Banking Risks and the Role of Value at Risk in Risk Measurement

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Abstract

This study seeks to shed light on the various approaches to risk measurement by drawing on both statistical techniques and financial analysis tools. Particular attention is devoted to the Value at Risk (VaR) approach, which is widely regarded as one of the most important quantitative measures of financial risk. The relevance of VaR stems from the advantages it offers, notably the relative simplicity and speed of its computation, as well as its ability to provide a single, concise numerical estimate that captures the magnitude of risk an underlying financial instrument may be exposed to. Owing to these features, VaR has become one of the most extensively adopted methods by financial institutions and market participants as a means of anticipating and mitigating potential losses, especially in a financial environment increasingly characterized by recurrent crises and successive shocks.

Keywords: *Risk; Banking Risk, Management Risk, Financial Risk, Value at Risk (VaR).*

Introduction

Risk measurement constitutes a prerequisite to effective risk management, as the concept of risk holds limited scientific relevance if it is not quantifiable. Accordingly, a wide range of approaches has been developed to classify and measure risks, often implemented by specialized institutions, while banks and insurance companies have also adopted institution-specific risk metrics tailored to the nature of their activities.

Both theoretical and applied research in financial management has increasingly focused on examining value creation and the extent to which it is exposed to risk. In this context, Value at Risk (VaR) models have emerged as a significant intellectual contribution, enriching this line of inquiry by enabling the estimation of potential losses associated with stock prices and market indices in securities markets. These models provide concise and simplified information regarding the magnitude of risks that may confront investors at both the macro and micro levels. Moreover, institutional disclosure of Value at Risk may confer a strategic advantage, allowing organizations to keep pace with rapid global developments in risk measurement and financial risk management practices.

Research Problem

What is the nature of banking risks, and what role does Value at Risk play in measuring risk within financial institutions?

Research Objectives

• To identify and examine the various tools used to measure financial risks, including statistical techniques and financial analysis methods;

• To analyze the concept of Value at Risk, its calculation methods, and the advantages associated with its application in financial risk measurement.

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Structure of the Study

- The concept of risk

- Risk from a financial perspective

- Measurement of financial risks

- Types of banking risks

- Value at Risk (VaR)

The Concept of Risk

In banking and finance, the term risk is commonly associated with financial losses; however, it is more accurately defined as uncertainty regarding the returns that may be generated by an asset. Risk constitutes an inherent and inseparable component of banking activity, as the pursuit of returns for shareholders necessarily entails the assumption of a certain level of risk.

Some risks are intrinsically linked to a bank's business model and cannot be disentangled from it. A notable example is maturity transformation, which exposes banks to both liquidity risk and credit risk. Risk, however, is not confined to banking activity alone; it is present in any form of investment. For instance, consider an individual who invests personal funds in a commercial project with the expectation of recovering the invested capital within two years through a projected monthly return of 100,000 dirhams. The uncertainty surrounding the realization of these returns constitutes a form of risk. Similarly, uncertainty regarding the timing of capital recovery represents an additional risk. In reality, such a project is exposed to a wide range of risks, including, but not limited to, destruction caused by natural disasters such as earthquakes or fires, losses due to theft, legal disputes arising from claims or litigation, or market downturns and economic stagnation. All these factors share a common foundation: uncertainty (Kandouz, 2020).

Risk in the Financial Perspective

In English, the term risk does not have a single, universally accepted definition. Its meaning varies across disciplines and contexts, leading researchers to conceptualize it differently depending on their analytical perspective and the domain in which risk arises. Among the prominent definitions, Mullins defines risk as the probability that actual returns will deviate from expected returns, where the degree of potential variability in expected returns determines the level of risk (Mullins, 1982).

Risk has also been described as a psychological or abstract condition that accompanies individuals when making decisions in their daily lives, giving rise to states of doubt, fear, or uncertainty regarding the outcomes of those decisions. In this sense (Al-Omari & Atta, 2012), risk represents a situation in which there is a possibility of deviation from the path leading to an anticipated and desired outcome. Risk emerges whenever multiple outcomes are possible and the final result cannot be predicted with certainty (Jorion & Khoury, 1996).

Furthermore, risk may be understood as a set of phenomena or events that threaten the achievement of objectives and adversely affect the continuity of an organization in fulfilling its mission. In the context of credit provision, risk reflects the exposure of lending institutions to unexpected losses, arising from the potential deviation of anticipated cash flows from their projected values (Abdul Sattar, 2012).

Banking institutions, due to the specific nature of their activities, are exposed to particular categories of risk. Banking risk may therefore be defined as a state of uncertainty regarding the recovery of lent capital or the realization of expected future profits. This uncertainty lies at the core of banking operations and

underscores the critical importance of effective risk measurement and management frameworks within financial institutions (Du Sert, 1999).

Measurement of Financial Risk

Measuring the magnitude of risk serves as a practical guide for decision-making, as it enables the identification of appropriate actions in response to potential uncertainty. A wide range of statistical and financial indicators can be employed to quantitatively express the relative level of risk. These measurement tools are generally classified into two main groups: indicators based on statistical techniques and those derived from financial analysis. This section focuses on these approaches in greater detail.

Several quantitative methods are used to assess the degree of exposure to risk, including gap analysis models, risk-adjusted return models, the Value at Risk (VaR) approach, the Capital Asset Pricing Model (CAPM), among others.

Statistical Tools for Measuring Financial Risk

Statistical tools rely primarily on measuring the degree of dispersion in the values of the financial variable under consideration or on assessing its sensitivity to changes in another variable. Among the most important of these tools are the following:

Range

The range is defined as the difference between the maximum and minimum values of the financial variable of interest. It is considered a basic measure of risk: the larger the range, the greater the volatility of returns, and consequently, the higher the level of risk associated with the financial variable under analysis (Ali, 2005).

Probability Distributions

Probability distributions provide a more detailed quantitative tool than the range by tracing the behavior of a financial variable and identifying the values that are expected to occur under different possible events. By determining the probability distribution of these values, it becomes possible to compare the levels of risk associated with different independent assets and to make informed choices among them. Generally, the wider the probability distribution—particularly toward both tails—the higher the indicated level of risk.

Standard Deviation

The standard deviation is the most widely used statistical indicator of total risk associated with a financial variable. It measures the degree of dispersion of observed values around their expected value. A higher standard deviation reflects greater variability in returns and, therefore, a higher level of risk.

First, the Variance of Returns Is Calculated (σ^2)

The variance of returns represents a fundamental statistical measure for assessing risk. It is calculated as follows:

$$\sigma^2 = \frac{1}{n-1} \sum_{t=1}^{n} (R_t - \bar{R})^2$$

where $\bar{R}$ denotes the average return, which is computed as:

$$\bar{R} = \frac{1}{n} \sum_{t=1}^{n} R_t$$

In this expression, R_t represents the actual return in period t, while n denotes the number of periods (years).

Based on the variance, the standard deviation is obtained as the square root of the variance and is expressed as:

$$\sigma = \sqrt{\sigma^2} = \sqrt{\frac{1}{n-1}\sum_{t=1}^{n}(R_t - \bar{R})^2}$$

The standard deviation provides a direct and intuitive measure of the dispersion of returns around their mean, and it is therefore widely used as an indicator of the overall level of financial risk associated with a given asset or portfolio.

Coefficient of Variation (CV)

The coefficient of variation is a relative (standardized) measure of dispersion. It expresses the level of risk per unit of return by linking risk—measured by the standard deviation—to return—measured by the expected (mean) value. For this reason, the coefficient of variation is considered more precise and, in many cases, preferable to the standard deviation when comparing several independent assets that differ in both their levels of risk and return. A higher coefficient of variation indicates a higher degree of risk. It is calculated as the ratio of the standard deviation to the average return, as follows:

$$CV = \frac{\sigma}{\bar{R}}$$

Beta Coefficient (β)

The beta coefficient measures the sensitivity of the value or return of a given financial variable to changes in another variable. For instance, it can be used to assess the sensitivity of an individual stock's return to movements in overall market returns, or to changes in interest rates within the banking system. A higher beta value reflects greater sensitivity to such changes and, consequently, a higher level of risk (Ali, 2005).

Financial Analysis Tools for Measuring Financial Risk

Financial analysis tools are based on assessing a firm's ability to meet its financial obligations to third parties—particularly creditors—within their specified maturities, as well as its capacity to generate positive net cash flows for shareholders. Measuring financial risk at the firm level relies on a set of financial ratios and indicators that serve as approximate signals of the firm's expected financial condition, particularly with respect to anticipated cash flows, profit margins, and coverage ratios for financial obligations. The most important of these ratios are summarized in the following figure (Ali, 2005):

Figure 1: Illustrates The Main Ratios Used in Financial Analysis to Measure Financial Risk

Types of Banking Risks

Challenges in the financial sector in general—and the banking sector in particular—are largely centered on risk management. Compared to other sectors, banking is more exposed to future uncertainty, which necessitates the continuous development of methods, tools, and measurement frameworks that enable banks to address risks efficiently and proactively.

Banking risks have intensified significantly in recent years due to two fundamental factors. The first relates to the management of change within economic life, while the second is associated with the increasing degree of interdependence and integration among different sectors of the economy.

The distinctive nature of the banking sector lies in its heavy reliance on funds owned by others, as well as the fact that the majority of its assets and liabilities are monetary in nature. Banking activity is primarily based on financial intermediation—lending and borrowing—which, combined with relatively small capital bases compared to total assets, results in very high financial leverage. At the same time, banks typically hold a limited proportion of fixed assets relative to total assets, implying low operating leverage. These characteristics render banks among the most risk-exposed financial institutions. Consequently, the risks they face are not confined to a specific industry or sector; rather, they reflect risks inherent in the economy as a whole, as well as those associated with the full spectrum of banking activities.

Given that banks operate fundamentally within an environment dominated by risk—whether related to specific clients, particular activities, the sectors in which clients operate, domestic economic conditions, or developments in the global economy—the primary concern of bank management is how to effectively manage potential risks in their broadest sense, with the aim of mitigating or avoiding adverse outcomes.

In the context of globalization and rapid economic and financial transformations, banking risks have become one of the most significant challenges confronting banks, exerting a substantial influence on their performance. The nature and intensity of these risks vary according to differences in business environments and the range of activities undertaken by banks.

Banking risks can therefore be categorized into several groups and types, depending on the perspectives adopted by scholars and researchers. These classifications reflect diverse analytical approaches that take into accout the nature of banking activities, the operating environment, available resources, prevailing economic conditions, and international economic relations. Accordingly, banking risks may be classified into multiple categories, as illustrated in the following figure (Al-Shammari, 2020):
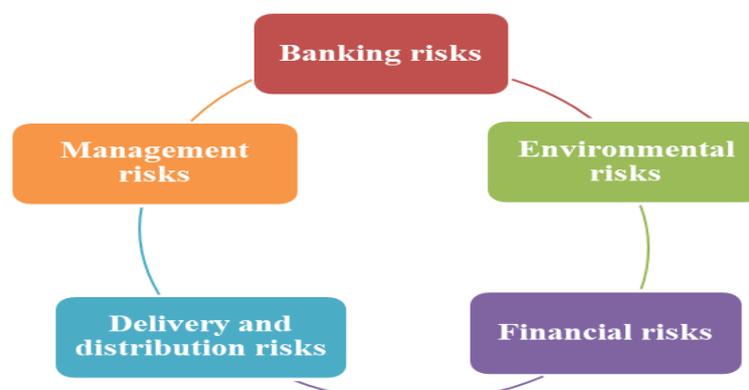

Figure 02: Types Of Banking Risks

Environmental Risks

Environmental risks refer to the risks faced by banks as highly regulated and institutionally governed entities. Most banking activities are embedded within the payment system of the economy, and the payment function constitutes a vital and substantial component of banking operations. Moreover, banks operate within an open system that both influences and is influenced by its surrounding environment—whether the internal environment, the specific (micro) environment, or the broader (macro) environment. This includes internal strengths to be reinforced and weaknesses to be mitigated, as well as external opportunities to be exploited and threats to be avoided, particularly those arising from competition or the introduction of new products. This category of risks encompasses the following types:

Legislative (Regulatory) Risk

Often referred to as compliance risk, this type of risk arises from the potential non-compliance with supervisory laws, regulatory frameworks, and legislative rules, which may adversely affect banking institutions. Regulatory authorities may impose financial penalties on non-compliant banks, and repeated violations can lead to more severe sanctions. Legislative risk also reflects the impact of national laws and regulations in the jurisdictions where banks operate and must therefore be considered when assessing overall risk exposure. It includes policies related to customs tariffs, import quotas, taxation, subsidies, and other regulatory measures that influence investment activities.

Economic Risk

Economic risk encompasses risks associated with domestic and international economic conditions that may affect banks' performance, either directly or indirectly. In particular, globalization has intensified economic interdependence, effectively transforming the world into a closely connected system in which financial shocks and macroeconomic disturbances can be transmitted rapidly across borders through relatively simple channels of interaction.

Competitive Risk

Competitive risk has emerged as a result of the introduction of new financial products, continuous innovation, and the provision of high-quality and efficient services through diverse delivery mechanisms. Banking services have evolved from traditional banking models to various forms of electronic and digital banking. This risk has also been amplified by the growing role of other financial institutions—often referred to as non-bank financial institutions—that have entered the competitive landscape, such as insurance companies, investment firms, pension funds, and social security institutions. Additionally, telecommunications companies have become influential competitors due to their extensive interaction with the public.

Organizational Risk

This type of risk arises from the failure to properly implement organizational, supervisory, and operational procedures, as well as established banking rules and standards. Such shortcomings may place banks in a non-competitive position, potentially leading customers and counterparties to avoid dealing with them. Organizational risk is particularly pronounced in banking due to the sector's highly regulated nature and the extensive body of laws, regulations, and supervisory requirements governing its activities. Non-compliance with these rules exposes banks to accountability and sanctions by regulatory and legislative authorities.

Managerial Risks

Managerial risks arise primarily from poor management practices, weak administrative capacity, and inadequate managerial competence. These risks encompass several interrelated dimensions, as outlined below:

Reputational Risk

The success of banking institutions is closely linked to the reputation they establish as trustworthy and reliable entities. Reputational risk emerges when a bank delivers inefficient or low-quality services, fails to provide services consistently, or lacks reliability in its operations. Such risks may also arise from insufficient disclosure to customers, weak transparency practices, or violations of customer privacy and data protection, all of which can undermine public confidence in the institution.

Organizational Risk

Organizational risk refers to risks associated with the organizational structures of banks, including their various forms, the hierarchy of authority and responsibility, and the nature of interrelationships and coordination among departments and operational units. This category also includes managerial risks related to the internal banking environment, as well as the design and effectiveness of compensation and incentive systems, which may distort decision-making or weaken accountability if not properly aligned with institutional objectives.

Capability (Competence) Risk

Capability risk arises when bank management lacks the efficiency, expertise, or adaptability required to respond effectively to environmental changes within the banking sector. Such deficiencies may impair the institution's ability to make sound and prudent banking decisions related to fund management, as well as the efficient management of assets and liabilities. Consequently, banks may lose valuable investment, lending, and employment opportunities due to insufficient managerial competence, limited experience, and an inability to manage funding sources and allocate them optimally across diverse investment avenues.

Compensation (Burden-Sharing) Risk

Compensation risk reflects the need for private sector participation in addressing financial and banking crises through mechanisms such as deposit insurance schemes and implicit depositor protection frameworks, as emphasized under Basel II. These arrangements aim to ensure that part of the financial burden or losses—particularly in the event of bank failure—are borne by the private sector rather than entirely by the state, a concern that is especially relevant in developing economies.

In the absence of an explicit deposit insurance system, depositors may lack incentives to differentiate between sound and weak banks, as they do not expect to incur losses during crises. By contrast, under an explicit deposit insurance scheme—where coverage is typically capped rather than comprehensive—depositors are exposed to a portion of potential losses in the event of bank insolvency. This exposure encourages depositors to favor financially strong and well-capitalized banks, thereby exerting market discipline. As a result, weaker banks are gradually driven out of the market, leading to improved discipline, enhanced efficiency, and greater overall effectiveness of the banking and financial system.

Financial Risk

Financial risks primarily emerge from the management of banks' balance sheets and encompass a wide range of risk types, as outlined below:

Credit Risk

Credit risk is widely regarded as one of the most significant risks faced by banks, despite the presence of other major risks such as market risk and operational risk. Numerous banking studies have shown that the majority of financial and banking crises—whether in developed or developing economies—have been fundamentally driven by credit distress and loan defaults. This has placed credit risk at the core of regulatory and supervisory attention, not only in countries that experienced crises, but also at the level of the

international banking system, particularly among global institutions such as the Bank for International Settlements (BIS), the International Monetary Fund (IMF), and the World Bank.

Credit risk arises from the possibility that borrowers may be unable or unwilling to meet their financial obligations on time, leading to direct economic losses for banks. These losses extend beyond the immediate default to include opportunity costs, as well as the administrative and monitoring expenses associated with managing non-performing loans.

Liquidity Risk

A bank's ability to meet its obligations depends largely on the adequacy of its cash and near-cash holdings, particularly secondary reserves in the form of marketable securities that can be sold with minimal losses. Liquidity risk reflects the relationship between a bank's liquidity requirements—needed to satisfy deposit withdrawals and to seize lending opportunities—and its actual or potential liquidity sources. These sources may include asset sales, forced liquidation of assets at a loss, or the acquisition of additional liabilities. In practice, banks often resort to investment adjustments as a means of addressing liquidity shortfalls.

Interest Rate Risk

Interest rate risk refers to potential losses incurred by banks as a result of adverse movements in market interest rates, which may affect both bank earnings and the economic value of assets. This risk is particularly pronounced for specialized banks operating in electronic or innovative financial markets, where exposure to interest rate volatility can be substantial. Negative interest rate movements may erode asset values and, consequently, affect outstanding electronic or financial obligations (Al-Hindi, 1996).

Leverage Risk

Leverage risk arises from an increase in the proportion of borrowed funds relative to total capital, which amplifies risk as leverage intensifies. Two main forms of leverage can be identified. The first is financial leverage, resulting from fixed financial charges such as interest payments on debt, reflecting reliance on borrowed funds. Banks with high levels of financial leverage are more vulnerable to default risk, particularly when revenues decline for any reason. The second is operating leverage, which stems from fixed operating costs directly related to banking activities, such as depreciation expenses and administrative salaries. High operating leverage can further magnify financial instability when income fluctuates.

International Risk

International risk refers to risks associated with foreign currency transactions and exposure to foreign exchange markets. These risks affect banks and financial institutions engaged in cross-border activities and arise from fluctuations in exchange rates, differences in regulatory environments, and volatility in international financial markets.

Delivery Risk

Many banks have increasingly expanded into advanced domains of electronic banking services, particularly internet banking, due to the speed, efficiency, and cost reduction these services offer. However, this transformation is accompanied by a set of risks that can be summarized as follows:

Operational Risk

Operational risk can be defined as the risk of losses resulting from inadequate or failed internal processes, people, or systems, or from external events. It is closely linked to the management of operational processes, performance incidents, and system failures. Since 1998, the Basel Committee on Banking Supervision has placed growing emphasis on operational risk, recognizing its critical role in shaping the scope and nature

of banking risks. This increased attention reflects the rapid development and complexity of financial services, the growing reliance on technology, and the expansion of banks' activities from local to global markets.

Technological Risk

Given the continuous innovation and technological advancement characterizing the banking industry, the provision of electronic banking services has become a strategic priority for banks seeking to achieve competitive advantage. While such technologies offer substantial benefits for both banks and customers, they are simultaneously associated with significant risks. Consequently, Basel II introduced supplementary guidelines addressing the risks inherent in technology-driven banking activities, acknowledging their potential impact on financial stability.

New Product Risk

The introduction of new financial instruments, the expansion in their use, the intensification of financial globalization, and the liberalization of banking and financial markets across countries have all contributed to an increase in the scale and diversity of banking risks. The entry of innovative financial products and instruments has amplified uncertainty, exposing banks to unfamiliar risk profiles that require advanced risk assessment and management frameworks (Al-Krasneh, 2006).

Strategic Risk

Strategic risk refers to current and future risks that may adversely affect an institution's earnings and capital as a result of incorrect decisions, improper implementation of decisions, or inadequate responsiveness to environmental and market changes. Ultimate responsibility for strategic risk rests with the board of directors, while senior management is accountable for ensuring the existence of an effective strategic risk management framework. At the operational level, strategic risk is closely linked to decisions concerning the allocation and composition of investment portfolios, where suboptimal choices can have long-term financial consequences.

Value at Risk (VaR)

The Emergence of the Value at Risk Concept

The emergence of concepts such as engineering, reengineering, change, and transformational change, alongside the rapid growth of commercial and financial activities and the expansion of trading volumes in financial markets—characterized by increasing volatility and instability—has driven the adoption of advanced financial concepts, most notably value and risk. This evolution, in turn, stimulated the development of sophisticated analytical approaches that rely on market fluctuations to estimate potential losses in investment returns, giving rise to what are known as Value at Risk (VaR) models.

The VaR framework is grounded in two fundamental principles. The first is the principle of selection, which involves choosing a representative sample of financial institutions. The second is the system principle, which focuses on selecting integrated financial systems exposed to risk. Through these principles, VaR seeks to describe and interpret potential losses in investment returns, while drawing attention to factors related to current and future market conditions.

Despite its relatively recent origin, VaR experienced rapid diffusion and widespread adoption among major financial institutions. Notably, J.P. Morgan incorporated VaR into its proprietary RiskMetrics system for market risk management, which significantly encouraged its use among traders, financial and non-financial institutions, small enterprises, investment firms, and central banks worldwide. Subsequent empirical surveys of VaR users, based on samples of international institutions, demonstrated its growing importance in terms of application, disclosure, and reliance as a core tool for risk assessment and for communicating potential losses.

The VaR concept gained further coherence by explicitly articulating the relationship between estimated losses, investment returns, and exposure to market fluctuations. This perspective was formally endorsed by the Basel Committee in its 1996 amendments, which recognized VaR as a qualitative and quantitative benchmark within international regulatory standards. Similarly, the World Bank's 1994 report emphasized the need for all financial intermediary institutions and investment portfolio managers to confront potential market risks, implement effective measures to reduce the likelihood of financial failure, and adopt mechanisms capable of identifying and mitigating risks—implicitly supporting the VaR framework, even though its methodological contours were not yet fully defined at that time.

Moreover, the escalation of financial crises during the early 1980s and 1990s significantly expanded the scope of VaR as a quantitative measure for estimating potential losses. The Basel Committee further facilitated this expansion, particularly in the context of banking supervision and the calculation of capital requirements under market risk. In parallel, supervisory and regulatory authorities required American and European financial institutions to disclose VaR on a mandatory basis as a means of limiting market risk. VaR thus became recognized as one of the most effective diagnostic instruments for detailed and rigorous analysis of financial systems, enhancing transparency and strengthening market discipline (Rachev, Schwartz, & Khindanova, 2002).

Concept of value at risk (VaR)

Value at Risk (VaR) stands as one of the most widely adopted metrics for assessing market risk, distinguished by its unique ability to condense the diverse risks affecting a financial portfolio or position into a single, interpretable figure. Unlike conventional methods, VaR quantitatively estimates potential losses with a specified level of confidence over a given time horizon. In other words, it provides a concise measure of the maximum expected loss for an isolated position, a financial portfolio, or the bank's overall holdings within a short-term period (Portait, Poncet, 2012).

Several scholarly definitions capture this concept: VaR can be defined as the maximum potential loss in the value of an investment portfolio arising from adverse market movements at a specified confidence level (Manganelli & Engle , 2001). Similarly, it is described as the expected maximum loss over a given time horizon under normal market conditions at a certain confidence level (Abdelhay, 2014). Another perspective frames VaR as a method that estimates the maximum possible future loss based on historical data at a given probability level, allowing investors or banks to anticipate the largest loss over, for instance, a ten-day period with a 1% probability (i.e., 99% confidence level), relying on sophisticated statistical techniques and demanding high institutional performance standards (Belazouz, Kendouz, & Habbar, 2013).

From these definitions, VaR can be synthesized as a statistical technique that quantifies and consolidates risk into a single metric, representing the maximum expected loss under normal market conditions over a defined time horizon and at a specified confidence level. This makes it a powerful tool for risk management, strategic decision-making, and regulatory compliance within financial institutions.

Mathematical Formulation of Value at Risk (VaR)

Let K represent the value of the portfolio and α the confidence level of interest. The Value at Risk can then be expressed mathematically as:

$$\mathbf{Pr}\ (\mathbf{\Delta K} \leq -\mathbf{VaR}) = \mathbf{\alpha}$$

where ΔK denotes the change in the portfolio value over a specified time horizon.

This equation indicates that the probability that the loss due to changes in the portfolio value will not exceed the VaR equals the predetermined confidence level α.

From this formulation, three essential components are required to calculate VaR:

1.   Unit of measure – typically the currency in which the portfolio is denominated, e.g., Saudi Riyal, US Dollar, or another relevant currency.

2.   Probability level (confidence level) – ranges from 0 to 1, with commonly used standard levels being 1% and 5% for VaR calculations.

3.   Time horizon – the period over which VaR is assessed, which can be a day, a week, a month, or a year. The horizon is usually determined by the liquidity of the asset or portfolio under consideration. It is also crucial that the horizon is sufficiently long to capture potential risks or adverse market events.

This mathematical framework allows financial institutions to quantify potential losses under normal market conditions and forms the foundation for both internal risk management and regulatory reporting.

Principle of Value at Risk (VaR)

In insurance theory, Value at Risk represents the potential value of assets that could be completely lost as a result of a risk event. This value ranges between zero (no loss) and the total value of the at-risk item. In financial management, where the at-risk item is usually a portfolio, VaR can even exceed the portfolio's total value due to the use of financial leverage, a common technique in investment strategies.

Financial institutions typically project the expected values of their investments over a future period. Given that most investments are exposed to market risks—with stock prices, currencies, and bonds fluctuating unpredictably—VaR becomes essential in assessing the maximum potential loss during a specified period. For example, a portfolio's VaR for the coming month may be estimated at $1 million with a 95% confidence level, meaning there is a 95% probability that losses will not exceed $1 million. VaR thus provides a quantitative measure of market risk exposure for assets or portfolios (Kandouz, 2020).

Disadvantages of the VaR Approach

The VaR methodology offers several key benefits:

•   Quantification of potential losses: VaR estimates the potential loss (or gain) of an institution over a defined period at a specified confidence level.

•   Simplification of complex risks: It condenses all financial risks in a portfolio into a single, interpretable figure. While primarily focused on market risk, VaR also encompasses risks from foreign exchange rates, commodity prices, and equities.

•   Ease of application: Particularly with historical and parametric approaches, VaR is straightforward to implement.

Diverse Applications of VaR

•   **Applicability across instruments**: VaR can be applied to any financial instrument with sufficient historical price data.

•   **Aggregation by risk category**: For instance, interest rate VaR accounts for fluctuations in interest rates, foreign currencies, equity options, commodities, money markets, swaps, and bonds.

•   **Comparison of risk across portfolios**: VaR allows the comparison of risks between fixed-income securities (bonds) and equities, as well as aggregation within a portfolio to account for correlations among assets.

- **Portfolio diversification benefits**: Risks are aggregated across asset classes, and the total is typically reduced due to diversification effects, as different asset classes behave differently over time.

Role of VaR in Risk Management

Implementing the VaR methodology highlights its effectiveness in risk management, with multiple applications:

- **Standardized risk measure**: VaR provides a consistent metric across risk factors, instruments, and asset classes, increasing transparency and harmonizing risk management practices.

- **Consideration of correlations**: If two risks offset each other, VaR reflects a relatively lower total risk. Conversely, if risks amplify one another, VaR captures a higher overall risk. This aligns with portfolio theory principles.

- **Aggregated risk metric**: VaR translates the maximum potential loss at a given confidence level (α) into a tangible figure, which can guide capital adequacy assessment and **risk-adjusted performance evaluation** from a shareholder's perspective.

- **Operational limits and monitoring**: VaR-based limits allow institutions to control risk exposure per business line and identify units contributing most to overall risk (e.g., equities, bonds, interest rates).

- **Decision-making support**: VaR provides senior management, boards, and regulators with an intuitive measure of risk, facilitating informed decisions about the appropriateness of risk levels relative to established limits.

Conclusion

The risks faced by financial institutions are diverse and multifaceted, necessitating multiple classification criteria—systemic or non-systemic, financial or non-financial, internal or external, significant or minor, manageable or unmanageable. Among the most critical risks impacting institutional operations are operational risk, liquidity risk, credit risk, and market risk, along with strategic and country-specific risks. Each of these can significantly influence institutional performance and continuity.

In this context, the Value at Risk (VaR) approach stands out as a pivotal quantitative measure of financial risk. Its key advantages include ease and speed of calculation, along with the ability to provide a single, interpretable figure representing the magnitude of potential risk. VaR has also emerged as one of the most widely adopted tools among financial institutions and market participants for anticipating and mitigating potential losses.

Recommendations

- Financial institutions should develop techniques and strategies to proactively manage these risks, as their success largely depends on the effectiveness and credibility of their risk management frameworks.

- Greater attention should be given to the VaR model both academically and practically, recognizing its strategic significance in financial risk assessment.

- Regulatory bodies should mandate the adoption of VaR for risk measurement and require periodic disclosure, as it provides a standardized, coherent, and comprehensive metric that accounts for various risk factors, thereby enhancing transparency and harmonization in risk management practices.

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