

Sizing Operational Risk and the Effect of Insurance:
Implications for the Basel II Capital Accord

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This chapter addresses the issue of whether and to what extent banks should be required by regulation to hold capital against operational risks. It argues that the types of operational risk for which Basel II requires capital, internal or external event risks, are and should be dealt with by other means--better controls, loss provisions or insurance. Basel's definition of "operational risk" excludes the major category of nonfinancial risk for which banks do hold capital--namely, business risk. According to the chapter's estimates, business risk accounts for slightly more than half of a bank's total nonfinancial risk, which, in turn, averages about 25-30% of economic capital. Analyzing legal risk, as a type of operational risk, the chapter shows the difficulties in defining or predicting such risk, and that the amount of such risk will vary depending on the legal jurisdictions to which a bank is subject. It also argues that the Basel II limit of 20% on capital mitigation achievable through insurance is arbitrary and creates a perverse incentive for banks to be underinsured. It generally concludes that banks should not be required by regulation to hold capital for operational risks; the issue would be better dealt with through supervision and market discipline.

This chapter addresses the issue of regulatory capital for operational risk, focusing on the Bank for International Settlements (BIS) proposals for banking organizations—the New Basel Capital Accord, or Basel II. The chapter is organized into four parts. The first part defines “operational risk” and examines how a financial firm should determine how much operational risk capital to hold.¹ The second part looks at legal risk as a microcosmic example of operational risk. The third part examines how the presence of insurance should affect this issue. The fourth part summarizes key conclusions and draws policy implications from the analysis.

1. Capital for Operational Risk

1.1 The General Problem

Basel II calls for the introduction of bank regulatory capital requirements for operational risk. The operational risk proposals are among the most significant provisions of Basel II, since they would extend bank regulatory capital to nonfinancial risks for the first time. These proposals have significantly changed over time.

1.1.1 The Earlier Proposals

When the second consultative package of the Basel Accord was released in January 2001 (CP2), it incorporated a capital charge for operational risk that would amount, on an industrywide basis, to 20% of the total regulatory capital (BCBS 2001a). The level of required capital was criticized on a number of grounds, one of which was that it did not take into account the fact that banks held insurance policies for many of the risks that were included in the new capital charge. Under the revised proposal of September 2001, the total charge was lowered to an average 12% of

¹ The first part of the chapter is a revised version of an earlier article, Kuritzkes (2002).

current regulatory capital, partly in response to the existing insurance coverage (BCBS 2001b, p. 1). CP2 proposed three approaches to operational risk, depending on the sophistication of the bank. Under the basic indicator approach, banks were required to hold capital for operational risks equal to a fixed percentage of gross income. Under the more sophisticated standardized approach, they were to hold capital based on their gross income for eight different business lines. Under the advanced management approach (AMA), banks could use their own models to determine necessary capital, subject to holding capital equal to at least 75% of what would be required under the standardized approach. This meant that the maximum reduction in capital from the level required under the standardized approach, as a result of the use of models *and* insurance, was 25%. It also meant that banks that used the basic indicator or standardized approach could achieve no reduction in capital through the use of insurance. The 75% floor of the AMA approach was subsequently dropped in 2002 after much criticism from both academics and industry (BIS 2002).

1.1.2 Changes in the Current Proposal

The latest proposal, of April 2003, makes three important changes. First, it gives banks that use the AMA approach more flexibility in the use of models; second, it puts a limit of 20% on the amount of capital reduction that banks that use the AMA approach can obtain through the use of insurance (BCBS 2003a). In addition, the committee will allow supervisors to permit banks to use an alternative standardized approach (ASA) “to the extent supervisors are satisfied that it provides an improved basis by, for example, avoiding double counting of risks” (BCBS 2003a,

paragraph 94).² The ASA is the same as the standardized approach except for two business lines, retail and commercial banking. For these lines, total loans and advances (an asset rather than an income measure) are multiplied by a fixed factor to determine the capital charge. (BCBS 2003b, paragraph 122).

Banks that use the standardized or AMA approaches must qualify by meeting certain requirements: (1) the bank's board of directors and senior management, as appropriate, must be actively involved in the oversight of the operational risk management framework; (2) the bank must have a risk management system that is conceptually sound and implemented with integrity; and (3) the bank must have sufficient resources in the use of the approach in major business lines as well as in control and audit areas. Supervisors can require an initial monitoring period before the standardized approach can be used, but, apparently, before AMA can be used, initial monitoring is obligatory (BCBS 2003b, paragraphs 620–22).

For a given bank, the capital charges for operational risk will be incremental to existing requirements for credit and market risk—the two sources of bank risk that are already subject to minimum capital rules. The overall calibration for credit and market risk, however, has been adjusted to keep the total amount of regulatory capital in the banking system unchanged. It is expected that the operational risk capital charge will be 12% of current minimum regulatory capital. To accommodate BCBS's objective of not increasing overall capital requirements, the new capital requirement for operational risk has led to a corresponding reduction in capital for credit risk. According to the most recent quantitative impact exercise, known as QIS 3, it is expected that banks that use the AMA approach would have a 14% decline in the capital

² Also, banks that qualify for AMA may use either the basic indicator approach or the standardized approach for some parts of their operations and an AMA approach for others (BCBS 2003a, paragraph 91).

requirement for credit risk, offset by the 12% increase for operational risk, for a net decline of 2% (BCBS 2003c, p. 26).

Basel II would become effective in January 2007.

1.1.3 U.S. Implementation

On February 27, 2003, the Federal Reserve Board announced how it would implement Basel II operational risk requirements at the end of 2006.³ At that time, the United States would mandate the 10 largest internationally active U.S. banks to use the advanced internal ratings approach (A-IRB) for credit risk and the AMA for operational risk. The Fed is developing criteria to identify these banks on the basis of asset size and foreign activities. Other banks could continue to use the current Basel rules, which include no charge for operational risk, or they could seek supervisory approval to use A-IRB and AMA. The Fed has stated that it expects an additional 10 banks to do so.⁴ The Fed has also stated that it expects the cushion built into the current Basel rules for credit risk to be adequate to cover operational risks for those banks that do not use the new Basel rules where a separate operational risk charge is assessed. It is expected that the 20 banks that use Basel II will account for approximately two-thirds of all U.S. banking assets. In addition, those U.S. banks are expected to account for about 99% of all foreign assets held by the top 50 domestic U.S. banking organizations, with the 10 mandatory banks themselves accounting for about 95% (Ferguson 2003).

This section now turns to a series of questions that are raised by the Basel II proposals:

³ The Federal Reserve Board issued an advance notice of formal rule making to implement its earlier statements on July 3, 2003. No formal rule-making proposal has yet been advanced. (See Ferguson 2003.)

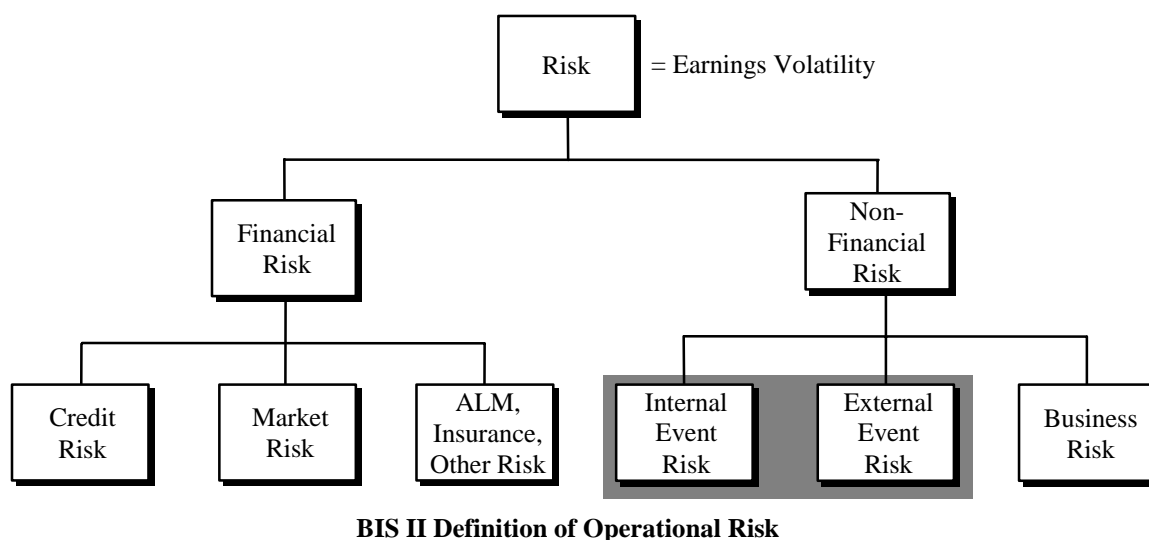
⁴ It is unclear how one can mandate the use of AMA for certain banks without the banks themselves qualifying for AMA, a basic requirement of Basel II. Perhaps the Fed envisions requiring these banks to develop systems that do qualify for AMA.

- *Definition:* What risks are captured within the Basel II definition of operational risk? While the term “operational risk” is commonly used to refer to all nonfinancial risks, the Basel II definition applies to only a subset of nonfinancial risks—those resulting from the failure of “internal processes, people, or systems” or from external events (BCBS 2001b, p. 1). The starting point for evaluating the Basel II proposals is to place the definition of operational risk in the context of a broader taxonomy of bank risks.
- *Bottom-up measurement:* How can operational risks be measured in terms of intrinsic—or economic—capital requirements? Are there unique challenges in trying to quantify operational risk? The ability to allocate capital to operational risk will ultimately hinge on the ability to measure it. If the purpose of risk-based capital allocation is to reflect differences across banks in business mix and risk profile, then operational risk measurement will need to be supported bottom-up within individual institutions.
- *Relative magnitude:* Given available top-down estimates, how big a problem is operational risk relative to other sources of bank risk? Is operational risk, as defined by Basel II (see figure 7.1), the main driver of nonfinancial earnings volatility? A preliminary sizing of operational risk helps address whether the problem is worth the regulatory candle: in effect, is this where regulators (and banks) should be spending resources on risk and capital measurement?
- *Effectiveness:* On the basis of the evidence, is capital the appropriate regulatory mechanism for protecting banks against operational risk? Unlike most financial risks, operational risk can be mitigated through improved “processes, people, and

systems” and/or transferred to third parties through insurance. To the extent that operational risks are difficult to quantify and can be controlled ex ante, alternative approaches to capital regulation may be more effective at protecting banks against operational losses.

1.2 Definition of Operational Risk

Figure 7.1. Taxonomy of Bank Risk. Source: Authors’ compilation



The first step in analyzing the new capital requirements is to fit operational risks within a broader bank risk and capital framework.

“Risk” for a bank is defined in terms of earnings volatility. Earnings volatility creates the potential for loss. Losses, in turn, need to be funded, and it is the potential for loss that imposes a need for banks to hold capital. Capital provides a balance sheet cushion to absorb losses, without which a bank subjected to large (negative) earnings swings could become insolvent.

Risk can be divided into two main sources of earnings volatility: financial risk and nonfinancial risk. Financial risks are risks that a bank assumes directly in its role as a financial

principal or intermediary. They can be classified into the familiar categories of credit and market risk, as well as asset/liability mismatch risk, liquidity risk, and, potentially, insurance underwriting risk. The assumption of financial risk is one of the defining characteristics of a financial institution—and the dominant reason why banks hold capital.

Unlike financial risk, nonfinancial risk is not a distinctive feature of financial institutions but is common to all firms. Nonfinancial risk arises because a firm may incur an operating loss due to nonfinancial causes—in other words, for reasons other than unexpectedly large credit losses, market trading losses, asset liability mismatch losses, or insurance underwriting losses. The cause of a nonfinancial operating loss could be a drop in revenues, a surge in costs, an internal operating failure, or an uncontrollable external event. Whatever the cause, a firm needs to hold sufficient capital to fund the loss. The need for capital is analogous to the role of equity in a nonfinancial company—and explains why commercial firms cannot operate with infinite leverage.

Nonfinancial risk can be subdivided into categories on the basis of risk factors or causes of loss. Three main categories include the following:

- *Internal event risk.*—These risks refer to losses from internal failures, such as fraud, operating errors, systems failures, and legal liability and compliance costs. A recent example of an internal event risk is the \$700 million loss suffered by Allied Irish in February 2002 as a result of unauthorized trading at its Allfirst subsidiary.
- *External event risk.*—These risks refer to losses from uncontrollable external events such as earthquakes or other natural catastrophes, terrorism, war, and acts of God. A stark example of an external event risk is the \$85 million loss reported

by the Bank of New York—a major securities processing bank headquartered in lower Manhattan—as a result of the terrorist strike on September 11.

- *Business risk.*—This category refers to residual nonfinancial earnings volatility not attributable to internal or external events. Business risk is a catchall that covers losses from such factors as a drop in volumes, a shift in demand, a price squeeze, a cost surge, regulatory changes, or technological obsolescence. A recent example of business risk is the \$1 billion loss reported by Credit Suisse First Boston (CSFB) in the fourth quarter of 2001, because of the collapse in investment banking activity in that period.⁵

Significantly, the Basel II definition of operational risk does not refer to all sources of nonfinancial risk but defines operational risk as “the risk of loss resulting from inadequate or failed internal processes, people, and systems, or from external events” (BCBS 2001b, p. 2). This definition is underinclusive in two key respects: First, it ignores business risk—the catchall category of risk that results when a firm runs a loss for ordinary economic reasons. CSFB’s \$1 billion loss, like that of other Wall Street firms in the fourth quarter of 2001, would be excluded from the Basel II definition.

Second, as clarified in the most recent BIS working paper on operational risk, only the direct losses associated with internal and external events are captured within the scope of the Basel II definition. Specifically excluded are strategic and reputation risks, as well as any opportunity costs associated with operational failures. Thus, in terms of the three categories of nonfinancial risk, the BIS definition can be reduced to direct losses associated with internal or external events.

While the Basel II definition may be a practical attempt to put a boundary around the scope of nonfinancial risk, a key problem in restricting the definition is that the categories of nonfinancial risks are inherently overlapping. Internal and external events can quickly bleed into business risk; in fact, the knock-on effects can often be greater than the initial loss. The events of September 11 provide an obvious example. Under the Basel II definition, operational risk would capture the direct losses to a bank from the terrorist attacks, including loss of life, injury to workers, damage to property, and other direct costs (e.g., systems failures). But the definition would exclude the costs of business disruption that affected banks around the world (the U.S. stock markets were closed for four days), let alone any broader economic impact triggered by the event. To see this point, one has only to compare the \$85 million direct loss for September 11 reported by the Bank of New York with the \$1 billion business loss reported by CSFB the following quarter.⁶ The case is equally true with internal event risks: the real threat to Arthur Andersen from the shredding of Enron documents was not the financial penalty at stake in the government's criminal prosecution but the implosion of the firm's business caused by massive client attrition.

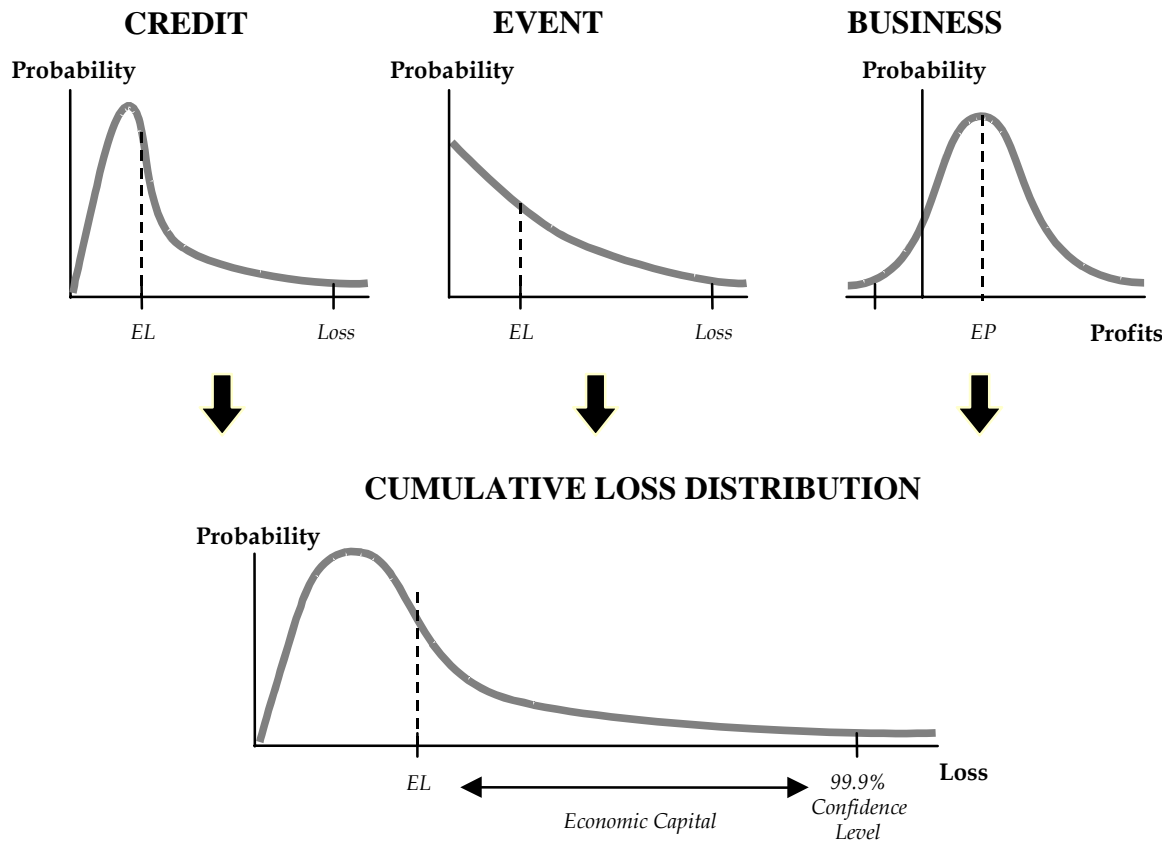
As these examples illustrate, the direct losses of internal and external events may not be the most significant source of nonfinancial risk. The Basel II focus on internal and external events may have more to do with the ease with which they can be classified for purposes of monitoring and reporting losses than with their actual contribution to earnings volatility.

⁵ Of CSFB's Q4 2001 loss, \$850 million was related to an extraordinary charge taken to cover the cost of severance packages and business disinvestment attributable to the business slowdown.

⁶ A significant portion of the capital markets slowdown in Q4 2001 resulted from the knock-on effects of September 11. Commentary on CSFB blames September 11 for much of the loss in corporate finance and equities revenues.

1.3 Bottom-Up Measurement

Figure 7.2. Economic Capital. Source: Authors' compilation



Ultimately, the question of how much capital should be allocated to operational risk is a problem of measurement. Within banking, economic capital has become the accepted standard for measuring the intrinsic capital needed to support risk taking. Indeed, the Basel II proposals specifically adopt economic capital as the relevant metric for calculating operational risk “bottom-up” under the advanced measurement approach.

The theory of economic capital is easy to state. As shown in figure 7.2, economic capital defines risk at a common point—or confidence interval—in a loss (or value) distribution. Typically, the confidence interval is tied to the bank’s solvency standard; for example, a bank that holds sufficient capital to protect against losses at the 99.9% level has a .10% risk of default—about the same solvency standard (or default risk) as an A-rated bond. By defining risk

in probabilistic terms, economic capital establishes a common currency for risk that allows exposures to be directly compared across different risk classes, such as credit risk, event risk, and business risk. It also allows risk to be aggregated across different risk classes (on the basis of underlying correlations) to create a cumulative loss distribution for the institution as a whole. These relationships are shown in figure 7.3.

It is important to note that, because capital is needed only to absorb unexpected swings in earnings, economic capital is attributed to the difference between the mean of the loss distribution (EL) and the designated confidence interval. Mean, or expected, losses are already reflected in expected earnings. They are not considered risk per se but rather a cost of the business. Expected losses are either accounted for through reserves, as in the case of credit provisions, or budgeted into the expense base, as in the case of routine operational errors. It is only variations in expected loss that create earnings volatility—in particular, the larger than expected losses that are responsible for downside volatility.

The division of the loss distribution into “expected loss” (covered by reserves or expected expenses) and “unexpected loss” (covered by capital) has significant implications for operational risk. As shown in figure 7.3, internal and external events can be characterized in a two-by-two matrix according to (1) whether they are high or low frequency events, and (2) whether the impact of the event is high or low in terms of loss severity. Capital for operational risk is not required for high-frequency, low-severity events, such as routine processing errors in a high-volume business, since these will be budgeted for in the expense base and reflected in expected earnings. Capital, however, is necessary to backstop against low-frequency, high-severity events—the rare events that threaten the solvency of the institution and contribute to the “tail” of the bank’s loss distribution. (Low-frequency, low-severity events are, by definition, immaterial.

High-frequency, high-severity events are assumed to be a null category, since repeated high losses would put a bank out of business.)

Figure 7.3. Measuring Operational Risk. Source: Authors

	<i>Low severity</i>	<i>High severity</i>
<i>High frequency</i>	Expected loss e.g., routine processing errors	N/A
<i>Low frequency</i>	Expected loss e.g., branch robbery	Capital (self-insure) or insurance, e.g., 9/11

In practice, economic capital for operational risk is very difficult to estimate internally.⁷

There are a number of reasons for this:

- *Paucity of data.* The first—and most fundamental—reason is that data for operational losses are limited. By nature, low-frequency, high-severity losses

⁷ This point is also made in a recent Federal Reserve Bank of Boston study by de Fontnouvelle, DeJesus-Rueff, Jordan, and Rosengren (2003). The authors rely on external databases of publicly reported operational risk events to quantify operational risk. Although de Fontnouvelle et al. conclude that “using external data is a feasible solution for understanding the distribution of . . . large [operational] losses,” their estimates still result in a wide range of outcomes. In their model, the key variable for estimating a bank’s operational risk capital requirement is the annual number of internal losses that exceed \$1 million. The bank’s loss distribution is then assumed to follow the same (Pareto) form as that for the external data. The authors report that “a typical large internationally active bank experiences an average of 50 to 80 losses above \$1 million per year.” However, depending on the exponential parameter assumed in their model, the 50 to 80 losses translate into an operational risk capital requirement at the 99.9% confidence interval of between \$500 million and \$4.9 billion—or a difference of 10 to 1. For a bank with 60 reported losses, the range is only slightly smaller—between \$600 million and \$4 billion.

seldom occur within any one bank. While there are well-known examples of extreme operational losses, such as the unauthorized trading losses that led to the collapse of Barings in 1995, most banks lack data on exactly the type of loss events that are most relevant for estimating economic capital. For this reason, the Basel II proposals require that banks that use the advanced measurement approach supplement internal data sources with external data on extreme events.

- *Endogeneity.* External data, however, may often not be strictly comparable to a bank's own loss potential because operational losses are, to a significant degree, endogenous. Management can take steps to prevent or mitigate operational losses, through improved business processes, audit, and controls. The problem with applying external data is in judging how relevant another bank's extreme loss is to a bank's own internal operations. From the perspective of a well-run institution, is a bank that incurred a large operational loss unlucky or just poorly managed? The question of comparability becomes even more acute the longer the time series used to estimate event losses, because industry practices—for example, segregation of front- and back-office activities in trading rooms, systems backup and contingency planning—evolve in response to previous events.
- *Insurance.* To the extent that operational losses cannot be mitigated by internal processes and controls, they often can be insured by third parties. This is particularly true of external event risks. As discussed in the next section, any measurement framework for operational losses must take into account the effects of insurance—both on historical experience (e.g., how did insurance affect realized losses reported in internal or external data?) and on prospective exposure.

- *Definitional problems.* As noted, operational losses do not fit neatly into a single category. Not only can internal and external event risks bleed into business risk, but operational risks can also overlap with credit and market risk. For example, a documentation error that leads to a lower recovery on a defaulted loan is, in principle, part credit risk, part operational risk. But segregating the causes is likely to prove difficult from a measurement perspective, especially when working with historical data.
- *Correlations.* To the degree that internal and external risk events can be discretely estimated, a further problem lies in aggregating individual events into a cumulative loss distribution. Portfolio theory is clear that unless perfectly correlated, the whole will be less than the sum of the parts. Since many operational risks reflect random occurrences, cross-event correlations are likely to be low. This suggests that aggregate capital should be significantly less than that implied for individual events on a stand-alone basis. A bottom-up economic capital model for operational risks needs to have an explicit method for taking correlations into account.

Reflecting these challenges, operational risk measurement is at a much more primitive stage of evolution than credit or market risk measurement. Banks are only now beginning to collect data systematically, both internally and externally, and to experiment with techniques for modeling operational risks. Ironically, these modeling techniques appear to be at a much earlier stage of development—and are likely to be more unstable—than the credit portfolio models considered and rejected by the Basel Committee for use in setting credit risk capital requirements

(BCBS 1999). It is an open question whether the models will be sufficiently robust to support meaningful internal capital allocation for operational risk by the 2006 implementation deadline.

1.4 Top-Down Estimates of Nonfinancial Risk

Given the difficulty of estimating low frequency, high-severity events for individual banks, an alternative approach is to develop top-down estimates for a group of banks that use market data. This admittedly "back of the envelope" approach can be applied to answer some basic questions about the magnitude of nonfinancial risk:

- How large is nonfinancial risk as a proportion of banks' total earnings volatility?
- What is the size of the internal and external event risks ("operational risk" as defined by BIS) relative to business risk?
- How do top-down market estimates of nonfinancial risk compare to the internal economic capital calculations used by large banks?

1.4.1 Top-Down Estimate of Total Nonfinancial Risk

By definition, total nonfinancial risk (inclusive of event and business risk) is measured by residual earnings volatility once financial risks have been stripped out. Nonfinancial risk can therefore be estimated by deviations in a return measure, such as return on risk-weighted assets (RORWA), provided returns are neutralized for the impact of financial volatility. As a proxy, this can be done by adding back credit provisions and subtracting trading gains/(losses) from RORWA to yield an adjusted measure, RORWA*:

$$\text{RORWA}^* = \text{RORWA} + \text{credit provisions} \text{ -/+ trading gains (losses)}$$

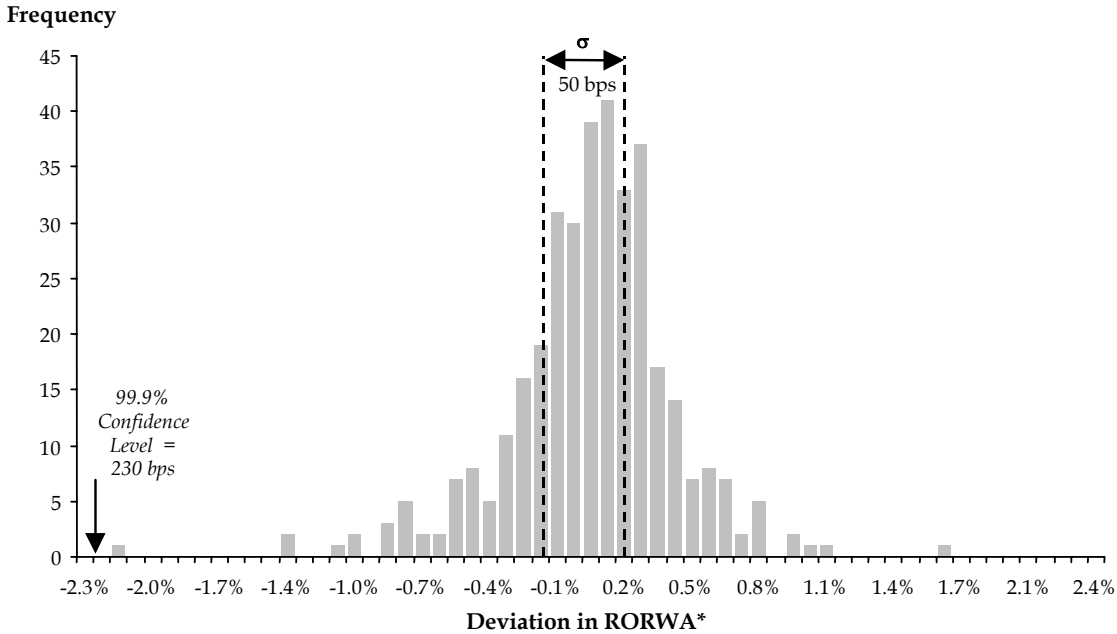
Figure 7.4 shows an analysis of deviation in RORWA* for a sample of 45 of the 50 largest U.S. banks for an eight-year period, from 1994 through 2001.⁸ On the basis of the distribution (360 data points), the standard deviation of RORWA* is calculated to be 50 bp of assets. Given the skewness in the distribution, the 99.9% confidence interval is roughly five times the standard deviation, or 2.5% of assets.

This result—2.5% of risk-weighted assets (RWA)—can be directly compared to existing regulatory capital requirements, since BIS capital requirements are defined as 8% of RWA. It suggests that at the 99.9% level—the same solvency standard set for operational risk under the advanced measurement approach—economic capital for total nonfinancial risk is roughly 31% of the BIS' total capital requirement (2.5% divided by 8.0%).

⁸ Five banks were dropped from the analysis because of incomplete data.

Figure 7.4. Top-Down Estimate: Nonfinancial Risk. Source: Bank Regulatory Reporting OWC

Analysis



- Top 50 US banks
- 8 years (1994–2001), 360 observations
- RORWA* = RORWA - Credit Provisions - Trading Gains
- $\sigma = 50 \text{ bps} \times 5 \Rightarrow \text{Economic Capital} \approx 2.5\% \text{ of Assets}$

1.4.2 Top-Down Estimates of Event Risk

Unlike nonfinancial earnings volatility, economic capital for internal and external event risk is difficult to estimate by conventional distribution analysis, because event risks are highly skewed, with a large number of high-frequency, low-severity events and a small but appreciable number of low-frequency, high-severity events. Data drawn from the mode of the distribution are not very useful for characterizing the behavior of the tail in the region relevant for economic capital.

An alternative approach is to focus directly on the tail of the distribution by applying extreme value theory to large, reported event losses. While only limited information is publicly disclosed about operational losses, extreme losses, such as rogue trading scandals or major

compliance failures, are reported in the press and included as extraordinary items in financial statements. A recent study by de Fontnouvelle, DeJesus-Rueff, Jordan, and Rosengren at the Federal Reserve Bank of Boston (de Fontnouvelle et al. 2003) uses two external databases of large, publicly reported event losses to quantify operational risk. While the de Fontnouvelle study attempts to model the full operational loss distribution through a random truncation model, a simpler, “back of the envelope” approach can be used to calculate the frequency of large event losses from a known sample of reporting banks.

Figure 7.5 shows a distribution of large reported losses from one of the two external databases, OpRisk Analytics, for a consistent sample of the global top 100 banks over a 10-year period, from 1992 to 2001.⁹ This sample yields 1,000 loss years of observation. The losses are scaled as a percentage of RWA, the same scalar used in the nonfinancial earnings volatility analysis of RORWA*.¹⁰ Applying a (simplified) version of extreme value theory, the losses in the distribution can be ordered from the right, or most extreme, observation—Standard Chartered’s Indian fraud in 1993, which cost the bank 1.44% of RWA—to the left. The 99.9% loss event in the distribution is 1.05% of RWA, which is roughly equivalent to the second most extreme observation, the Daiwa trading loss in 1995.

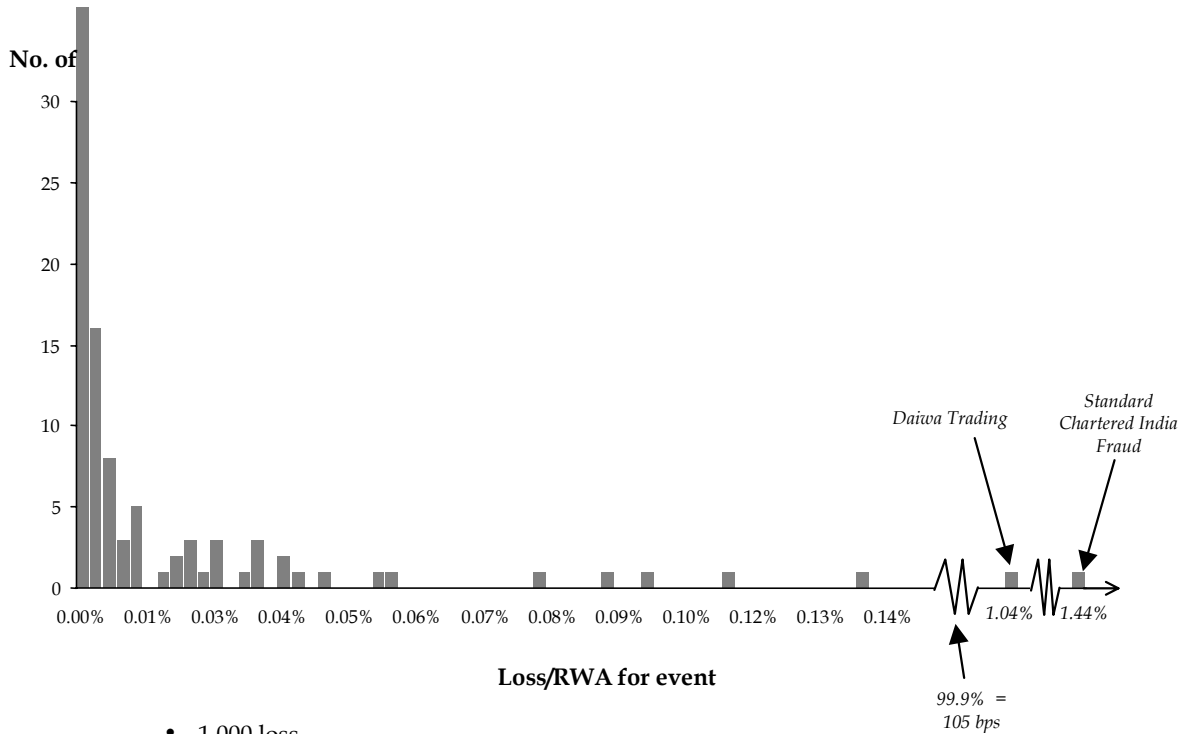
The 1.05% estimate of event risk is 13% of the BIS total bank capital requirement of 8% of RWA, in line with the proposed 12% calibration for operational risk under Basel II. But recall from the RORWA* analysis that the total estimate of nonfinancial earnings volatility is 2.5% of RWA. This implies that internal and external event risks account for only 42% of total

⁹ The OpRisk Analytics database is considered to be comprehensive for large publicly reported losses (>\$10 million) going back at least 10 years.

¹⁰ The OpRisk Analytics database reports losses as a percentage of assets, not risk-weighted assets. However, for comparability with the RORWA* analysis, assets were converted to risk-weighted assets. For the sample of 45

nonfinancial risk. The residual—or business risk—is worth the other 58% and is actually the bigger driver of nonfinancial risk.

Figure 7.5. OpRisk Analytics: Publicly Reported Losses, Top 100 Banks, 1992–2001. Source: OpRisk Analytics, OWC Analysis



- 1,000 loss
- Extreme Events: database based on public
- Loss/RWA = same scale as RORWA analysis
- 99.9% = 105 bps

1.5 Internal Economic Capital Benchmarks

The top-down estimates of total nonfinancial, event, and business risk can be compared to bottom-up calculations of internal economic capital requirements for a sample of large banks.

Figure 7.6 shows the results of a benchmarking study conducted by Oliver, Wyman & Company in 2001 of the internal economic capital attributions of 10 large, internationally active U.S. and

banks used in the RORWA* analysis, risk-weighted assets were 78% of total assets. This conversion factor was

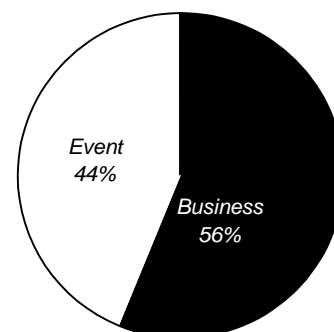
European banks. On average, the economic capital attributed by these banks to nonfinancial risk was 26%, which is very close to the 31% estimate of nonfinancial risk implied by the top-down RORWA analysis. Not surprisingly, the range in internal nonfinancial risk capital across the banks is fairly wide, from 16% to 36% of total economic capital. More significant, however, 9 of the 10 banks in the sample allocated economic capital for both business and event risks. This suggests that banks that use internal economic capital models recognize the importance of business risk as a driver of nonfinancial risk. Finally, of those banks in the sample that reported the breakout between the two risks, the split between event and business risk was 44% versus 56%—again, very close to the results of the top-down analysis (42% versus 58%).

These results support the following tentative conclusions:

- Nonfinancial risk is a significant source of bank risk, accounting for roughly 25–30% of economic capital.
- However, Basel II operational risk accounts for less than half of the nonfinancial risk total. The bigger driver of nonfinancial risk is business risk.
- Accepting the narrow definition of operational risk, the Basel II calibration of 12% of total economic capital appears to be confirmed by the top-down analysis.
- The range in nonfinancial capital allocation across banks suggests that, even if right on average, the calibration for operational risk could be wrong in practice unless supported by effective, bottom-up allocation.

Figure 7.6. Oliver, Wyman & Company Benchmarks Percentage of Total Risk Capital. Source: OWC database. (N.b. The sources for OWC Analytics and OWC databases cannot be accessed by readers.)

INSTITUTION	CREDIT	MARKET/ ALM	NON FINANCIAL
Bank A	47	27	27
Bank B	61	24	16
Bank C	43	25	32
Bank D	37	27	36
Bank E	63	8	29
Bank F	58	16	26
Bank G	46	28	26
Bank H	55	24	21
Bank I	45	24	31
Bank J	71	7	22
Average	53	21	26



2. Legal Risk as a Microcosm of Operational Risk

It may be useful to look at a particular type of operational risk to get a better idea of the difficulties of devising a capital framework for operational risk. Legal risk is not a separate category of operational risk under the Basel approach. It cuts across the various Basel categories of inadequate or failed internal processes, people and systems, and external events. It is thus unclear where it actually fits in the Basel analysis.

2.1 Defining and Predicting Legal Risk

Like operational risk generally, legal risk is difficult to define. Losses from legal risk depend on how the law (including the law of contract) allocates risk between banks and other transactors and on the extent to which banks actually have to bear losses not allocated to other transactors. Obviously, not all losses depend on how the law allocates risk. For example, it is not a legal risk as to whether an institution bears the risk of having its employees embezzle funds (assuming

there is no contract requiring third-party insurers to bear that risk). It is a legal risk that an insurance contract that does cover such risk could be interpreted, contrary to the intention of the bank, not to cover the embezzlement.

Loss allocation can be of two types. Primarily it is between financial institutions and other private contractors. But the government can also play a role by assuming losses, as is the case with terrorism reinsurance, or by imposing losses on banks, as occurs when it fines banks for regulatory violations. Particular legal risks are often exceedingly difficult to predict. Their incidence depends not only on whether the event giving rise to the risk will occur, for example, the breach of the contract but also on who will bear the loss of the event if it occurs.

As with other types of operational risk, some risks are high frequency and low impact; most credit card fraud falls into that category. Others are low frequency and low impact and are by definition unimportant, as when an employee is entitled to severance pay after a court determines that her firing was unjustified. The most important events are low frequency, high impact occurrences, such as 9/11, where there is an insurance dispute, or the Orange County claims against derivative dealers.

One can get a sense of the range of risks by looking at a sample of decided cases in federal district courts from October 2000 through October 2001 in table 7.1. This is not a representative sample because it includes only litigated cases that were not settled and only deals with a short period of time. Nonetheless, it shows the variety of cases in federal court.

Table 7.1
Federal District Court Cases Against Banks, 2000–2001
Source: Authors' compilation.

<i>Type of case</i>		<i>Number</i>
Banks as trustee		4
Antitrust		2
Checks		9
Consumer protection		54
Truth in lending	21	
Fair debt collection	9	
Other	24	
Contracts		31
Discrimination		24
Customer	6	
Employees	18	
Fraud		15
Holocaust compensation		1
Indian land claims		2
Mortgage or foreclosure dispute		8
Patent infringement		2
RICO		10
Securities fraud		17
Fraud	8	
Disclosure	9	
Third party		32
Deposit holder or trustee	18	
Finance provider or debt holder	4	
Mortgage or lien holder	10	
Torts		4
Trademark		2
Other		7
TOTAL		224

Notice that is the cases cover a wide range of issues, from antitrust violations to consumer protection, to the Holocaust, to conflicts over patents and trademarks. How would one predict the likelihood of low-frequency, high-severity events like the Holocaust? Surely it would not be on the basis of gross income, as under the prescribed Basel methodologies. And it is also far from clear how a bank's internal model could predict exposure to such claims.

We have also collected a sample of state appellate court cases in California, New York, and Texas over the same period of time. The data are given in table 7.2.

Table 7. 2
 State Appellate Court Cases Against Banks, 2000–2001
 Source: Authors' compilation.

<i>Type of Case</i>	<i>California</i>	<i>New York</i>	<i>Texas</i>
Banks as trustee	3	0	4
Checks	1	4	7
Consumer protection	1	0	5
Contracts	1	9	13
Conversion	0	1	4
Employment discrimination	2	3	0
Fraud	0	4	5
Mortgage/foreclosure	1	1	2
Personal injury	0	10	1
Securities	0	0	2
Third party	2	9	8
Other	1	1	4
TOTAL	13	41	55

The interesting feature of this table is that the incidence of litigation can depend on the state in which a bank is located. This is also obviously the case for countries, as well. It is probably true that U.S. banks are more likely to be exposed to legal risk than foreign banks because of the litigious nature of the United States, the availability of class actions, and the significant statutory impediments to disclaiming risk. U.S. banks are probably much more exposed, as well, to costly regulatory sanctions. This raises the question of how to apply any standardized operational risk methodology across countries. Even apart from legal risk, one can well imagine that other types of operational risk, such as computer failure or employee theft, might well have different incidences in different jurisdictions.

One way of getting an insight into the incidence of high-impact legal risk is to look at what disclosures banks make about material litigation. Table 7.3 shows the disclosures of the top 100 banking companies in 2000.

Table 7.3
Material Litigation Disclosures by 100 Top Bank Holding Companies, 2000
Source: Authors' compilation.

<i>Type of case</i>	<i>Number</i>
Breach of fiduciary duty	3
Consumer protection	6
Conversion and fraud	2
Derivative suit	2
Employment	1
Environmental	2
Lender Liability	1
Merger related suits	2
Patent infringement	1
Securities violation	3
Unspecified	1
TOTAL	24

Banks tend to disclose when an event can have an impact on 5%–10% of earnings. Such disclosures were made by 21% of banks in 2000. This is surprisingly a high number, but even this level of exposure significantly understates the level of major risk litigation, since, if banks had already set aside reserves to cover cases with probable losses, there would be no material impact on earnings when the cases were actually brought. Table 7.3 does reflect, however, the kinds of cases that were difficult enough to predict so that reserves were not set aside in advance.

3. Insurance Against Operational Risk

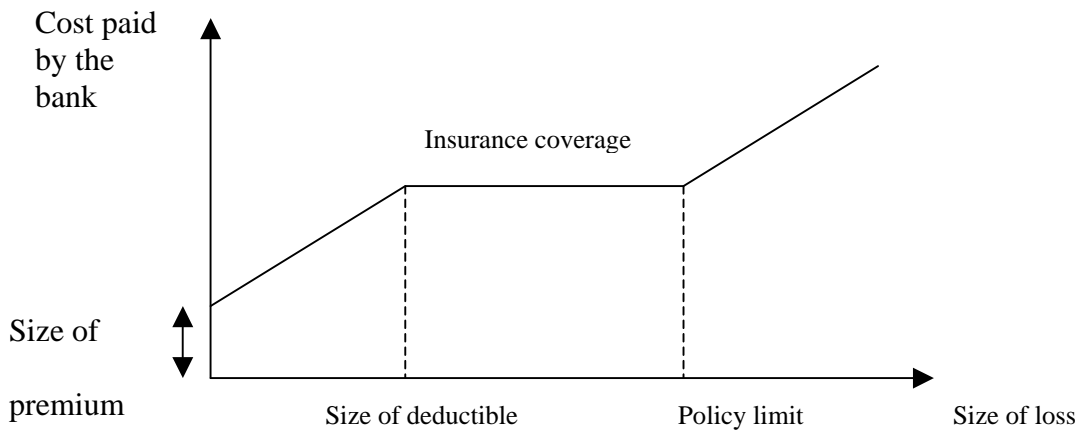
This section of the chapter addresses the question of insurance coverage for operational risk and how the availability of such coverage should affect capital requirements (Bunge 2002). We begin by discussing the problem of insurance coverage.

3.1 Coverage

Let us focus again on figure 7.3. Generally, banks insure against low-frequency, high-intensity

events. Expected losses of low severity, such as routine processing errors, are planned for in the budget process and are expensed as they occur. Low-frequency, low-severity events are dealt with through contingencies. Not only are these events not insured against, but, as we argued earlier, they should not be subject to mandatory capital requirements. As before, we also assume that high-frequency, high-severity events are a null set. Thus, the decision to insure externally applies to low-frequency, high-severity events like 9/11, and, in principle, insurance is a direct substitute for capital. Institutions would compare insurance costs against the cost of capital. The cost of capital is influenced significantly by regulation if regulation requires that one hold more capital than one would otherwise do (Insurance Working Group 2001). Banks might not be willing or able to purchase insurance for all low-frequency, high-severity events. Policies may be too expensive. It appears that rogue trader insurance has not become popular because banks believe the policies are too expensive and would rather rely on internal controls (*Insurance Journal* 2002). Due to information asymmetries, it may be difficult and costly for an insurance company to differentiate between risky and safe banks. To mitigate the effect of moral hazard, a deductible may be included in the insurance policy. The effect of such deductible is set out in figure 7.7.

Figure 7.7. Effect of Deductible. Source: Marshall (2001), p. 436



This deductible effectively means that part of the risk is uninsured. Also, insurance policies may have a cap on liability. Such caps, like deductibles, may give banks incentives to manage risk, but they also mean that such risks are uninsured. In addition, many insurance policies exclude certain events, such as risk from war or nuclear attacks, from coverage. This creates further gaps in coverage. Insurance policies are often written in extremely technical and complicated language, and it may be difficult in advance to specify which risks are covered and which are excluded. This problem is further intensified by the number of different policies that may cover different types of risks, each with its own set of deductibles, caps, and exclusions. For example, there are the following kinds of policies: Bankers' Blanket Bond or Financial Institutions Bond, Computer Crime, Unauthorized Trading, Property Insurance, Bankers' Professional Indemnity, Commercial General Liability, Employment Practice Liability, Director's and Officer's Liability, Electronic Insurance, and Environmental Protection.

These complications may also result in disputes about whether policies actually do cover particular loss events. A notable recent example is the litigation over the extent of insurance coverage for the destruction of the World Trade Center.¹¹

There have been some important developments in reducing such complications by the introduction of a broader and more complete “blanket” policy. For example, Swiss Re has introduced a policy for Financial Institutions Operational Risk Insurance (FIORI) that covers liability, fidelity and unauthorized activities, technology risks, asset protection, and external fraud. However, there is a \$100 million deductible for every loss and a requirement that the insured bank have at least a \$20 billion balance sheet and be listed on an exchange.

It is widely acknowledged that there is an indirect benefit of insurance coverage. The presence of insurance causes the insurer, in cooperation with the insured, to monitor and try to reduce risk. This protects the insurer against moral hazard and generally reduces its exposure. From a capital point of view, this might be thought to be irrelevant, since, if the risk is covered, it will be borne by the insurer. Monitoring may reduce the insurer’s exposure, but lack of monitoring does not increase the insured’s exposure. This may not be true if there are deductibles and caps. Insurance company monitoring may reduce the insured’s exposure for the uninsured portion of the risk. Basel has suggested no way in which the quality of insurance company monitoring would affect capital for partially insured risk.

3.2 Insurance Payoffs

Even if a bank is insured, it may not be able to collect on its insurance. This may result from a default of the insurance company, although one would assume that the probability of default of a

¹¹ See, for example, World Trade Center Properties LLC et al. v. Travelers Indemnity Company, 01 Civ.12738 (June

highly rated insurance company on a given policy is quite small. A more difficult issue is posed by the fact that the insurance company might not promptly pay its claims. This could be the result of conscious stalling, but the reputational consequences of nontimely bill paying can be severe. However, there may be legitimate issues about the extent of coverage that delay prompt payments. One might think that this would be of special concern to banks that may need to draw on the funds immediately. However, third parties or the insurance company itself should be willing to finance delayed but clearly expected payments. Under the FIORI policy, Swiss Re agrees to solve the liquidity problem by buying treasury shares from the bank once a claim for loss is made. This provides Swiss Re with security against the return by the bank of any insurance payments that are ultimately decided not to be due.

The Basel Committee has attempted to collect some data on insurance coverage through the Quantitative Impact Study (BCBS 2002), but its data are generally unsatisfactory because they were collected from only 30 banks from 11 countries over three years. The committee had a limited ability to capture tail events represented by low-frequency, high-severity events, which are those that should be insured. Thus, when it found that only 2.4% of loss events (out of a total of 7,463) had an insurance payoff, this indicates not that insurance is not important but rather that only a small portion of operational risk is insured. Most loss events, as we have discussed, are expensed and pose no threat to capital. The study also reports that the average recovery rate for insured losses was only 80% of loss amounts. This does not necessarily mean that payoffs are unreliable but may rather reflect deductibles and caps.

If Basel insists on factoring in the willingness of insurance companies to pay into the amount of capital reduction achievable through insurance, it might permit banks to rely on

willingness to pay ratings, such as the Financial Enhancement Ratings, issued by Standard & Poor's since 2000.

3.3 Insurance for Legal Risk

As previously discussed, there is a range of different policies that cover operational risk. Not all such policies cover legal risk. For example, the Bankers' Blanket Bond covers losses through acts of dishonest employees, which is not a legal risk. It is also unclear to what extent any of the policies that might cover legal risks of some kind, for example, Bankers' Professional Indemnity or Commercial General Liability, cover some of the major legal risks (e.g., the Holocaust or Indian land claims). This might be because such claims were specifically excluded or exceeded caps. Often, however, it occurs because no one anticipated the claims involved and therefore no one sought to insure against them. This could be remedied by blanket policies, but, again, cost would be a major consideration. The unpredictability of events that might give rise to legal risk is of an order of magnitude of uncertainty that is beyond the unpredictability of known risks such as, for example, rogue trading. Indeed, such unpredictability of the types of events calls into question the whole operational risk exercise.

As with other risks, there is also the question of the dependability of insurance payoffs for legal risk. But there is the additional issue of legal risk about the payoffs themselves. This is the issue in the World Trade Center litigation. The destruction of the WTC was a nonlegal operational risk, but legal risk affects the validity and the extent of insurance.

3.4 The Basel Committee Approach

Neither the basic indicator approach, under which banks are required to hold capital for operational risk equal to a fixed percentage of gross income, nor the standardized approach, under which they are required to hold capital in an amount based on their gross income for eight different business lines, allows any reduction in required capital for the amount of insurance. Only the AMA permits insurance to reduce required capital, and then only to the extent of 20%. The committee originally envisioned developing parameters that would affect the actual extent that insurance could reduce capital, such as criteria relating to timeliness of payment, certainty of coverage, length of contract, credit rating of the insurer, and use of reinsurance, but it abandoned this in favor of an absolute limitation of 20%. It also refused to take insurance into account at all under the basic indicator and standardized approaches. This will be irrelevant to U.S. banks to which these two approaches will not apply.

We see no economic justification for the 20% limit on insurance under AMA. Given that regulators are letting banks use models to determine capital risk for operational risks generally, they should also have permitted them to do so with respect to insurance mitigation.¹² Indeed, this limit may have the perverse effect of reducing the incentives of banks to obtain insurance and thus increase banking losses. It may create further disincentives for those U.S. banks that have

¹² The argument against the 20% cap applies even though many banks with economic capital models have yet to integrate insurance into their models. There are two reasons that existing economic capital models fail to take account of insurance. First, “bottom-up” models for operational risk are still at an early stage of development, for the reasons stated in the section on bottom-up measurement. The current focus of modeling efforts is on the underlying operational risk exposure rather than on risk mitigation through insurance, in the same way that credit exposure measurement for derivatives focused first on *gross* exposure, and then on *net* exposure with individual counterparties. Given the Basel II mandate, however, banks are accelerating development of bottom-up models under the AMA, and they will inevitably seek to integrate the effects of insurance once the underlying exposure is measured. Second, existing economic capital approaches to operational risk are often calibrated using external benchmarks of capital levels for nonfinancial company analogs. The external benchmarks reflect the prevailing level of insurance cover among the analog companies. As banks move from an external benchmark approach to calibration to an internal modeling approach consistent with the AMA, they will need to factor insurance into their internal capital calculations or risk potentially overstating capital.

substantial operational risks but that are not in the core 10 mandated to adopt A-IRB and AMA. This would be particularly true for banks like State Street that focus on processing and have virtually no consumer or commercial loans. The negative prospect of a 12% operational capital charge combined with limits on insurance mitigation could more than outweigh the nonexistent savings of reductions in capital for credit risk. Indeed, such banks might well decide not to adopt Basel II even with full mitigation from insurance.

The insurance industry has suggested using a premium or limits approach (Insurance Companies 2001). Under the premiums approach, the sum of insurance policy premiums is used as a single indicator proxy for measuring capital relief. The total amount of premiums is multiplied by a prescribed fixed percentage and a ratio to reduce the expected loss portion of the risk transferred. The foundation for the use of premiums is that insurance premiums are directly correlated with the amount of risk transferred; the higher the premiums, the higher the level of risk transfer. The key is the fixed percentage adjustment. It is unclear whether and to what extent such a fixed percentage could be determined with any reasonable reliability. The ratio adjustment would adjust the level of premiums for the limits of coverage and the credit rating of the insurer; the latter appears more feasible than the former.

The second method proposed by the industry is the limits approach. Under this approach, the insurance premiums paid are assumed to represent the portion of the risk applicable to the expected loss. Thus, the policy limit less the insurance premium should be the amount of the policy limit related to unexpected loss that is actually insured against. This amount would be discounted by a coverage breadth factor. To the extent that coverage breadth was coextensive with the operational risks identified by the Basel Committee, this factor would be close to 1.0; to the extent it was much less, the factor would approach 0. This determination would be aided by a

mapping exercise in which the Basel-identified risks would be mapped to particular insurance policies and empirical data. As the industry points out, there are aggregate and specific loss limits in policies, an aggregate overall limit and a limit on specific risks. It is unclear how these different limits are taken into account. Further, the mapping process seems difficult, given the problems in generally defining operational risk, as well as in defining the specific components.

4. Conclusion: Is Capital a Cure-All for Risk?

Given the modest impact of Basel II operational risk on bank earnings volatility, the question becomes whether capital is the appropriate regulatory mechanism for protecting banks against internal and external events. Unlike financial risks, which a bank consciously assumes in the expectation of financial return, operational risks are an unwanted by-product of the business. At the same time, banks can take significant steps to mitigate exposure to operation risks ex ante, rather than relying on capital to absorb losses ex post. The tradeoff a bank faces in managing operational risks is not risk versus return but risk versus the costs of avoidance.

The approach to avoiding operational risks differs for internal and external event risks. Internal event risks, by their nature, are endogenous; they result from the failure of internal processes, people, or systems. The first line of defense against internal event risks should be management controls. The history of quality control in industrial manufacturing demonstrates that there are effective measures banks can take to reduce operational losses. The key determinant of how safe a bank is against operational failures is not the level of capital it holds but how well managed the bank is in the first instance. In fact, in a few spectacular cases of operational failures, incremental capital would have made no difference to the firm's

survivability. If Barings had held more capital, arguably all that would have happened is that trading losses would have continued to mount until the firm ran out of capital.

External event risks, by contrast, are caused by exogenous incidents outside the control of the firm. Because of this, external events have little moral hazard and tend to be uncorrelated, which makes them good candidates for insurance. For most firms, insurance is the first line of defense against external event risks. And, while insurance transfers exposure to a third party, banks can also take steps internally to mitigate the consequences of external events. As an example, at a recent Oliver, Wyman & Company-Wharton Risk Roundtable on operational risk, several participants discussed how their firms managed through the events of September 11. It became clear that the financial heroes of September 11 were firms, such as Morgan Stanley and Depository Trust & Clearing Corporation (DTCC), that had invested heavily in safety measures, contingency planning, and back-up systems and that were prepared to cope with a catastrophic event whose nature was entirely unpredictable *ex ante*. No amount of capital would have made a difference to the ability of these firms to withstand the business disruption and uncertainty surrounding September 11.

The one category of nonfinancial risk that cannot be effectively mitigated by management controls or insured against is classic business risk. This is the reason that firms like CSFB need to hold capital to absorb the potential for loss from a business downturn—similar to the need for equity in nonfinancial companies. It is ironic that the source of nonfinancial risk that is best protected by capital is ignored by Basel II.

It is clear that insurance is a substitute for capital. It is thus highly unclear why insurance should not be taken into account in setting capital requirements under the basic indicator and standardized approaches of Basel II. Also, a 20% limit on capital reduction achievable under

AMA may give many banks a perverse incentive to underinsure. There is no established formula or methodology for determining the degree of substitution. This counsels against Basel II's establishing any arbitrary limit. Financial institutions should be free to adopt their own substitution approach, subject to regulators's review of the thoughtfulness of the process that led to the substitution approach. There is no reason to give banks this freedom for operational risk in general and then to limit it with respect to insurance substitution.

The U.S. implementation of Basel II is troubling. In the first place, it creates significant competitive problems in the United States among large banks with significant operational risk that Basel I sought to diminish.¹³ For example, banks with low credit risk and high operational risk (as defined by Basel) that are required to adopt Basel II will be at a disadvantage compared to banks that are not required to adopt Basel II, since, for the former group of banks, overall capital will increase. This competitive problem also has an international dimension. The E.U. Capital Adequacy Directive (CAD), based on Basel I, applies to all E.U. banks. If the European Union applies its revised CAD, based on Basel II, to all E.U. banks, the low-credit-risk and high-operational-risk U.S. banks not subject to Basel II will have a potential competitive advantage over European banks. This could lead the disadvantaged Basel II banks to change their business mix or to sell off their operations to advantaged banks.

For these reasons, we believe that operational risk should be dealt with under Pillar 2 and not Pillar 1. This view has been strengthened by the consequences of the U.S. approach to the implementation of Basel II under which some but not all banks with major operational risks will be subject to operational risk charges.

¹³ In our view, however, the ability of the Accord to reduce competitive inequality is quite limited (Scott and Iwahara 1994).

As a second-best solution, we recommend that the European Union follow the U.S. lead by eliminating operational risk charges for most banks. In addition, we think that a better method should be devised to determine the core U.S. banks that will have mandatory operational risk charges or that the adoption of AMA should be entirely voluntary, as Basel II envisions. By making Basel II mandatory for certain banks, the United States is going farther than Basel II requires. Given our fundamental disagreement with the approach of Basel II to operational risk, we see no reason to compel banks to use it. While it is true that banks can use their own models in AMA, the limit on insurance mitigation significantly limits this freedom. At the least, the arbitrary 20% ceiling should be removed.

We note with interest that a bipartisan group of U.S. representatives has sponsored a bill that would require reports to Congress concerning the Basel II process and that would permit the U.S. Treasury, rather than the Fed, to control U.S. policy on Basel capital requirements.¹⁴ Whether or not this bill passes, its mere filing and the hearings that preceded it indicate that this entire process will become more political in the future. This is perhaps an inevitable result of the adoption of highly contestable policies with significant competitive implications.

¹⁴ H.R. 2043, 108th Cong. 1st Sess. (2003).

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