BANK FOR INTERNATIONAL SETTLEMENTS

A discussion paper on

Public Disclosure of Market and Credit Risks by Financial Intermediaries

Prepared by a Working Group of the Euro-currency Standing Committee
of the Central Banks of the Group of Ten countries

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Preface

1. At their meeting in Basle on 12th September, the Governors of the G-10 central banks agreed to the release of this Discussion Paper on the Public Disclosure of Market and Credit Risk by Financial Intermediaries, as recommended by the Euro-currency Standing Committee of the G-10 central banks. The paper has been prepared as a contribution to the Standing Committee's ongoing assessment of financial market functioning by a working group chaired by Peter R. Fisher of the Federal Reserve Bank of New York.

2. The discussion paper, while reflecting preliminary thinking in G-10 central banks, is being released with the intention of stimulating further debate in a wider forum, including market participants and accounting authorities, about the role that enhanced public disclosure by financial intermediaries could play in addressing concerns about the risks incurred by financial intermediaries in the active trading of financial assets and derivative instruments. The Standing Committee hopes that relevant national authorities will find the discussion paper helpful in their efforts to encourage the evolution of disclosure practices that will improve the functioning of financial markets.

3. The preparation of this paper has benefited from discussion with the Basle Committee on Banking Supervision, which may in due course consider specific supervisory issues in relation to disclosures by banks.

4. The G-10 central banks will be taking further steps to encourage comments and reactions to this discussion paper from interested parties.

Euro-currency Standing Committee

A discussion paper on Public Disclosure of Market and Credit Risks by Financial Intermediaries

1. Summary and recommendations

1.1 This paper addresses disclosure issues relating to the risk exposures and risk management performance of trading activities of financial intermediaries. It has been prepared by the Euro-currency Standing Committee of the G-10 central banks for the purpose of stimulating further debate about the methods and purpose of public disclosures of financial information by financial intermediaries. The paper complements disclosure formats for financial trading activity recently proposed by accounting bodies and private market associations and seeks to advance further the public debate about disclosure of risk exposures and risk management performance.

1.2 Financial markets function most efficiently when market participants have sufficient information about risks and returns to make informed investment and trading decisions. However, the evolution of financial trading and risk management practices has moved ahead of the public disclosures that most firms make of information that is relevant for such decisions. As a result, a gap exists between the precision with which a firm's management can assess its financial risks and the information available to outsiders. This asymmetry of information can cause a mis-allocation of capital among firms and can also amplify market disturbances. During episodes of market stress, this lack of transparency can contribute to an environment in which rumours alone can cause a firm's market access and funding to be impaired.

1.3 To improve the transparency of financial risk exposures, market participants should strive to disclose more meaningful information about risks and risk management performance. Current accounting conventions do not provide a sufficient means of presenting such information. However, financial risks are already measured and expressed in many firms' internal risk management systems. This paper recommends that information generated by such systems be adapted for public disclosure purposes. Such information would complement, but not substitute for, disclosures based on traditional accounting conventions because it would provide answers to questions about risks and risk management on which balance sheet and income statements are silent.

1.4 In an environment that lacks transparency, a firm that discloses more information about its risks than others may fear that outsiders will erroneously perceive its riskiness to be greater than that of other firms. Such concern may have hampered progress in voluntary disclosures of risk exposures. However, if consensus developed on an appropriate framework for understanding such disclosures, enhanced disclosures could be seen as an indication of strength. An approach based on each firm's own methods of assessing and managing risks should provide the flexibility that will make it easier for firms to communicate their risk management practices and performance.

1.5 **Recommendation:** The Euro-currency Standing Committee suggests that all financial intermediaries - regulated and unregulated - should move in the direction of publicly disclosing periodic quantitative information which expresses, in summary form, the estimates relied upon by the firm's management of:

- the market risks in the relevant portfolio or portfolios, as well as the firm's actual performance in managing the market risks in these portfolios;
- the counterparty credit risks arising from its trading and risk management activities, including current and potential future credit exposure as well as counterparty credit worthiness, in a form which permits evaluation of the firm's performance in managing credit risk.

1.6 Disclosures based on this recommendation would have the advantage of providing information about risks as they are managed by each firm. Moreover, by contrasting individual firms' prior risk assessment with subsequent outcomes, such disclosures would provide scope for comparison of firms' relative risk management performance over time. Because the information required for such disclosures is already generated for internal risk management purposes, the approach should not be burdensome.

1.7 While comparability of disclosures is desirable and should be an ultimate goal, at present no consensus on best practice for the measurement of risk exists. For example, the technical details of the models used for risk measurement differ between firms; strict comparability would require consensus on such details. Given such differences, an insistence on immediate comparability would be impractical. Recognising that consensus on best practice, and thus comparability, cannot be achieved immediately, the benefits to be gained from improved transparency recommend an evolutionary approach. To that end, flexibility in disclosure methods is desirable, at least for some time.

1.8 The Basle Committee on Banking Supervision is currently developing a framework for the measurement of market risk for capital purposes at commercial banks. Once finalised, the procedures, methods and parameters of that framework could be a basis for increasing the comparability of commercial banks' public disclosures.

1.9 This discussion paper, however, serves the more general purpose of stimulating debate about the purpose and scope of public disclosures by all financial intermediaries and encouraging an evolution of disclosures practices that will improve the functioning of financial markets. Although this paper's recommendation is directed at financial intermediaries, the process it encourages could be of value for non-financial firms as well, especially those with active treasury units.

2. Rationale

2.1 Financial markets function most efficiently when participants have access to information that facilitates the prompt and accurate pricing of assets. This applies not only to individual instruments and financial assets but also to the assessment of financial intermediaries themselves. For shareholders, creditors and counterparties in financial markets to allocate capital efficiently, they need to be able to assess the risks to which firms are exposed and which, in their view, should be reflected in share prices, funding costs and credit decisions.

2.2 The use of derivative instruments has added diversity and complexity to firms' financial assets, liabilities and off-balance-sheet commitments. This has rendered the assessment of their risk exposures more difficult. At the same time, derivative instruments have provided firms with new opportunities to assess, price and manage increasingly refined elements of financial risk. The development of methodologies for assessing the riskiness of portfolios or trading positions has increased firms' ability to assess and understand their overall risk exposures.

2.3 However, the evolution of trading and financial risk management practices in recent years has moved well ahead of the public disclosure of financial information made by most financial firms. As a result, a gap exists between the precision with which a firm's management can assess and adjust the firm's own risk exposures, and the information available to outsiders to help them assess the riskiness of that firm's activities. Indeed, market participants are increasingly aware of the contrast between their increased ability to assess and manage their own financial risks and their relative inability to assess the riskiness of other market participants on the same terms.

2.4 The lack of transparency of financial intermediaries' trading and risk management activities can cause a mis-allocation of capital among firms and can also amplify market disturbances. When the riskiness of firms' activities are not apparent to outsiders, the market allocation of capital to such firms is unlikely to reflect their actual risk-return prospects. During episodes of market stress, a lack of information about a firm's market and credit risk exposures can create an environment in which rumours alone can cause a firm's creditors and counterparties to reduce their dealings with the firm solely to avoid uncertainty. This may impair the firm's market access and funding at the very time that these may be critical to the firm's survival. Moreover, problems encountered by one firm may cause funding or market access difficulties at other firms which, because of a lack of transparency, appear similar to outsiders. As counterparties withdraw from new transactions, market liquidity for some instruments may decline.

2.5 The problems caused by a lack of transparency affect all financial intermediaries and financial market participants. In order to address these problems, major market participants need to disclose more meaningful information about their risk exposures and risk management performance. While some firms' disclosures in these areas have improved in recent years, such improvements have been isolated and have lacked a framework that allows outsiders to assess firms' ability to manage the risk embedded in their portfolios.

2.6 It is important to recognise that current national accounting conventions do not provide a sufficient means of representing the risk exposures that are measured and managed by increasingly common risk management concepts such as value-at-risk and stress tests. Disclosure of information based on such concepts would be complementary to, but not a substitute for, continued efforts by the accounting profession to improve the accuracy of information contained in balance sheets and income statements.

2.7 Some regard it as desirable for accounting conventions to include or reflect risk management concepts so that firms' financial disclosures could provide a single consistent statement of income. Others, however, believe that any additional disclosure of risk management information should be kept entirely distinct from accounting conventions, which are seen as appropriately serving the limited purpose of providing a snap shot of firms' assets and liabilities as well as rules for the recognition of income. These differences reflect the continuous and healthy debate over appropriate accounting practices and differences in existing national accounting rules.

2.8 Despite the continued lack of harmony in national accounting practices, accounting principles should not hinder meaningful disclosure of firms' risk management activities. There is growing convergence among the major financial intermediaries in the basic analytic tools used for internal risk management. These can, in turn, be used as the starting point for providing improved disclosure about firms' performance in managing their risk.

2.9 In developing an approach for improved disclosure of risk management information, an effort should be made to assess the effectiveness of any proposal against potential costs. First, disclosure should be meaningful in the sense of expressing how a particular firm does, in fact, assess and manage risk. Second, it should be understandable by providing an adequate context or paradigm for relating details to the overall concepts. Third, it should preserve proprietary information of the firm, so that a firm would not need to reveal specific market opportunities (and risks). Fourth, it should not be burdensome, in that the cost of producing the information should not exceed the total benefits disclosure would bring to the firm, its shareholders and the market. Fifth, it should be comparable so that it can provide a basis for comparisons among firms. Sixth, it should be verifiable in the sense of being independently auditable. And finally, the approach should be flexible so that it does not stifle the further development of risk management concepts and disclosure practices.

2.10 In practice, there are obvious trade-offs and tensions among these criteria. For example, a disclosure regime that is sufficiently flexible to accommodate changing trading and risk management practices, and which encourages firms to provide the information they consider most meaningful and informative about their own risk management activities, may reduce the degree of comparability of disclosures across firms and over time. However, the gain in transparency and meaningfulness of disclosures made by individual firms about their risk exposures and risk management capacity would appear to make such an approach a reasonable starting point. Moreover, while the existence of these trade-offs has contributed to the difficulty of achieving consensus on public disclosure, a very large obstacle has been the reluctance of individual firms to forge ahead unilaterally.

2.11 In an environment of limited transparency, a firm that reveals more information about its risks than others may have reason to fear that outsiders perceive its risk to be greater than those of firms who conform to the status quo in disclosure. Given the general paucity of risk-related disclosures, a firm whose overall risks are low could still encounter difficulty convincing investors that its risks are lower than those of firms that do not make such disclosures.

2.12 However, a firm's ability to measure and control increasingly complex risks is of significant importance in determining the firm's performance and standing in the market place. Hence, it is in the firm's self-interest to communicate its risk management capabilities to the market place. A shift in the focus of disclosures from the language of traditional accounting conventions to the firm's own assessment of risks and its performance in managing those risks could make it easier for each firm to communicate its risk management performance to outsiders and should reduce the likelihood that such disclosures will be misconstrued by outsiders.

2.13 While it is desirable for firms to have the flexibility to disclose quantitative information which they consider meaningful, the information thus disclosed also needs to be capable of receiving or being subject to an objective, external check. This points to the need for the auditing profession to be closely involved in the public debate on disclosure because they will have an important role to play in ensuring that information disclosed about firms' risks represents an accurate statement both of the estimates of risk themselves and of the actual outcomes against which the estimates are assessed.

2.14 If firms with superior risk management systems begin to disclose information adapted from these systems, this approach could initiate a dynamic competitive process leading to enhanced disclosure practices and greater market transparency. In turn, the information revealed would allow outsiders to make informed judgements about the adequacy of the firm's capital in relation to its risk exposures and risk management capability. Firms that adopt such improved disclosures and are able to demonstrate that they take less risk - or manage risks better - than they are perceived to will be deemed more creditworthy than they otherwise would be. Such a process could also strengthen market discipline because firm management will correct and adjust their risk management strategy in anticipation of possible responses to their disclosures by market participants.

3. Market risk disclosure

3.a Recommendation

3.1 All financial intermediaries, regulated and unregulated, should move in the direction of publicly disclosing periodic quantitative information which expresses, in summary form, the estimates relied upon by firm management of:

- the market risks in the relevant portfolio or portfolios, as well as the firm's actual performance in managing the market risks in these portfolios.

3.2 This recommendation suggests that firms move in the direction of drawing from their risk management information systems for their public disclosures. Firms could meet the principle by disclosing (summary) information about risks and performance using whatever methods are employed in their risk management systems, and covering whatever portions of the firm that are spanned by their risk management systems. Many firms may not yet have sophisticated risk management information systems that cover the entire firm. Nevertheless, firms should draw on the information used by management about the parts of the firm or the portfolios for which risk management systems exist.

3.b Quantitative information

3.3 Quantitative information about risk exposures and risk management performance can provide a framework for qualitative description and assessment. While qualitative information about risk management and risk control practices is useful and should be an integral component of disclosure, it is not a substitute for quantitative information. Qualitative information or discussion of risk management activity can become meaningless boiler-plate if it is not linked to quantitative data about risks and realised outcomes. Quantitative measures of risk and the impact of market prices on portfolio values are now used internally by many firms, and for that reason should be used as the basis for firms' disclosures about their risks. Quantitative disclosures about a firm's risks as they are viewed by the firm's management are likely to be informative because they will conform to the specific circumstances of the firm's risk profile and approach to managing those risks.[1]

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[1] The link between quantitative and qualitative disclosures could be strengthened by reference to risk management guidelines such as those developed by the Group of Thirty and by supervisory authorities such as the Basle Committee and the Technical Committee of the International Organisation of Securities Commissions.

3.c Risk management information systems

3.5 Risk management concepts and practices developed by financial institutions provide useful ways of organising and presenting information about financial risks, and disclosure practices would benefit from adopting such risk management concepts. The use of risk management information systems as the source of disclosures also has the benefit of allowing disclosures to evolve with these systems. While a divergence of views exists at the level of specific computation methods and assumptions, risk measurement and management as practised by market participants do have common features. Such features include: (1) a portfolio approach; (2) a focus on basic types of risk (e.g. interest rate risk, exchange rate risk, or credit risk), rather than on instruments or balance sheet categories; (3) a measure of the value of the portfolio that reflects current market prices, interest rates, and exchange rates; and (4) a measure of the sensitivity of the portfolio's value to changes in these prices. Drawing on these features, disclosures consistent with the recommendation would take a portfolio perspective and would include measures of the portfolio's performance and risks that are based on market prices.

3.6 Disclosures of information from risk management systems need not be provided at the level of detail that would reveal proprietary information. Where the coverage of the systems are broad, managers, who are aware of what information is proprietary, should be able to find ways to aggregate information into summary statistics that allow outsiders to evaluate a firm's risk and performance and yet do not reveal the firm's trading positions. Where systems coverage is partial, it may be that, even after aggregation, proprietary trading strategies could still be revealed. In such cases, firms should explore alternative measures that would not reveal proprietary information. However, the fact that the information disclosed would involve an institution's past rather than current trading activities should, in general, mitigate the sensitivity of any information revealed.

3.d The relevant portfolio

3.7 Disclosures about risks and the management of those risks will be most meaningful if they are made from a portfolio perspective. Such an approach is necessary because exposures to a particular type of financial risk (e.g. exchange rate risk) can arise from a variety of financial instruments or balance sheet categories. Hence, a portfolio approach that takes account of all sources of exposure to that particular risk (in the portfolio) is necessary. For example, financial derivatives should not be looked at in isolation from the rest of a firm's assets and liabilities. Financial derivatives have risks that are varied but at the same time are also similar or related to risks of traditional assets and liabilities. Hence, separate disclosures of risk exposures arising only from financial derivatives are misleading.

3.8 Ideally, the portfolio about which disclosures are made should be the consolidated portfolio describing the exposures of the entire firm. For example, some firms, in managing a structural exposure (e.g. asset/liability maturity mismatch) might choose to only partially hedge such exposures. Such partial hedging strategies can have exposures similar to trading positions and disclosures should include such exposures. However, firms are organised and managed along different lines and for some firms disclosure of a single firm-wide consolidated portfolio may be neither practical nor meaningful. For this reason, disclosures could be organised along lines determined by a firm's management and organisational structure.

3.9 At a minimum, the portfolios whose risks should be disclosed would include the trading portfolio and all other exposures whose risks are managed within the trading account. In practice, however, not all "trading" activity always occurs in the trading account, and such activity should be included in disclosures.[2]

3.e Measures of risks and performance

3.10 Disclosure of risk management information need not involve all the details, parameters and assumptions that are used internally, but information in aggregate or summary form can still be meaningful. Drawing on the approach taken by firms in their risk management systems for market risks, the quantitative disclosures envisioned in this paper would have two basic components: for the relevant portfolio(s), (i) a measure of the size and variability of the portfolio's riskiness, and (ii) a measure of the size and volatility of the changes in portfolio market value.

(i) *Portfolio risks*

3.11 One method of measuring market risk exposure that is becoming widely used is *value-at-risk*: an estimate of potential changes in portfolio value based on a statistical confidence interval of changes in market prices that are likely to occur some proportion of the time. (Additional discussion of value-at-risk appears in the Appendix.) An

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[2] Structured debt securities whose returns are linked to prices of underlying assets are similar to trading positions and should be reflected in the disclosures. For example, a treasurer or fund manager can use structured debt instruments to acquire option-like exposures to exchange rate, interest rate, equity, or commodity risks.

estimate of riskiness, however, should not be interpreted as a projection or forecast. In addition, a statistical measure of risk such as value-at-risk should not be interpreted as a risk limit. Instead, by construction, it is a measure of likely declines in portfolio value that will be exceeded some proportion of the time, even in a perfectly well managed portfolio.[3]

3.12 Value-at-risk is one way of measuring risk, and, even though it is becoming more widely used, other approaches are also used by market participants. Disclosures might include elements of market risk assessment methodologies developed by supervisors of financial institutions for prudential purposes. Moreover, in the future other measures of risk might also be developed. Market participants should be encouraged to develop more meaningful ways of communicating risks. Until consensus on "best practice" for conveying risk profiles emerges, the guiding principle should be that disclosures reflect the risks as measured by the firm and presented in a way that allows outsiders to assess the firm's risk management capacity.

(ii) *Portfolio performance*

3.13 The depiction of portfolio performance should reflect the effects of changes in market prices, interest rates, and exchange rates on the value of the portfolio. Market or present values provide meaningful information for performance assessment because they are observable (present values are computable in standardised ways) and are also independent of management assumptions. One method that is becoming a standard tool of risk management practice is the use of market values. If market valuation is used by a firm in the risk management of the relevant portfolio, then the disclosure of performance could be based on the portfolio market value, and the change in that value due to changes in market prices.

3.14 Examples of market risk disclosures are provided in the Appendix.

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[3] An inference that risk management is inadequate would be supportable only when the frequency at which losses exceed the value-at-risk is significantly higher than the confidence level of the value-at-risk (assuming stationary distributions).

4. Credit risk disclosure

4.a Recommendation

4.1 All financial intermediaries, regulated and unregulated, should move in the direction of publicly disclosing periodic quantitative information which expresses, in summary form, the estimates relied upon by firm management of:

- the counterparty credit risks arising from its trading and risk management activities, including current credit exposure, potential future credit exposure, and counterparty creditworthiness, in a form which permits evaluation of the firm's performance in managing these credit risks.

4.2 Disclosures of credit risk arising from trading and risk management activity should provide information about all aspects of credit risk: current exposures, potential future exposures, and probabilities of default. As with market risk, these disclosures should be based upon the methodologies firms use internally for assessing their risks. The sophistication with which firms currently measure such risks varies. However, this recommendation encourages firms to refine these methodologies and develop techniques that most meaningfully convey information about their risks. When appropriate, elements of these disclosures could be based on the methodology used by the relevant supervisors. For example, the Basle Committee's Capital Accord includes a framework for measuring the credit exposure associated with certain off-balance sheet items for capital adequacy purposes.

4.3 Credit risk arises from the possibility that a firm will experience a loss when a counterparty defaults. The magnitude of the credit risk depends on the likelihood of default by the counterparty; on the potential value of the contracts with the counterparty at the time of default; and on the extent to which legally enforceable netting arrangements allow the value of offsetting contracts with that counterparty to be netted against each other, or collateral held against the contracts reduces credit exposure.

4.4 Measurement of credit risk is complicated by the fact that both credit exposures and the likelihood of default can vary over time and may be interdependent. The creditworthiness of counterparties shifts, as reflected in credit rating upgrades and downgrades. Counterparties that originally are highly rated are more likely to default later in a contract's life than earlier, while counterparties that originally are speculative grade are more likely to default earlier. Credit exposures in derivative contracts and structured products also vary as underlying prices (interest rates and exchange rates) on which contracts are based move, and can change dramatically over the life of the contract. This potential increase in credit exposure due to changes in underlying prices is called potential future credit exposure.

4.5 To date, most disclosures of credit risk in trading and risk management activity focus solely on current exposure. This exposure is measured as the current mark-to-market value (replacement cost) of the contracts with a counterparty after bilateral netting, if positive. While current exposure is undeniably an important component of credit risk, both the variability of exposure through time and the likelihood of default are also critical. Because both counterparties' creditworthiness and credit exposures are determined by variables that change over the business cycle, credit risk measurement is a complicated statistical problem.

4.6 Several initiatives by market participants to improve disclosure of credit risks in trading and risk management activity have recently been undertaken. These initiatives are based on the progress market participants have made in this aspect of risk management, and reflect as well their own concern to improve transparency. In recognition of that progress, the recommendation articulated in this report has features in common with these initiatives. The recommendation is complementary to these initiatives, and seeks to encourage market participants to broaden credit risk disclosures to encompass information about probabilities of default and potential future exposures as well. In the latter regard, in July 1994 the Basle Committee published a proposed amendment to the Capital Accord which would refine the calculation of capital charges associated with potential future credit exposures of certain off-balance sheet contracts.

4.7 A key feature of the recommendation is its focus on risk rather than exposures alone. A few firms have begun experimenting with disclosures that address risk. Some firms provide a breakdown of exposures by type of counterparty -- bank or non-bank -- for example, but such data do not offer a very precise picture of the likelihood of default. A few firms have gone further, breaking down current exposures by the internal credit rating assigned to counterparties. The latter information allows more meaningful assessment of the probability of default. However, little if any quantitative information is currently being disclosed about potential future exposures. Practices consistent with this recommendation will require firms to refine their methodologies for measuring credit risk. Ultimately, the goal should be disclosures which integrate current and potential credit exposures with the estimated probabilities of default.

4.8 Firms should disclose information that allows readers of financial reports to assess how successfully the firms have managed credit risk. Information on the variability of exposures over the reporting period could be illustrative. Credit losses will not always correspond to ex ante credit riskiness due to the active management of credit exposures. For example, use of collateral, close-out provisions and other forms of credit enhancement will influence actual credit loss experience. Hence, some information about such credit risk management could be disclosed. Credit losses in trading activities could be placed in the context of the scope of that activity and the capital being used to support it.

4.9 Examples of credit risk disclosures are provided in the Appendix.

Appendix
Illustrative Examples

The following examples provide illustrations of the type of information that a firm could disclose over the reporting period. The examples are only intended to illustrate the recommendation set forth in this report. Each example has its own limitations, and implementing the recommendation as illustrated in the examples may require further refinements. Moreover, other ways of implementing the recommendation could be developed; market participants should explore alternative approaches to meeting the recommendation described in this report that might be more effective means of disclosure than the examples offered here.

Examples A and B describe possible ways of providing information about a portfolio's market risk profile. Examples C through F describe different ways of disclosing market risk and performance. Examples G through I illustrate different ways of disclosing credit risk.

A. Market risk disclosure

As noted in the text, no consensus exists on a single best method of measuring market risk exposures. However, most market risk assessment systems share a number of common features (see paragraph 3.5). Many of these features are present in *value-at-risk* calculations, a method that is increasingly widely used. Without prejudice to other methods, the following paragraphs briefly describe this method and provides an example of how it might be used to disclose the market risk profile of a portfolio.

Value at Risk

Value-at-risk is a concept derived from statistical estimates of the losses or gains a portfolio could experience, due to changes in underlying prices, over a *given holding period, for given confidence intervals*.[4] The confidence interval is an estimate of the changes in portfolio value that are likely to occur some proportion of the time -- though for disclosure purposes, likely declines in portfolio value might be most relevant. For example, over a one-week time horizon, the portfolio could experience a larger loss (than the reported value-at-risk) with a likelihood of 1% (i.e. in one week out of a hundred).[5] The interpretation of a value-at-risk figure requires knowledge of the confidence interval and the holding period used in the estimation. For example, the value-at-risk with an associated likelihood of 1% is higher than the value-at-risk with a 5% confidence level. In addition, the value-at-risk for a one-day holding period is smaller than the value-at-risk for a holding period of one week. Hence, a value-at-risk

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4 The holding period refers to the time interval over which changes in value of a given portfolio is assessed. Holding the portfolio constant, a longer holding period entails higher risks, because a large price move is more likely over a longer interval of time.

5 Value-at-risk incorporates two important components of risk: (1) the sensitivity of a portfolio to changes in underlying prices (how well the portfolio is hedged), and (2) the volatility of underlying prices (the likelihood of large price changes).

report should always be accompanied by the associated confidence level and the holding period.[6]

Value-at-risk is an effective tool for describing and communicating risk because it assesses different risks in terms of a common metric -- losses relative to a standard unit of likelihood. For this reason, it can be used to compare and aggregate risks across instrument types, trading units, and markets. In addition, value-at-risk lends itself readily to a comparison of trading outcomes and risks taken to attain those outcomes, because it is articulated in terms of the size of potential losses.

Example A: Using value-at-risk to disclose risk profiles. For the relevant portfolio(s), the firm could disclose:

- the high, low, and average value-at-risk, for holding periods of one-day, and two-weeks, that occurred during the reporting period.

Along with the value-at-risk figures, the associated confidence level of the value-at-risk should also be disclosed -- interpreting a value-at-risk figure is not possible without the associated confidence level. The disclosure in this example would convey information about the riskiness of the firm's portfolio during the reporting period, and in the case of firms whose portfolios change over the reporting period, the disclosures would indicate the degree to which the firms' risk profiles change. The use of holding periods longer than one-day in this example provide an indication of the portfolio's exposure to market liquidity risk -- the risk that positions cannot be closed out when desired -- as well as its exposure to gamma or curvature risk arising from options or option-like elements. To properly measure curvature risk, however, the changes in portfolio value should be calculated explicitly for the two-week holding period. Simply multiplying the one-day value-at-risk by the square root of ten (the number of business days in a two-week period) would obscure the gamma or curvature risk in the portfolio.

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[6] The following examples show how value-at-risk estimates calculated using different confidence levels and holding periods are related. The examples assume a given portfolio whose composition remains fixed over time:

(a) Value-at-risk over a one-week horizon with a confidence level of 5% (95%) is $10 million. Interpretation: On average, in one week out of *twenty*, the portfolio could lose at least $10 million.

(b) Value-at-risk over a one-week horizon with a confidence level of 1% (99%) is $20 million. Interpretation: On average, in one week out of *a hundred*, the portfolio could lose at least $20 million. A comparison of (a) and (b) reveals that for a given holding period, a larger potential loss is less likely than a smaller loss.

(c) Value-at-risk over a one-day horizon with a confidence level of 1% (99%) is $3 million. Interpretation: On average, in one day out of *a hundred*, the portfolio could lose at least $3 million. A comparison of (b) and (c) reveals that for a given probability, a longer holding period increases the likelihood of a larger price change and thus of a larger potential loss.

Value-at-risk is one way of measuring risk, and, even though it is becoming more widely used, other approaches are also used by market participants. For firms that do not use value-at-risk, a measure of volatility of actual outcomes could also reveal riskiness. The next example presents one alternative measure of risk.

Example B: Using realised outcomes to disclose riskiness. For the relevant portfolio(s), the firm could disclose:

- the histogram (frequency distribution) of daily changes in portfolio value over the reporting period.

Other measures of risks that are used by market participants include (for interest rate risk) gap analysis and duration. While these measures do not lend themselves to a comparison of risks and performance as directly as does value-at-risk, such alternative measures of risk could be used in a discussion of risk profiles and risk management outcomes.

Disclosure of risk profiles alone, as in the above examples, however, would not adequately meet the principles recommended in this paper. Disclosures should also allow an assessment of the firm's capacity to manage its exposures to market risks. The next example depicts one way of conveying information about risks and performance.

Example C: A simple disclosure of risk and performance. For the relevant portfolio(s), the firm could disclose:

c.1 the average daily value-at-risk;
c.2 the average change in portfolio market value, and some measure of its volatility.

The volatility of changes in portfolio value could be depicted in a variety of ways, such as one of the following: the standard deviation of daily changes in portfolio value; the largest declines and largest increases in portfolio value corresponding to, for instance, the lower 5% and the upper 95% of the distribution; or, the histogram of daily changes in portfolio value.

The unpredictability of market prices and the unstable nature of correlations between different prices implies that trading outcomes (and to a lesser degree, hedging results) will be variable. For this reason, the disclosure of only average outcomes is not sufficient. Some measure of extreme outcomes, or the tails of the frequency distribution of changes in portfolio value, are required for an assessment of the firm's ability to manage its risk within a range determined by its appetite for risk. Examples D and E, depict possible approaches to this problem, that are based on a comparison of the tails of the frequency distribution of realised outcomes and ex-ante value-at-risk.

Over time, successful risk management would tend to keep the frequency of large declines in portfolio value below a level consistent with a firm's appetite for risk. As a description of a portfolio's riskiness, value-at-risk could provide information about a firm's appetite for risk in the management of that portfolio. One measure of risk management performance, therefore, is the comparison of the confidence level of the value-at-risk with the frequency of the declines in portfolio value that exceed value-at-risk -- superior risk management would tend to keep the frequency of large losses below the frequency associated with the confidence level of the value-at-risk. Such comparison would require information about the tails of the frequency distribution of changes in portfolio value. Disclosures therefore should allow outsiders to evaluate the performance of risk management by disclosing information about declines in portfolio values in sufficient detail.

A disclosure of the single largest decline or the single largest gain in portfolio value would not allow a meaningful assessment of risk management, because value-at-risk is a statistical confidence interval -- changes in portfolio value will fall outside this interval some proportion of the time. The assessment of risk management requires information relating to a sufficiently large number of trading days in order to discover whether the frequency of large decreases in portfolio value is significantly larger than the confidence level of the value-at-risk.[7]

Example D: Summary comparison of portfolio performance with value-at-risk. For the relevant portfolio(s), the firm could disclose:

- a summary measure of the frequency at which the changes in portfolio value exceeds daily value-at-risk.

Such summary data could be presented in a variety of ways. A minimal approach would be to disclose the frequency with which daily changes in portfolio value exceed value-at-risk. More informative alternatives would be to disclose the histogram (frequency distribution) of the ratio of daily variation in portfolio value to daily value-at-risk, or the five or ten largest one-day declines in portfolio values together with the (one-day prior) estimate of the one-day value-at-risk for the days on which these declines occurred.[8] Along with the value-at-risk data, the associated confidence level of the value-at-risk should also be disclosed.

Example E: Detailed comparison of portfolio performance with value-at-risk. For the relevant portfolio(s), the firm could disclose one of the following alternative depictions of the relationship between daily value-at-risk and daily changes in portfolio value:

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[7] Over a reporting period of 13 weeks, the five to ten largest instances would be sufficient, depending on the confidence level, but over a different reporting interval, a different number or instances would be appropriate. Moreover, a single time period as small as 13 weeks is not sufficiently long to allow reliable conclusions. Hence, the assessments of the type described here, would require interpretation of disclosures over a long period of time. Such assessments, however, require that a sufficiently large data set be assembled -- disclosing the single largest gain or decline in a reporting period would not be sufficient.

[8] The actual dates on which these events occurred need not be disclosed. In addition to the decline in portfolio values, the five or ten largest one-day increases in value and their associated one-day value-at-risk could also be disclosed.

- a chart in which daily value-at-risk is plotted against the daily change in portfolio value (one variable on the y-axis and the other on the x-axis).

- a chart in which daily changes in portfolio value are displayed relative to a "confidence band" determined by daily value-at-risk (both measures on the y-axis and time on the x-axis).

Trading units with significant intraday positions relative to end-of-day or overnight positions should include intraday activity in disclosures of portfolio risks. For example, if value-at-risk is measured in real time, then the peak intraday value-at-risk could be used; alternatively, the intraday value-at-risk could be based on intraday trading limits.

A risk measure such as value-at-risk can only be a measure of the risk profile of the current portfolio. To the extent that the portfolio changes, the risk measure of the old portfolio might not reflect the riskiness of the new portfolio. For this reason, interpretation of measures of risk must be performed with care. As mentioned above, one way of addressing the issue of intraday trading is to include in daily value-at-risk an estimate of the risks due to intraday trading. The next example gives another way of addressing this issue.

Example F: Disclosure of portfolio performance using a benchmark portfolio. The disclosures of the type described in the preceding examples could be supplemented with measures of performance based on:

f.1 the change in value of the beginning-of-day portfolio measured at end-of-day prices (the beginning-of-day portfolio valued at yesterday's closing prices subtracted from that same portfolio valued at today's closing prices);

f.2 the actual change in portfolio value (the previous day's portfolio valued at yesterday's closing prices subtracted from today's end-of-day portfolio value at today's closing prices).

Such measures would allow comparison of trading and risk management performance, by comparing actual portfolio performance with the benchmark performance of the "unmanaged" beginning-of-day portfolio.[9]

Disclosure of interpretative information. The quantitative disclosures in the preceding examples should be supplemented by information necessary to interpret the quantitative data. For example, as already mentioned, the parameters of the value-at-risk figures should be disclosed. In addition, the relationship of the portfolio (about which the quantitative disclosures are made) to the rest of the firm should be made

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9 The reliability of the models used to estimate value-at-risk could also be revealed by comparing prior estimates of value-at-risk with the benchmark change in (f.1).

clear. Likewise, in the disclosure of risk and performance, information should be provided about the treatment of revenues from market making (customer spreads) and gains and losses from position taking.

B. Credit risk disclosure

Example G: Basic information about credit risk. For its trading and risk management activities, a firm could disclose:

g.1 the current credit exposure (net replacement values when close-out netting arrangements are in place, otherwise gross replacement values);
g.2 broken down by credit quality class, and/or counterparty type.

Such an approach would provide information about current exposures and likelihood of default, but it would not address potential future exposures.

Example H: A more comprehensive disclosure of credit risk. For its trading and risk management activities, a firm could disclose:

h.1 the information presented in Example G;
h.2 a breakdown of exposures by maturity;
h.3 some indication of the firm's estimate of potential future credit exposure.

This approach provides additional information about likelihood of default through (h.2). Information on maturities is helpful because longer term contracts are associated with greater credit exposures and default risks.

In addition to the above disclosure of credit risks, firms should also move toward disclosing their performance in managing that risk. The next example is illustrative.

Example I: Disclosure of credit risk management performance. For its trading and risk management activity, a firm could disclose:

i.1 the information presented in examples G and H;
i.2 a measure of actual losses over the reporting period;
i.3 a measure of losses relative to capital supporting the activity in which the losses occurred;
i.4 variability of credit exposures over time -- high, low, average gross or net replacement values over the reporting period.

In all the above examples, qualitative discussion should be an integral part of the quantitative disclosure. For example, methodologies used by firms to estimate potential future credit exposures should be described, as well as netting conventions used. Other supplementary information could include discussions of the use of collateral and how credit risk is managed for counterparties that are parts of both the trading portfolio and the loan portfolio.

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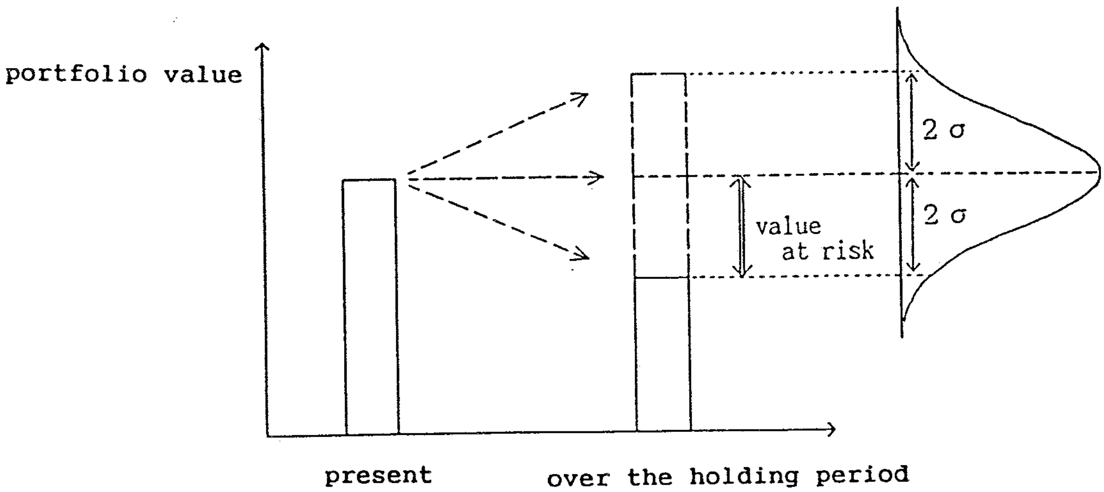
<u>Illustrative Examples of Market Risk Disclosures</u>

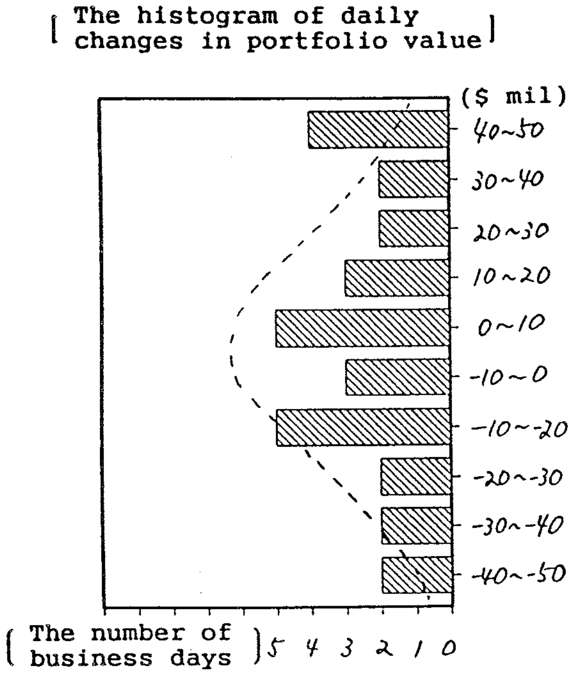
Example A: Value-at-risk

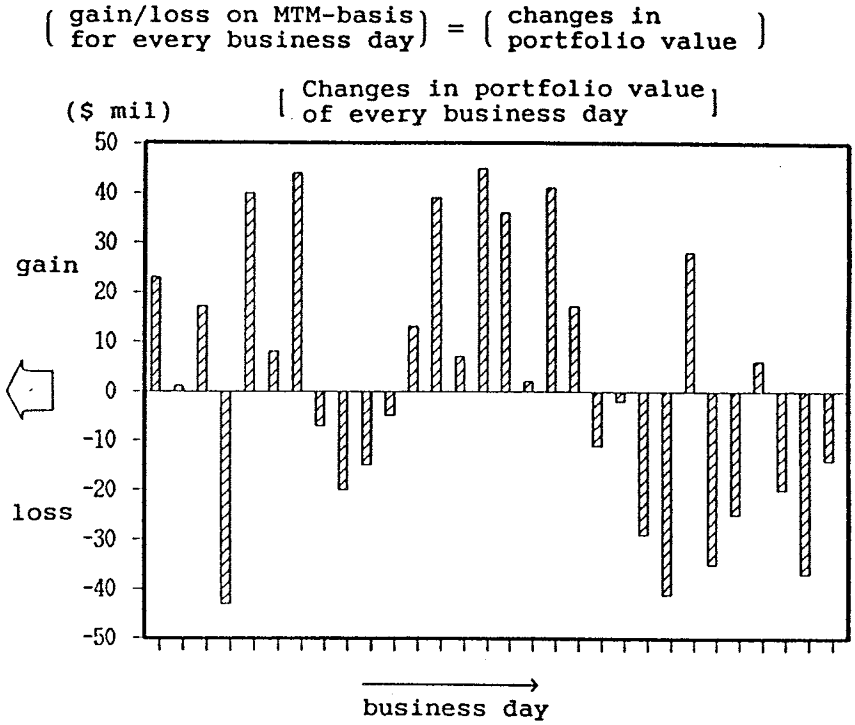
—— The high, low, and average value-at-risk
(holding periods of one-day, and two-weeks;
confidence level of the value-at-risk should also be disclosed.)



Example B: The actual changes in portfolio value

—— The histogram of daily changes in portfolio value

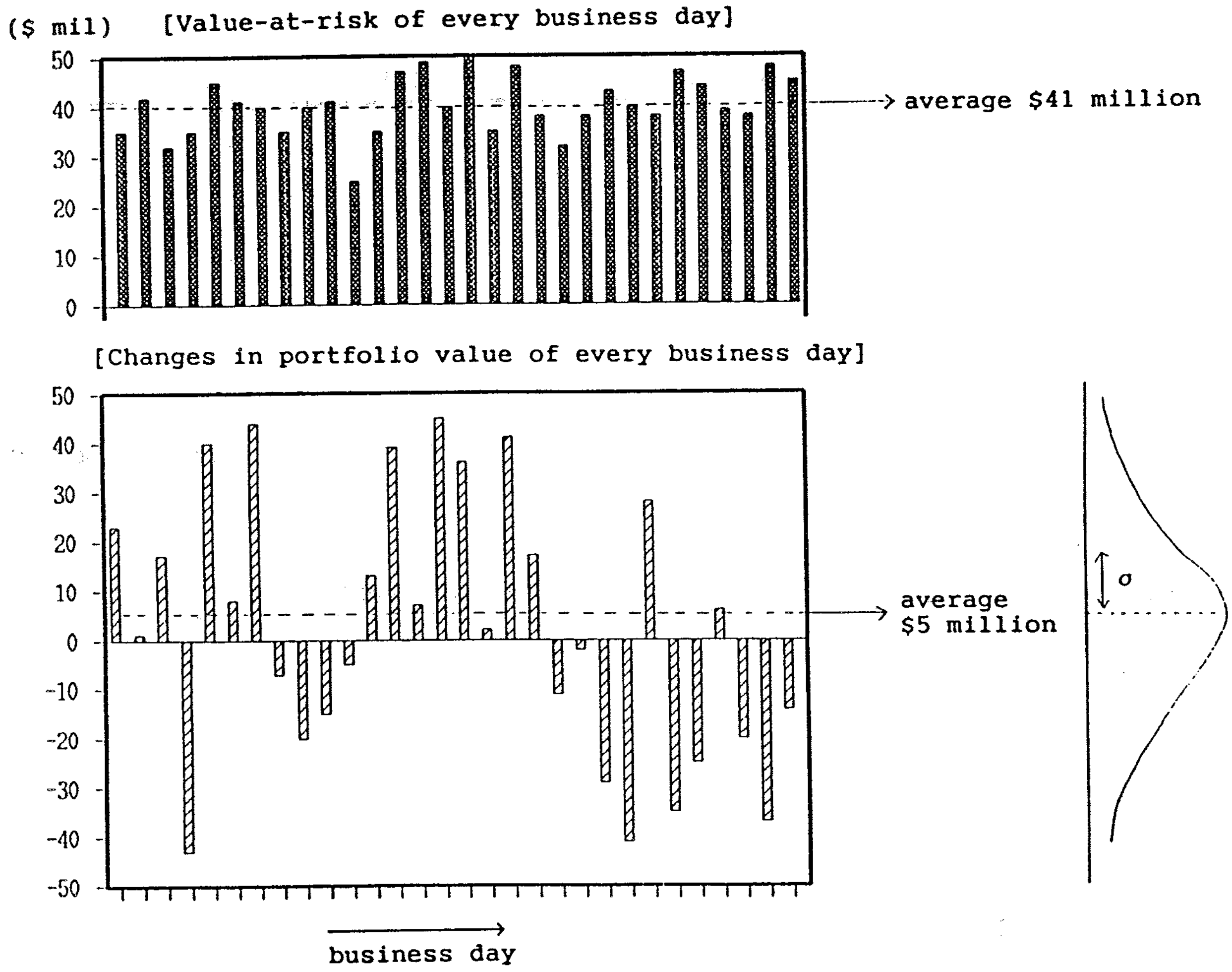




Example C: A comparison of risk with portfolio performance

—— The average value-at-risk for holding period of one-day

—— The average change in portfolio value, and some measures for its volatility



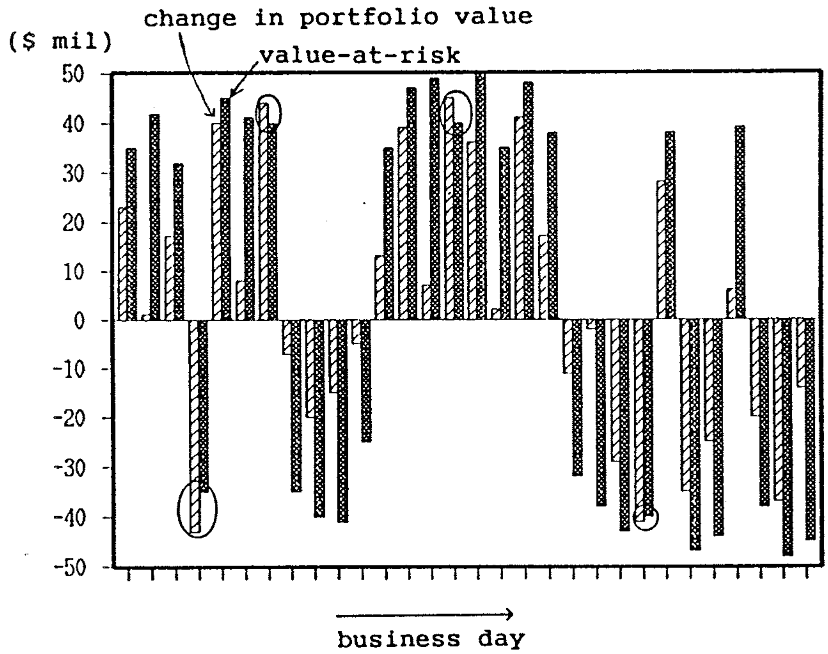
Example D: Summary comparison of portfolio performance with value-at-risk

—— The frequency at which daily changes in portfolio value exceeds daily value-at-risk

Possible alternatives:

(1) The histogram of the ratio of daily variation in portfolio value to daily value-at-risk

(2) The five or ten largest one-day changes in portfolio values and relevant value-at-risk



The frequency at which daily changes in portfolio value exceeded daily value-at-risk = 4 days

Example E: Detailed comparison of portfolio performance with value-at-risk

—— A chart in which daily value-at-risk is plotted against the daily change in portfolio value