

OPERATIONAL RISK IN FINANCIAL SERVICE PROVIDERS AND THE PROPOSED BASEL CAPITAL ACCORD: AN OVERVIEW

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ABSTRACT

The 1988 Basel Accord and the proposed revisions to the Accord represent some of the most significant international regulations impacting the financial decisions of firms, in this case, financial services firms, in recent years. The revisions to the Accord incorporate operational risk into the capital, supervisory and market requirements. In our review of the issues in this area, we provide insight into the workings of an important international regulation. We also present suggestions for further research in this area that will become feasible when data on the impact of the new regulations become available after the proposed implementation in 2006.

1. OVERVIEW

One of the key developments in recent managerial practices is the recognition of the importance of enterprise-wide risk management in the strategic analysis of corporate activities. Firms are recognizing the need to more fully understand the risks of the firm's various actions, their interrelations within the firm and their

connectedness to the rest of the economy. While traditional risk management emphasizes insurance products for hazard risks and, to some degree, financial hedging for market risks, enterprise-wide (also called holistic or integrated) risk management demands that managers reconceptualize risk within the firm, identifying, measuring and managing risks as disparate as accounting fraud, soft consumer demand, and environmental requirements. These non-traditional risks are frequently labeled "operational risk."

Partly because of its highly regulated nature as well as its dependence on the capital markets with their well-defined prices for products, this holistic approach to risk management has been more fully analyzed and implemented in the financial services industry as compared to any other. Financial firms have for years actively measured and managed credit risk, related to the probability of defaults, and market risk, related to potential losses in trading accounts. The level of sophistication of the mathematical models for the analysis of these risks is remarkable. Any review of recent publications in this area illustrates the technical expertise in the quantification of risk measurement and management.

The framers of the proposed Basel Capital Accord argue that the new Accord would again make the financial services industry a leader in risk management. Operational risk, in addition to credit and market risk, would be a determinant of minimum capital requirements. While firms in general are beginning to more explicitly discuss the importance of operational risk, the new Basel Capital Accord explicitly requires the financial services industry to manage that risk. The Basel Committee on Banking Supervision (Basel Committee) defines operational risk as "the risk of direct or indirect loss resulting from inadequate or failed internal processes, people and systems or from external events."¹ In surveys, the Basel Committee found the current measurement of operational risk by banks to be relatively undefined and qualitative in nature. In its proposal, the Basel Committee suggests three alternative means to proxy operational risk, all depending to some extent on the mapping of business lines and allocating capital requirements as fixed percentages of those varying lines (see, e.g. Basel Committee, 2001c).

In this paper we discuss operational risk and its applications to financial services firms. Our main focus is a review of the literature and the issues in this critical area in international corporate finance. The Basel Accord and the proposed revisions to the Accord represent some of the most significant international regulations impacting the financial decisions of firms, in this case, financial services firms, in recent years. In our review of the issues in this area, we believe we can provide insight into the workings of an important international regulation. We also present suggestions for further research in this area that will become feasible when data on the impact of the new regulations become available.

Note that the application of the new Accord is very much an evolving process. The Basel Committee intends that there should be a common implementation of the revised Accord by 2006. Both regulators and practitioners are debating the definition of operational risk, how to measure it and how to determine appropriate capital requirements. Therefore, in our review of the knowledge in this area, we refer to very recent presentations and proposals. The empirical analysis is limited generally to surveys and small samples. Thus, while there is limited academic evidence on operational risk management now, we believe that it will be a fruitful area for academic research in coming years.

2. THE 1988 BASEL ACCORD

The Bank for International Settlements (BIS), headquartered in Basel, Switzerland, is the world's oldest international financial institution (as noted in BIS, 2002). The stated mission of the BIS is to encourage and facilitate cooperation among central banks. The BIS was originally established after 1930 to take over the supervision of reparation payments imposed on Germany by the Treaty of Versailles. In addition, the BIS promotes cooperation among central banks and other agencies to provide for monetary and financial stability. The role of monitoring reparations ended, but the BIS has become an important international regulatory body for banks. Today (and historically), the BIS has several roles. The BIS has regular meetings of officials of member central banks, is a forum for information exchange among central banks, conducts research and produces data on international finance, performs traditional banking functions such as reserve management for central banks, organizes emergency financing in financial crises, and, through committees of international experts, makes recommendations to the financial community with the stated goal of strengthening the international financial community (see BIS, 2002, for further information on the BIS).

The Basel Accord of 1988 resulted from the role of the BIS in making recommendations to the financial community. The Basel Accord defined a set of risk-based capital requirements for financial services firms. The Accord was implemented in the U.S. in the 1991 Federal Deposit Insurance Corporation Improvement Act. The underlying premise of the 1988 Accord is to link banks' capital requirements to the financial assets in their portfolio. The assets of banks are divided into four risk categories – from the risk-free Category I (for example, cash and reserves), to Category IV (for example, business and household loans – although as Kirstein (2002, p. 394) notes the requirements do not distinguish between loans to firms with differing risk levels, which can lead to adverse incentive effects). The capital requirements of the banks are then linked to the amount of assets in each of the four

categories. When banks shift the composition of their portfolio into more risky assets, they must increase their reserves and therefore decrease their financial leverage. Krainer (2002, p. 425) notes that since banks generally decrease the risk of their portfolios in recessions (the so-called flight to quality), resulting in increased financial leverage of banks, these capital requirements will be countercyclical.

Krainer (2002) argues that the Basel Accord of 1988 is a regulatory solution to the agency problem that arises because depositors and bondholders are more risk adverse than stockholders. He suggests that a solution to this agency problem is a corporate governance system that requires managers to make portfolio/investment decisions in the interest of shareholders and financing decisions based on the interests of depositors/bondholders. Then, depositor/bondholders can reduce the agency problem that arises when risk shifting portfolio investment decisions are made by shareholders. The Basel Accord, with risk-based capital requirements on depository institutions, is a regulatory framework that attempts to solve this agency problem. Krainer (2002) notes that the Basel Accord in 1988, and its revisions in the 1990s, were responses to the major problems banks had faced worldwide in the 1980s and 1990s. Regulators and commentators believed that many of the banking crises that had occurred were indirectly a result of non-financial firms increasingly using the capital markets (commercial paper and long-term bonds) as a replacement for bank financing. Banks as a response turned to more risky loans and became overleveraged given the riskiness of their portfolios.

Kane (2001) argues that international regulatory standards (such as the 1988 Basel Accord) are inferior to competition among national regulatory systems, especially in strengthening the banking systems in developing countries. Kane suggests that even when policy makers act in the public interest and the world is static enough to identify optimal standards, it is unlikely that regulators from high-income countries will agree on standards that are appropriate for emerging economies. It is also unlikely that the high-income countries would agree to compensate emerging economies to adopt and enforce the non-optimal standards. Kane notes that the problem is worse under a public choice model, where policy makers pursue goals other than the public interest. This is especially true in the dynamic complex world of international finance. He believes that a best outcome is much more likely when national regulatory agencies compete in promulgating regulations – those countries that develop the best regulations will attract capital.

Kane (2001) illustrates his point with the 1988 Basel Accord. While Kane agrees that risk-based capital requirements can be an effective way of reducing risk-shifting and reducing the likelihood of crises, he does not believe that the Basel Accord has worked well, noting numerous failings. First, methods of measuring capital and risk identified by the Basel Accord are not closely related to the measures that would be used by the market to consider the same factors. Second,

the standards emphasize crisis prevention rather than crisis management. Third, the standards are generally not appropriate for the policy making environments of developing countries.

In his comment on Kane's paper, Goldstein (2001) is much more positive on the potential for value-increasing international regulatory standards, especially if flexibility is built into the standards and if the international standards do not reach down into all aspects of the financial system. Goldstein is also less willing to believe that competition between national regulatory bodies can effectively manage the potential for financial crises on a timely basis. Barth, Caprio and Levine (2001a, b), however, empirically examine the relation between regulatory restrictions and bank performance. They find that greater restrictions are associated with higher probability of a major banking crises, lower bank efficiency and no countervailing positive effects.

There have been numerous other criticisms of the 1988 Basel Accord. One of the primary criticisms has focused on the fact that there is a much greater variation in the quality of assets than those defined by the four categories named under the Accord. Krainer (2002, p. 425) points out that the categories are based on legal classifications of assets, which are only remotely related to the investment quality of the assets. In addition, the Accord is only advisory; its capital requirements are actually determined by local bank regulators, who respond to local political considerations. For example, Krainer (2002, p. 426) reports that if an economically important country, such as Japan or Germany, relaxes its capital adequacy requirements, the BIS tends to revise the Accord to accommodate that country.

Petrou (2002) outlines another problem with the 1988 Accord. She notes that regulatory actions such as the Basel Accord can make economic cycles more volatile. For example, since the Basel Accord's requirements only apply to banks, it can have the effect of driving risk-taking to non-regulated entities, which are not subject to the ongoing supervision that banks face from regulators. In addition, Petrou notes that in the U.S., financial service firms have an incentive to abandon their charters and the regulation of the Federal Reserve Board to remain competitive.

3. THE NEW BASEL ACCORD: OVERVIEW

In response to the many problems with the 1988 Basel Accord, the Basel Committee is revising the Accord. The changes we discuss in this paper are part of the comprehensive revision of the 1988 Basel Accord developed by the Basel Committee (see Basel Committee, 2001a, b, c, d, 2002a, b) for a much more thorough discussion of the many issues related to the proposed Accord). We do not discuss

all the changes in the new Accord in detail. Our focus is on operational risk, which was not recognized explicitly by the Basel Committee in the 1988 Accord. While factors that are classified as operational risk were recognized in the past, it is only recently that a formal framework for recognizing and dealing with operational risk has developed. The Basel Committee has become one of the first policy making groups to explicitly recognize this risk and attempt to incorporate effects of operational risk in its regulations. In the words of the Basel Committee, "the Basel Committee believes operational risk is an important factor facing banks, and that banks need to protect against the potential loss from it" (Basel Committee, 2002b, p. 1). (Note that the Basel Committee is not the only regulatory institution that has incorporated concepts of operational risk in their regulation of banks and other type firms – see King (2001, pp. 35–43) for other examples.)

In broad terms, the Basel Committee has developed a "more comprehensive framework for capital regulation based on three pillars – minimum capital requirements, supervisory review and market discipline" (Basel Committee, 2002b). While we will concentrate on the operational risk component of the new Capital Accord, note that it is only part of the proposed Accord. More broadly, the Basel Committee intends to emphasize risk management of all types of risks in the new Accord and, especially, improvements in banks' assessments of risk. As opposed to the 1988 Basel Accord, the new Accord has many more options for banks to choose from in calculating their minimum capital requirements. For example, in the calculation of credit risk, the Basel Committee has suggested that a common risk classification for all businesses, large and small, ignores certain risks of lending to small- and medium-size firms. Thus, lending to small- and medium-size firms will be treated differently in the new capital requirements as compared to lending to large firms. Another example is that in calculating the risk to certain types of loans (such as residential mortgages), the banks will perform internal assessments of the risk, which will be used in calculating the capital requirements. In addition, banks can choose from multiple approaches to calculate their minimum capital requirements. In sum, the new Accord is much less "one size fits all" than the 1988 Basel Accord.

One of the most fundamental changes proposed in the new Accord, however, is the requirement that the banking industry incorporate operational risk into overall risk analysis for the purpose of setting capital requirements. The Basel Committee notes that several major international banks have been leaders in analyzing and assessing operational risk. We discuss the Basel Committee's view of operational risk in detail in Section 6.

In sum, the proposals for the new Basel Accord make changes to areas that were already included in the Accord and add another important dimension to regulatory

capital requirements – operational risk. Thus, there are now three areas of risk that are related to the minimum capital requirement in: (1), credit risk (which was the focus of the original 1988 Accord); (2), market risk of trading activities (which was introduced in a 1996 amendment to the Accord); and (3) operational risk. Implementation and development of the exact form of the new Accords will take some time. After survey analysis of the impact of the new Accord and any necessary revisions, the Basel Committee anticipates the implementation of the new Accord by the end of 2006.

4. OVERVIEW OF OPERATIONAL RISK

4.1. Definition

The widely used definition of operational risk – "the risk of loss resulting from inadequate or failed internal processes, people, and systems or from external events" – resulted from an industry study by the British Bankers' Association, the International Swaps and Derivatives Association, RMA and Pricewaterhouse Coopers (BBA, ISDA, PwC, RMA, 1999). The Basel Committee adopted this definition early in their documentation of operational risk (see, e.g. Basel, 2001a). King (2001, p. 3) defines operational risk as the risk "not related to the way a firm finances its business, but rather to the way a firm operates its business. He offers an alternative definition (King, 2001, p. 7) – operational risk is "a measure of the link between a firm's business activities and the variation in its business results." Culp (2001, p. 432) notes that the data entry form for the British Banker's Association Operational Risk and Loss Database suggests that examples of losses from operational risk include "failed securities trades, settlements errors in funds transfers, stolen or damaged physical assets, damages awarded in court proceedings, penalties and fines assessed by member associations or regulators, irrecoverable or erroneous funds and asset transfers, unbudgeted personnel costs, and negligence or fraud." Note these examples include legal risk but exclude reputational and strategic risk (Harris, 2002a).

Another approach to a definition of operational risk starts with the observation that all risk faced by banks is financial or non-financial. Kuritzkes (Wharton, 2002) suggests that operational risk is a non-financial risk that has three sources. The first is internal risk such as risk of rogue traders. The second is external event risk, which is an uncontrollable external event such as a terrorist attack or weather destruction. The third is business event risk, which captures many things such as price wars or stock market downturn. Kuritzkes argues that business risk is the most important but is ignored in the proposed Basel Accord.

While operational risk has existed for as long as financial institutions (and all firms) have existed, it is only recently that a discipline of operational risk management has begun to develop. It is most developed among financial services firms who are attempting to quantify its analysis, just as credit and market risk are quantified.² If and when the new Basel Accord is implemented as regulations in individual countries, there will be a significant movement toward the analysis of operational risk within financial services firms. We will look at several issues in operational risk management including the proposed regulations of the new Basel Accord.

Culp (2001) notes that operational risk is so broad a concept that it can be found anywhere. Therefore an appropriate strategy is not in identifying all operational risks, but rather in identifying important operational risks that can affect the value of a firm. Culp (2001, p. 433) discusses several difficulties in identifying operational risk. First, the distinction between operational risk and business risk at any firm is a function of the strategies of the firm. For example, Culp notes a commodity-exporting firm has a number of risks such as crop spoilage, truck breakdowns, and worker strikes that the firm's managers probably consider as normal business risks it expects to deal with. Those same factors might be considered operational risk to a bank. Another difficulty in identifying operational risk is that it is often linked to credit risk or market risk. For example, Culp discusses the often-mentioned example of Baring's – the investment bank that failed as a result of the losses from a rogue trader. While a rogue trader is generally considered an operational risk, in the end failure occurred because the rogue trader's positions lost huge amounts of money resulting from a market downturn, i.e. market risk. Culp also argues that it is difficult to identify operational risk because different firms use different organizational processes to deal with operational risk. He notes that financial firms have only recently begun to address operational risk in an organized way while non-financial firms have often long paid attention to risks from product management and product liability. Conversely, non-financial firms have only recently begun to address credit and market risk, which financial firms have long considered it.

4.2. *Why Do We Care?*

Hiwatashi (2002) argues that banks have already begun to consider operational risk because of advances in information technology, deregulation, and increased international competition. Similarly, the increase in the number of large mergers and acquisitions, where the combined firm must integrate the systems of the merged firms, can lead to increased operational risk. New financing techniques have reduced credit and market risk but have led to more operational risk within

firms, increasing the benefits of managing this risk (Wharton, 2002). Hiwatashi argues that the increase in the complexity of bank operations as well as increased ability to consider risk have made traditional qualitative risk management inadequate. He reports several reasons why banks try to measure operational risk (he also notes that it is mainly large banks that try to measure the risk). First, by measuring operational risk banks are able to develop objective criteria in analyzing the adequacy of internal risk control measures. Second, banks have long established risk management systems to analyze whether they have adequate economic capital to deal with market and credit risk. Banks have been able to do this because of well-established methods of measuring market and credit risk. Thus, as methods of calculating operational risk have become more feasible, banks have begun to allocate economic capital to operational risk.

Harris (2002a) classifies the benefits from operational risk management in a slightly different way. He notes that proper management can improve bottom line earnings by reducing exposure to low frequency but high impact losses. In addition, proper risk management can reduce insurance premiums and lower capital requirements, especially if and when the new Basel Capital Accord is implemented. In fact, large banks that have implemented operational risk management generally already allocate economic capital to operational risk (Hiwatashi, 2002, p. 2). Further, he notes that operational risk management can develop information useful to senior management. Donnelly (2001) takes this final point further and argues that proper operational risk management needs to provide audit committee members with information on the methodology used in risk assessment, identification of issues, and resolution and tracking mechanisms. In the present post-Enron climate, Donnelly's argument of the importance of the audit committee in providing independent information for senior management is especially relevant.

Rosengren (2002) also argues that financial organizations should manage operational risk because of the significant potential costs of operational risk losses. He reports examples of operational risk that have imposed significant costs on firms. First, damage to physical assets and disruption of the business are important considerations, including the \$27 billion publicly announced insurance exposure to the 9/11 attack on the World Trade Center. Second, internal fraud and criminal behavior also impose costs, such as the losses to Allied Irish banks of \$690 million in rogue trading.³ Third, losses that result from dealings with clients, products, and businesses must also be considered. For examples, he cites the \$2 billion settlement of the class action lawsuit by Prudential Insurance caused by its improper sales practices and the \$400 million paid by Provident Financial for its unfair sales and collection practices.

A much more comprehensive analysis of the overall operational risk loss experience in financial institutions was conducted by the Risk Management

Group (RMG) of the Basel Committee (Risk Management Group, 2002). The RMG performed two studies – QIS2 – Tranche 1 focused on internal capital allocation data for operational risk and information about other exposure indicators. In QIS2 – Tranche 2, the RMG gathered data on individual operational risk loss examples. The data were collected from 30 banks in 11 countries.

The studies are really trial runs and one should not read too much into the results. For example, the dataset spans only three years, which limits its usefulness in identifying the rare but extreme events that characterize operational risk. In addition, different banks had different levels of completeness in reporting. In fact, the difficulty of compiling these data illustrates the enormous difficulty in performing one key aspect of operational risk management – collecting data on relatively infrequent and unpredictable events.

However, there are still some suggestive results from the study, at least in indicating types of operational risk losses. The RMG collected the number of loss events and gross loss amounts for eight business lines:

- (1) corporate finance;
- (2) trading and sales;
- (3) retail banking;
- (4) commercial banking;
- (5) payment and settlement;
- (6) agency and custody services;
- (7) asset management; and
- (8) retail brokerage.

They considered seven different types of loss events:

- (1) internal fraud;
- (2) external fraud;
- (3) employment practices and workplace safety;
- (4) clients; products, and business services;
- (5) damages to physical assets;
- (6) business disruption and system failures;
- (7) execution delivery.

There were 27,371 loss events with a total value of 2.6 billion Euros. Most of the events and the largest Euro value of the losses were in retail banking (67% and 39% of all events and losses respectively) and commercial banking (13% and 23% respectively), which may reflect where the sample firms do most of their business. Across all business lines, the breakdown of the percent of all events and percent of the value of the losses by event type is as follows: Internal fraud – 2.72%, 10.66%, external fraud – 36.39%, 20.32%, employment practices

and workplace safety – 2.71%, 2.92%, clients, products, and business services – 6.39%, 27.51%, damage to physical assets – 4.48%, 3.02%, business disruption and system failure – 5.32%, 0.82%, execution, delivery, and process management – 41.99%, 34.76%). The most likely and the most costly events were in external fraud and in execution, delivery and process management.

The RMG report also compiled results on the distribution of the size of the loss events. Most of the loss events were relatively small – only one percent of the sample were events with losses of one million Euros or more. However, the large loss events dominated the total value of the losses. Events with losses over one million Euros accounted for almost three-fourths of the total losses.⁴

Finally, one of the most important reasons banks care about operational risk is in preparation for the proposed Basel Capital Accord. We will first discuss the present ways firms have in dealing with operational risk and then review the proposed requirements of the Basel II Accord.

5. METHODS OF DEALING WITH OPERATIONAL RISK

5.1. Approaches

Since operational risk is a broad concept that is not well-defined, it is not surprising that there is no one methodology for dealing with operational risk. We will briefly review some approaches and measures that have been used. We then turn to the proposed guidelines of the new Capital Accord.

Culp (2001, p. 434) reports (based on survey results) that companies often go through five stages of operational risk implementation. It is useful to review the stages because operational risk management is such a new, ongoing process and the pattern of implementation tells us something. First is the traditional baseline stage. The firm has no processes or personnel to deal with operational risk. Each case is dealt with in an ad hoc reactive manner. In the second stage, firms recognize that operational risk must be considered. Personnel are appointed with operational risk responsibilities and senior managers draft policies for identification, measurement, and control of operational risk. The third stage is the monitoring stage, where “explicit and formal risk tolerances for op risk first begin to appear, albeit on a largely qualitative basis.” The business starts to analyze and track risk measures and adjust performance for operational risk. Senior managers define tolerances for operational risk based on the business and risk management strategies of the firm. In the next stage, the firm develops an operational risk management function, under the Chief Risk Officer or in an Enterprise Wide Risk Management Unit. The firm will have a formal measurement of operational risk on a business unit basis,

and senior managers express their tolerance for risk that are compared to actual measures of exposure to operational risk. In the final stage (to which few firms have moved), operational risk is fully integrated into an Enterprise Wide Risk Management program. The firm integrates quantitative measures of operational risk with the general risk tolerances of the firm, "for example, VaR inclusive of integrated market, credit, liquidity, and operational risk sources" (Culp, 2002, p. 435).⁵

Harris (2002a) provides a basic overview of what advanced financial organizations are doing to address operational risk that summarizes the implementation of operational risk management. He identifies this pattern: recognizing operational risk as a separate discipline, restructuring the organizational hierarchy, defining a management process, creating measurement tools, developing monitoring systems.⁶

Hiwatashi (2002) outlines several approaches to operational risk management in banks. He notes first that banks traditionally controlled operational risk based on qualitative risk management checklists and guidelines. This has become inadequate due to the increased complexity and speed of bank operations. Now, banks must first try to measure operational risk so that senior managers can establish objectives in "prioritizing risk control among different business lines and risk categories, in order to supplement internal control in a more robust way" (p. 1). Measurement is also necessary for the management to determine whether the banks have appropriate capital for their level of operational risk. In addition, measurement also enables the bank to tie performance to employees' risk management effectiveness.

5.2. Measurement

Hiwatashi (2002, p. 2) discusses several ways operational risk is measured. The methods are generally categorized as "top-down" or "bottom-up" methods. In top-down methods, risk is estimated based on macro data without identifying the individual events or the causes of losses. One top-method method uses the indicator approach, where some variable, perhaps gross income or cost, is a proxy for firm performance and a certain percentage of the variation in that variable is considered risk. Another approach relies on the CAPM, where total risk is estimated based using the CAPM model. Then, market risk and credit risk are subtracted and what is left is considered operational risk. In the volatility approach, the volatility of some variable, say non-interest income, is treated as the operational risk.

Hiwatashi (2002, p. 2) also provides illustrations of the bottom-up methods of measuring operational risk, which uses individual events to determine the source and amount of operational risk. (King, 2001, also provides a complete description

of many of these methods.) These methods include the statistical measurement approach, where operational risk is measured using data from individual events with frequency based on a Monte Carlo simulation or an analytical solution. Another approach is scenario analysis, where losses are estimated based on scenarios derived from other banks and events. A third approach is factor analysis, where factors related to losses are identified and used to calculate risk. For example (King, 2001, p. 73) discusses the Delta Methodology, which is based on error propagation. Under the Delta Methodology, the uncertainty of risk factors is used to calculate the uncertainty in earnings based on sensitivities. The sensitivities represent the correlations of the changes in earnings with changes in risk factors. The Delta Methodology allows losses to be predicted when there is no comprehensive loss data. In addition, it is linked to business activities through the sensitivities. A final method of operational risk measurement considered by King uses Bayesian Network Models to model the causes and effects of operational risk.

Culp (2001, p. 435) also discusses methods of measuring operational risk based on four regimes suggested by the ISDA (International Swaps and Derivatives Association). The first is the "basic indicator" regime. Measurement is based on a few roughly defined risk indicators. The firm usually uses an ad hoc control process that depends on existing controls (such as audits) for operational risk management. Often firms use industry or regulatory measures of operational risk. The second is the "standard lines of business" regime. Here the risk management process is less ad hoc and operational risk is measured at the business unit level, often using survey data. The "internal ratings" regime uses subjectively determined quantitative ratings for specific operational risk factors in individual business units. Fourth, the "internal models" regime uses institution-specific loss data and then uses structural econometric models (like credit scoring models) or analytical-and simulation-based VaR-like constructs to determine operational risk.

Critical to all the above are the data. Harris (2002a) notes several reasons why an operational risk database is so important. It is necessary for the effectiveness of "sound risk management, realistic evaluation of performance and risk indicators, determining profitability by business unit, locating problem areas within a business unit, senior management and board oversight, and maximizing profits." At a minimum, Harris argues that a database must contain in which business unit the loss was recognized, which business line recognized the loss, and in what function the loss occurred. He also notes that accuracy depends on having those who collect the data being knowledgeable in the area, on having reasonable reporting thresholds, and on verifying the accuracy and the completeness of the data through audits.

5.3. *Challenges and Implementation*

A major difficulty in operational risk management is the development of meaningful data. The definition of operational risk is still nebulous as are the data collection methods, especially for low-frequency and high-severity events that represent perhaps the greatest source of operational risk. The most obvious example is the 9/11 terrorist attack. How many firms seriously contemplated a terrorist attack that affected them directly, or even indirectly? How would they have modeled it? The widespread impact of 9/11 is still being felt through a worldwide recession.

Hiwatashi (2002, p. 3) lists several areas that pose challenges to banks implementing operational risk. Firms must develop a robust database, which probably needs to include difficult to collect data. A challenging area is determining how much data to collect on indirect losses. The firm must supplement its own internal data with external data and develop a meaningful way to link the two. He also recommends banks establish qualitative data objectively (noting situations where individual managers' incentives and firm value maximization are not aligned), and keep abreast of rapidly developing risk-transfer methods.

Once operational risk is identified (to the extent it can be), the firm must then perform risk control and capital management. One response is insurance. The insurance industry is developing new tools to insure some of the risks we have discussed but many of the risks in operational risk are uninsurable (BBA, ISDA, PwC and RMA, 1999, p. 77). Top management must be informed of the operational risk analysis to consider its implications on the strategy of the firm. The bank must also develop an approach to "quantifying economic-capital for operational risk" (BBA, ISDA, PwC, and RMA, 1999, p. 87). There is no well-developed view of how to do this, however.

5.4. *Bank Examiner's Treatment of Operational Risk*

Before we turn to the proposed Basel Accords, it is important to note that the concept of operational risk is actually very old. However, it has only recently begun to be considered directly by regulators. Kvistad and Donnelly (2001) note that since the mid-1990s, the Office of the Comptroller of the Currency and the Federal Reserve System have attempted to identify operational risk (Fed) or transaction risk (OCC) within their CAMELS rating and have assigned a charge to it. Kvistad and Donnelly note that the Fed examiners evaluate operational risks in two ways – inherent level of risk in an activity (high, moderate, low) and quality of risk management (strong, acceptable, weak). The Federal Reserve Bank of Chicago has developed eight components for examiners to use in evaluating operational

risk. Each of these indicates potential for operational risk losses. The first is growth and consolidation – a rapidly growing bank, or recently consolidated banks have greater potential for operational risk losses. Second is the quality of the information systems. Third are the quality, training, and morale of the employees. Fourth is the transaction volume and complexity of the transactions of the bank. Fifth is the bank offering new products and services. Next are ripple effects – what would be the indirect effect of an operational disruption. Seventh are the facilities and geographical dispersion of the bank. The final component of operational risk is electronic delivery, with its complexity and security challenges.

6. OPERATIONAL RISK AND THE NEW BASEL ACCORD

While the concept of operational risk management has been well-known to financial firms for many years, the response of firms to operational risk had not developed in a systematic way due to the complexity of the concept and the difficulty of developing meaningful data. The proposed Basel Accord offers more standardization in the various approaches to operational risk management. However, as we discuss in the next section, not all share the view that the proposed Accord is the proper regulatory approach.

Over the past several years, the Basel Committee has been revising the Capital Accord to better integrate measures of risk, including operational risk, into capital requirements. The revised Accord is based on three pillars – minimum capital requirements, supervisory review, and market discipline (see Basel Committee, 2002a, b). The Basel Committee says its goal is to "foster a strong emphasis on risk management and to encourage ongoing improvements in banks' risk assessment capabilities. The Committee believes that minimum capital requirements can and should be aligned with prevailing strong risk management practices" (Basel Committee, 2002b, p. 1).

As we discussed above, there are numerous changes in the new Accord. We concentrate here on the inclusion of operational risk into the three pillars. In July 2002, the Basel Committee (2002a) published "Sound Practices for Management and Supervision of Operational Risk," a paper that explains in more detail the concepts behind the inclusion of operational risk in determining capital requirements, the proposals for measuring operational risk and the results of surveys and data collection already undertaken. This document provides an excellent overview of the Basel Committee's work. We will summarize some of the major points of the report.

The Basel Committee (2002a, p. 2) begins with a discussion of the causes and impacts of operational risk. They suggest that operational risk is growing as a result

of several factors, including increased use of automated technology, e-commerce, large scale mergers, banks acting as high volume service providers, the growing use of risk mitigation to optimize exposure to market and credit risk that may actually increase the banks' exposure to operational risk, and the growing use of outsourcing. The Basel Committee (2002a, pp. 2-3) goes on to note that substantial losses can occur from internal fraud, external fraud, employment practices, clients, products, and business practices, damage to physical assets, business disruption, execution, delivery and process management (note these are the same items in the Committee's survey of banks' losses from operational risk).

The Basel Committee (2002a) then outlines what they believe are sound practices for operational risk management based on their work on credit risk and market risk management. The Committee notes that operational risk is fundamentally different from other sources of risk since it is not directly taken as a tradeoff for expected return. Thus, the sound practices report first discusses that banks must develop an appropriate risk management environment, adopting "policies, processes, and procedures to control or mitigate material operational risk." The first part of the report offers suggestions on how to set up an appropriate risk management environment including the role of management in setting up the framework, the principles for the definition of operational risk, and how operational risk is to be "identified, assessed, monitored, and controlled/mitigated" (Basel Committee, 2002a, p. 6). The report also covers the role of supervisors in monitoring management.

The Basel Committee also advocates the release of additional information to the market, stating that banks "should make sufficient public disclosure to allow market participants to assess their approach to operational risk management" (Basel Committee (2002a, p. 5). This is the third pillar of the proposed Basel Accord - providing information that allows the market to monitor banks' policies for operational risk management.

The report also emphasizes the need for the mitigation of operational risk through business practices. "Banks should have policies, processes and procedures to control or mitigate material operational risks. Banks should assess the feasibility of alternative risk limitation and control strategies and should adjust their operational risk profile using appropriate strategies, in the light of their overall risk appetite and profile" (Basel Committee, 2002a, p. 10). The report provides suggested guidelines for risk mitigation, but many of them actually deal with what to watch out for as a source of operational risk rather than true methods to minimize risk. In particular, there are still no well-developed methodologies for quantifying low probability but large impact events in an overall measure of operational risk. The Basel Committee does make one specific recommendation, however. The report states, "Banks should have in place contingency and business

continuity plans to ensure their ability to operate as going concerns and minimize losses in the event of severe business disruption" (Basel Committee, 2002a, p. 12).

Perhaps the best discussion of the basic outlines of the Proposed Accord with respect to operational risk come from the Basel Committee itself (Basel Committee, 2002b, pp. 7-8):

42. The Basel Committee believes that operational risk is an important risk facing banks and that banks need to hold capital to protect against potential losses from it. This view is shared by a number of globally-active financial institutions, which have been at the forefront of analyzing and assessing operational risk. The Committee proposes to define operational risk as the risk of loss resulting from inadequate or failed internal processes, people and systems, or external events, and therefore includes legal risk.

43. Approaches to the measurement of operational risk continue to evolve rapidly, but are unlikely to attain the precision with which market and credit risk can be quantified. This poses obvious challenges to the incorporation of a measure of operational risk within the minimum capital requirement. Nevertheless, the Committee believes that such inclusion is essential to ensure that strong incentives exist for the continued development of approaches to operational risk measurement and management and to ensure that banks are holding sufficient capital buffers for operational risk. It is clear that a failure to treat operational risk within the minimum capital requirement (pillar one) would reduce these incentives and result in a reduction of industry resources devoted to operational risk issues.

44. On the other hand, the Committee is prepared to allow an unprecedented amount of flexibility to banks in choosing how to measure operational risk and the resulting capital requirement. Under the advanced measurement approaches (AMA), banks will be permitted to choose their own methodology for assessing operational risk, so long as it is sufficiently comprehensive and systematic. The extent of detailed standards and criteria for use of the AMA are minimal in an effort to spur the development of innovative approaches, although the Committee intends to review progress in regard to operational risk approaches on an ongoing basis.

Thus, an important part of the proposed Accord is the minimum capital requirement of Pillar I, where the Committee will allow "an unprecedented amount of flexibility to banks in choosing how to measure operational risk and the resulting capital requirement." The Basel Committee has suggested several alternative means to determine capital requirements for capital risk. The Basic Indicator Approach is the simplest measure and would be easiest to implement for many smaller banks. The Basel Committee anticipates that the Basic Approach could be used by any bank regardless of its complexity or sophistication, though it does not expect the largest or most active banks to choose this approach. The Basic Approach states that required capital for operational risk would be equal to a fixed percentage (denoted as α) times a single indicator such as the level of gross income.

In the Standardized Approach, banks' activities are classified into eight categories. Each firm would determine the relative weights of each line of

business in their overall activities through an indicator measure such as that line's gross income. Required capital would be equal to the summation of the indicator for each line multiplied by a factor (β) that would reflect the riskiness of that line. The Basel Committee would set the β so it would reflect the operational risk of that business line. Banks would have to meet certain standards to be eligible to use this approach, basically requiring well-developed processes and controls for the measurement and management of operational risk. Both the Basic Indicator Approach and the Standardized Approach are relatively simple. However, they are not sensitive to the specific activities of each bank nor do they take into account the bank's ability to manage its operational risk.

In response to industry critiques of these two approaches, the Basel Committee has turned its emphasis to the Advanced Measurement Approach (AMA). Under the AMA, there is a firm-specific calculation of the capital requirement based on the firm's internal risk measurement models. These models use the bank's own metrics to measure operational risk including internal and external loss data, scenario analysis, and risk mitigation techniques to then set its capital requirements. There are essentially three components: (1) operational loss data; (2) quantification methodologies (which can be very complex); and (3) qualitative risk assessment and risk indicators (like scorecards and early warning systems). Cumming and Hirtle (2001) offer some preliminary guidelines on the development of consolidated risk management and the economic rationale for doing so. Rosengren (2002) argues that this approach is risk sensitive since the capital requirements are based on the operational risk exposure of the bank and flexible since banks choose the methodologies. He also notes that this approach provides a return to banks for investing in controls for operational risk losses. The Basel Committee has provided extensive guidelines of the requirements for banks to be eligible to use AMA. Basically, the bank must have a well-developed and comprehensive risk management plan that carefully analyzes all risk components and includes controls to insure that risks are managed correctly.

Pillar 2 (the supervisory review process) and Pillar 3 (the enhancement of market discipline through disclosure) also play important roles in the proposed Capital Accord. Under Pillar 2, banks will be required to establish efficient means to measure and manage operational risks and supervisors will be given guidelines to assess capital adequacy and risk management techniques in the firm. The Committee anticipates including disclosure requirements with respect to operational risk to support Pillar 3 in the new Accord. These disclosures would include the approach used to determine capital requirements, the operational risk objectives and policies of the bank, the internal systems for control of operational risk and the success of the bank in its operational risk management.

7. COMMENTARY ON BASEL CAPITAL ACCORD II

Several commentators have expressed strong criticisms of the proposed Basel Capital Accord, especially in the initial stages of its development. Petrou (2002) agrees that there is a need to modify the regulatory capital requirements applying to credit and market risk, but she is critical of the very idea of applying capital requirements to operational risk and also of the method of implementation. She notes that regulatory standards can distort economic incentives and create perverse incentives, perhaps leading to the holding of excessive operational risk. Even with the AMA approach, which attempts to benefit those firms that actively manage their risks, she questions why the Basel Committee believes it can define capital requirements for operational risk when regulators have long agreed to allow supervisory agencies to consider interest-rate risk on a more qualitative basis. Since interest-rate risk is far more quantifiable than operational risk, she argues that the Basel Committee is attempting something that cannot be done on a methodological basis and should be left to the Pillar 2 and Pillar 3 guidelines. She argues that "regulators should devote the resources now distracted by the complex quantitative exercises necessary to develop the operational risk-based capital rules to improving supervisory standards and bank operational risk management and mitigation." In sum, Petrou (2002) notes that while there are three pillars to the proposed Accord, almost all the focus has been on the capital requirements. She argues that relatively much more attention should be paid to supervision, which may be much more effective than capital requirements.

Several participants at a Wharton Conference on Operational Risk (Wharton School, 2002) were also critical of the capital requirements tied to operational risk. Kuritzkes said, "I do not think that BIS or any other regulatory authority can come up with any rules for how much capital banks can hold against operational risk. The first line of defense for such risk is internal controls." He was especially critical of the AMA method of calculating regulatory capital, stating "The AMA not only tries to specify a rule-based approach but tries to do it in a highly structured and sophisticated way that I think stretches the bounds of what operational risk can deliver. It seems not worth a candle. There is a much better payoff for BIS to concentrate on other components of the Risk Framework like the credit risk." Muermann (Wharton School, 2002) noted that operational risk is bank specific and thus regulatory capital requirements are not appropriate. He asked an insightful question about capital requirements, "Could capital requirements have avoided major risk events such as the collapse of Barings?"

ISDA (2000) also presents strong criticisms of the proposed capital requirements, arguing that the capital requirements are unworkable and can lead to distorted actions, such as attempts to avoid control rather than mitigate risk. The

ISDA report argues instead for the importance of strong supervision and market discipline (Pillars II & III). They note that any attempt to set capital requirements based on system-wide operational risks would: "reintroduce the sort of failings that undermined the 1988 Capital Accord, by making it insensitive to the true risks being run by any one bank (ISDA, 2000, p. 43)." Further, they discuss other types of measures of risks for setting capital requirements such as activity-based or cost-based measures. The ISDA paper states that, with respect to the various methods of determining capital charges, "Each remains experimental, with no single method or combination of methods currently deemed satisfactory by the institutions that have reviewed them. Each has serious and readily apparent drawbacks, consistent with the general philosophical problem of providing capital against operational risk (ISDA, 2000, p. 43)."

Finally, while the academic analysis in this area is still developing, Barth, Caprio and Levine (2002) analyze the relationship between different regulatory and supervisory practices and banking-sector development, efficiency and fragility. The authors use a cross-sectional database on banks in 107 countries. While this type of research is difficult to do and must be interpreted with skepticism (see Megginson & Netter, 2001, for a discussion of the difficulties of performing international cross-sectional studies of firm performance), their results have implications for the effectiveness of the proposed Basel Accord. For example, they find that stringent capital requirements are not associated with "bank development, performance or stability when controlling for other features of bank regulation and supervision" (Barth, Caprio & Levine, 2002, p. 31). They also find that there is little relation between supervision of banks and performance and stability. They do find that policies that force information disclosure and encourage private-sector control of banks do improve performance and stability. Barth, Caprio and Levine note that their results are consistent with other recent studies that show harmful effects of capital requirements imposed on banks. Thus, these results suggest that the first two pillars of the proposed Basel Accord (capital requirements and supervision) may not be beneficial while the third (market discipline through increased disclosure by banks) may be useful.

8. CONCLUSION

Throughout the world, the governance of financial service firms is perhaps the most regulated area of firm behavior due to the importance of the banking system to national and international economies. The Bank of International Settlements (BIS) makes recommendations for regulatory strategies that are adopted by national

regulatory bodies worldwide. As such, the regulatory standards adopted by the BIS are an important example of external corporate governance mechanisms. In 1988, the BIS adopted the Basel Accord, which defined a set of risk-based capital requirements for financial firms that were adopted by many governments. The Basel Committee is presently proposing revised Accords, which are based on three pillars – minimum capital requirements, supervisory review, and market discipline. For the first time, the requirements will apply to operational risk. In this paper we discuss operational risk and its applications to financial service firms, through a review of the issues and existing literature in this critical area of international standards of corporate governance. We believe we provide a timely review of a developing managerial area and an important international corporate governance standard.

While the specific requirements of the new Basel Capital Accord are still under discussion, and are not expected to be fully implemented until 2006, it is essential that financial services firms begin to understand the definition, measurement, analysis and management of operational risk. Overall, whether as a result of the new Accord, or in recognition of the increasing level of operational risk in financial service firms, banks will have to continue to develop sophisticated ways to measure operational risk, integrating market and credit risk into its analysis in the next few years.

There are numerous research issues to be pursued as operational risk management is integrated into the overall risk profile of financial institutions. Several key questions include:

- What are the key challenges in quantifying operational risks in banks. Is it possible to truly measure these risks or will banks end up relying on *ad hoc* schemes to satisfy regulators.
- What will be the requirements for banks to qualify for the Advanced Measurement Approach in determining capital requirements? This approach places emphasis on developing appropriate risk control measures, in addition to simply quantifying risks. As such, it seems to offer the best approach to operational risk management.
- To what extent should firms differentiate between regulatory capital requirements versus economic capital needs?
- To what extent can firms integrate the three areas of risk – credit, market and operational? By identifying each in isolation, financial services firms can allocate risk within the firm, but in so doing may ignore correlations between the risks that actually lower the overall risk profile of the firm. As the sophistication in the measurement of operational risk increases, can these correlations be used to reduce capital requirements?

- It is important for the Basel Accord and national regulatory bodies to recognize the differences between firms. Are there differing bank characteristics that suggest different approaches to risk management? How does a firm determine its "best practices" relative to its competitors?

We look forward to answers to these questions and more as the financial services industry reacts to new Basel Capital Accord and as new data become available on the integration of operational risk measurement and management in financial firms.

NOTES

1. The Basel Committee adopted this definition from a comprehensive analysis of operational risk by the British Bankers' Association, ISDA (International Swaps and Derivatives Association), RMA and PricewaterhouseCoopers, published as *Operational Risk: The Next Frontier* (BBA, ISDA, RMA and PwC, 1999).
2. See, e.g., Cumming and Hirtle (2001) for a discussion of the analysis of comprehensive risk management in financial institutions. A recent conference at the Federal Reserve Bank of Boston (2001) provides several examples of the differing approaches to operational risk management that have been suggested by various banks and consulting firms. Cagan (2001) and Nash, Nakada and Johnston (2002) offer specific suggestions for institutions preparing for the 2006 implementation of the new Accord.
3. In addition, to the widely publicized incidents of fraud in the U.S. recently, there are many other examples of large losses often due to fraudulent behavior in large firms. King (2001, pp. 21–34) discusses some examples (and provides data on 89 cases) where financial service firms suffered large losses because managers did not monitor and control the risk of operational processes. Two other papers provide case studies of major losses by financial services firms. Buchanan, Arnold and Nail (2003) analyze the corporate governance failures that led to the collapse of Australia's second largest insurer – HIH Insurance in March 2001. Buchanan and Netter (2002) analyze the money laundering scandal of the Bank of New York, the 16th largest bank in the U.S. Improper oversight by supervisors at the bank allowed others in the bank to launder \$10 billion for Russian organized crime.
4. The RMG report also reports recovery rates and percent of losses that were recovered, where recovery comes from insurance and other sources. The RMG reports that there are significant problems with these data but they do show recovery in 12.2% of all events (36.1% of the greatest magnitude loss events), with recovery when it occurs averaging 81.6% of the loss.
5. Harris (2002b) outlines the pattern of adoption of enterprise risk management that is very similar. He notes the common approach relies on "siloed line of business risk management, business line manager owns the risk, ad-hoc assessment, many performance indicators, inconsistent reporting, internal data only, crude capital indicators, or 8% minimum regulatory capital." In contrast, the emerging practices are "integrated risk management, corporate risk management, standardized firm-wide risk self assessment,

core indicators/triggers, uniform reporting, economic loss, internal and external data, and risk sensitive capital."

6. Harris (2002b) also outlines the role of an operational risk manager in a firm. The roles include: document risk management policy, ensure senior management buys into policy, establish reporting and metrics, promote capital data management systems, develop loss tracking methods, and map to business line by proxy (such as net income).

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