Operational Risk - Opportunities for Accounting Research

By Patrick J McConnell*
Visiting Fellow, Macquarie Applied Finance Centre

Abstract

In January 2008, the so-called Basel II regulations came into force for banks in the major industrial economies. Developed over many years, these new regulations are, at the highest level, designed to improve risk management in individual financial institutions and across the industry, through a regulatory regime based on minimum capital requirements. While the main thrust of Basel II focuses on Credit Risk, the concept of 'Operational Risk Capital' was introduced, requiring banks to retain specific capital to cover operational losses. Much debate has taken place in the industry as to how this new capital requirement should be calculated but, during these deliberations, accounting perspectives on control and reporting have rarely been to the fore. Since Operational Risk Capital must be reported to shareholders and the public from 2008, this is a deficiency that should be remedied. This paper first describes Basel II and the specific requirements for Operational Risk Capital. It then discusses some of the practical issues of implementation, highlighting areas where an accounting perspective could add value before, finally, identifying potential areas where useful research could be undertaken.

Key Words: Basel II, Operational Risk, Regulatory Capital, Accounting Research.

1. Introduction

In 2004, the Basel Committee on Banking Supervision published the Basel II Accord, which proposed major changes to the way that regulated banks calculate, manage and report not only their Credit and Market Risks but, in addition, a new category of Operational Risk.

Although the concept of Operational Risk regulation has been discussed in the banking industry since the mid-1990s and have been amplified by banking disasters, such as Barings, it has proven difficult to develop workable definitions of Operational Risk and even more difficult to develop tools and techniques to measure it so that regulatory capital can be set aside to cover Operational Risk.

Although progress towards measuring Operational Risk has been less than satisfactory, Basel II was, nevertheless, officially implemented in many banking jurisdictions on 1st January 2008. This decision to proceed with resolution of measurement issues is not completely unsatisfactory, as Basel II had already been delayed a number of times and considerable progress has already been made in (arguably) more important aspects of Operational Risk Management, i.e. risk management policies, processes, organisation and governance. In short, the measurement of Operational Risk is still a 'work in progress'.

One other significant part of the Operational Risk puzzle remains to be developed - Disclosure/Reporting. In part, this is because disclosure (or Market Discipline in Basel terminology) was always perceived to be an issue that would be delegated to national regulators, because accounting standards vary in different jurisdictions. The most basic requirements for market disclosure of Operational Risks have been put in place but obviously will have to be enhanced as Operational Risk is reported and analysed on a year-to-year basis.

Reporting of Operational Risk information is an area of interest to accounting and hence there is, at minimum, a need to understand the requirements of Basel II and if, accountants are to perform their fiduciary duties to their Boards and shareholders, to ensure that published information is validated to the highest standards possible.

This paper first summarises Basel II and describes new regulations on Operational Risk. It then describes some of the practical issues that have made Operational Risk difficult to measure, pointing out where accounting can play a constructive role. Finally the paper suggests areas where accounting research could be valuable.

2. Basel II

The Bank for International Settlements (BIS), the world's senior banking regulator, operates through the "Basel Committee on Banking Supervision" which formulates supervisory standards and best practice for action by local banking regulators.[1] The first Basel Capital Accord (Basel I) was established in 1988, setting minimum standards of "capital adequacy" for both Credit and Market Risks. In 2001, the Basel Committee proposed, for the first time, to set capital charges for all banks to cover Operational Risk (Basel 2001). Over the next few years, the Committee conducted research and proposed methods for calculating Operational Risk Regulatory Capital (ORRC) culminating, in 2004, in the publication of the 'Revised Framework for the International Convergence of Capital Measurement and Capital Standards', the so-called Basel II Accord (Basel 2004).[2]

The stated objective of Basel II is to "develop a framework that would further strengthen the soundness and stability of the international banking system while maintaining sufficient consistency that capital adequacy regulation will not be a significant source of competitive inequality among internationally active banks" (Basel 2004 §4).[3] The Basel Committee stated that it believed that "the revised framework will promote the adoption of *stronger risk management practices* [author's emphasis] by the banking industry, and views this as one of its major benefits … as it sought to arrive at significantly more *risk-sensitive capital requirements* that are conceptually sound and at the same time pay due regard to particular features of the present supervisory and accounting systems in individual member countries" (Basel 2004 §4).

Since the release of the final proposals in 2004, local banking regulators, such as the Australian Prudential Regulation Authority (APRA), have been expanding on these proposals for financial institutions under their supervision. Originally scheduled to be implemented in 2006, the Basel II regulations finally came into force in several jurisdictions on 1st January 2008.[4] Much, but not all, of the delay in implementing Basel II is related to the difficulties of measuring capital requirements for Credit Risk, which is outside of the scope of this paper, but many of the issues related to measuring Operational Risk Capital have proved difficult to resolve, resulting in, as described later, a less than satisfactory situation for complying institutions.

Under Basel II, the Committee has identified 'Three Pillars' of regulation:

1. *Pillar 1 – Minimum Capital Requirements;*
   Roughly, has a regulated institution sufficient Capital to cover 'unexpected' losses?
2. *Pillar 2 – Supervisory Review;*
   Is Risk being managed properly?
3. *Pillar 3 – Market Discipline;*
   Are Risks being disclosed properly to regulators and the market?

Under Pillar 1 of Basel II, a regulated institution must calculate the 'minimum capital' required to cover losses for each of its Credit, Market and Operational risks and then add them together to arrive at an overall Minimum Capital Requirement.[5] The definition of what exactly constitutes so-called Tier 1, Tier 2 and Tier 3 'capital' for regulatory purposes remains, in essence, unchanged from Basel I and, although of interest to accountants within banking regulated institutions, will not be covered here, but is detailed in local regulations such as Prudential Standard APS 111, published by APRA (2008 - 111).

It should be noted at this point that the Basel II proposals on Operational Risk were not universally endorsed, in particular as to the use of 'capital' as a mechanism for regulatory. Academics, such as Sheedy (1999) and Currie (2005), have argued that the capital proposals could encourage unwelcome distortions in the behaviour of individuals and firms in the financial industry. Future research is needed to identify if these worries are indeed well founded.

Pillar 2 of Basel II describes the "supervisory review process" that clearly links capital to the quality of a firm's risk management and is:

> Intended not only to ensure that banks have adequate capital to support all the risks in their business, but also to encourage banks to develop and use better risk management techniques in monitoring and managing their risks (Basel 2004 §720).

In Basel II, the Committee identifies 'Four Key Principles of Supervisory Review' which clearly articulate the responsibilities of the Board and senior management of an institution for developing policies, procedures, systems and staff to ensure that capital adequacy is 'comprehensively assessed' in relation to the firm's 'risk profile' and that adequacy is regularly monitored and reviewed. The principles also describe how regulators must operate to ensure that firms are embracing these principles.

Pillar 3 of Basel II is labelled 'Market Discipline' but more properly should be termed 'Market Disclosure' as it relates to how risks are reported (Basel 2004 §808):

> [T]o allow market participants to assess key pieces of information on the scope of application, capital, risk exposures, risk assessment processes, and hence the capital adequacy of the institution.

As consolidation, reconciliation and reporting of information to regulators, shareholders and the public is normally the responsibility of a firm's internal accounting function, it is Pillar 3 of Basel II that will impact accountants most. However, without an understanding of Basel II (and here Operational Risk within Basel II) the accounting function will have difficulty fulfilling their statutory, fiduciary and professional responsibilities.

It is interesting to note that Basel Committee does not itself address accounting issues, arguing that it is the role of national regulators to clarify accounting details with national accounting standards setters (Basel 2004 §12):

> The Committee is aware that interactions between regulatory and accounting approaches at both the national and international level can have *significant consequences* for the comparability of the resulting measures of capital adequacy and for the costs associated with the implementation of these approaches….. The Committee and its members intend to continue playing a pro-active role in the dialogue with accounting authorities in an effort to reduce, wherever possible, inappropriate disparities between regulatory and accounting standards.

In practice, this means that accounting issues will be addressed by local regulators, such as APRA and the UK Financial Services Authority (FSA).

This paper aims to assist in this dialogue by identifying some of the difficult, practical issues raised by the Operational Risk Capital regulations of Basel II, highlighting some areas where input and research from accounting could be valuable. It should be noted, however, that this paper considers only Operational Risk issues, and there is a need for research into other impacts of Basel II, in particular for Credit Risk.

3. Basel II and Operational Risk

One of the trickier issues in considering regulation in this area is the definition of Operational Risk, which the Committee eventually agreed as:

> The risk of loss resulting from inadequate or failed internal processes, people and systems or from external events. This definition includes legal risk but not strategic or reputational risk.

Despite the (not insignificant) exclusions, this definition is extremely broad and covers losses that can occur not only across an organisation and also as result of external events, such as a terrorist attack.

While Operational Risk had been recognised as a real risk that needed to be managed before Basel II, its inclusion as a specific risk that requires regulatory capital was, in part, driven by a number of well-publicised events that caused spectacular financial losses, in particular the failure of Barings bank in 1995. The loss of over US$1.4 Billion at Barings can be tracked back to the 'inadequate or failed process, people and systems' within the Basel definition of Operational Risk (McConnell 1998). Subsequently, other significant losses at banks, such as Allied Irish Bank (AIB) and National Australia Bank (NAB), have strengthened arguments for improving the regulation of Operational Risk (McConnell 2003, 2005). The recent 'rogue trading' scandal at Société Générale with losses of over € 4.9 Billion has demonstrated that the problem has not gone away (SOCGEN 2008).

Under Pillar 1, Basel II permits three methods or 'approaches' for calculating operational risk capital charges:

1. *Basic Indicator Approach (BIA);*
2. *The Standardised Approach (TSA);*
3. *Advanced Measurement Approaches (AMA).*

These approaches increase in complexity and the Committee encourages banks to:

> move along the spectrum of available approaches as they develop more sophisticated operational risk measurement systems and practices (Basel 2004 646).

Of the approved methods, the Basic Indicator and Standardised approaches are 'formulaic' where capital is calculated according to (relatively simple) formulae and the AMA where firms are permitted, subject to stringent 'qualitative standards' to develop their 'own model'. Regulators assume that so-called 'internationally active banks' will use the AMA for the bulk of its operations.

During the development of Basel II, practitioners and academics have concentrated their efforts on identifying theories and practical tools for developing compliant AMA models. As noted below however, as Basel II is being rolled-out, there is little consensus on AMA models.

3.1 Basic Indicator Approach

As its name would imply, the BIA is indeed a 'basic' approach to calculating ORRC, based on the average over the previous three years of a fixed percentage of "positive annual gross income". Equation 1 shows the calculation of the capital charge K_{BIA} under the BIA approach (Basel 2004 §649):

$$K_{BIA} = [\Sigma (GI_{1..n} * \alpha)]/n \qquad (1)$$

Where

GI = annual gross income, where positive, over the previous three years;

n = number of the previous three years for which gross income is positive;

α = 15%.

This very simple formula, of course, uses information normally calculated and published by the accounting function, such as 'Gross Income' and hence would naturally fall within the responsibilities of that function.

3.2 The Standardised Approach

The Standardised Approach (TSA) is only marginally more complex than the BIA, based on the average over the previous three years of a simple sum of regulatory capital charges across each 'business line' in the firm, where each 'business line' is allocated a different *Beta* factor. Equation 2 shows the calculation of the capital charge K_{TSA} under the TSA approach (Basel 2004 §654):

$$K_{TSA} = \{\Sigma_{years\ 1\text{-}3} max[(GI_{1..8} * \beta_{1..8}), 0]\}/3 \qquad (2)$$

Where

$GI_{1..8}$ = annual gross income in a given year, for each of the eight business lines;

$\beta_{1..8}$ = is a fixed percentage which relates level of capital to each business line.

Again this relatively simple formula uses information normally calculated and published by an accounting function.

At this point it is worth asking the question - 'What does Basel II define as a business line for Operational Risk purposes'?

3.3 Business Lines and Event Types

Without delving into the rather tortured history of Basel II, it is sufficient to note that the concept of 'business line' arose as a result of a number of so-called Quantitative Impact Surveys (QIS) conducted by the Basel Committee (through national regulators) which collected information about what banks were actually doing about Operational Risk. From those surveys, eight generic Business Lines and seven generic Loss Event Types were identified. Table 1 below shows the official classifications, plus the related Beta factors for Business Lines (Basel 2004 §654 & Annex 7).

From Table 1 we can see that, for example, the Basel Committee considers that the Corporate Finance (18%) is more 'risky' than Asset Management (12%) and hence would incur higher capital charges for Operational Risk according to Equation 2. Needless to say that this assumption is somewhat contentious and remains to be tested by detailed research (see sidebar 'Operational Risk Measurement' below).

It should be recognised that few firms will, in practice, be organised into the neat eight business lines identified by Basel II, and hence a mapping process must be adopted. Basel II lays out "several principle for business line mapping", but ultimately any mapping must be performed according to the internal organisation reflected in the firm's Chart of Accounts.

Basel II - Business Lines	Beta Factors	Basel II - Loss Event Types
Corporate finance	18%	Internal Fraud
Trading and sales	18%	External Fraud
Retail banking	12%	Employment Practices and Workplace Safety
Commercial banking	15%	Clients, Products & Business Practices
Payment and settlement	18%	Damage to Physical Assets
Agency services	15%	Business disruption and system failures
Asset Management	12%	Execution, Delivery & Process Management
Retail brokerage	12%	

Table 1: Basel II Classifications - Business Lines and Loss Event Types

Problems will obviously arise if income has to be split between business lines, giving rise to reports for different purposes that are difficult to reconcile and to explain, for example in allocating capital.

3.4 The Alternative Standardised Approach

Sensitive to the charge that there is no obvious link between Gross Income and a capital charge for Operation al Risk, either across the firm (i.e. BIA) or by business line (TSA), the Basel Committee permitted national regulators to allow banks to use a so-called Alternative Standardised Approach (ASA), where 'asset size' is used rather than gross income for two business lines, specifically Retail and Commercial Banking. The precise definition of assets (nominally loans and advances) will be determined by national regulators, such as APRA, (Basel 2004 footnote 97).

However, national regulators have not only taken the opportunity to identify what constitutes 'assets' but also to change slightly the formula recommended by the Basel Committee, and jurisdictions have diverged on the precise definition of an ASA. Equation 3 shows the calculation of the capital charge K_{SA} under the ASA mandated by APRA (2008 - 114):

$$K_{SA} = \Sigma_{t=1-6} (.12 * m * LAR_t)/6 + \Sigma_{t=1-6} (.15 * m * LAC_t)/6 + \Sigma_{t=1-6} max [(.18 * AGI_t)/3 \quad (3)$$

Where

LAR_t = = total gross outstanding loans and advances for the *Retail* banking area of business measured at the end of each financial year and half-year (i.e. 6 periods);

LAC_t = = total gross outstanding loans and advances for the *Commercial* banking area of business;

AGI_t = adjusted gross income earned over each six month period; and

m = .035.

It should be noted also that APRA applies this formula to *all* its regulated banks[6] not using an AMA - i.e. APRA does not sanction a BIA approach for local banks.

The rather convoluted Equation 3 states no more or less than a factor of .035 is applied to total Loans and Advances for the retail and commercial business lines, adjusted by the relevant Beta factor, and for *all other* lines a factor of 18% is applied to positive 'Adjusted Gross Income' for those business lines. All balances are averaged over six half-yearly periods to arrive at a total capital calculation.[7]

Although slightly more complex, the ASA formula uses information that would normally be calculated and published by the accounting function and, in practice, it is difficult to identify which other function in a regulated firm could calculate the components of this formula other than accounting. Furthermore, APRA (2008-114) specifically requires banks to reconcile the capital calculated in these formulae against its audited financial statements.

The calculation of operational risk capital using the BIA, TSA or ASA methods, therefore, would/should naturally fall within the responsibilities of the accounting function in a Basel regulated institution.

Operational Risk Measurement

Equation 3 neatly demonstrates some of the trickier issues in measuring Operational Risk under Basel II. In considering just the first term in the equation, the ORRC for 'retail banking' is a function of 'Loan and Advances'. While this may indeed be so, could Operational Risk not equally likely be related to numbers of staff, branches, customers, transactions, ATMs etc. or to the quality of a bank's systems, staff training, fraud detection? Furthermore, it is improbable that the relationship would be purely linear and a factor of exactly .42% (i.e. .12*.035)?

3.5 Advanced Measurement Approaches

Put simply, an Advanced Measurement Approach allows banks, with sophisticated risk management capabilities, to calculate Operational Risk capital using their own 'internal model'. However, to qualify to use their own models, firms must meet stringent 'quantitative' and 'qualitative' standards and be approved by their national regulator. In developing the standards, however, regulators appear to have set the compliance bar extremely high - possibly unnecessarily so and probably unachievable.

Before considering 'quantitative standards' in detail, it is worth noting the major 'qualitative standards' mandated in Basel II (Basel 2004 §666):

> The bank must have an *independent operational risk management function* that is responsible for the design and implementation of the bank's operational risk management framework. …

> The bank's internal operational risk measurement system must be … an *integral part of the process of monitoring and controlling* the bank's operational risk profile (the so-called 'use test')
>
> There must be *regular reporting of operational risk exposures and loss experience* to business unit management, senior management, and to the board of directors. …
>
> Internal and/or external auditors must perform *regular reviews* of the operational risk management processes and *measurement systems*.

While such standards provide the rationale for the creation of a new organisational function - Operational Risk Management (ORM) - with which the accounting function must interact, the standards also mandate processes, such as 'controlling', 'reporting' and 'measuring', that are often associated with an accounting function. At the very least, in a Basel-regulated institution, a 'modus operandi' must be negotiated between new ORM function(s) and accounting function.

It is, however, the 'quantitative standards' of Basel II where interactions between ORM and accounting are less well understood. The major 'quantitative standards' for a compliant AMA include (Basel 2004 §667-676):

- "A bank must be able to demonstrate that its *operational risk measurement model* meets a *soundness standard* comparable to a one-year holding period and a *99.9 percent confidence level*;
- A bank's operational risk measurement model *must*:
  - » Capture an appropriately *robust set* of operational risk-related events that can lead to *severe and rare* operational risk losses.
  - » Be sufficiently granular: to capture the major drivers of operational risk affecting *the shape of the tail* of the bank's operational *loss distribution*.
  - » Be sufficiently comprehensive: to capture *all material* sources of operational risk across the bank.
  - » Include the use of *internal data*, relevant *external data*, *scenario analysis* and factors reflecting the *business environment and internal control systems*."

There are also several other technical requirements that make compliance difficult, as described later.

It is the need to calculate capital to cover 'severe and rare' losses at a 99.9% confidence interval (i.e. a 1 in 1,000 year event) that has caused the most difficulty for firms attempting to qualify for use of an AMA internal model. Some of these practical problems achieving these quantities standards are discussed below.

3.6 Capital Allocation and Economic Capital

Having calculated the minimum regulatory capital required to cover Operational Risk, using either formulae or an AMA, there is usually a management imperative to reflect the cost of that capital in business line budgets and profitability calculations. Basel II raises several questions in this respect.

Having calculated capital using a simple BIA approach, which formulae should be used for allocating the resulting total to business lines? For example should 'Gross Income' by business unit be used as in the BIA formula and, if so, how should negative GI be handled? If Gross Income is not used, which method should be employed? On the other hand, if a Standardised or Advanced Standardised Approach is used, should the Beta factors, as laid down by Basel II, be used also for allocating total regulatory capital? To do so, implies that the firm's internal measures of relative 'riskiness' are the same as those determined by the Basel Committee, if not, which methods should apply?

For a firm aspiring to gain the capital benefits of an AMA, there is a specific requirement that its measurement system must (Basel 2004 §665):

> Be capable of supporting an *allocation of economic capital* for operational risk across business lines in a manner that creates incentives to improve business line operational risk management.

The introduction of 'economic capital' (as the only reference to this complex topic in the Basel II Operational Risk standards) raises many difficult issues, not least, should the same model be used for calculating regulatory and economic capital and if so, which confidence interval should be used?[8]

A discussion of Economic Capital and its uses in creating incentives to manage risk is outside the scope of this paper, other than to note that the issue must be addressed during the implementation of an AMA in a regulated institution, ideally within a formal comprehensive firm-wide RAPM (Risk Adjusted Performance Management) methodology.

3.7 Expected and Unexpected Losses

During the development of Basel II for Operational Risk, the Committee's focus was on calculating capital to cover Unexpected Losses (EL), to a confidence level of 99.9%, and Expected Losses (EL) were not specifically considered in the 2004 publication. However, this raised the obvious question of where exactly is the boundary between EL and UL for Operational Risk.[9] This issue is being addressed by national regulators (prompted by the Basel Committee) as for example by APRA (2008-114):

> [The AMA] must cover expected losses (EL) and unexpected losses (UL) unless the [bank] can demonstrate that it has **adequately measured and accounted for** EL in its business practices by way of EL offsets.

APRA specifies stringent conditions for such EL offsets, including, being "used to support the management of the business including being **systematically budgeted** and considered in **pricing of related products** and services", clearly a requirement that involves some input from accounting.

3.8 Basel II Implementation

Basel II was developed by an international committee, comprising the major national regulators in G10 countries, with input from major financial institutions around the world. It is little surprise then that the end result is (overly?) complex and that many issues, particularly with the AMA approach to Operational Risk, remain to be resolved during implementation. Many of these unresolved issues relate to disclosure of

information where the detail is being fleshed out by national regulators, in line with other reporting requirements.

Before discussing reporting, however, it is worth summarising the current state of Basel II implementation, with respect to Operational Risk. Since BIA and TSA approaches are relatively simple it is no surprise that much of the effort has concentrated on bank's development of AMA approaches.

4. Basel II Implementation

4.1 Loss Distribution Approach

Although the first working paper on Operational Risk was released in 2001 by the Basel Committee (Basel 2001), a lot of discussion in the industry had already preceded its publication. There is, as a consequence, some 10 years worth of academic literature on the subject. However, over time, thinking has evolved and a number of major threads have emerged and it is not necessary to give a complete history here. Jobst (2007) provides an excellent overview of the development of the Basel II regulations on Operational Risk and describes some of the major theories that are being considered.

Although not specifically recommended (nor discouraged) by regulators, the banking industry has promoted what has been called the Loss Distribution Approach (LDA) for complying with the requirements for an AMA.[10] In essence, with an LDA, operational losses (collected from internal data) are co-mingled with external data (after appropriate 'scaling') and expert assessments/guesses (from 'scenario analysis') to form a statistical distribution from which the 99.9th percentile value is estimated. Note that some parts of such analyses are quantitative while others are purely qualitative.

It is a 'stylised fact', detected in the results of one of the first Quantitative Impact Studies - QIS2 - and reinforced by later research (Moscadelli 2004 and Jobst 2007) that statistical distributions of Operational Losses are 'heavy tailed', that is, typically there are very many small to medium sized losses but only a few large losses. However, in statistical terms, it is these 'severe and rare' losses that dominate the distribution and have the major influence in the calculation of Operational Risk Capital.

4.2 Extreme Value Theory

The most popular approach to developing an LDA in the industry has been 'Extreme Value Theory', or EVT, using theories and actuarial techniques that are widely employed in the insurance industry. EVT is supported by well-developed statistical theories that, as the name suggests, can be applied to modelling certain types of "extremal events" (Cruz 2002, Embrechts et al., 2003, DeFountnouvelle et al., 2003, Chernobai et al., 2006).

In essence, using an EVT approach involves isolating the large losses, in the 'tail' of the distribution, and estimating the 'shape' of this tail distribution, from which a 'Value At Risk' (VAR) at the required confidence interval can be approximated. Herein, lies a real problem - good estimations of the 'shape' of the tail distribution and the Basel requirement for a very high confidence interval (99.9%) requires a significant amount of data. In practice, firms do not have that many large losses - severe losses really are very rare.

4.3 Industry Experience

As part of the preparation for Basel II, the Accord Implementation Group's Operational Risk subgroup (AIGOR) of the Basel Committee, released the results of a study on the progress being made by the world's largest banks towards developing AMA approaches. The study reported that (AIGOR 2006):

- There is a "*paucity*" of internal loss data "relative to what is required to reasonably assess bank's operational risk profile";
- *No bank* has developed a workable methodology for 'scaling' external data;
- Most banks have not "undertaken *sufficient statistical or other analysis* to justify their assumptions", merely justifying their choice of distributional assumptions based upon the (poor level of) data available;
- Banks with similar risk profiles could "hold *different levels of capital* if they rely on substantially *different modelling and assumptions*".

In short, there is little evidence of any consistency in approach to calculating ORRC in banks across the world. Furthermore, as banks are entering the new Basel II reporting environment there is little in the way of theory and practice that can be used to compare Operational Risk management practices between firms.

More worryingly, the AIGOR report also concluded that:

> Volatility of capital allocated to business lines, resulting from *changes in underlying assumptions*, could undermine the '*internal credibility*' of risk calculation and allocation methodologies.

In essence, this means that it is proving very difficult to explain the results of Operational Risk models, and their sensitivity to assumptions, to non-professional business line managers. How much more difficult will it be then to explain these results to external parties, including regulators, shareholders and rating analysts? Clearly this is a less than satisfactory situation to be in, and one in which accountants will inevitably be drawn into.

4.4 Data Management

Under Basel II, firms are required to record all 'operational losses' in a so-called Loss Event Database, which is used as part of risk analysis and capital calculation.[11] AIGOR also reported some disconcerting findings concerning the management of operational loss data, specifically the 'patchiness' as regards reconciling operational losses used for calculating capital against the general ledger - some banks do and some don't (AIGOR 2006). While such inconsistencies raise serious questions about the accuracy and comprehensiveness of the underlying data from which operational risk figures are reported, the reasons are, somewhat, understandable, given the lack of specific detail in Basel II:

- *Valuation*: when considering operational losses, for example of equipment/premises due to a fire, various valuation methods, e.g. book, market or replacement, may be used to crystallize the losses. This may not

reconcile easily to valuations on the existing general ledger;

- *Loss Collection Threshold*: for efficiency, many firms only record losses above a so-called 'de minimis' threshold, typically set at $10,000. It becomes difficult then to reconcile this subset of losses against any general ledger category which co-mingles losses above and below the chosen threshold;
- *Recoveries*: for Basel II, only net losses, after recoveries, are used for capital purposes. For example, in the event of a theft by an employee (internal fraud) the loss may be booked as experienced but then adjusted by any insurance receipts. In order to reconcile, therefore, losses and related recoveries must be linked in the general ledger;
- *Organisational Mapping*: for Basel II, losses must be mapped into the 8*7 matrix of Business Line and Loss Event Type. However, if a Chart of Accounts structure does not support such a structure, reconciliation will be difficult;
- *Loss Allocation*: some losses, such as those due to an equipment failure, will impact multiple business units and must be allocated across those business lines (and event types if appropriate). Again it may be to difficult to link information about a single loss to its constituent parts within a general ledger structure;
- *Other Issues*: there are a number of other practical issues that make reconciliation difficulty, such as 'booking' versus 'actual' date of the loss.

Since the calculation of minimum regulatory capital (and economic capital if appropriate) ultimately depends on the quality of data captured, strict control policies and procedures must be put in place to ensure information is reported correctly to regulators and shareholders. This is an area where an accounting function, which normally controls regulatory reporting, should get involved.

4.5 Reporting

While Pillar 3 - Market Discipline/Disclosure - was far from an afterthought in Basel II, specific detail was left to national regulators to work through with national and international accounting standards bodies. With respect to Operational Risk, Basel II provides little details as to the level or content of reporting required but does articulate some general principles on topics such as materiality, frequency, confidentiality etc. (Basel 2004 §808-819). For all risks, including Operational, Basel II requires several general 'qualitative disclosures' concerning a firm's "risk management objectives and policies", including (Basel 2004 §824):

- "Strategies and processes;
- The structure and organisation of the relevant risk management function;
- The scope and nature of risk reporting and/or measurement systems;
- Policies for hedging and/or mitigating risk and strategies and processes for monitoring the continuing effectiveness of hedges".

For Operational Risk, there are no mandated 'quantitative disclosures', but there are a number of additional qualitative standards (Basel 2004 §826- Table 11), including descriptions of:

- The approach used, i.e. BIA, TSA or AMA;
- Details of the AMA measurement approach if relevant; and
- Insurance used as Operational Risk mitigants.

In its prudential standard on the Public Disclosure of Prudential Information, APRA additionally requires a statement of the "Capital requirement for Operational Risk", i.e. the calculated ORRC (APRA 2008 - 330).

Since such disclosures are normally collated, validated and communicated by accounting functions, there is an obvious need, at a minimum, for understanding of the numbers, methods and assumptions used and, ideally, for validation that the figures are compatible with the firm's normal accounting standards as to accuracy, timeliness and comprehensiveness.

As a consequence, reporting will be the entry point for involvement of accounting in the Operational Risk measurement process.

5. Opportunities for Research

As a new discipline, there are many opportunities for research in Operational Risk, not least in the thorny area of risk measurement. While theoretical and practical research into useful measurement techniques will continue in Finance and Statistics, there is also a need to do research into issues related to the practical implementation of the Basel II regulations, not least from an accounting perspective.

The potential areas for research identified below address some of the, many, questions that have been posed as regards implementation of the new regulations:

i. Operational Risk Capital

a) What is the 'role' of Operational Risk Regulatory Capital (ORRC), both across the industry and within a firm?

b) What should ORRC cover as regards 'Expected Losses' and 'Unexpected Losses'?

c) What is the 'cost' of ORRC and how should it be allocated to business lines?

d) What is the role of Economic Capital for Operational Risk and how should it be calculated?

e) How should operational risks that are explicitly excluded in Basel II, such as strategic risk, be incorporated in any capital regime?

f) How should ORRC be aggregated with other capital requirements, e.g. is there any diversification benefits?

ii. Organisation

a) What is the role of accounting in measuring and reporting on Operational Risk?

b) How should the accounting function interact with the new Operational Risk Management functions? In

particular, should accounting be solely responsible for calculating ORRC where a formulaic method is used (e.g. as in the Standardised Approach)?

c) What is the role of accounting in assuring the Board and shareholders that the numbers underlying Operational Risk reports are 'correct'?

d) What is/should be the relationship between the CFO and the CRO (Chief Risk Officer)?

v. Operational Risk Measurement

a) What are Operational Risk losses and how should they be reflected in a firm's Chart of Accounts?

b) How should 'near-misses' and external Operational Risk losses be reflected in a firm's Chart of Accounts, or elsewhere?

c) How should accounting engage in the Operational Risk measurement debate, especially if the accounting function is required to assure stakeholders that the models used for capital calculation are 'valid'?

d) What is the role of accounting in the mandatory qualitative aspects of Operational Risk measurement, such as Scenario Analysis and risk assessment of Business Environment and Internal Control Factors?

v. Disclosure

a) What should Operational Risk reports contain, from both a quantitative and qualitative perspective?

b) How should a firm communicate the complex topic of Operational Risks to interested stakeholders, especially with respect to 'severe and rare' events?

c) What is the role of accounting in collecting and/or reconciling information gathered for Operational Risk reports?

d) What is the role of accounting in validating models used to calculate figures used in Operational Risk reports?

The list of potential research opportunities above is not exhaustive but illustrates several areas in which practical applied accounting research could add value in the implementation of Basel II.

6. Conclusion

During the development of the new Basel II regulations on Operational Risk, it was recognized that many of the practical issues relating to the implementation of the regulation would, by necessity, have to be left to national regulators. In particular, how to account for and report on Operational Risks, within the principles set in Basel II, are issues that remain to be fleshed out. This paper is a contribution to debate in these areas.

First the paper summarised the goals of the Basel II regulations and then described the key proposals on Operational Risk, in particular the calculation of Operational Risk Capital. The paper then summarised the state of Basel II, with regard to Operational Risk, as at its formal introduction in January 2008, concluding that many issues, not least how to quantify Operational Risk, remain unresolved. Finally, the paper identified areas where research into accounting for Operational Risk could prove valuable.

Development of regulation in the area of Operational Risk has already taken considerable time, and many issues remain unresolved. There is a particular need for the accounting profession to take a pro-active role going forward and the paper argues that, in some circumstances such as capital allocation and reporting, accounting should be the lead function/agency.

* **Author contact details:**
Patrick J McConnell
Visiting Fellow, Macquarie Applied Finance Centre
Macquarie University
North Ryde NSW 2109
AUSTRALIA

Notes

1 The BIS is not itself a regulatory body but its rules are applied by G10 countries to regulate major banks and used by most of the rest of the world as a regulatory standard.

2 It should be noted that in 2006 the Basel Committee published a 'comprehensive' version of its 2004 document, which included some additions for Credit Risk only, and hence is not relative to this paper.

3 When the 2004 Basel regulations are referenced in this paper, the clause number is prefaced by the section symbol, e.g. (Basel 2004 §666).

4 While Europe, Australia and Japan have adopted Basel II in 2008, implementation in the US and many Asian jurisdictions have been delayed for a number of years. However, all major regulators have affirmed their intention to adhere to the Basel II Accord.

5 In should be noted at this point that the 'comprehensive' version of Basel II, is over 330 pages long with over 800 jargon-laden clauses, and hence is difficult to summarise in a paper such as this.

6 APRA uses the term Authorised Deposit-taking Institution (ADI) for a bank and excludes some branches of foreign banks from having to use the ASA.

7 In a quirk of Basel II, capital charges calculated under all ORRC methods are multiplied by a factor of 12.5 to arrive at a so-called 'risk weighted asset' (RWA) for no other reason than, under both Basel I & II, aggregated RWA are multiplied by a fixed factor of 8% (1/12.5) to arrive at a minimum capital number.

8 The issue of which confidence interval to use for economic capital (often 99.95%) is problematic because of the technical problems of calculating capital at the much lower regulatory level of 99.9%

9 In the Basel II treatment of Credit Risk, Expected Losses are well understood as they relate to historical Credit Loss experience, less so in the new area of Operational Risk.

10 It should be noted that in the initial Basel II working paper (Basel 2001), the use of an LDA was supported and described in some detail. However, in the final Basel II regulations (Basel 2004), all references to an LDA approach were removed.

11 To qualify to use an AMA, banks must maintain at least 5 years of 'internal data' on operational losses.

References

AIGOR (2006) "Observed range of practice in key elements of Advanced Measurement Approaches (AMA)" Basel Committee - Accord Implementation Group Operational Risk sub-group, October 2006

APRA (2008-111) " Prudential Standard APS 111 Capital Adequacy - Measurement of Capital", Australian Regulatory Prudential Authority, January

APRA (2008-114) " Prudential Standard APS 114 Capital Adequacy - Standardised Approach to Operational Risk", Australian Regulatory Prudential Authority, January

APRA (2008-330) " Prudential Standard APS 330 Capital Adequacy - Public Disclosure of Prudential Information", Australian Regulatory Prudential Authority, January

Basel (2001) "Working Paper on the Regulatory Treatment of Operational Risk", Basel Committee on Banking Supervision. September

Basel (2004) "International Convergence of Capital Measurement and Capital Standards - A Revised Framework", Basel Committee on Banking Supervision. June

Chernobai, A., & Rachev, S.T. (2006) "Applying Robust Methods to Operational Risk Modeling" Tech. rep., University of California Santa Barbara.

Cruz M. G. (2002) Modelling, Measuring and Hedging Operational Risk, Chichester: Wiley

Currie, C.V. (2005) "A test of the Strategic Effect of Basel II risk requirements on Banks" University of Technology Sydney: Business - Working Paper 143.

DeFontnouvelle P., DeJesus-Rueff V., Jordan J. & Rosengren E. (2003) "Using Loss data to quantify Operational Risk", Federal Reserve, Boston

Embrechts P., Furrer H. & Kaufmann R. (2003) "Quantifying Regulatory Capital for Operational Risk", ETH Zurich

Jobst, A. (2007), "Constraints of Consistent Operational Risk Measurement and Regulation: Data Collection and Loss Reporting". Journal of Financial Regulation and Compliance, 2007

Mc Connell P. J. (1998) "Barings: Development of a Disaster International". Journal of Project and Business Risk, Vol. 2 Issue 1 pp. 59-74.

Mc Connell P. J. (2003) " AIB/Allfirst – Development of another Disaster", Henley Working Paper Series, Henley Management College

Mc Connell P. J. (2005) "NAB – Learning from Disaster", Henley Working Paper Series, Henley Management College

Moscadelli M. (2004) "The modeling of operational risk: experience with the analysis of the data collected by the Basel Committee", Bank of Italy WP 517

SOCGEN (2008) "Progress report of the Special Committee f the Board of Directors of Société Générale", Société Générale February 2008

Sheedy, E. (1999) "Applying an Agency Framework to Operational Risk Management" Applied Finance Centre, Macquarie University. Working Paper 22