

Foundations of Banking Risk

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1.2.3 Central Banks

Central banks are the principal monetary authority of a country or a group of countries and are crucial to the functioning of all banks, financial markets, and the economy. Central banks manage the amount of money and credit in an economy—usually in an effort to contain inflation rates and/or to foster economic growth. They typically accomplish this through their daily activities of buying and selling government debt, determining and maintaining core interest rates, setting reserve requirement levels, and issuing currency. Some central banks are also charged with maintaining certain foreign exchange rate levels for the home currency. Central banks also arrange payments between banks and act as regulators and supervisors for banks within a country. In their regulatory capacity, central banks supervise other banks and focus on the safety and soundness of its country's financial system. Examples of central banks include the European Central Bank (European Union), the Bank of England (United Kingdom), Bank of Japan (Japan), the People's Bank of China (China), and the Federal Reserve System (United States).

An **interest rate** is the price of credit, or the rate a lender charges a borrower for using borrowed funds. The **inflation rate** is the change in the purchasing value of money.

EXAMPLE

BankCredit lends EUR 1,000,000 to Compagnie Petit, a French corporation. In exchange for using these funds, the bank charges 6% interest rate per year. At the end of the year, Compagnie Petit must pay EUR 60,000 in interest to the bank as well as repay the original EUR 1,000,000.

At the beginning of the year, Jean Molineaux paid EUR 100 for various groceries at the store. At the end of the year, the same groceries at the same store cost EUR 105. Since the price of the same groceries increased 5% during the year, the purchasing power of the money declined by approximately 5%. This decline in purchasing power is the inflation rate.

1.3 BANKING RISKS

There are multiple definitions of risk. Each of us has a definition of what risk is, and all of us recognize a wide range of risks. Some of the more widely discussed definitions of risk include the following:

- The likelihood an undesirable event will occur
- The magnitude of loss from an unexpected event
- The probability that “things won't go right”
- The effects of an adverse outcome

Banks face several types of risk. All the following are examples of the various risks banks encounter:

- Borrowers may submit payments late or fail altogether to make payments.
- Depositors may demand the return of their money at a faster rate than the bank has reserved for.
- Market interest rates may change and hurt the value of a bank's loans.
- Investments made by the bank in securities or private companies may lose value.
- Human input errors or fraud in computer systems can lead to losses.

To monitor, manage, and measure these risks, banks are actively engaged in risk management. In a bank, the **risk management** function contributes to the management of the risks a bank faces by continuously measuring the risk of its current portfolio of assets and other exposures, communicating the risk profile of the bank to other bank functions and by taking steps either directly or in collaboration with other bank functions to reduce the possibility of loss or to mitigate the size of the potential loss.

From a regulatory perspective, the size and risk of a bank's assets are the most important determinants of how much **regulatory reserve capital** the bank is required to hold. A bank with high-risk assets faces the possibility that those assets could quickly lose value. If the market—depositors—perceives that the bank is unstable and deposits are in peril, then nervous depositors may withdraw their funds

Sample Chapter

from the bank. If too many depositors want to withdraw their funds at the same time, then fear that the bank will run out of money could break out. Section 3.1 discusses how bank runs occur. And when there is a widespread withdrawal of money from a bank, the bank may be forced to sell its assets under pressure. To avoid this, regulators would want a bank with high-risk assets to have more reserves available. Therefore, understanding banking regulation requires understanding financial risk management.

This section introduces the various types of risk a bank may face and provides examples that demonstrate each risk. Later chapters explore these risks and their regulatory implications in more detail. The risks discussed below are those identified by the **Basel Accords**, the cornerstone of international risk-based banking regulation. The Basel Accords, described in greater detail in Section 3.3 and throughout the book, are the result of a collaborative attempt by banking regulators from major developed countries to create a globally valid and widely applicable framework for banks and bank risk management.

The Basel II Accord, the most recent of these accords, focuses on three types of risk:

1. Credit risk
2. Market risk
3. Operational risk

The Basel Accord also recognizes that there are other types of risk that may include these different core risk types (see Figure 1.4).

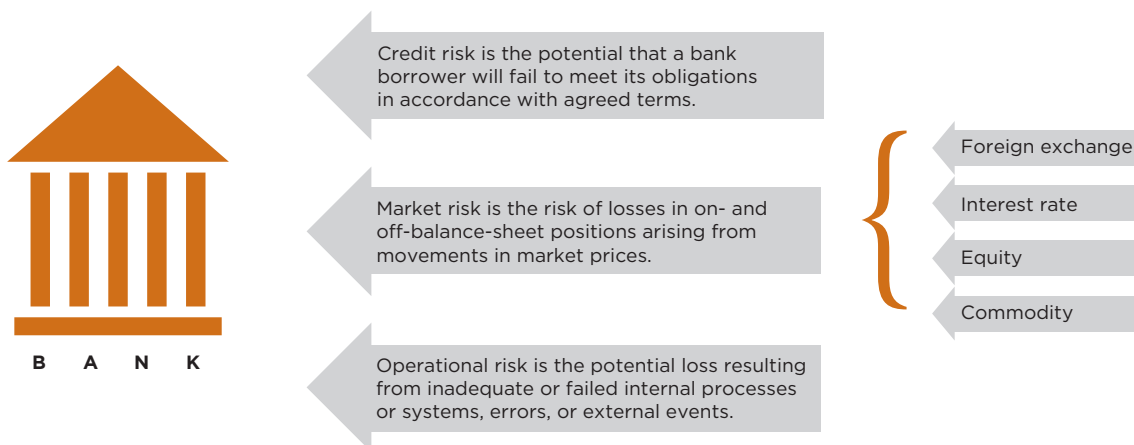
1.3.1 Credit Risk

Credit risk is the potential loss a bank would suffer if a bank borrower, also known as the counterparty, fails to meet its obligations—pay interest on the loan and repay the amount borrowed—in accordance with agreed terms. Credit risk is the single largest risk most banks face and arises from the possibility that loans or bonds held by a bank will not be repaid either partially or fully. Credit risk is often synonymous with default risk.

EXAMPLE

In December 2007, the large Swiss bank UBS announced a loss of USD 10 billion due to the significant loss in value of loans made to high-risk borrowers (subprime mortgage borrowers). Many high-risk borrowers could not repay their loans, and the complex models used to predict the likelihood of credit losses turned out to be incorrect. Other major banks all over the globe suffered similar losses due to incorrectly assessing the likelihood of default on mortgage payments. This inability to assess or respond correctly to this risk resulted in many billions of U.S. dollars in losses to companies and individuals around the world.

Figure 1.4 Bank risks



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Default risk affects depositors as well. From the depositors' perspective, credit risk is the risk that the bank will not be able to repay funds when they ask for them.

The underwriting process aims to assess the credit risk associated with lending to a particular potential borrower. Chapter 5 contains a detailed description of the underwriting process. Once a loan is underwritten and the credit is received by the customer, the loan becomes a part of the bank's **banking book**. The banking book is the portfolio of assets (primarily loans) the bank holds, does not actively trade, and expects to hold until maturity when the loan is repaid fully. Section 2.2 discusses the banking book further. A bank's credit risk is the aggregate credit risk of the assets in its banking book.

1.3.2 Market Risk

Market risk is the risk of losses to the bank arising from movements in market prices as a result of changes in interest rates, foreign exchange rates, and equity and commodity prices. The various components of market risk, and the forces that give rise to them, are covered more extensively in Chapter 6. The components of market risk are as follows:

- **Interest rate risk** is the potential loss due to movements in interest rates. This risk arises because bank assets (loans and bonds) usually have a significantly longer maturity than bank liabilities (deposits). This risk can be conceptualized in two ways. First, if interest rates rise, the value of the longer-term assets will tend to fall more than the value of the

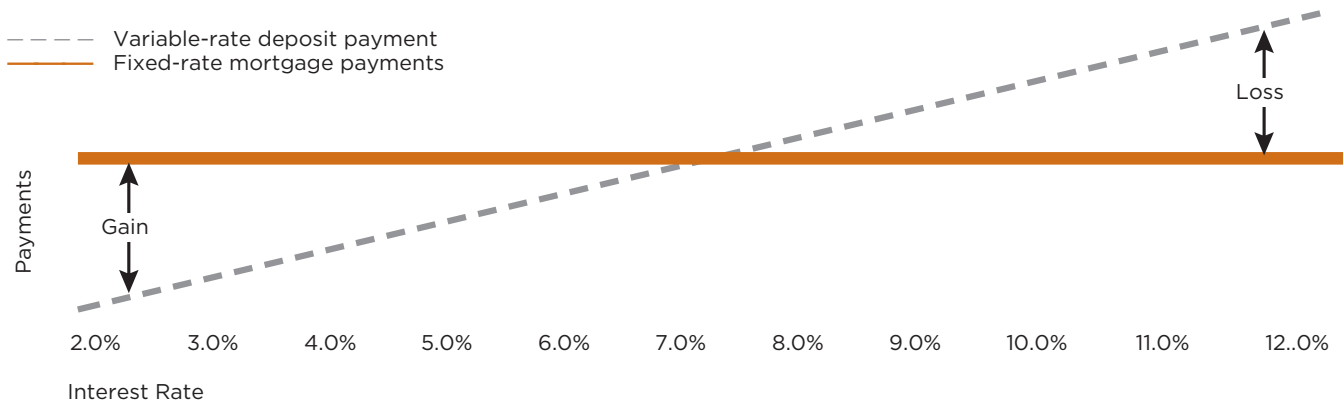
shorter-term liabilities, reducing the bank's equity. Section 2.2 discusses bank assets, liabilities, and equity further. Second, if interest rates rise, the bank will be forced to pay higher interest rates on its deposits well before its longer-term loans mature and it is able to replace those loans with loans that earn higher interest rates.

EXAMPLE

American savings and loans (S&Ls), also called thrifts, are essentially mortgage lenders. They collect deposits and underwrite mortgages. During the 1980s and early 1990s, the U.S. S&L system underwent a major crisis in which several thousand thrifts failed as a result of interest rate risk exposure.

Many failed thrifts had underwritten longer-term (up to 30-year) fixed-rate mortgages that were funded by variable-rate deposits. These deposits paid interest rates that would reset, higher or lower, based on the market level of interest rates. As market interest rates increased, the deposit rates reset higher and the interest payments the thrifts had to make began to exceed the interest payments they were receiving on their portfolios of fixed-rate mortgages. This led to increasingly large losses and eventually wiped out the equity of thousands of S&Ls and led to their failure. As shown on the next page in Figure 1.5, as interest rates rose, the payments the S&Ls had to make on variable rate deposits became larger than the payments received from the fixed rate mortgage loans leading to larger and larger losses.

Figure 1.5 Gains vs. losses for American S&Ls as interest rates rise



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- **Equity risk** is the potential loss due to an adverse change in the price of stock. Stock, also referred to as shares or equity, represent an ownership interest in a company. Banks can purchase ownership stakes in other companies, exposing them to the risk of the changing value of these shares.

EXAMPLE

As the functionality and use of the Internet expanded in the late 1990s, stock prices in technology and Internet sector companies (known as dot-coms) increased rapidly. Interest in these companies grew and pushed stock prices higher and higher, in part driven by speculation of future increases. Unfortunately, from March 2000 to October 2002, this dot-com bubble burst, and the stock price of many of these companies including Amazon, Dell, AOL (America Online) and Yahoo! fell markedly, resulting in shareholder losses of 50% or more.

- **Foreign exchange risk** is the risk that the value of the bank's assets or liabilities changes due to currency exchange rate fluctuations. Banks buy and sell foreign exchange on behalf of their customers (who need foreign currency to pay for their international transactions or receive foreign currency and want to exchange it to their own currency) or for the banks' own accounts.

EXAMPLE

Early in 1992, Swedish companies found it increasingly difficult to obtain credit. Because interest rates were high and the banking system was strained, banks that could lend funds charged high interest rates. Many SMEs turned to the Swedish banks for foreign currency loans; at the time, foreign interest rates were lower than domestic interest rates. Both the banks and the borrowers were willing to assume the currency exchange risk in order to obtain the foreign loans and their lower interest rates. At that time, the Swedish krona (SEK) had a stable exchange rate, linked to the ECU, a basket of European currencies, and there was no expectation that it would change.

But later that year—November 19, 1992—the Swedish government, after a lengthy and expensive struggle to maintain the

strength of its currency, effectively devalued the currency, and allowed the SEK to float freely against other currencies by removing the linkage between the SEK and the ECU. The value of the SEK fell significantly, approximately 10% against the major currencies.¹ On November 19, 1992, therefore, it took 10% more SEK for Swedish companies to make the interest payments on their foreign currency loans than it did the day before. While the interest rates on these loans did not change, the amount of SEK the borrower had to have to repay them increased by 10% because the value of the currency was 10% lower. (For example, a SEK 10 interest payment became a SEK 11 interest payment.) While a 10% change may not seem like much, it presented a significant hardship to some borrowers—particularly for those companies that did not generate foreign currency revenue. As a result, many small and medium-sized companies in Sweden failed, making an already weak banking system and economy even more unstable.

- **Commodity risk** is the potential loss due to an adverse change in commodity prices. There are different types of commodities, including agricultural commodities (e.g., wheat, corn, soybeans), industrial commodities (e.g., metals), and energy commodities (e.g., natural gas, crude oil). The value of commodities fluctuates a great deal due to changes in demand and supply.

EXAMPLE

During the 1970s, two American businessmen, the Hunt brothers, accumulated 280 million ounces of silver, a substantial position in the commodity. As they were accumulating this large position—approximately 1/3 of the world's supply—the price of silver rose. For a short period of time at the end of 1979, the Hunt brothers had "cornered" the silver market and effectively controlled its price. Between September 1979 and January 1980, the price of silver increased from USD 11 to USD 50 per ounce, during which time the two brothers earned an estimated USD 2 to 4 billion as a result of their silver speculation. At its peak, the position held by the brothers was worth USD14 billion. Two months later, however, the price of silver collapsed to USD 11 per ounce, and the brothers were forced to sell their substantial silver holdings at a loss.

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Market risk tends to focus on a bank's **trading book**. The trading book is the portfolio of financial assets such as bonds, equity, foreign exchange, and derivatives held by a bank to either facilitate trading for its customers or for its own account or to hedge against various types of risk. Assets in the trading book are generally made available for sale, as the bank does not intend to keep those assets until they mature. Assets in the bank's banking book (held until maturity) and trading book (not held until maturity) collectively contain all the various investments in loans, securities, and other financial assets the bank has made using its deposits, loans, and shareholder equity. Distinguishing between the trading and banking books is essential for how the banks operate and how they manage their risks. The Basel Accord does not provide a definition for the term banking book; this is an important and easily forgotten point. In effect, what is included in the banking book is what is not included in the bank's trading book, which is defined by the Basel II Accord. The trading and banking books will be the subject of discussion in later chapters (see Section 2.2).

1.3.3 Operational Risk

Operational risk is the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events. This definition includes legal risk, but excludes strategic and reputational risk.

EXAMPLE

In 1995, Baring Brothers and Co. Ltd. (Barings) collapsed after incurring losses of GBP 827 million following the failure of its internal control processes and procedures. One of Baring's traders in Singapore hid trading losses for more than two years. Because of insufficient internal control measures, the trader was able to authorize his own trades and book them into the bank's systems without any supervision. The trader's supervisors were alerted after the trades started to lose significant amounts of money and it was no longer possible for the trader to keep the trades and the losses secret.

Compared to credit and market risk, operational risk is the least understood and most challenging risk to measure, manage, and monitor. There is a wide range of loss events that can be categorized as operational risk events. Chapter 7 discusses how banks measure and manage the different types of operational risks they are exposed to as part of the banking business.

1.3.4 Other Risk Types

Beyond the three main types of risk—credit, market, and operational—there are other risks banks face and must manage appropriately. Here is a listing of some of them:

- **Liquidity risk** relates to the bank's ability to meet its continuing obligations, including financing its assets. Liquidity risk will be discussed in greater detail in Chapters 3 and 6.

EXAMPLE

In August 2007, Northern Rock, a bank focused on financing real estate in the United Kingdom, announced that it needed emergency funding from the Bank of England. Northern Rock was a relatively small bank that did not have a sufficient depositor base to fund new loans from deposits. It financed new mortgages by selling the mortgages it originated to other banks and investors and by taking out short-term loans, making it increasingly vulnerable to changes in the financial markets. How much financing Northern Rock could raise depended on two factors. The first was the demand for mortgages it originated to sell to other banks. The second was the availability of credit in the credit market to finance these mortgages. Both of these depended on how the overall banking marketplace, particularly the availability of funding to finance lending, was performing. When the credit markets came under pressure in 2007, the bank found it increasingly difficult to sell the mortgages it had originated. At the same time, Northern Rock could not secure the required short-term financing it required. Effectively Northern Rock could not finance its assets, was unable to raise new funds, ran out of money, and, notwithstanding the emergency financing from the Bank of England, was ultimately taken over by the government.

1. For example, on October 5, 1992, when the SEK was linked to the ECU, one USD cost SEK 5.30. On December 23, 1992, after the SEK was allowed to float, one USD cost SEK 7.12. The value of the SEK declined relative to the USD by 34% in the fall of 1992.

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- **Business risk** is the potential loss due to a decrease in the competitive position of the bank and the prospect of the bank prospering in changing markets.

EXAMPLE

In the mid-1990s, BestBank of Boulder, Colorado (USA), attempted to build its credit card loan portfolios quickly by issuing cards to many low-quality, “subprime,” borrowers. Unfortunately, too many low-quality borrowers failed to pay their BestBank credit card debts. In July 1998, BestBank was closed after incurring losses of about USD 232 million. This serves as a classic example of a bank seeking to grow its business by lending money to high-risk customers: Although the bank was apparently generating high returns for a period of time, it failed to adequately provide for and guard against bad debts in its business strategy.

- **Reputational risk** is the potential loss resulting from a decrease in a bank’s standing in public opinion. Recovering from a reputation problem, real or perceived, is not easy. Organizations have lost considerable business for no other reason than loss of customer confidence over a public relations problem, even with relatively solid systems, processes, and finances in place.

EXAMPLE

In early 1991, Salomon Brothers, then the fifth largest investment bank in the United States, was caught submitting far larger purchase orders for U.S. government debt than it was allowed. When the U.S. government borrows funds, it sells the debt at an auction and invites selected banks to purchase these securities, called Treasuries. To ensure that Treasuries are correctly priced and all investors willing to lend money to the U.S. government receive a fair price and interest rate, each bank invited to bid at this auction can only purchase a limited amount of the securities. By falsifying names and records, Salomon Brothers amassed a large position in the Treasuries, ultimately controlling the price investors paid for these securities. When its illegal activities became known, the price of Salomon shares dropped significantly, and there were concerns in the financial markets about Salomon’s ability to continue doing business.

Salomon Brothers suffered considerable loss of reputation that was only partially restored by Warren Buffett, a well-respected U.S. investor, who injected equity in the firm and took a leadership role in the firm. The U.S. government subsequently fined Salomon Brothers USD 290 million, the largest fine ever levied on an investment bank at the time.

1.4 FORCES SHAPING THE BANKING INDUSTRY

There are numerous other aspects of banking that have not been covered in this chapter but will be briefly touched upon in later parts of the book—either directly or as part of a discussion about other topics.

- *Regulation, deregulation, and globalization.* Deregulation led to a relaxing of restrictive banking regulations in many countries around the globe. This allowed many banks to compete against each other and with other financial services providers with less direct government oversight and more freedom in how they structured their businesses. The theory behind the movement resulting in less oversight was that increased competition among banks would increase their bank efficiency. Deregulation puts market pressures on banks from organizations that offer similar banking services. Additionally, it was felt that banks would, in their own self-interest, effectively regulate themselves with little need for heavy-handed oversight from government regulators. The reasoning is that it is in the bank’s self-interest to ensure they functioned properly to compete in an increasingly competitive world. However, as it became apparent in 2008, banks were unable to police themselves effectively. Their lack of discipline resulted in a virtual collapse of the global financial system. It has also become clear that many banks are now considered “too big to fail” due to their global connectivity and importance to the worldwide financial system. Now, governments are considering numerous banking regulation reforms and are, for the first time, considering adopting some type of cooperative system to allow for the rapid sharing of information among world financial regulators with the intent of more proactively addressing future financial services-related risks and issues.