts.

An important feature of AT1s is their loss-absorbing mechanism, which is triggered once some capital ratio trigger levels are hit and results in the bonds being converted into equity or being completely written off. Additionally, AT1s are perpetual in nature and have no final maturity but are callable with regulatory approval, usually after a period of 5 to 10 years from their issuing. Their coupon payments are discretionary; hence, a non-payment is not considered a default, even if such a scenario is very rare and is eventually enforced by regulators as a consequence of losses and capital being eroded (TwentyFour, 2021). Regulators can decide to take action when they believe that a bank has hit the *point of non-viability* in order to protect the bank's depositors and prevent wider losses.

### *3.1.2 The wipeout of AT1s: A breach of the hierarchy of claims*

These instruments played a central role in Credit Suisse's acquisition by UBS. As part of the government-backed deal, FINMA announced a complete write-down of all of the bank's AT1 bonds, a decision that angered some investors. The fact that shareholders were paid \$3.25 billion by UBS as the deal was reached, while AT1 bondholders were left with nothing on their hands, gave rise to a wave of criticism and, for many, represented the first case of a reversal of the hierarchy of claims. The Credit Suisse transaction is reminiscent of the 2017 takeover of the Spanish lender Banco Popular, in which the bank's AT1 bonds were wiped out in what became the first example of the value of the hybrid asset class collapsing in the rescue of a European bank (Smith et al., 2023).

Legal action followed. On April 18, the law firm Pallas, on behalf of two groups of Credit Suisse bondholders, filed legal action against Finma over the emergency ordinance that prioritized shareholders over AT1 bondholders. The amount at stake is around \$1.7 billion, of which \$1.35 billion is on behalf of institutional investors and asset managers, and the other \$300 million is held by retail and family offices (Beioley & Walker, 2023). According to the law firm, Finma did not have the authority to issue an emergency ordinance that affected the write-down of the bonds and now claims that the ruling should be invalidated and the AT1 notes restated. In addition, around 80 Credit Suisse AT1 bond investors in Singapore are seeking to sue the Swiss government on the grounds that the write-down violated a free trade agreement. The law firm Wilmer Hale, which is in talks with the investors, is considering whether it is possible to argue that the move breached protections against unfair state actions under the Singapore-European Free Trade Association, signed with Switzerland in 2003 (Ruehl, 2023).

Several investors and analysts have argued that the contractual requirements for writing down the bonds were not met, despite the fact that the AT1 bonds issued by Credit Suisse included a warning that Swiss regulators "may not be required to follow any order of priority". Typically, AT1s can only be triggered when a "viability event" occurs, that is to say, when "customary measures" to increase the bank's capital adequacy are "inadequate or unfeasible" or the institution receives "an irrevocable commitment of extraordinary support from the public sector" to maintain its capital level, as specified in the bond prospectus (Beioley et al., 2023). Nonetheless, the Swiss government claimed that a change in the law had given it a "clearer legal basis" for writing down the bonds.

In a recent statement, the ECB distanced itself from the decision of the Swiss authority, confirming that AT1 holders should expect to be senior to shareholders and stating: "In particular, common equity instruments are the first ones to absorb losses, and only after their full use would Additional Tier 1 be required to be written down. This approach has been consistently applied in past cases and will continue to guide the actions of the SRB and ECB banking supervision in crisis interventions" (European Central Bank, 2023b). The stance of the Bank of England is in line with that of the ECB, as remarked by the BOE's governor, who stated: "In any resolution, we will always abide by the creditor hierarchy because that's a cardinal principle" (Asgari et al., 2023).

Now, investors warn that the riskiness of AT1 bonds, which was highlighted by the recent write-down, will cause a risk premium repricing of these instruments. The consequence will be that strong banks will continue to be able to access the market, while weaker ones will find it too expensive to do so and will in turn be forced to rely more heavily on other sources of capital in order to meet regulatory requirements.



## 3.2 JPMorgan's acquisition of First Republic Bank

On May 1, First Republic Bank, a US commercial bank catering to high-net-worth individuals, was sold to JPMorgan. The Californian institution became the protagonist of the second-largest bank failure in US history, after spooked depositors started withdrawing their money out of fear of bankruptcy. In the wake of the financial instability created by Silicon Valley Bank's collapse, First Republic was initially bailed out by the private sector, with a \$30 billion deposit injection coming from the 11 largest US banks. While the lifeline bought some time for regulators to evaluate the possible measures, depositors kept pulling money out of the bank and parking it in institutions that were deemed safer. Shares kept plummeting, especially after First Republic's release of its earnings results, which showed that the bank had borrowed heavily from the Federal Reserve. The regional bank lost more than \$100 billion in deposits, and its shares lost 97% of their value in just a few weeks (Lynch et al., 2023). Finally, the FDIC seized the institution and opened an auction for its sale. JPMorgan took the opportunity and bought it, enticed by the FDIC shared-loss agreement and by the possibility of expanding the bank's presence and building relationships with new customers.

### 3.2.1 *Renewed concerns over the "Too Big to Fail"*

One element that draws particular political attention is the fact that such a deal makes JPMorgan, already the nation's biggest bank, even bigger. In fact, the US behemoth, with more than \$3.2 trillion in assets, added an additional \$200 billion by acquiring First Republic. Normally, the law would not allow institutions that control more than 10% of national deposits to acquire other banks; however, First Republic's acquisition did not fall under such a restriction due to the fact that the acquired entity was failing (Lynch et al., 2023).

One of the most evident consequences of the 2023 banking crisis has been the deposit outflow from small regional banks to larger and safer institutions. This aspect, added to the fact that only a few institutions retain the financial power to complete sizable acquisitions, has reignited the "too big to fail" concerns. JPMorgan represents the most striking example, as it became the largest US bank and the world's largest by market capitalization as a result of multiple mergers and

acquisitions throughout the years, the last ones being the purchases of Bear Stearns and Washington Mutual in 2008 and now First Republic. While it was anticipated that the deal would have calmed the markets, some analysts and business leaders claimed that it would have an adverse effect on the long-term viability of the American economy.

The recent bank failures have sparked talks among lawmakers over the need for an enhanced regulatory framework. Much of the discussion has concerned the reinstatement of the original banking requirements as imposed by the Dodd-Frank Act of 2010 and the consequent stricter regulations on the banks below the current \$250 billion threshold. Another proposal being discussed is to increase the Federal Deposit Insurance Corporation's cap on deposits, currently at \$250,000, as it was done in the aftermath of the great financial crisis. Although guaranteed deposits help restore calm in markets and limit contagion, in the long run, however, they increase moral hazard and can lead banks to take on more risks.

### **3.3 A US accounting rule reform? Book value vs. fair value**

We have seen that, when banks purchase securities, they have to decide whether they plan to hold them until maturity or not, and based on this decision, the securities will be denominated as HTM or AFS. The main difference between the two is their accounting treatment, with the former recorded at book value and the latter recorded at fair value and hence marked to market.

In the wake of Silicon Valley Bank's collapse, US accounting rulemakers are being solicited to revise the way in which banks should value their assets in financial statements. The supporters of "fair value" accounting are pushing the Financial Accounting Standards Board to force banks to recognize unrealized losses on securities regardless of their intentions to hold the assets until maturity or not. According to the proponents, had SVB used fair value for their long-term market securities, the losses on the bond portfolio would have been evident to investors from the beginning and would have led the bank to shore up its finances before reaching a stress point.

In 2010, FASB had proposed an extension of the use of fair value on corporate balance sheets, but the idea was eventually rejected, with the then-Fed chair Ben Bernanke being among the ones who stood up against the proposal. Among the firm supporters of fair accounting in 2010 there was also the CFA Institute, a professional organization for investors that recently urged FASB to "eliminate 'hide-'til-maturity' accounting", affirming that "the hold-to-maturity classification only makes it harder for investors and depositors to see what's really going on" (Foley, 2023). Opponents of the rule change in 2010 asserted that unrealized gains and losses are irrelevant on loans and securities that are held for the full length of their life and that fair value requirements would make US records harder to compare with those prepared using international standards (Foley, 2023).

### 3.4 US and Europe: Structural differences with respect to the crisis

There has been much discussion on whether the crisis initiated in the United States would have eventually propagated in Europe, and the fear of a domino effect on the old continent led to a coordinated response by other central banks together with the Fed. However, there are some structural differences between Euro area and US banks that can help us understand the potential negative spillover effects of the SVB failure on Europe.

In the balance sheets of European banks, debt securities represent a smaller part, with just 12% of the total compared to 30% of US commercial banks (Moody's Investors Service, 2023). Of these, around 40% of European banks' holdings are government securities, compared to 80% for US banks. Moreover, deposits in Europe have grown far less rapidly, as shown in *figure 8*, and for this reason they are considered to be more stable. The strong cash balances at the ECB, which total about 16% of assets, are then another factor of reassurance for European banks that they are not running the risk of having to sell their securities and realize losses.

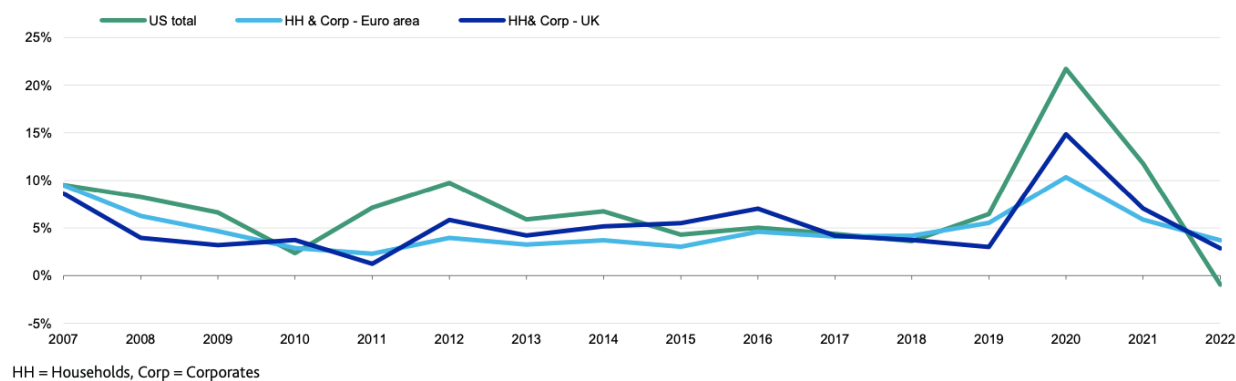


Figure 8: Deposit inflows during the pandemic. Moody's Investors Service. (2023, March). European bank balance sheet structure limits contagion from distressed US banks.

It is true, however, that the ECB likely has further to go in its tightening cycle than the Fed, so the full effects of the restrictive monetary policy may still lie ahead for European banks.

### 3.5 The future of the banking sector: Analysis of the current environment and potential directions

Even though the last months have been the most frantic for banks since the great financial crisis, the US banking sector enjoyed all-time high profits of around \$80 billion in Q1 2023, up 33% from the previous year (Gandel, 2023). About half of the increase derives from the gains reported by First Citizens and Flagstar for the acquisitions of SVB and Signature Bank, respectively, which were put under receivership by the FDIC and later sold at a discount. First Citizens alone, thanks to the FDIC-brokered auction to take over SVB's banking business, recorded a \$9.5 billion profit in the first quarter, making it the second-most profitable US bank, right after JPMorgan (Franklin, 2023). UBS has recently reported in a regulatory filing that it expects to make a \$35 billion gain as a result of the acquisition of Credit Suisse, the largest bank deal since the financial crisis. The gain, referred to as *negative goodwill*, is the difference between the fair value of the net assets and the acquisition price. Nevertheless, UBS announced that it has set aside a fraction of the gain to cover regulatory and litigation matters arising from the controversial write off of AT1 bonds (Walker & Morris, 2023).

The remaining increase in profits comes from the higher interest rates, which increased the interest profit margin of financial institutions. However, the profits are unlikely to continue growing as banks need to pay higher rates to compensate depositors. A sign of this change has been the 10-fold increase in aggregate interest expense for all banks, up to \$85 billion in the first quarter (Gandel, 2023). Additionally, banks will probably need to face extra fees to recoup the costs caused by the financial turmoil. The FDIC has recently announced a plan to recover the losses caused by the rescue of SVB and Signature Bank. The proposal provides for a \$16 billion bill to be paid by the largest US banks in extra fees over two years starting in 2024, with 95% of the total cost funded by financial institutions with over \$50 billion in assets, while exempting the smallest ones (Masters et al., 2023).

The worst of the banking crisis seems to be behind us, but financial markets are still under pressure. Banks continue to borrow money from the Fed in order to maintain their liquidity (see *figure 9*),

and depositors are still fleeing small banks and parking their money in bigger institutions, albeit at slower rates than before.

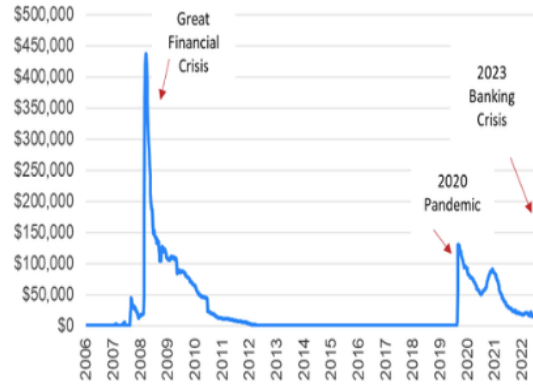


Figure 9: Total Federal Reserve Bank Credit. The Conference Board. (n.d.). 2023 Banking Crisis: US By the Numbers, Update 1.

The trend of the VIX index, a measure of the stock market’s expectation of volatility, suggests greater investors’ confidence compared to the start of the pandemic shutdowns in 2020, as shown by *figure 10*.

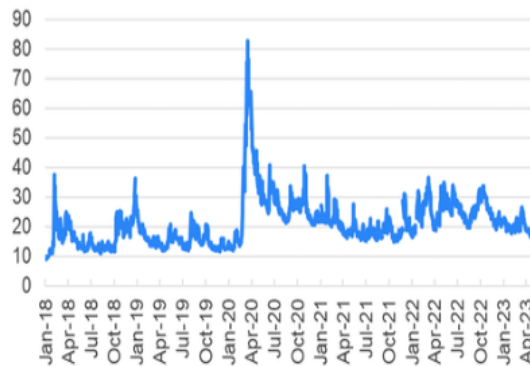


Figure 10: CBOE Market Volatility Index, VIX. The Conference Board. (n.d.). 2023 Banking Crisis: US By the Numbers, Update 1.

An additional element of assurance is represented by the spreads of corporate investment-grade and high-yield debt to US Treasury securities, which remain narrow, thus suggesting an abundance of market liquidity (The Conference Board, n.d.). Nonetheless, even though there are no impediments to businesses or corporations’ ability to borrow over the short term, history has shown

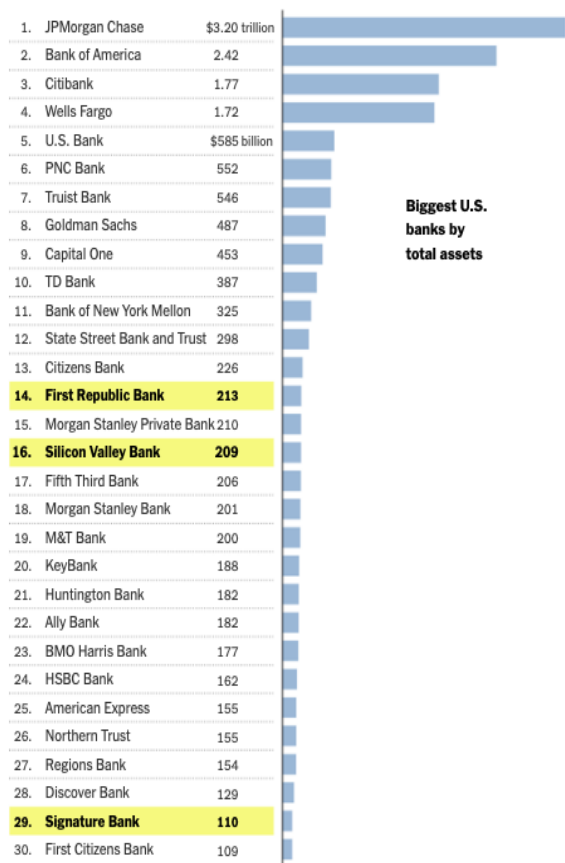
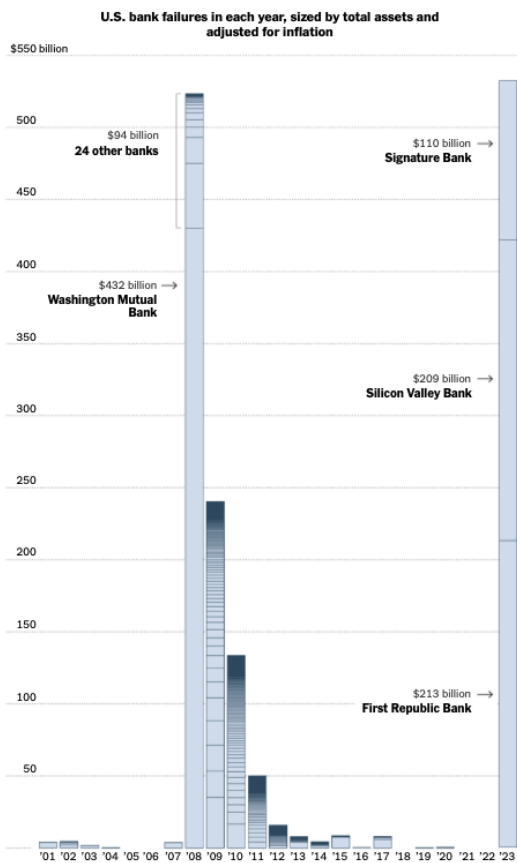
us that cash can dry up quickly in a panic and that during financial distress the risk of a credit crunch always lies around the corner.

In the coming months and years, we shall expect a wave of regulation of the banking system and a review of the banks' risk management playbooks. The experience of Silicon Valley Bank has once again highlighted the importance of an effective and solid risk management framework as well as the need for greater supervision by regulators. SVB failed to understand the spillover implications across different risk types, mainly interest rate and liquidity risks, which hardly hit the bank because of its concentrated client base. Reverse stress testing, which implies considering what it will take to "break the bank", could be an effective way to better understand the interconnectedness and correlation of various risk types (Boston Consulting Group, 2023). Additionally, concentration risk should be given greater emphasis, especially in the age of social media, when the pace and coordination with which depositors run to the bank are unprecedented.

Federal Reserve regulators are now reexamining the risks of uninsured deposits and considering whether stricter requirements should once again be placed on mid-sized banks with assets between \$100 billion and \$250 billion. Numerous of these modifications, particularly the one regarding the re-extension of stress testing requirements on banks with less than \$250 billion in assets, were described in the Federal Reserve's review of SVB supervision.

# Conclusion

Starting in March, the banking sector underwent a period of turbulence that witnessed the demise of multiple financial institutions with impressive speed. First Republic, Silicon Valley Bank, and Signature Bank now rank as the second, third, and fourth largest failures in US history, after the remarkable collapse of Washington Mutual during the great financial crisis of 2008. The numbers and bar charts reported below are a testament to the scale of the crisis we are experiencing. Comparing the current numbers with those of the subprime mortgage crisis, the combined assets of the three recently failed banks total \$532 billion, exceeding the \$526 billion held by the 25 ill-fated banks in 2008 (see figure 11).



Figures 11 and 12: 2023 banking crisis in numbers. Russell, K., & Zhang, C. (2023, May). *First Republic, Silicon Valley Bank and Signature: How Banking Failures Compare*. *The New York Times*.

The failed banks were similar in many regards: they grew rapidly using short-term funding, they invested heavily in long-term bonds and mortgage-backed securities, and hence they were exposed



to large unrealized losses due to rising interest rates. Adding to that, what led depositors to withdraw their funds en masse and in a coordinated fashion was the highly concentrated client base, the high levels of uninsured deposits, and the role played by social media in the spread of panic. Furthermore, poor risk management practices, the loosening of regulatory requirements, and lax supervision by the US Federal Reserve were among the other underlying causes blamed in the official report on SVB's failure published by the Fed.

In response to widespread concerns about potential systemic risks stemming from bank runs, central banks and other regulatory bodies unveiled a series of measures aimed at restoring calm in financial markets, such as guaranteeing deposits in full, providing liquidity backstops, and promptly implementing bank resolutions of institutions in distress. Although these measures seem to have helped stabilize the banking sector, they have come at a cost, with great controversy around the wipeout of AT1 bonds in Credit Suisse's acquisition and renewed concerns over "too big to fail" institutions in the context of JPMorgan's acquisition of First Republic.

Now, one of the main concerns is that the ongoing banking unease will manifest in a credit crunch, with a tightening of lending standards and a reduction of credit availability, especially from regional and small-sized banks. This would have an immediate impact on small businesses and low-income households, who heavily rely on these institutions. The past months have featured a deposit flight away from small to big banks as worried depositors pulled money from local institutions and parked it in larger ones, deemed safer. While regional banks may lack brand recognition, they are of crucial importance for the economy nonetheless, as they provide credit to SMEs and the commercial real estate sector, which is already grappling with the challenges arising from the interest rate hikes that followed the Covid-19 pandemic.

In conclusion, although the worst seems to be over, financial markets continue to face pressure. The collapse of Silicon Valley Bank has underscored the fragility of the banking system and prompted regulators to reevaluate and enhance regulatory measures. As financial institutions face ongoing challenges and potential risks, it is crucial for regulators to implement effective oversight and risk management practices to safeguard the stability and resilience of the banking sector.

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