

Foundations for Determining the Link between Risk Management and Value Creation in Banks

Risk management in banking and insurance is not a new phenomenon. Dealing with risk has always been the *raison d'être* of financial intermediation and its underlying principle.¹ However, risk analysis—although well established from an individual investor's perspective in the context of modern portfolio theory²—was not well determined and rigorously analyzed on an industry or bank level until very recently.

This is also true for viewing risk-management activities in banks from a risk-return perspective and, hence, in the context of value creation—which should be for banks, as for any other company, the firm's ultimate objective. Given the central role of risk in banks, in order to use risk management the right way, it is crucial to understand its impact on and the relationship of risk management to the overall firm value.

We are going to lay the theoretical foundations for the detailed analysis of this link between risk management and value creation in banks in this chapter. We will first discuss value maximization in a banking context. Second, we will define risk and its management and will then discuss its importance in banks. Third, we will evaluate which goals risk management can have and which instruments are available to conduct risk management in banks. We will close this chapter by briefly reviewing the empirical evidence on the link between risk management and value creation.

¹See Scholtens and van Wensveen (2000), p. 1247.

²As first introduced by Markowitz (1952) and (1959).

VALUE MAXIMIZATION IN BANKS

In this section, we will investigate if and how value maximization should be the ultimate objective of banks, how value creation is currently measured, and what problems can be related to this approach.

Value Maximization as the Firm's Objective

The last decade has witnessed a revolution in the relationship of corporations to their owners. It is now almost universally³ recognized that a firm's general objective is to create value for its shareholders by maximizing the firm's value.⁴ If companies underperform (i.e., do not maximize shareholder value), hostile takeovers⁵ and corporate raiders⁶ frequently force out underperforming management. Investor activism, especially from activist shareholder groups and institutional investors, is on the rise.⁷ This so-called "market for corporate control"⁸ is becoming more and more efficient and has forced corporations and banks to focus on economic rather than accounting measures. This is due to the fact that many studies⁹ provide empirical evidence that cash-flow-based, that is, economic measures, seem to show a higher correlation with stock price performance, companies' market values, and, hence, shareholder value than traditional accounting measures.¹⁰

This development assumes that firms (including banks) should also do what shareholders would do in their own interest: maximize their end-of-period wealth.¹¹ However, from an economic point of view, this general firm objective is not immediately obvious, because firms are only a means rather than an end in modern finance theory.

The ultimate goal of any economic activity is to maximize an individual's

³At least in the Anglo-American countries.

⁴See, for example, Damodaran (1997), p. 5.

⁵With the Mannesmann-Vodafone deal, a new cross-border dimension of hostile takeovers was reached in Europe.

⁶As first described by Burrough and Helyar (1990) as "barbarians at the gate."

⁷This development can be summarized as either being able to restructure the business from the inside or being forced to restructure from the outside. As a recent example, "Cobra" and its role in the Commerzbank merger talks can be mentioned. See, for example, FAZ (2000), p. 23.

⁸See Jensen (1993), pp. 850–852.

⁹See, for example, Stewart (1991), pp. 72 and 217, and Copeland et al. (1994), p. 83.

¹⁰See Friedrich et al. (2000), p. 31. However, this result is little surprising since these methods are used by almost the entire analyst and investment community, which "makes" the markets.

¹¹See Brealey and Myers (1991), p. 22.

utility, as described in the Arrow-Debreu neoclassical market theory. In this world, an investor's utility is determined by the stream of income available for consumption, which is characterized by three dimensions:¹²

- Its absolute value(s)
- The time of occurrence (time structure)
- Its uncertainty (risk characteristics)

Any investment is an economic activity that gives up some of this stream of consumption in order to increase consumption in the future, which is uncertain. Therefore, the decision rule for any economic activity should be whether an investment increases the utility that the investor hopes to extract in the form of consumption from the investment's future income stream, while considering preferences with regard to the time structure and uncertainty of this income stream.¹³

However, as Fisher has already shown in 1930,¹⁴ the capital-investment decision can be separated from the individual's preferences with respect to current versus future consumption.¹⁵ The optimal investment decision, therefore, only needs to maximize the expected utility over the planning horizon of the decision maker.¹⁶ This in turn is equivalent to the maximization of the net present value of wealth, because shareholders can transform that wealth into their preferred time pattern of consumption with their desired risk characteristics as long as they have frictionless access to capital markets. Hence—at least in the classical world, with no agency or transaction costs and perfectly efficient markets—it is correct that the objective of the firm is to maximize the wealth of its shareholders by trying to maximize the stock price.¹⁷

In this world, the net present value (NPV)¹⁸ criterion for capital-budgeting decisions is consistent with shareholder wealth maximization, and managers should—on behalf of the firm¹⁹—pursue all investment opportu-

¹²See Schmidt and Terberger (1997), p. 49.

¹³See Schmidt and Terberger (1997), pp. 48–49.

¹⁴See Fisher (1965).

¹⁵See, for example, Brealey and Myers (1991), p. 22, also commonly referred to as Fisher separation.

¹⁶See Copeland and Weston (1988), p. 17. In many cases this means to maximize the present value of the shareholder's lifetime consumption.

¹⁷See Copeland and Weston (1988), pp. 17–18. Strictly speaking shareholders try to maximize total return, that is, stock price plus dividends.

¹⁸As long as the discount rate is chosen appropriately and any real options are valued correctly.

¹⁹While neglecting their own preferences.

nities that have a positive NPV. In turn, the discounted cash flow of the firm²⁰ can be used to estimate the value of a firm:

$$\text{Firm Value} = \sum_t \frac{E(CF_t)}{(1+r_t)^t} \quad (2.1)$$

According to Equation (2.1), the value of a firm is the present value of its expected (future) cash flows $E(CF_t)$ ²¹ in each period t , discounted at the appropriate rate r_t reflecting the riskiness and the timing of the cash flows as well as the financing mix,²² that consequently can affect the discount rate and the expected cash flows.²³

However, there is some disagreement as to whether the firm's objective should be to maximize the wealth of shareholders or that of the firm.²⁴ If the objective is to maximize shareholder value, this can potentially lead to conflicts of interest between shareholders and debt holders as well as between shareholders and managers.²⁵ It is especially this last point that relaxes the assumption that all decisions by the firm are always made in the best interest of the shareholders, because in most of the cases these decisions are made by managers who are pursuing their own goals instead. These problems,²⁶ however, can only occur in less than perfect markets—which

²⁰See Copeland and Weston (1988), p. 24.

²¹These are cash flows available for redistribution to the firm's stakeholders and are, therefore, called free cash flows. See, for example, Copeland et al. (1994), p. 135.

²²Modigliani and Miller (1958) distinguish between business risk and risk stemming from financing decisions for firms within the same risk class. See, for example, Perridon and Steiner (1995), p. 457.

²³Expected cash flows can also be influenced by dividend decisions.

²⁴Including the wealth of all claimholders (or stakeholders), especially debt holders.

²⁵Shareholders can take, for example, actions that expropriate wealth from the bond holders. Even though shareholders maximize the value of their stake in the firm, their actions may not be in the best interest of the firm and might reduce the value of the stakes that belong to other stakeholders. See Damodaran (1997), pp. 6, 13, and 822.

²⁶Value maximization is often viewed as "unethical," but as self-correcting with respect to its problems. For example, if the manager–shareholder conflict becomes too great, proxy battles and hostile takeovers will occur. If the shareholder–bond holder conflict becomes too great, bond holders will use more covenants. If markets are inefficient (and short-term focused), long-term investors will step in to take advantage of these inefficiencies. Or, if social costs become too high, governments will restrict and regulate firms. See Damodaran (1997), p. 822.

brings us to the next problem: Even if one agrees to maximize shareholder value, the question is whether this translates into maximizing stock prices. Markets may be less than perfect, and stock prices may not reflect the long-term value of the firm, but rather myopic market assessments and poor information. Shareholder value could be—provocatively—viewed as only a theoretical concept. It is perception of value that drives share prices, which, at best, is correlated with “true”²⁷ value.²⁸ Therefore, the general firm objective should be to maximize firm value and only in special cases the maximization of the stock price.²⁹

Likewise, there is some discussion on whether other objectives³⁰ would be better suited for maximizing an individual’s utility than (shareholder) value maximization.³¹ However, the firm’s objective should be consistent with economic theory, that is, it should try to maximize utility from consumption. Besides, it should have—according to Damodaran³²—the following characteristics in order to lead to meaningful decision rules:

- Be clear and unambiguous
- Be operational (measurable)
- Have as few social costs associated as possible
- Enable and ensure long-term survival of the firm

²⁷One would have to define, though, what “true” value is.

²⁸Inefficiencies in the financial markets may lead to a misallocation of resources and incorrect decisions so that “true” firm value is not reflected in the stock prices. See Shimko and Humphreys (1998), p. 33.

²⁹See Damodaran (1997), p. 822.

³⁰Alternate objectives could be the maximization of other financial goals (e.g., profits, income, etc.). However, when evaluated in the light of whether they maximize the utility that can be extracted from their consumption by the individual investor, these are measures that do not reflect what can be distributed to investors so that they can use it for consumption. Likewise, turnover, market share, company growth, and company survival are only means of trying to maximize the stream of consumption and can, therefore, only be viewed as interim objectives. Nonfinancial goals (e.g., power, prestige, etc.) are difficult to measure and, hence, operationalize. See Schmidt and Terberger (1997), pp. 44–47.

³¹See, for example, Schmidt and Terberger (1997), pp. 41–47, Copeland (1994), pp. 101–107, and Copeland et al. (1994), pp. 4–29 and the references to the literature provided there.

³²See Damodaran (1997), p. 11.

When benchmarking the alternatives against these criteria, we can conclude that value maximization is the objective that best suits these postulated characteristics.³³

All of the preceding is also true for banks. However, as indicated by Equation (2.1), investment, financing, and dividend decisions are essentially all linked to firm value in that they can affect current cash flows, expected growth, and risk.³⁴ The challenge for bank management is to maximize Equation (2.1) by trying to increase current and future cash flows (especially by exploiting growth opportunities), while keeping the (perceived) riskiness of the bank relatively unchanged. Since risk taking is an integral part of a financial institution's business, it is obvious that the relationships between risk, the objective to manage it, and the overall objective of (firm) value maximization need to be closely scrutinized.

Before we enter this discussion, we will first address in the next two sections how the value of a bank can be determined and the problems that are associated with this approach.

Valuation Framework for Banks

The approach that is typically applied to decide whether a firm creates value is a variant of the traditional discounted cash flow (DCF) analysis of financial theory, with which the value of any asset can be determined.³⁵ This (shareholder value) approach estimates the value of the entire firm (therefore, it is also called "entity" approach³⁶) using a multiperiod framework. It estimates a firm's (free) cash flows, which are available for distribution to both shareholders and debt holders, and discounts them at the appropriate rate, which is the so-called weighted average³⁷ costs of capital (WACC) and reflects both the riskiness and timing of the cash flows and the firm's leverage. The (market) value of the firm's equity is then determined by

³³(Shareholder) Value maximization provides a clear and unambiguous goal of using the NPV criterion (using cash flows and not accounting numbers) as focus for corporate financial decisions. Shareholder wealth is also an operational goal because welfare is measurable. Since, in its idealized form, it assumes the existence of perfect and efficient markets with no agency or transaction costs, all social costs associated with value maximization can be priced and will be charged to the firm. Even though value calculated as discounted cash flows (DCF) can have its difficulties when one is trying to estimate the input factors, it seems to be nonetheless a superior metric (see Copeland [1994], p. 104), because it uses a long-term perspective, the most complete information, and is well correlated with a company's market value.

³⁴See Damodaran (1997), p. 826.

³⁵See, for example, Brealey and Myers (1991), pp. 63–67.

³⁶See Copeland et al. (1994), p. 478.

³⁷The weights are determined using the market values of debt and equity.

subtracting the (market) value of the firm's liabilities from the determined entity value.

As an exception to the rule, a different approach is often chosen for banks—even though the results are mathematically equivalent. This so-called “equity” approach³⁸ estimates the bank's (free) cash flows to its shareholders and then discounts these at the cost of equity capital³⁹ to derive the value of the bank's equity directly. Besides being easier to apply, this approach also has the following practical and conceptual advantages in the financial industry:⁴⁰

- Determining the equity value by first determining the entity's value and then subtracting the value of the liabilities is much more difficult for banks than for industrial companies, because a bank's debt is, to a large extent, not traded in the capital markets. For instance, savings and current account deposits have either no interest rate or an interest rate far below their fair market return—and an unknown maturity. Hence, it is very difficult to determine the fair overall market value of debt because of the simple practical inability to determine the appropriate cost of capital for these liabilities.
- Additionally, the fact that taking in deposits may allow the bank to generate value (because it pays interest rates below their market opportunity costs) makes liability management a part of the bank's business operations and not just a pure financing function. This potential for value creation needs to be adequately reflected in the applied valuation methodology, which is not the case in the entity approach.
- Given the narrow margins of the banking business, small errors in the estimation of the appropriate interest rates can lead to huge swings in the value of the equity when applying the entity approach.

Even though we will not discuss the details⁴¹ of the determination of (free) cash flows and the application of this framework at the business unit or even the transaction level⁴² here, some authors⁴³ and—by anecdotal evidence—many bank analysts point out that this valuation framework is

³⁸See Copeland et al. (1994), p. 478. For a detailed discussion, see, for example, Strutz (1993) or Kümmel (1993).

³⁹As, for example, derived via the Capital Asset Pricing Model (CAPM).

⁴⁰See Copeland et al. (1994), p. 479.

⁴¹For these details, see, for example, Benninga and Sarig (1998) or Schröck (1997), pp. 81–89, and the list of references to the literature provided there.

⁴²The results of such an analysis could be the basis for restructuring and value-based management of the bank, see Copeland et al. (1994), pp. 502+.

⁴³See, for example, Copeland et al. (1994), p. 482.

notoriously difficult and cumbersome to apply to banks. This observation is true for bank insiders, but especially for bank outsiders and is mostly due to the fact that banks are opaque⁴⁴ institutions.⁴⁵ However, these informational problems⁴⁶ may be only one reason for the scarce application of the valuation approach in banks. We will discuss potential other problems in the following section.

Problems with the Valuation Framework for Banks

Empirical Conundrum For an initial sample of ninety European banks from fifteen different countries, whose (equity) market capitalization was larger than Euro 1 billion on December 31, 1999, we collected time series of quoted equity prices denoted in or transposed into Euro available on Datastream. Comprehensive time series between January 1, 1992 and December 31, 1999 were available for forty-seven of these banks. Additionally, we collected, for the same time period, the two price indices DJ EURO STOXX 50 (broad market portfolio) and DJ EURO STOXX BANK (index for banks).

We could make the following observations, shown in Figure 2.1, when comparing the relative performance (Index = 100% on January 1, 1992): A broad index for European banks underperformed compared to the broad market index by roughly 35% (320.90% versus 490.45%) over the eight-year period (see Figure 2.1).

There were big deviations in the performance of the forty-seven banks. Sorting their individual performance (measured by the index value as of December 31, 1999) in ascending order, we can draw the chart shown in Figure 2.2.

Plotting the performance of the two indices as horizontal (benchmark) lines, Figure 2.2 reveals that roughly 77% (or thirty-six) of the forty-seven banks performed worse and only eleven better than the broad market index. Note that twenty-three banks performed better and twenty-four banks worse than the bank index, indicating that our final sample of forty-seven banks represents the broad market fairly well (the [simple] average performance for this sample was 357.20%⁴⁷ versus 320.90%). The results for the individual banks range from 76.29% to 797.98%, making some banks value destroyers even on an absolute level and some others value creators on a

⁴⁴See Merton and Perold (1993), p. 16.

⁴⁵Even insiders will face similar difficulties, because of the problems associated with transfer pricing and (cost) allocation.

⁴⁶For instance, it is also difficult to determine the appropriate cost of capital for illiquid credit transactions.

⁴⁷Its standard deviation: 198.13%.

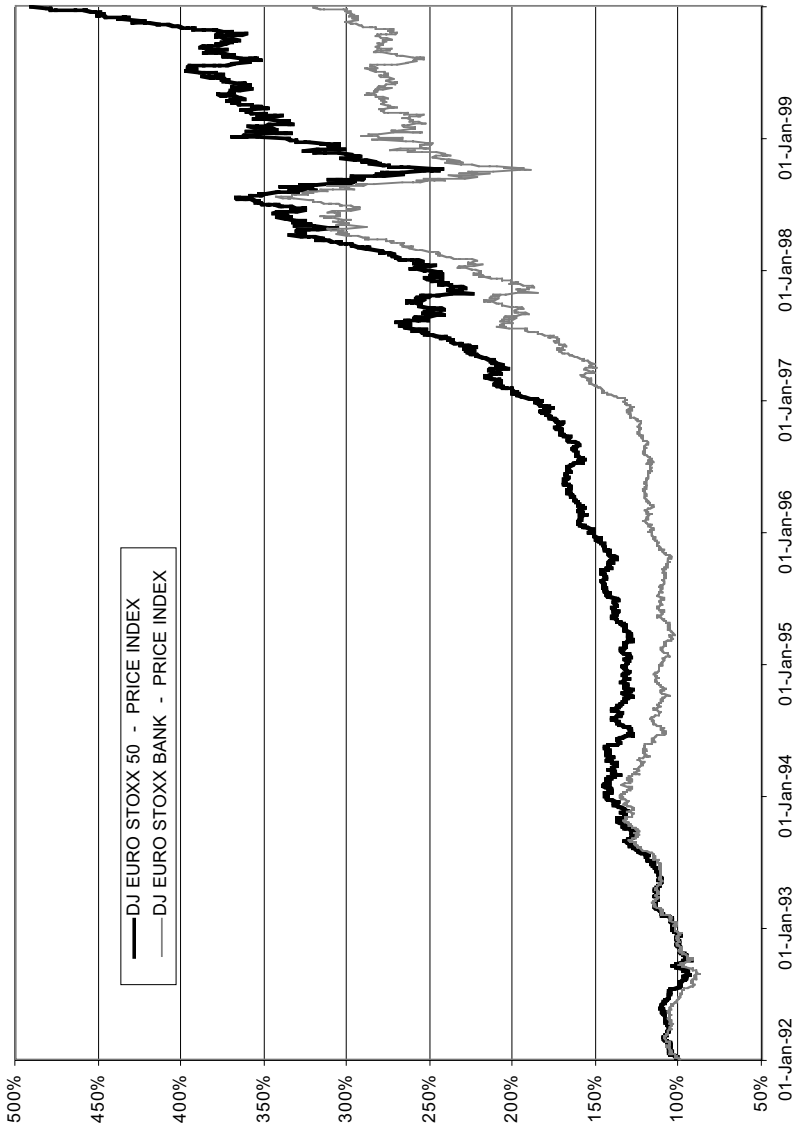


Figure 2.1 Average bank performance versus broad market index.
Source: Datasream and author's analysis.

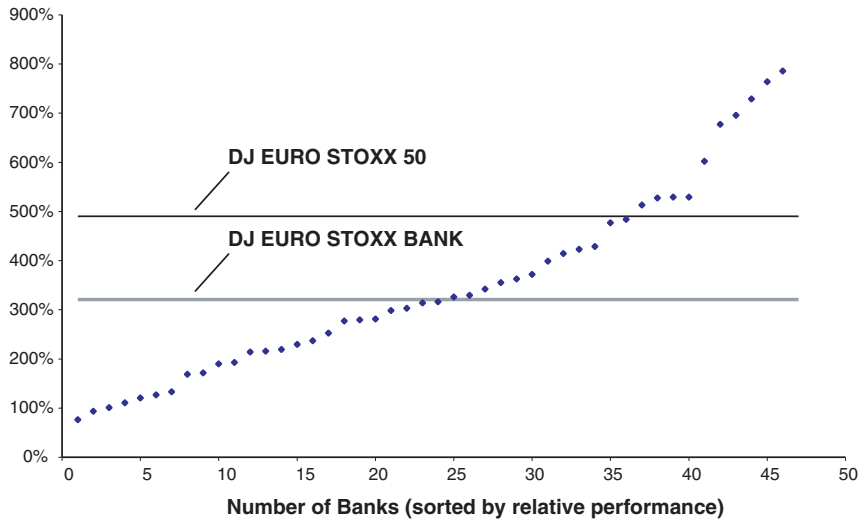


Figure 2.2 Deviations in bank performance.

Source: Datastream and author's analysis.

relative level vis-à-vis the broad market. The best and worst performers are depicted in Figures 2.3 and 2.4.

It is worthwhile to note the sharp decrease in value for all banks following the Russian and Southeast Asian crises in the fall of 1998, reflecting the extreme sensitivity of the market capitalization of banks to financial crisis situations.

Of course these results are only a snapshot and will deviate for different time windows. But, despite the influence of numerous merger and acquisition (M&A) activities⁴⁸ and the broad consolidation in the banking industry,⁴⁹ which do also influence these results,⁵⁰ we can observe a general trend that banks tend to underperform compared to the overall market.⁵¹

What are the reasons for this phenomenon and how can the differences in performance between various banks be explained? Given the preceding results, one could ask the provocative question: "Is value maximization really

⁴⁸For instance, The Securities Data Company, Inc., reports 744 completed (no self-tendered) merger & acquisition deals exceeding \$100 million in the financial services sector worldwide for the time period from January 1, 1993 to January 18, 1999.

⁴⁹The *Journal of Banking & Finance* devotes an entire issue to this topic: February 1999, Volume 23, Numbers 2–4, pp. 135–700.

⁵⁰Practically all of the banks in the final sample were influenced by one or the other event.

⁵¹Matten (1996), p. xiii, and Dermine (1998), p. 21, make the same observation.

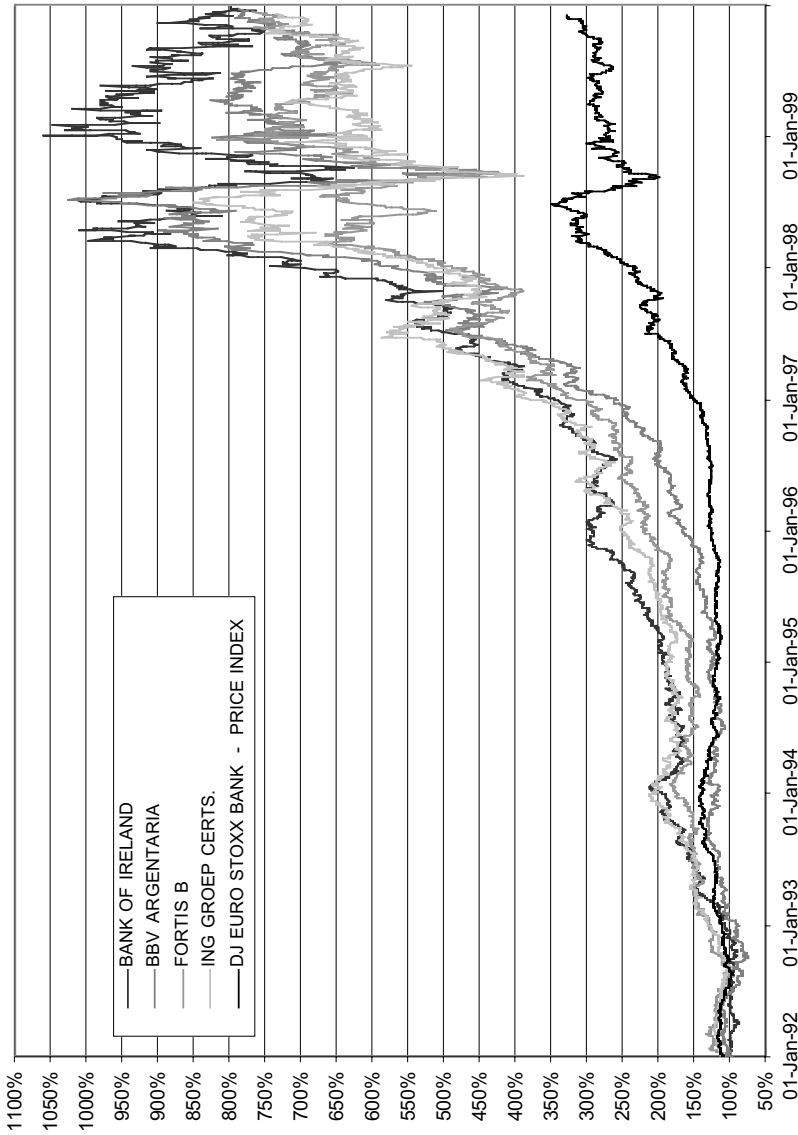


Figure 2.3 Best bank performers.
Source: Datasream and author's analysis.

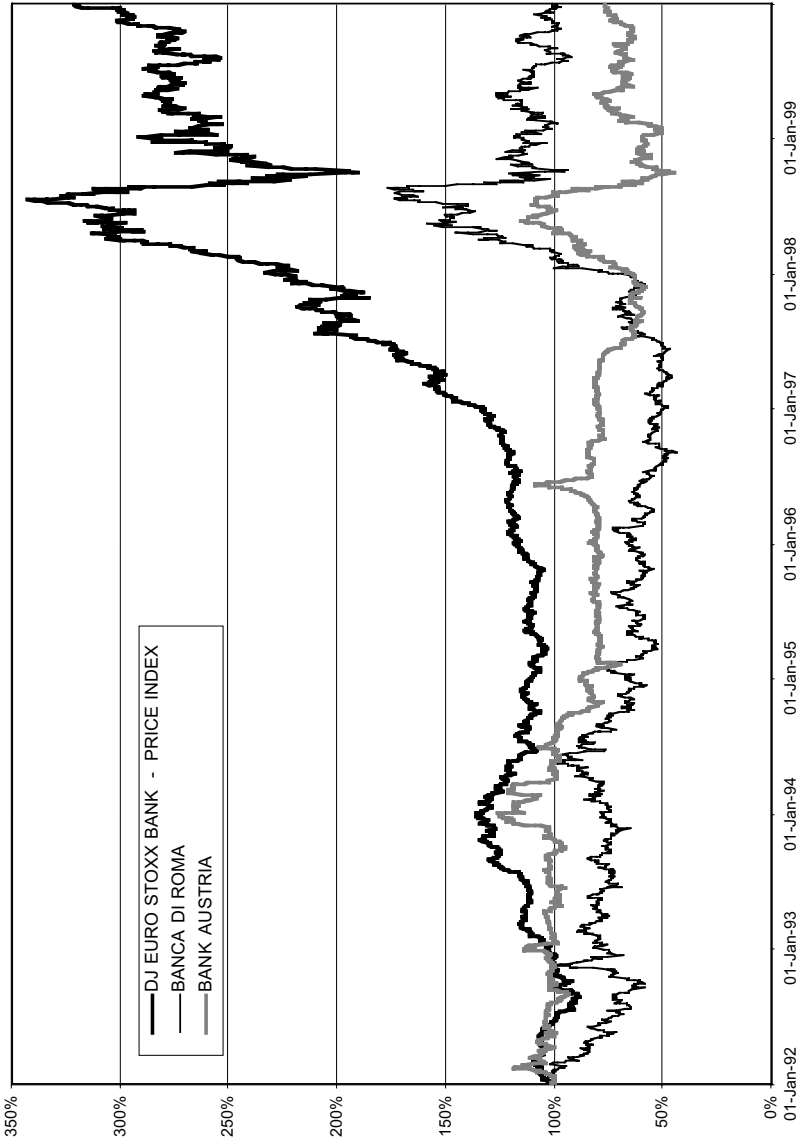


Figure 2.4 Worst bank performers.
Source: Datastream and author's analysis.

the ultimate objective in banking, or do regulatory constraints limit the overall performance by a certain degree?”⁵² However, this book is not intended to address these questions.

Rather, we will assume that value maximization is the ultimate goal in banking. However, we then need to ask whether the valuation framework (as introduced above) is the right tool for banks or whether it is simply not applied.⁵³ Or, if it is applied, whether it does not (properly) work for banks, because an important component might be missing (because this model is largely based on the assumptions of the neoclassical finance theory).⁵⁴ Additionally, we will have to clarify whether and how risk and its management are major influencing factors in this process.

Other Stakeholders’ Interests in Banks As discussed previously, (firm) value maximization is—from a theoretical point of view—the ultimate objective of any corporation. And, as we have concluded, banks are no different from industrial companies in this respect,⁵⁵ because they should only invest in projects with a positive NPV or a return above the appropriate hurdle rate of return that is commensurate with the risk profile of the project.⁵⁶

In reality though, the stakeholders of a company require⁵⁷ that the management of a corporation needs to make decisions that balance their own interests and the interests of the shareholders as well as those of other stakeholders.⁵⁸ These other stakeholders (besides shareholders and manage-

⁵²For a discussion of this point see Kim and Santomero (1988).

⁵³Note that bank stock prices are mostly dependent on risk factors such as changes in exchange rates and interest rates; see, for example, Choi et al. (1996).

⁵⁴We will address this question mainly in Chapter 6.

⁵⁵Banks are different in many other respects. For a description of these differences, see, for example, Merton and Perold (1993), p. 16.

⁵⁶See Damodaran (1997), p. 824. Note that—as we will see later—this is equivalent to the application of the “equity” approach at the transaction level.

⁵⁷We have seen above that value maximization for shareholders may mean that other stakeholders lose out.

⁵⁸Therefore, besides the focus on shareholders, there are many valid arguments that other stakeholders’ interests should be included in the process. Even though it is true that without economic success there will not be any opportunity to satisfy the wants and needs of employees, customers, and so on, it is also true that, for example, unhappy customers will not buy products as may occur if efficiency is more highly valued than customer satisfaction, which then reduces (shareholder) value (see Friedrich et al. [2000], p. 31). Many authors consequently suggest a “balanced stakeholders” approach; see, for example, Copeland (1994), p. 97 and Copeland et al. (1994), pp. 4–29.

ment) are, for example,⁵⁹ debt holders (such as bondholders, lenders/depositors, and other creditors), employees, customers, suppliers, society, the government, and, especially, regulatory bodies in the banking industry.

Still, since management can always apply the NPV criterion⁶⁰ to find out how much a particular decision benefits or harms the shareholders,⁶¹ any decision made under the value maximization proposition—as long as all “externalities” are priced and included—automatically reflects the optimal choice for all involved constituents.⁶²

However, this might not function so automatically for banks. The various stakeholders’ interests are much more relevant and have a more far-reaching impact on banks. Banking is a heavily regulated industry in many countries—for good reasons.⁶³ Regulators on behalf of society at large and bank depositors in specific try to avoid systemic risks⁶⁴ and to protect customer savings.⁶⁵ As indicated by Equation (2.1), if banks try to (naïvely) maximize value (for example, in the interest of the shareholders), they can often only increase cash flows by exploiting growth opportunities, which are in turn usually associated with increased risk taking. Risk is therefore a necessary but manageable complication in the effort to increase a bank’s returns.⁶⁶

Nonetheless, all bank stakeholders are extremely concerned with this increased risk taking, because they are particularly sensitive to any increase in the likelihood of bank default. This is true because:

⁵⁹It seems rather difficult to generate a complete list of stakeholders in a company. Schmidt and Terberger (1997), pp. 41–42, generate the list that is used in the main text and which is in line with other references [e.g., Copeland (1994), p. 97].

⁶⁰See Brealey and Myers (1991), p. 23.

⁶¹According to Copeland (1994), pp. 106–107, shareholders are the only stakeholders who, in seeking to maximize the value of their claim, simultaneously maximize the value of everyone else’s claim. As residual claimants of a company’s cash flows, they are the only stakeholders who need full information of all other claims in trying to maximize the value of their claim. By that, they implicitly maximize the value of all other claims. And they have the incentive to use this information to align other stakeholders’ interests and make their company successful in competitive markets.

⁶²There is (at least anecdotal) evidence that in many cases, decisions that increase shareholder value also benefit other stakeholders and, therefore, do not seem to conflict with their long-term interests, because successful companies create greater value for all stakeholders. See Copeland (1994), pp. 101–103.

⁶³For a discussion of the theory of regulation, see Hartmann-Wendels et al. (1998), pp. 321–337, who also provide an extensive list of references to the literature.

⁶⁴This argument is also often used by economists who want to ensure a safe and sound financial system and the avoidance of so-called domino effects.

⁶⁵See Mason (1995), p. 37.

⁶⁶See Shimko and Humphreys (1998), p. 33.

- The existing banking business might immediately vanish⁶⁷ as soon as there is the slightest indication of problems.⁶⁸ This is mostly relevant to shareholders who would consequently lose most of the residual cash flows of the bank.
- The bank debt holders⁶⁹ are extremely credit sensitive⁷⁰ because they cannot diversify the bankruptcy risk of the bank⁷¹ and therefore are very focused on the lower-tail outcomes of the net asset value distribution⁷² of a bank. This is especially true for depositors, who want their savings and deposits to be safe and do not want to worry about default risk at all.

This means that banks and their stakeholders are much more concerned with bankruptcy risk than industrial companies,⁷³ which is also particularly reflected in the regulatory point of view.

As can be easily seen, the bank stakeholder and shareholder views of risk (and risk taking by the bank) differ, but are still related.⁷⁴ The difficulty for a bank (and its management) is how to strike the right balance to address these various interests.

RISK MANAGEMENT IN BANKS

Before we shed some more light on the problems discussed in the previous section, we need to define the terms risk and risk management and then discuss if and why risk and risk taking are so important for banks, making risk management a significant means of influencing value.

⁶⁷The derivatives business is extremely sensitive to the credit standing of the intermediary.

⁶⁸Deposit insurance is often used to try and avoid this problem. It is also used to avoid “bank runs” (see discussion below).

⁶⁹Mostly customers (depositors), but also any other suppliers of funds (e.g., other banks).

⁷⁰Not only on an absolute level, but also from a relative change in the likelihood of default.

⁷¹See Stulz (2000), p. 4-5.

⁷²See Drzik et al. (1998a), p. 24.

⁷³We will discuss the reasons for this in more detail in the next chapter.

⁷⁴The fact that the shareholder perspective tends to dominate all others is often neglected in the discussion on risk management, which is only focused on the regulators’ and bond holders’ point of view; see Drzik et al. (1998a), pp. 22–23. Trying to avoid the occurrence of bank default and to minimize the variability of returns (i.e., to limit downside risk) is very different from the shareholders’ interest of exploiting the upside potential.

Definition of Risk

Risk is defined as uncertainty, that is, as the deviation from an expected outcome.⁷⁵ We can differentiate uncertainty into:⁷⁶

- **General uncertainty:** Complete ignorance about any potential outcome makes both rational decision making and any quantification impossible.
- **Specific uncertainty:** Objective, or at least subjective, probabilities can be assigned to the potential outcomes⁷⁷ and hence allow for quantification.

The term *risk* is usually used synonymously with *specific uncertainty*, because statistics allows us to quantify this specific uncertainty by using so-called measures of dispersion. The variability around the expected or average value is usually measured by calculating the variance or (its square root) the standard deviation,⁷⁸ which is also often called *volatility* in a finance context, because we can usually observe positive and negative deviations from the mean.⁷⁹ In a business context, risk usually expresses only the negative deviations from expected or “aimed at” values and is therefore associated with the potential for loss,⁸⁰ whereas positive deviations are considered to represent opportunities.

Other classifications of risk encompass:

- (Firm-) Specific versus market (-wide) risks:⁸¹
 - Specific risks are risks that are specific to the firm or the industry in which a firm operates.
 - Market-wide (also often called systematic) risk is risk that cannot be diversified away and expresses the covariance of the de-

⁷⁵See Johanning (1998), p. 47.

⁷⁶See, for example, Steiner and Bruns (1995), pp. 49–50, and Perridon and Steiner (1995), pp. 95–98.

⁷⁷These outcomes are therefore stochastic.

⁷⁸For a discussion of other measures of dispersion (such as, for example, range, semi-interquartile range, semi-variance, mean absolute deviation), see Copeland and Weston (1988), pp. 149–153.

⁷⁹See Steiner and Bruns (1995), p. 53.

⁸⁰See Glaum and Förschle (2000), p. 13.

⁸¹The distinction between firm-specific and market-wide risk can be fuzzy, because of different investor clientele: Widely held firms with well-diversified investors may categorize more risks as firm-specific, whereas firms whose investors hold significant portions in the firm may look at the same risks as being market-wide risks. See Damodaran (1997), pp. 776–777.

viations with the changes in the broad economic development. Only market risk is reflected in the expected returns as derived, for example, by the CAPM.

- Continuous versus event risk:⁸²
 - Continuous risk is caused by a source or factor that can change continuously (e.g., interest and foreign exchange rates).
 - Event risk is created by a specific (discontinuous) event (e.g., an earthquake, a fire, etc.).

Risk in a banking context arises from any transaction or business decision that contains uncertainty concerning the result. Because virtually every bank transaction is associated with some level of uncertainty, nearly every transaction contributes to the overall risk of a bank. Some examples of the risks faced by banks are:

- Will all payments on a loan be made according to the expectations/schedule?
- Will interest rates fluctuate more than expected in the near future?
- Will demand for new mortgages fall short of the expectations in the next year?

All of these risks lead to possible fluctuations in the bank's income stream or profitability⁸³ and hence the value of the bank. In general, event risk has a much larger impact on a firm's cash flows and value than continuous risk.⁸⁴

Definition of Risk Management

In this section, we are going to define the term *risk management*. On the one hand, risk management is often associated with an organizational unit,⁸⁵ which is ideally an independent staff function reporting directly to the board of directors, making risk management a board responsibility, function, and

⁸²See Damodaran (1997), p. 777.

⁸³Assuming that all risk is eventually fed through the bank's profit and loss (P&L) account.

⁸⁴See Damodaran (1997), p. 777.

⁸⁵Such an organizational unit is also mandated for banks by regulatory requirement. See, for example, in Germany the "Mindestanforderungen an das Betreiben von Handelsgeschäften," which require written guidelines, the organizational separation of trading, settlements, and control (minimum critical size necessary); regular marking-to-market of the positions' regular quantification of loss potential of open positions; regular performance measurement; regular reporting of results; and open positions to the board.

task.⁸⁶ However, the board cannot conduct risk management on its own. It has to set strategic targets and ensure, via strict controls, that the delegated goals are actually achieved within the centrally mandated guidelines. Running a risk-management function in a centralized manner has the following advantage: it allows for an independent, integrated view of all types of risk,⁸⁷ so that only the net positions need to be managed⁸⁸ and specialized staff can achieve better pricing in the capital markets. However, firms rarely measure and manage the entirety of their risk exposures. They rather micromanage single-risk exposures⁸⁹ because of the high cost of running the risk management centrally⁹⁰ or because of legal restrictions.⁹¹

On the other hand, risk management can be defined as a distinct process, that is, as a set of activities.⁹² This process is divided into the following steps:

1. Definition, identification, and classification⁹³ of a firm's risk exposure and the source of risk (risk factors).
2. Analysis and quantification of the risk exposure, that is, the understanding of the relationship between and the measurement of how much the cash flows and the value of a firm are affected by a specific source (risk factor). An exposure profile relates unexpected changes in a risk factor to unexpected changes in the firm's value (including correlations between the risk factors), which is the foundation for being able to analyze the impact of risk management on the firm's value.⁹⁴ So far, many banks concentrate on this (passive) risk measurement step, which is only a requirement for being able to actively influence firm value.
3. Allocation of (risk) capital⁹⁵ to the business units as a common currency of risk that is comparable across business units and risk

⁸⁶Shimko and Humphreys (1998), p. 33, see an independent and senior risk-management function as an important part of the overall management quality of a bank.

⁸⁷We will define and discuss the typical types of risk in banks in Chapter 5.

⁸⁸This also allows the recognition of compensating effects in the portfolio.

⁸⁹See Pritsch and Hommel (1997), p. 685.

⁹⁰For instance, process-related costs (expensive political fights with the subsidiaries, etc.) and IT-related costs (unless adequate IT-systems are available, many functions cannot be provided on a timely basis).

⁹¹For internationally operating organizations, there might be, for example, capital transfer restrictions between various countries in which they operate, and so on.

⁹²See Damodaran (1997), pp. 795–796, Schröck (1997), pp. 23–25, Glaum and Förschle (2000), p. 13.

⁹³For instance, firm-specific versus market risks or continuous versus event risk.

⁹⁴See Smith (1995), p. 20.

⁹⁵See Froot and Stein (1998a), pp. 59+.

types and that is commensurate with the risk taken—as measured in Step 2⁹⁶—and the allocation of a charge reflecting the cost of capital.

4. (*Ex ante*) decision of whether a new transaction should be accepted from a portfolio perspective and consideration of whether the risk taking is compensated appropriately from a risk-return perspective.⁹⁷
5. Limitation of risk taking to ensure a constant risk profile by “mitigating” risk. This step is the actual and active management of risk and, therefore, what people commonly refer to when they use the term risk management. In order to “mitigate” risk, various (hedge) instruments and policies can be applied, such as, for example, (1) complete avoidance of risk, (2) reduction of risk, (3) transfer of risk to third parties, and (4) limitation of risk.⁹⁸
6. Risk controlling usually encompasses the documentation and controlling of risk-management actions to ensure the achievement of the goals that have been set. Deviations between targets and actual performance are analyzed to identify causes, which in turn lead to changes in either the planning or the implementation process. Additionally, risk control also covers controlling the involved people and business units by checking whether methods and instruments are applied properly in order to avoid abuse, manipulation, and other misconduct (process controlling).
7. (*Ex post*) performance evaluation in order to link risk-management actions to the overall corporate goals. Management has to develop strategic goals for the various risk areas (risk strategy) that are commensurate with the ultimate firm objective to maximize firm value. The goal of risk management should, therefore, be to identify any uneconomic risk taking, that is, to ensure that any risk-management activity is consistent with value maximization. The goal, however, cannot and should not be to avoid or minimize all risk taking. Rather, it should be to find the optimal balance between risks and expected returns by concentrating on the competitive and compara-

⁹⁶This step provides an immediate link to the required capital structure in banks, which we will discuss in Chapter 5.

⁹⁷This step provides an immediate link to the capital-budgeting decision in banks, which we will discuss in Chapter 6.

⁹⁸Note that all of these actions are usually associated with costs—even avoidance in the form of lost profit opportunities.

tive advantages of the firm,⁹⁹ redefining the role of risk management from pure “hedging” to a more differentiated activity in light of the goal of value maximization.

All of these steps are dependent on each other. For example, a goal-oriented active management of risks is not sensible without accurate quantification, and so on.¹⁰⁰

In this book, we will refer to risk management as an active, strategic, and integrated process¹⁰¹ that encompasses both the measurement¹⁰² and the “mitigation”¹⁰³ of risk, with the ultimate goal of maximizing the value of a bank, while minimizing the risk of bankruptcy.¹⁰⁴

Role and Importance of Risk and Its Management in Banks

The traditional role of banks can be seen in the transformation of cash flows with respect to (1) scale, location, and liquidity, (2) term (maturity), and (3) risk, in order to reduce frictions from both asymmetric information as well as transaction costs in (less than perfect¹⁰⁵) markets.¹⁰⁶ By specializing in

⁹⁹As we will see in the section “Empirical Evidence,” many firms choose “selective” hedging strategies, that is, that they leave ca. 70% of their risk exposure open (only ca. 30% are therefore hedged), if they believe markets move in their favor. On the contrary, almost 100% are hedged when the firms believe that markets will move in the opposite direction. However, decision makers, in the belief that they can generate superior cash flows by leaving positions unhedged, are running the risk of substantial losses. It seems very difficult that someone can consistently earn superior returns in highly liquid and (information) efficient markets. Even banks do not appear to have a comparative (information) advantage in these markets that they could consistently exploit.

¹⁰⁰However, given anecdotal evidence, some market players conduct risk management without any measurement.

¹⁰¹And hence not the organizational unit.

¹⁰²That is the quantification of the overall risk exposure, that is, aggregation of the effects of all risk factors on the firm value, including the derivation of the causative relationship between risk and a change in value.

¹⁰³We do not restrict ourselves to only hedging transactions, but rather include all possible risk-management actions like, for example, diversification (see the later section “Ways to Conduct Risk Management in Banks”).

¹⁰⁴We control for risk of being caught short of funds, as described by Froot and Stein (1998a), p. 58. However, this depends on the portfolio composition and the amount of capital backing it as well as the quality of the risk-management team, the risk-management systems, the liquidity of the positions, and so on.

¹⁰⁵In perfect markets banks would not even exist, because there would be no reason for intermediation between market participants.

¹⁰⁶See, for example, Scholtens and van Wensveen (2000), pp. 1249–1250, and Hartmann-Wendels et al. (1998), pp. 5–10.

information production and processing, banks fulfill an origination and servicing function¹⁰⁷ as well as a distribution function in financial markets.¹⁰⁸

While basically taking deposits from savers and lending them to borrowers with risky businesses, banks can exploit the effects of the diversification of individual credit and term risks, which allows them to absorb risks within. But banks are also able to transfer risks and thereby distribute them across different market participants. Here lies the key value-added feature of banks: the ability to allocate risk efficiently at minimum cost through the trading of¹⁰⁹ and the bundling and unbundling of the risks of various financial contracts.¹¹⁰ Additionally, banks can and do create products with relatively stable distributions of returns, and hence constant risk profiles, which can lower the participation cost of other market players.¹¹¹

Since banks deal in financial assets, they are, by definition, in the financial risk business. Because of the simple fact that they originate, trade, or service financial assets, banks transform, manage, and underwrite risk.¹¹² Even though it may not be immediately obvious that risk management is the core capability of banking, the increased concentration by banks (and other financial institutions) in the business of asset trading and risk transfer reveals the importance of risk management. Thus, risk management plays a central role in intermediation, and is therefore an integral part and a key area of the business of banking,¹¹³ and is viewed as one of the most important corporate objectives.¹¹⁴

Risk management, therefore, also appears to be one of the most likely sources of value creation in banks and “value maximizing banks should have a well-founded concern with risk management”.¹¹⁵ The question is how risk management can be linked to the overall objective of value maximization. It is essential to know how risk management can contribute to this overall goal, because, in order to use risk management the right way, one has to have a clear objective function for it and needs to know its impact on the firm’s overall objective. Since positive NPV projects are the result of good

¹⁰⁷Disintermediation (as indicated by securities issued directly by firms) is reflecting the changing nature of the information set available to market participants.

¹⁰⁸See Allen and Santomero (1996), p. 7.

¹⁰⁹See Allen and Santomero (1996), p. 7.

¹¹⁰See Merton (1995b), p. 25.

¹¹¹See Allen and Santomero (1996), p. 24.

¹¹²See Allen and Santomero (1996), p. 19, and Scholtens and van Wensveen (2000), p. 1247.

¹¹³See Merton (1989).

¹¹⁴According to Meridian Research, the 400 largest banks and security firms worldwide spent US\$2,063 million on enterprise-level risk technology. See Williams (1999), p. 1, Table 1.

¹¹⁵See Froot and Stein (1998a), p. 55.

strategic decisions and the firm's ability to create comparative advantages over their competitors,¹¹⁶ conducting risk management without a clear strategy will not automatically increase (shareholder) value.

However, so far, the most important rationale for risk management has typically been seen as the prevention of the bankruptcy¹¹⁷ of a bank. This rationale is also reflected in the regulatory constraints for financial institutions. On the one hand, merely to ensure a bank's long-term survival by avoiding lower-tail outcomes¹¹⁸ (i.e., extreme losses) will not completely satisfy the shareholders of a bank. On the other hand, treating risk management as a subobjective to value maximization or optimizing value subject to risk-management¹¹⁹ constraints will neglect the questions of why, how, and when risk management can contribute to value creation. Since many bank stakeholders are so concerned with the survival of the bank, the framework of simple value maximization needs to be expanded and adjusted in regard to banks and their risks to reflect a stakeholder approach that incorporates a risk-management orientation.

LINK BETWEEN RISK MANAGEMENT AND VALUE CREATION IN BANKS

Accepting that risk and its management plays a central role in banks, we now need to address the "logic of links"¹²⁰ between risk management and value creation. As described by Smith (1995), we have to answer the following questions:

- Why practice risk management?
- How should we measure risk?
- What should we do about the risks? What instruments should we use?

We have already agreed that the objective of risk management in banks should be to contribute to the firm's overall objective of value maximization. However, the choice of the objective has a direct impact on how risk

¹¹⁶See Damodaran (1997), p. 824.

¹¹⁷Or in the avoidance of any financial distress situation.

¹¹⁸See Stulz (1996), p. 8.

¹¹⁹As indicated above, this is meant in the sense of simply avoiding lower-tail outcomes.

¹²⁰This means the development of an understanding of the benefits of a well-structured risk management program and how its mechanisms increase the value of the firm in designing an effective risk-management program. See Smith (1995), p. 20.

should be measured¹²¹ and, what is equally important, what the goals of risk management should then be and which one of the various ways to conduct risk management should be applied. We will describe the various options in the subsequent sections and return to the question of what should be done in detail in Chapter 6.

Goals of Risk Management in Banks

The choices related to the risk-management goal can be differentiated along the following dimensions:¹²²

- The goal variable
- The (dominant) stakeholder perspective
- The risk dimension
- The risk-management strategy

We will discuss each of these dimensions in turn below.

Choice of the Goal Variable According to survey evidence,¹²³ firms view the primary goal of their risk-management efforts as the reduction of the volatility of the company's cash flows and its earnings. Typically, firms name the following subdimensions:

- **Reduction of the volatility of (near-term) operating income¹²⁴/(reported or accounting) earnings.¹²⁵**
- **Simple reduction of the volatility of (free) cash flows:¹²⁶** Risk management aims to protect the bank's balance sheet against severe losses of a monetary nature (e.g., shocks in foreign exchange rates) and the

¹²¹We will address this question in detail in Chapter 5.

¹²²We neglect here how risk management ranks against other financial objectives in banks.

¹²³See Glaum and Förschle (2000), pp. 19+; also see Bodnar et al. (1996) and (1998) for the U.S. market. Note that these surveys exclude financial institutions. We will discuss this problem in more detail in the section "Empirical Evidence."

¹²⁴See Fenn et al. (1997), p. 23, who refer to Dolde (1993) who finds that the probability of using derivative increases with the volatility of firms' operating income. Even though this is consistent with hedging motives for using derivatives, this assumes that the volatility of operating income is itself not affected by the use of derivatives (which is usually, although not always, the case).

¹²⁵See Smith (1995), p. 20, Glaum and Förschle (2000), pp. 19+.

¹²⁶See Smith (1995), p. 20, Fenn et al. (1997), p. 13, Glaum and Förschle (2000), pp. 19+.

- bank's (operational) cash flows against serious financial uncertainties (interest and foreign exchange rate fluctuations, or credit risk).¹²⁷
- **Strategic (sophisticated) reduction of the volatility of cash flows:** Following Froot et al. (1993), firms should ensure via risk management that they have the cash available that is required in order to make value-enhancing investments. This goal is based on the M&M-observation that the key to creating corporate value is making good investments. According to the pecking order theory,¹²⁸ internally generated cash flows are the cheapest source of funds. However, sophisticated risk management should ensure that the cash flow volatility translates into the changes in the company's required funds for lucrative investment opportunities, which are dependent on the general economic conditions.¹²⁹
 - **Reduction of the volatility in the firm's market value¹³⁰ and hence share return volatility:**¹³¹ The goal of risk management in this area is the insulation of the stock price from shocks in economic and financial variables.¹³²
 - **Stabilization of the return on equity.**
 - **Increase in (accounting/reported) earnings:** This is mostly associated with using risk-management tools as a means for speculation (see also, below, risk-management strategy).
 - **Minimization of borrowing costs (especially important for banks).**

It is important to note that using risk management in order to address each of these subdimensions (in isolation) can have very different effects on the other subdimensions. For instance, hedging value and hedging earnings are simply not the same thing.

¹²⁷See Scholtens and van Wensveen (2000), p. 1249.

¹²⁸See Brealey and Myers (1991), pp. 446+.

¹²⁹The starting point of Froot et al.'s model is that, when external finance is more costly than internally generated sources of funds, it can make sense for firms to hedge. However, the optimal hedging strategy does not generally involve complete insulation of firm value from marketable sources of risk: (1) firms want to hedge less, the more closely correlated their cash flows are with future investment opportunities; (2) firms will want to hedge more, the more closely correlated their cash flows are with collateral values (and hence with their ability to raise external finance). See Froot et al. (1993), p. 1655.

¹³⁰See Smith (1995), p. 20.

¹³¹See Stulz (2000), p. 2-36.

¹³²See Fenn et al. (1997), p. 13.

Choice of the Stakeholder Perspective As we have already identified above, there are various stakeholder interests in a bank. The different perspectives with regard to the goal of risk management are:

- **Firm value maximization:** For obvious reasons, the shareholders' interests mostly drive this perspective. Some authors express the opinion that in order to increase firm value, the goal of risk management should be to reduce the volatility of the firm's value¹³³ (also see above). However, since shareholders have an option on the upside potential,¹³⁴ they could have a valid interest in using risk management in order to increase the volatility in firm value, while increasing the value of their option.
- **Elimination of costly lower-tail outcomes:**¹³⁵ This view is driven mostly by the regulators'¹³⁶ and debt holders' interest in ensuring the survival of the bank.¹³⁷ This narrows down the focus of the goal of applying risk management, because this interest does not play any role in neoclassical finance theory, where the right to exist is a simple matter of profitability (see value-orientation above) and where there are no costs associated with default.
- **Maintenance of a certain financial risk profile:** This goal of risk management is a form of signaling to all stakeholder groups.
- **Reduction of the tax burden.**¹³⁸
- **Tool for achieving a certain accounting policy:**¹³⁹ The goal of risk management could also be the protection of (cash-flow-irrelevant) balance sheet numbers with cash-flow-relevant transactions, which can lead to real losses. Even though this is a value-destroying proposition, managers could have an incentive to hedge the negative consequences of some balance sheet positions (because they are evaluated and compensated on the basis of those numbers).¹⁴⁰

¹³³See Smith (1995), p. 20.

¹³⁴Meaning that an increase in the firm value benefits them more than all other stakeholders.

¹³⁵See Stulz (1996), p. 8.

¹³⁶Of course, risk management can also be used to arbitrage out the deficiencies in the regulatory requirements.

¹³⁷Glaum and FörSchle (2000), pp. 19+, report that the concern with the long-term survival of a company is especially a concern in continental Europe.

¹³⁸See Glaum and FörSchle (2000), pp. 19+.

¹³⁹See Glaum and FörSchle (2000), pp. 19+.

¹⁴⁰See Tufano (1998).

- **Motivation of employee and subsidiary behavior:**¹⁴¹ The goal of risk management is to remove certain risk factors that cannot be influenced by these stakeholder groups in order to motivate their appropriate behavior in the areas that they can influence.

As already observed, the difficulty is to strike the right balance among these various stakeholder views and to find out which view (should) dominate(s) the others.¹⁴²

Choice of the Risk Dimension Another dimension for the choice of the goal for risk management is which type of risk should be managed—systematic (market-wide) or (firm-) specific risk.¹⁴³ From a theoretical point of view, the answer to this question would be fairly clear. If one assumes that one is in a neoclassical finance world and that financial risks are mostly unsystematic, then transferring these specific risks to efficient capital markets does not influence the firm's value. It only shifts the firm along the Security Market Line (SML).¹⁴⁴ Therefore, a bank should only manage its systematic risks. However, in practice, we can observe that most of the risk-management actions within a bank try to address specific issues at the individual transaction level, that is, banks try to focus on specific risks and mostly neglect the overall portfolio perspective (systematic risks).

Yet, if we look at stock market data, we can observe for banks that over time specific risk tends to increase (measured as percentage of overall risk) and systematic risk tends to decrease (see Figure 2.5).

We have derived these results in the following way: In order to avoid the effects of idiosyncratic influences at the individual bank level, we selected a banking industry level index (DJ EURO STOXX BANK) and a broad market index (DJ EURO STOXX 50) for the time period January 1, 1992 to December 31, 1999 and obtained respective data from Datastream. We then calculated daily returns on the banking industry (B) as well as the broad market index (M):

$$R_{i,t} = \ln\left(\frac{S_{i,t}}{S_{i,t-1}}\right) \quad (2.2)$$

¹⁴¹See Glaum and Förschle (2000), pp. 19+.

¹⁴²See Smith (1995), p. 20.

¹⁴³For a definition see above.

¹⁴⁴See Copeland and Weston (1988), pp. 197+, for a discussion of the security market line in the context of the CAPM.

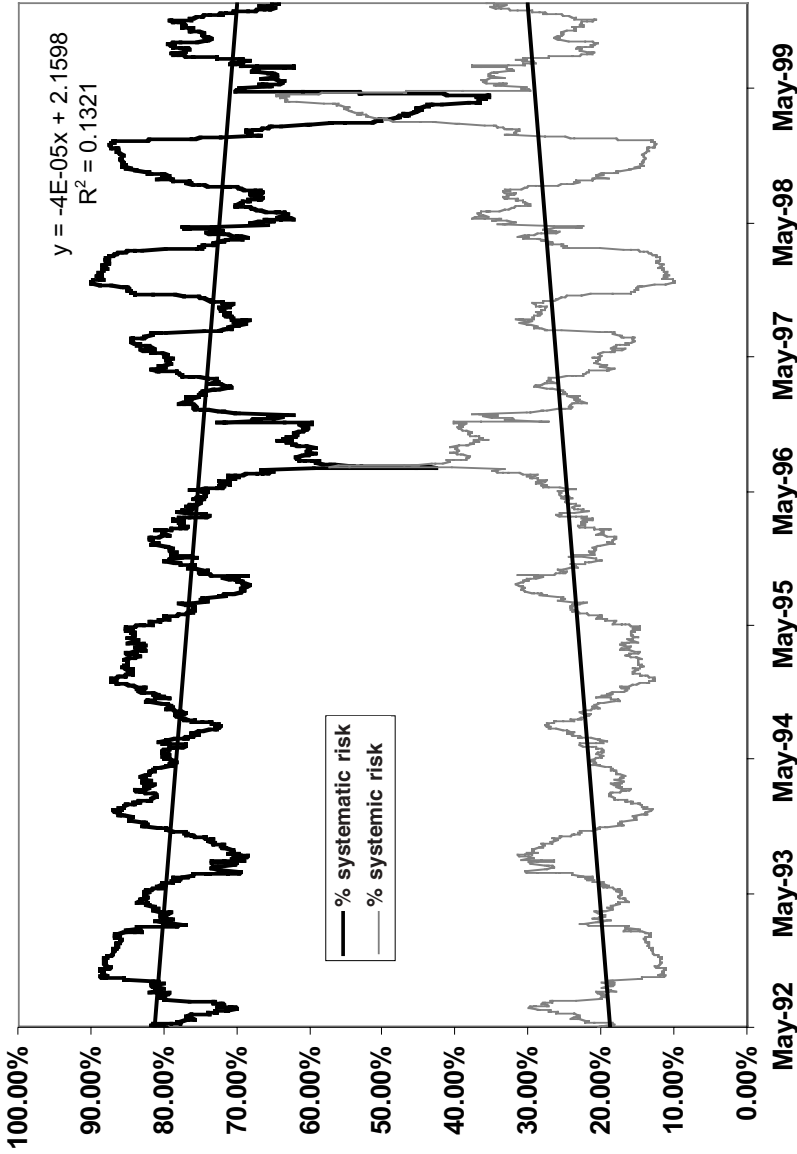


Figure 2.5 Systematic versus specific risk in the banking industry.
Source: Datasream and author's analysis.

- where $R_{i,t}$ = Return on index i at time t
 i = B (banking index) and M (market index)
 \ln = Natural logarithm
 $S_{i,t}$ = Index value at time t
 $t-1$ = Prior observation point of i , here: one trading day earlier

We then determined the overall risk of the index as the standard deviation of the rate of return over the prior ninety trading days:¹⁴⁵

$$\sigma_i = \sqrt{\frac{1}{90-1} \left[\sum_{t=90}^t \ln \left(\frac{S_{i,t}}{S_{i,t-1}} \right)^2 - \frac{1}{90} \left[\sum_{t=90}^t \ln \left(\frac{S_{i,t}}{S_{i,t-1}} \right) \right]^2 \right]} \quad (2.3)$$

where σ_i = Estimated volatility (standard deviation) of the rate of return of index i

Since¹⁴⁶

$$\sigma_B^2 = \underbrace{\beta^2 \cdot \sigma_M^2}_{systematic} + \sigma_{specific}^2 \quad (2.4)$$

- where σ_i^2 = Total risk for index i (as defined above)
 β = Beta = $\sigma_{B,M} / \sigma_M^2$, where $\sigma_{B,M}$ is the covariance between B and M
 $\sigma_{specific}^2$ = *Specific* risk (unexplained by the broad market)

we can determine the component *systematic* and *specific* risk over the same ninety days by determining the beta value (and hence *systematic* risk) and the difference between the two (*specific* risk).

We then rolled the ninety-day window forward over time so that we have 1,996 observation points (number of trading days between May 5, 1992 and December 31, 1999) with the determined split between systematic and

¹⁴⁵As a critique of the chosen approach one could argue that daily returns usually lead to more erratic estimates, due to higher fluctuations, than weekly or monthly returns. However, the ninety-day windows represent averages of these observations, normalizing some of these effects. Besides, choosing weekly or monthly returns did not significantly change the results.

¹⁴⁶Note that we return to discrete space notation here.

specific risk.¹⁴⁷ We subsequently run a linear regression on these observation points to display the long-term trend.¹⁴⁸

Figure 2.5 shows that, despite our hypothesized reduction of specific risk due to risk-management actions at the individual transaction level, systematic risk decreased for the overall banking industry. These industry level results for the banking industry can be replicated at the individual bank level.¹⁴⁹ Note that in the beginning of the sample period the systematic risk constitutes roughly 80% of the overall risk—which is in line with the fact that bank betas are roughly around 1.0, meaning that banks fluctuate basically as the market does. However, this component decreases over time to below 65%.¹⁵⁰ Note also that the betas over time were fairly stable for all banks and hence the banking industry overall. An exception is the aftermath of the financial crisis in the fall of 1998, which led to an increase in the betas.¹⁵¹

We compared these results for the banking industry to the development in other industries. Even though we looked at basically all available (DJ EURO STOXX) industry indices and conducted the same analysis as above, we would like to present three representative results here (as a control sample). We selected three industries that had an index performance similar to that of the banking industry (320.90%) over the selected time period (as summarized in Table 2.1).

Additionally, one could argue that all of these three industries tend to be as cyclical as the banking industry.¹⁵² However, the results were very different with regard to the development of the split between systematic and specific risk. Whereas the energy sector (the same results can be observed for

¹⁴⁷An alternate method would have been to run regressions as described in the market model [see, for example, Steiner and Bruns (1995), pp. 32+] for each of the ninety-day windows and determine the adjusted R^2 . Running a regression on these results would have resulted in the same graph for systematic risk because the adjusted R^2 explains the systematic risk contribution.

¹⁴⁸Regression equation and R^2 for systematic risk observations are also displayed in Figure 2.5.

¹⁴⁹Even though we will not display all results of our analysis, we refer to the Appendix to this chapter and the results for Deutsche Bank.

¹⁵⁰The split for example, for Deutsche Bank shows that the systematic to specific risk goes down from 85% : 15% to 70% : 30%.

¹⁵¹The effects show up in the shift of systematic to specific risk in the beginning of 1999.

¹⁵²Note also that all of these three industries had a similar level of betas over time as the banking industry.

TABLE 2.1 Industry Control Sample

DJ EURO STOXX Index	Index Performance
Energy	314.24%
Consumer Cyclical	311.19%
Utilities	320.71%

Source: Datastream and author's analysis.

autos and chemicals) showed a steeper change¹⁵³ in the split between systematic and specific risk, the cyclical consumer goods industry basically experienced no change (both trend lines are essentially flat for this industry). For utilities the reverse holds true, meaning that the component systematic risk increased over time.¹⁵⁴

Therefore, given that the index performance of these four industries is so similar, there is no clear-cut answer as to which risk component (systematic or specific risk) should be chosen to manage in order to maximize value. This (somewhat contradictory) result motivates a closer examination of the problem, which we will provide for the banking industry in the subsequent chapters.

Choice of the Risk-Management Strategy The last dimension for the choice of the goal of risk management is the risk-management strategy a bank would like to choose. The spectrum of choices runs from a complete elimination of all risks to a (lethargic) “do nothing at all” risk-management strategy,¹⁵⁵ with the following options in between:

- Eliminate all risks (i.e., complete hedging)
- Eliminate risk selectively (i.e., selective hedging)
- Allow for profits (i.e., selective speculation)
- Actively seek profits (i.e., (outright) speculation)¹⁵⁶
- Do not manage risks at all

¹⁵³Meaning that the component systematic risk decreased more than that in the banking industry.

¹⁵⁴The results are displayed in the Appendix to this chapter.

¹⁵⁵The choice of specific risk-management instruments cannot be naïvely delegated to the financial specialist. Senior management needs to understand how the instruments link up to the overall risk-management strategy. See Froot et al. (1994), pp. 98–102.

¹⁵⁶In this context, derivatives are used to increase the exposure to risk in order to enhance earnings. See Fenn et al. (1997), p. 22.

By anecdotal evidence, typically the goal of risk management in banking is not the complete protection against risk, because this would also remove all opportunities to create value. It is rather to implement as much protection against risk as makes sense, given the marginal benefits and costs of acquiring the protection. We will also closer examine this statement in later chapters in order to find out how much protection makes sense, while still allowing the organization to create value.

We have explained in this section that there are multiple goals for conducting risk management at the corporate level. We have also seen that it is difficult for a bank to identify what its primary goal for managing risks is. We can summarize the discussion as follows: If the objective of a bank is to maximize its value, risk management should be undertaken, as long as it increases the present value of the firm's expected cash flows. Therefore, a proper risk-management strategy does not seek to insulate banks completely from risks of all kinds. The banks' stock price, earnings, return on equity, and so on will fluctuate with the underlying risk factors. If, for example, the economy is doing badly, a bank will be less valuable. But, there is nothing risk management can do to improve the underlying economics of being in a specific business such as banking. The goal of risk management is, therefore, not to insure investors and other stakeholders against the risk that is inherent in economic development *per se*.¹⁵⁷ Trying to do so could destroy value. However, as soon as concerns outside the neoclassical finance world—such as a concern with lower-tail outcomes—enter the decision-making process, protection against default, and hence the management of specific risk, can make sense.

Ways to Conduct Risk Management in Banks

In this section, we will describe and discuss the various ways to conduct risk management in banks. Figure 2.6 provides an overview and indicates that there are two broad categories that need to be distinguished when discussing the various options: First, the bank needs to determine which approach or set of actions it wants to apply when managing risks, and second, the bank then has to choose a set of instruments to actually manage these risks.

We will discuss the three approaches or sets of actions¹⁵⁸ and within them the various instruments¹⁵⁹ that are available to banks and how they can be applied.

¹⁵⁷See Froot et al. (1994), p. 98.

¹⁵⁸This distinction is adapted from Allen and Santomero (1996), pp. 19+.

¹⁵⁹The instruments are distinguished as in Mason (1995), pp. 9+, and Allen and Santomero (1996), pp. 19+.

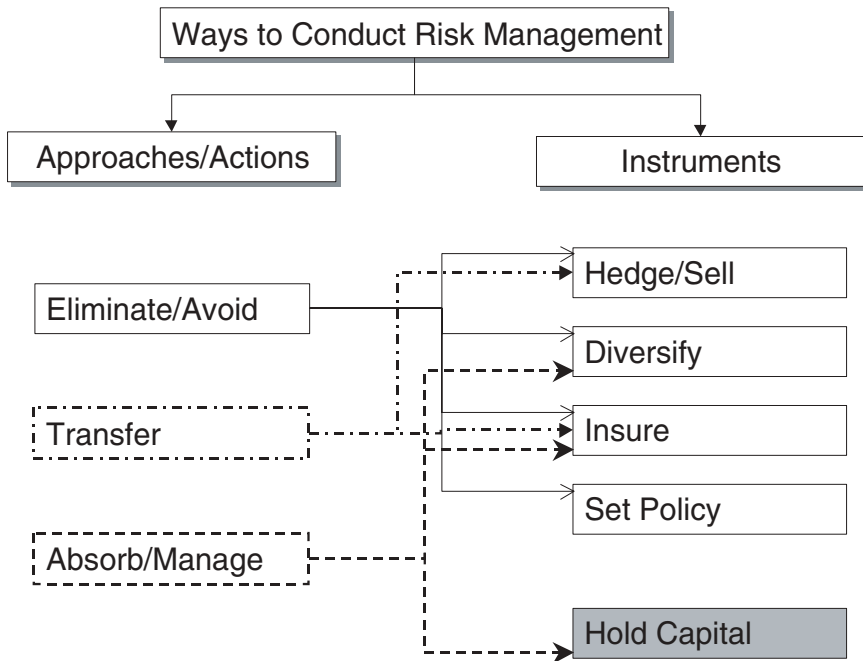


Figure 2.6 Overview of ways to conduct risk management.

Eliminate/Avoid The bank can decide to eliminate certain risks that are not consistent with its desired financial characteristics or not essential to a financial asset created.¹⁶⁰ Any element of the systematic risk that is not required or desired can be either shed by selling it in the spot market or hedged by using derivative instruments such as futures, forwards, or swaps.¹⁶¹ Moreover, the bank can use portfolio diversification¹⁶² in order to eliminate specific risk.¹⁶³ Additionally, it can decide to buy insurance in the form of options¹⁶⁴ or actuarial insurance, for example, for event risks. Furthermore,

¹⁶⁰Recall from above that banks do bundle and unbundle risks to create new assets. See Merton (1989).

¹⁶¹This could also include securitizations.

¹⁶²Note that diversification is something shareholders and other stakeholders can do on their own—but potentially only at a higher cost than the bank can.

¹⁶³Usually, risk elimination is incomplete because some portion of the systematic risk and that portion of the specific risk, which is an integral part of the product's unique business purpose, remain. See Allen and Santomero (1996), p. 19.

¹⁶⁴Note that Mason (1995), p. 9, classifies options as insurance.

the bank can choose to avoid certain risk types up front by setting certain business practices/policies (e.g., underwriting standards, due diligence procedures, process control) to reduce the chances of certain losses and/or to eliminate certain risks *ex ante*.

Transfer Contrary to the bank's decision to (simply) avoid some risks, the transfer of risks to other market participants is decided on the basis of whether or not the bank has a competitive advantage in a specific (risk) segment and whether or not it can achieve the fair market value for it. The alternative to transferring risks is to keep (absorb) them, which will be discussed in the next point.

The transfer of risk eliminates or (substantially) reduces risk by selling (or buying) financial claims (this includes both selling in the spot market and hedging via derivative instruments, as well as buying insurance, as described above¹⁶⁵). As long as the financial risks of the asset (created) are well understood in the market, they can be sold easily to the open market at the fair market value. If the bank has no comparative advantage in managing a specific kind of risk, there is no reason to absorb and/or manage such a risk, because—by definition—for these risks no added value is possible. Therefore, the bank should transfer these risks.¹⁶⁶

Absorb/Manage Some risks must or should be absorbed and managed at the bank level, because they have one or more of the following characteristics:¹⁶⁷

- They cannot be traded or hedged easily.¹⁶⁸
- They have a complex, illiquid, or proprietary structure that is difficult, expensive, or impossible to reveal to others.¹⁶⁹
- They are subject to moral hazard.¹⁷⁰

¹⁶⁵Note that diversification is no means of transferring risks to other market participants for obvious reasons.

¹⁶⁶As we will see later, Froot and Stein (1998a) come to the same conclusion; however, their model uses a different approach.

¹⁶⁷See Allen and Santomero (1996), pp. 20–21.

¹⁶⁸Therefore, hedging or selling is not an option in this context, because the costs of doing so would exceed the benefits.

¹⁶⁹This is due to disclosure or competitive advantages. For a discussion of the optimal information release to the public in order to maximize value see Schröck (1997), p. 88.

¹⁷⁰For instance, even though insurance is provided for a certain risk type, other stakeholders may require risk management as a part of standard operating procedures to make sure that management does not misbehave.

- They are a business necessity. Some risks play a central role in the bank's business purpose¹⁷¹ and should therefore not be eliminated or transferred.¹⁷²

In all four of these circumstances, the bank needs to actively manage these risks by using one of the following three instruments:

- **Diversification:** The bank is supposed to have superior skills (competitive advantages), because it can provide diversification more efficiently/at a lower cost than individual investors could do on their own.¹⁷³ This might be the case in illiquid areas where shareholders cannot hedge on their own.¹⁷⁴ We know that banks care about the internal diversification of their portfolios and especially the management of their credit portfolio, because the performance of a credit portfolio is determined not only by exogenous factors but also by endogenous factors such as superior *ex ante* screening capabilities and *ex post* monitoring skills.¹⁷⁵ Diversification, typically, reduces the frequency of both worst-case and best-case outcomes, which generally reduces the bank's probability of failure.¹⁷⁶
- **Internal insurance:** The bank is supposed to have superior risk-pooling skills¹⁷⁷ for some risks, that is, it is cheaper for the bank to hold a pool of risks internally than to buy external insurance.
- **Holding capital:** For all other risks that cannot be diversified away or insured internally and which the bank decides to absorb, it has to make sure that it holds a sufficient amount of capital¹⁷⁸ in order to

¹⁷¹For instance, if the bank offers an index fund, it should—by definition of the product—keep exactly the risks that are contained in the index and should not try to manage, for example, the systematic part of the constituent stocks. See Allen and Santomero (1996), p. 21.

¹⁷²If the bank has superior skills in transferring some assets, this is considered to be a competitive advantage in this situation, but not as described in the previous point.

¹⁷³Individual investors lack specific knowledge relative to banks.

¹⁷⁴Some level of diversification of specific risk of credits must be valuable to shareholders. Otherwise, they would hold, for example, (corporate) loans directly.

¹⁷⁵See Winton (2000).

¹⁷⁶Winton (2000), p. 2, shows that “pure” diversification in credit portfolios into areas where the bank does not have these superior screening and monitoring skills can result in an increase in the bank's probability of failure.

¹⁷⁷See Mason (1995), p. 9.

¹⁷⁸A conservative financial policy is considered to be an alternative to the other instruments of risk management. See Tufano (1996), p. 1112.

ensure that its probability of default is kept at a sufficiently low level.¹⁷⁹

However, the decision to absorb risks internally should be based on competitive advantages that reimburse the bank more than the associated costs, that is, when value is created. A bank should have appropriate instruments to identify uneconomic risk taking, which allows it to decide when risk absorption is not the right choice and to decide when it is better to transfer risk to the market, or to avoid it altogether.¹⁸⁰ Again, we can observe that the complete hedging of all risks should almost never be an option, or as Culp and Miller put it, “most value-maximizing firms do not hedge.”¹⁸¹

We have seen in this section that there are many other ways to conducting risk management than just hedging.¹⁸² Again, the decision as to which approach is most appropriate and which instrument should be chosen should be based on the trade-off between costs and value created. The key, however, is to have a competitive advantage vis-à-vis the market in order to be able to create value.¹⁸³ In order to find this out, the bank needs to monitor both risks and returns.

Empirical Evidence

We have seen in the previous two sections that—from a theoretical point of view—there is no clear and detailed answer as to how banks should structure and conduct their risk management in order to increase value. In this section we will discuss whether and what empirical evidence there is on the link between risk management and value creation.¹⁸⁴

Despite everything that has been written about corporate risk management, researchers and academics know very little about how risk manage-

¹⁷⁹Note that equity finance is costly. We will discuss this point in more detail in Chapter 3.

¹⁸⁰See Allen and Santomero (1996), p. 21. We will address this issue in Chapter 6.

¹⁸¹See Culp and Miller (1995), p. 122.

¹⁸²Note that some risks can be hedged at low costs, others are expensive or impossible to hedge.

¹⁸³Hedging/selling in liquid markets is a zero NPV transaction and does not create value in itself; it just shifts the bank along the Capital Market Line (CML). It seems problematic to systematically earn a positive return in highly liquid and transparent markets that exceed the costs of doing so.

¹⁸⁴For an overview and summary of the theoretical and empirical evidence, see Smithson (1998).

ment is applied in practice.¹⁸⁵ A major difficulty facing researchers is that the data needed to measure a firm's risk exposure and its derivative positions is generally not available.¹⁸⁶ Since hedging operations are typically off-balance sheet transactions, they are not included in databases such as COMPUSTAT. This lack of well-developed databases has made empirical work very difficult (especially for banks) and has led researchers to collect survey data on firm risk-management policies.¹⁸⁷ However, these surveys may have major drawbacks:

- Many of the surveys do not seem to be conducted according to correct academic practices and are therefore not particularly useful. For instance, surveys are typically sent to a very limited number of firms and different surveys draw typically different samples.¹⁸⁸ Nonetheless, many surveys try to claim generality and draw conclusions that are presented as universally valid. Another difficulty, in our context, is that some surveys use risk management and hedging—or what is even worse, risk measurement and risk management—as synonyms, making it difficult to reveal the level of differentiation we are looking for.
- Survey questions are sometimes ambiguous, rendering it difficult to interpret responses. Additionally, surveys only convey what respondents say their firms do and not what they actually do in the real world, because the wrong people, who have the wrong perception of what their firms do, answer the questions. If surveys do not ask the right control questions, the reliability of the survey results could be

¹⁸⁵Tufano (1996), p. 1097, summarizes the situation as follows: “Academics know remarkably little about corporate risk-management practices, even though almost three-fourths of corporations have adopted at least some financial engineering techniques to control their exposures. While theorists continue to advance new rationales for corporate risk management, empiricists seeking to test if practice is consistent with these theories have been obstructed by a lack of meaningful data. Corporations disclose only minimal details of their risk-management programs, and, as a result, most empirical analyses have to rely on surveys and relatively coarse data that at best discriminate between firms that do and do not use specific types of derivative instruments. Case studies of individual firms, while providing greater detail on firm practices, typically lack cross-sectional variation to test whether existing theories explain behavior.”

¹⁸⁶See Fenn et al. (1997), p. 20.

¹⁸⁷See Froot et al. (1993), p. 1652.

¹⁸⁸Surveys may not even be necessarily from the same industry(ies).

questionable.¹⁸⁹ For instance, firms that use risk management to speculate might be reluctant to admit doing so in a survey.¹⁹⁰

- Surveys are often based on year-end financial statements and annual reports.¹⁹¹ However, our current ability to judge whether one firm hedges more than another has important limitations:¹⁹²
 - There are potentially huge differences in the disclosure of corporate hedging activities. Some firms with essentially equivalent hedging policies might appear different, because they voluntarily disclose more than required or the industry average does.
 - Even with complete access to hedging data, if two firms use different risk-management instruments, judging which firm conducts more risk management can be difficult.¹⁹³

Therefore, we can conclude that survey-based data on risk management is associated with (fundamental) difficulties and can lead to inconsistent results that are not of much use for our purposes. Additionally, there are hardly any surveys and studies that are tailored specifically to banks, which is also due to the fact that banks are perceived to be opaque institutions. The empirical studies that are available so far can only give an indication as to what other players are doing in very specific areas.¹⁹⁴ But, as we have seen previously, drawing conclusions from surveys might not only be difficult, but also dangerous because, for example, the supposedly evolving industry standard could be completely off from what organizations should really consider from a theoretical perspective. The message should be rather

¹⁸⁹Glaum and Förtschle (2000), pp. 47+, reveal, for example, that hedging strategies often differ substantially from the actual hedging, meaning that internal guidelines are not strictly followed. This could indicate that there is a severe agency problem: The ranks and files are not maximizing value, because they potentially have the wrong incentives.

¹⁹⁰See Smith (1995), p. 28.

¹⁹¹A major drawback of using such data is that the information they contain is often limited in scope and varies greatly from firm to firm. See Fenn et al. (1997), pp. 20–21.

¹⁹²See Smith (1995), p. 28.

¹⁹³For instance, one of the questions is how notional amounts should be compared to derivatives contracts with different times to maturity and exercise prices. One alternative would be to use the delta of the options. But this depends on the price of the underlying at which it is evaluated—and it is, therefore, unlikely that the results are comparable across firms.

¹⁹⁴It is also difficult to see firms using risk-management instruments along the dimensions as we have described them above (i.e., hedge, diversify, insure, etc.).

that companies (even) in the same industry should not necessarily adopt the same risk-management strategy.¹⁹⁵

Despite these difficulties, we can observe the following general trends in the empirical findings of the surveys and studies available:¹⁹⁶ Risk-management instruments are typically used to hedge.¹⁹⁷ Despite the reluctance of firms to admit in surveys that they speculate,¹⁹⁸ data limitations that preclude a comprehensive analysis, and the anecdotal evidence that derivatives are used to speculate, there seems to be systematic evidence that firms do not use risk management to speculate. However, when asked for details of their hedging strategy, these firms have open/unhedged positions, when they have a market opinion, of up to 70%. Firms almost never hedge 100% of their risk exposure¹⁹⁹ for the following reasons:

- **Transaction costs:** Hedging should only occur up to the point at which the marginal benefit of risk reduction equals the marginal costs of using derivatives.²⁰⁰
- **Errors in risk measurement:** If a firm is uncertain of its true risk exposure, it underhedges, using the best estimate, to minimize the possibility that it is adding rather than subtracting risk.
- **Opportunistic speculation:** Firms seem willing to let their view influence their hedge if it leads to underhedging, but not if it leads to overhedging.²⁰¹ This behavior, firms underhedging on average, is often

¹⁹⁵See Froot et al. (1994), pp. 98–102.

¹⁹⁶We base these statements on studies provided by Glaum and Förtschle (2000), p. 24, Raposo (1999), pp. 47+, Mian (1996), Tufano (1996), p. 1097, Dolde (1993), Nance, Smith, and Smithson (1993), Mayers and Smith (1990), Wall and Pringle (1989), Block and Gallagher (1986), Booth, Smith, and Stolz (1984), and the studies additionally mentioned in the overview tables provided by Pritsch and Hommel (1997), pp. 687–689.

¹⁹⁷See Smith (1995), p. 20.

¹⁹⁸Typically 99% of the survey respondents answer that they do not speculate.

¹⁹⁹Indirect evidence against full hedging is provided by a study that uses stock market data to investigate the sensitivity of firm equity values to financial price risk. It finds that the stock price sensitivity of derivatives users and nonusers is roughly the same, implying that users do not fully eliminate their exposure to risk. See Fenn et al. (1997), pp. 23–24, who refer to Hentschle and Kothari (1995).

²⁰⁰One model finds that transaction costs of 14 bps reduce the optimal hedge ratio from 100% to 80%.

²⁰¹The explanation for this behavioral asymmetry is that firms confuse reversing their exposure with increasing risk. Overhedging actually reverses the exposure—only negative hedging amplifies the exposure.

described as selective hedging.²⁰² Even though selective hedging is not explained by theory,²⁰³ it is an observable phenomenon. Like individuals who shed unwanted risks and acquire preferred risks, firms also buy or increase risks (via selective hedging), even if they know that, when things go wrong, these actions will affect firm value adversely.²⁰⁴

However, for one of the most fundamental questions—whether risk management can create value—there is almost no (direct) empirical evidence,²⁰⁵ because the major challenge facing researchers is to design strategies for obtaining such evidence. One possibility for providing such evidence would be, for example, to use event studies. However, they are difficult to implement because the use of certain risk-management tools is rarely publicly announced.²⁰⁶ Additionally, it is difficult to determine the effects of, for example, derivative usage on other financial characteristics of a firm (an increase in the leverage) that could have counterbalancing effects on the firm's value. Another possibility would be to try to measure the reduction in cash flow volatility through risk management. When trying to do so,²⁰⁷ the reduction is so low that the benefits of using, for example, derivatives are unlikely to outweigh their costs.

Therefore, we can conclude that the positive link between firm value and risk management is still more of an object of theory than a hard empirical fact²⁰⁸ because the empirical evidence for such a link is inconclusive. That is why I decided neither to use or derive survey results for this book, nor to try to provide empirical evidence on the value effects of risk management.

²⁰²If a firm has no view or if its view agrees with the market's view, then it tends to hedge almost fully. Conversely, if a firm believes that the price will decrease relative to the market's expectation, it hedges less than 100%.

²⁰³Market players do not seem to believe in efficient markets and try to outperform the market by using selective hedging and forecasting, which is impossible in most liquid markets. Nonetheless, firms are trying to face risks in which they perceive themselves as having a comparative advantage while managing others. See Raposo (1999), p. 47.

²⁰⁴See Mason (1995), p. 33.

²⁰⁵See Fenn et al. (1997), pp. 14 and 28.

²⁰⁶Dolde (1993) reports that derivative users outperform nonusers over a two-year period. But the difference is very small and could be simply due to the fact that better managers are the first to adopt state-of-the-art risk management techniques.

²⁰⁷See Copeland, Joshi, and Queen (1996).

²⁰⁸Nonetheless, a seminal paper by Froot et al. (1993) shows that—given the anecdotal and survey evidence on risk management—risk management as it is currently applied can enhance value, but does not optimize it.

SUMMARY

We have seen in this chapter that value maximization is, for banks (as for all corporations), the ultimate objective—even if there is evidence that bank stocks underperform on average and that there are other deviating and strong stakeholder interests. We then went on to define how the terms risk and risk management will be used in this book and identified the central role of risk management in banks as well as indicating that it is a likely source for value creation in banks.

We subsequently presented possible goals of and ways to conduct risk management in the light of how they can be linked to the ultimate objective, which is to maximize value. We finally evaluated whether there is empirical evidence for this link, but recognized that the results are inconclusive and do not provide detailed answers as to which exact risk-management strategy a bank should apply in order to increase value.

We will, therefore, explore in the next chapter whether financial theory offers more detailed answers as to whether banks should conduct risk management in order to maximize value. So far, we can only observe that banks are—by their very nature—in the risk business and that they do conduct risk management as an empirical fact (positive theory for risk management). We are now trying to find out whether there is also a normative rationale/theory for risk management.

APPENDIX

Part A: Bank Performance

TABLE 2.2 Bank Performance

BANK NAME (INDEX = 100% ON January 1, 1992)	INDEX ON December 31, 1999
Bank Austria	76.29%
EuroHypo	93.33%
Banca di Roma	101.27%
Natexis bq pop	110.72%
Baden-Württembergische Bank	120.58%
Banesto	126.99%
IKB Deutsche Industriebank	133.13%
Vereins- & Westbank	168.83%
Bankgesellschaft Berlin	171.70%
Okobank	190.15%
Bca. Toscana	193.07%
Bnc. Prtg. Atlantico	214.21%
RheinHyp	215.84%

Cdt. Bergamasco	219.44%
Bca. Agricola Mantovana	229.55%
BHF–Bank	237.22%
Deutsche Bank	252.71%
Oldenburger Landesbank	277.07%
Banca Intesa RNC	279.39%
Bca. PPO. Bergamo	281.41%
Commerzbank	298.28%
Merita	303.11%
COMIT	314.14%
Deutsche Hypothekenbank Frankfurt Hamburg	316.11%
Societe Generale	325.86%
Dresdner Bank	329.67%
Bayer. Hypo- und Vereinsbank	342.25%
Banca Lombarda	355.03%
BCP R	362.50%
DePfa–Bank	372.12%
Almanij	398.63%
Bnc. Popul. Español R	414.60%
Bca. PPO. Emilia Romagna	422.80%
Bca. PPO. Coml. Indr.	428.97%
CCF	477.24%
Allied Irish Banks	483.76%
Banca Intesa	513.38%
ABN AMRO Holding	527.66%
KBC Bkvs. Holding	529.18%
Unicredito Italiano	529.28%
HSBC Trinkaus & Burkhard	602.01%
BSCH	677.11%
Bankinter R	695.56%
ING Groep Certs.	729.20%
Fortis B	763.75%
BBV Argentaria	785.56%
Bank of Ireland	797.98%

Source: Datastream and author's analysis.

Part B: Systematic versus Specific Risk

See Figures 2.7 through 2.10 on the following pages.

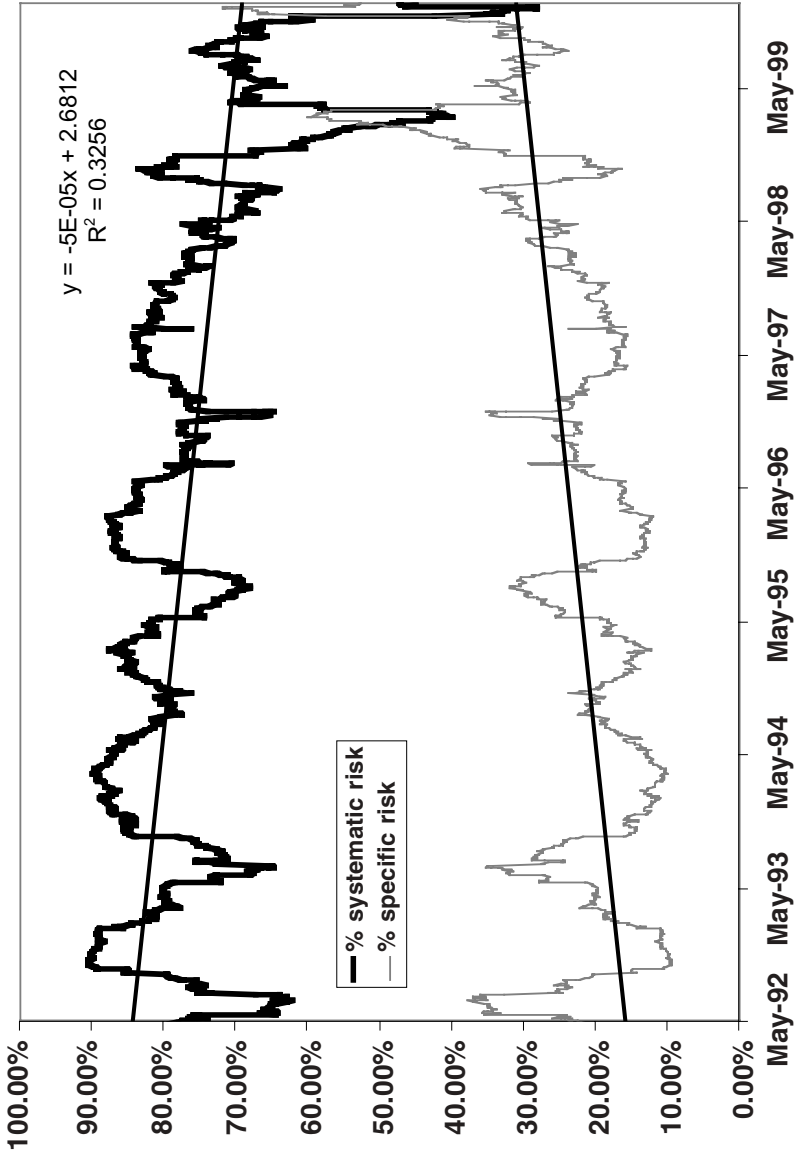
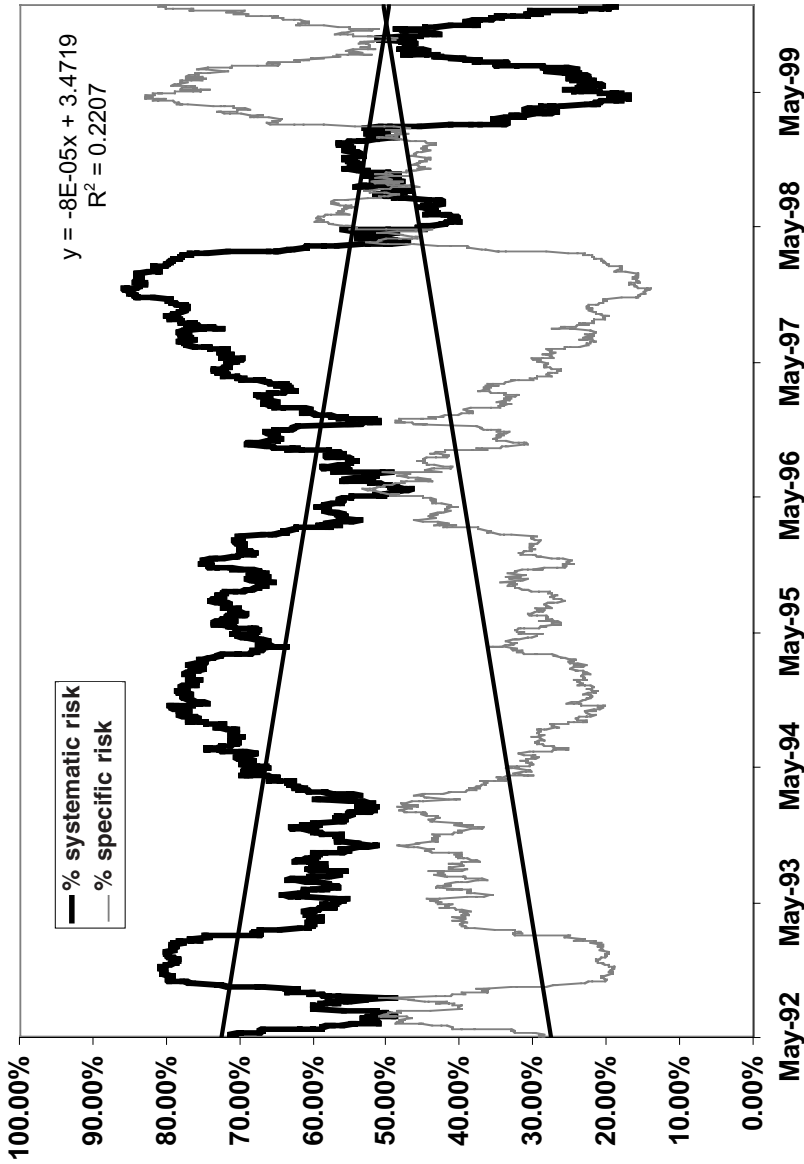


Figure 2.7 Deutsche Bank.
Source: Datastream and author's analysis.



■ Energy industry.
Source: Datastream and author's analysis.

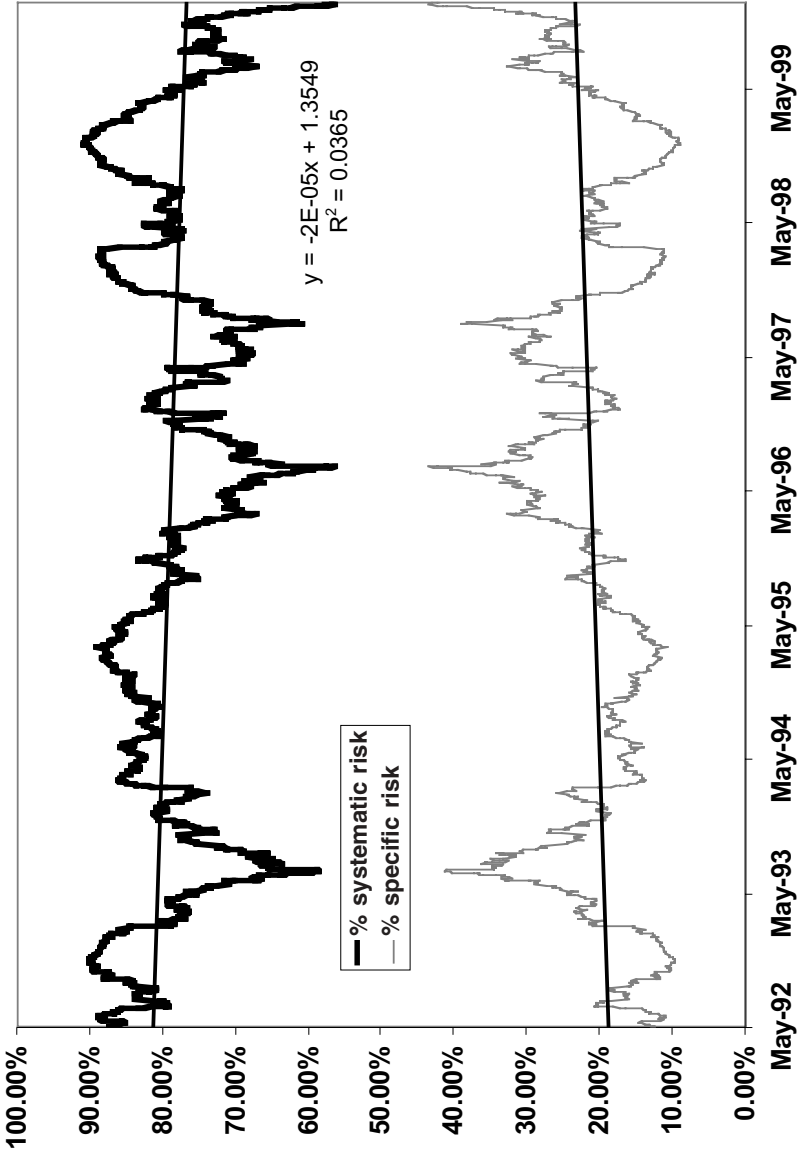
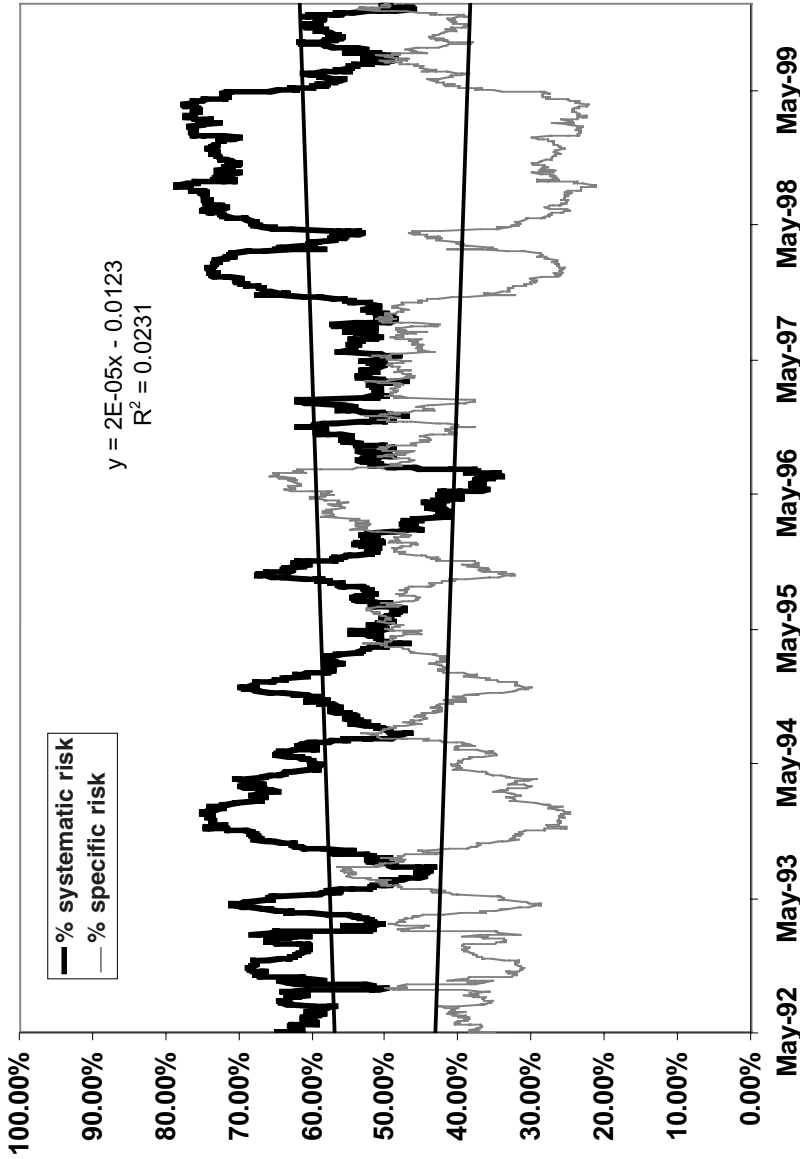


Figure 2.9 Consumer cyclical industry.
Source: Datastream and author's analysis.



■ Utility industry.
Source: Datasream and author's analysis.

