Modelling Operational Risk Capital -
The Inconvenient Truth

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Abstract
Since 2008, over $200 billion of Operational Risk losses have been incurred by large banks, mainly as a result of regulatory fines, lawsuits and demands for customer redress for various types of misconduct. A basic assumption underlying the modelling of Operational Risk Regulatory Capital (ORRC) under Basel II, is that such operational risk losses can be modelled as being idiosyncratic to an individual institution, as this is the (micro-prudential) level at which banks are currently regulated. This paper challenges that assumption and shows that it is an ‘inconvenient truth’ that the largest losses by banks are not firm specific. Instead the largest losses involve multiple banks being fined at the same time by multiple regulators for the same types of misconduct. In this paper, such large multi-bank incidents are called Systemic Operational Risk Events and it is argued that, in addition to the firm level, ORRC should also be modelled at the ‘systemic’, or macro-prudential, level. The paper also discusses arguments made by academics against current approaches taken to modelling ORRC and finally makes a suggestion to the Basel Committee that, similar to the current review being undertaken for Market Risk, a comprehensive Fundamental Review be undertaken for Operational Risk.

Keywords
Operational Risk Regulatory Capital, Systemic Risk, Systemic Operational Risk LIBOR, Foreign Exchange Benchmark Manipulation
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Introduction

In 2015, the fundamental assumptions that underlie the estimation of Operational Risk Regulatory Capital (ORRC) are being questioned. In late 2014, the Basel Committee for Banking Supervision (BCBS) issued a consultation paper on “revisions to the simpler [i.e. standardised] approaches” for estimating ORRC, with the rationale that

“Despite an increase in the number and severity of operational risk events during and after the financial crisis, capital requirements for operational risk have remained stable or even fallen for the standardised approaches. This indicates that the existing set of simple approaches for operational risk [...] do not correctly estimate the operational risk capital requirements of a wide spectrum of banks [emphasis added]” (BCBS 2014).

The fundamental reason for this incorrect estimation has been well-known for some time. The estimates are based on Gross Income (GI) as a proxy indicator for operational risk exposure, which in turn is based on the assumption that “banks’ operational risk exposure increases linearly in proportion to revenue”. However,

“This assumption usually turns out to be invalid. In particular, where a bank experiences a decline in its GI due to systemic or bank-specific events including those involving operational risk losses, its operational risk capital falls when it should be increasing. Moreover, the existing approaches do not take into account the fact that the relationship between the size and the operational risk of a bank does not remain constant or that operational risk exposure increases with a bank’s size in a non-linear fashion [emphasis added]” (BCBS 2014).

In their review the BCBS identified, from their analysis of historical losses, a new proxy for operational risk, the “Business Indicator” (BI) which comprises three components of a bank’s income statement: the “interest component”, the “services component”, and the “financial component” (BCBS 2014). The Committee proposed a new ‘simpler’ Standardised Approach (SA) to estimating ORRC, using the BI as a ‘bucketed’ or ‘tiered’ indicator of capital, with capital rising progressively in bands as BI increases. BCBS (2014) stated that the new SA is

“based on the statistical methodology of the LDA [i.e. Loss Distribution Approach], which banks commonly use in their AMA [i.e. Advanced Measurement Approach] models for estimating operational risk regulatory capital. However, where necessary, further techniques and principles from the field of actuarial science were used”.

It is estimated that use of this new SA approach could increase the ORRC for the largest banks by over 50% (PWC 2014). Importantly, by using data from multiple banks across the system and mandating an approach based on that systemic analysis, the BCBS is taking a small step towards a ‘macro-prudential’ approach to regulation.

It is not the purpose of this paper to discuss this new SA approach, except to note that many of the industry bodies that responded to the consultation1 were not supportive of the new approach, citing a number of deficiencies, which may be summarised by the response of the Institute of Operational Risk (IOR) to the consultation request

1 Comments on the Consultation have been published on http://www.bis.org/publ/bcbs291/comments.htm
“The proposed approach, which resolves the income component to General Income and adds a further component relating to a firm’s size, adds little, in our view, either to validity or credibility, yet introduces additional complexity and potentially significant costs of compliance to implement the new approach. We believe that policy makers and supervisors should focus their efforts on raising the standards of operational risk management within the industry, rather than focusing on changing the maths [emphasis added]” (IOR 2015).

Nor is the Standardised Approach (SA) to estimating ORRC the only approach that has been criticized. The Advanced Measurement Approach (AMA) requires banks to request approval to use their ‘own’ models, typically LDA models, to estimate ORRC (Basel 2004). However it has been found, because of the scarcity of data, that such models produce ORRC estimates that are ‘unstable’ because the models typically employed are “fragile”, being heavily dependent on the data selected for analysis (Ames et al 2015, Zhou et al 2014). As Ames et al (2015) noted

“Pertinent data are sparse and models of operational risk tend to be extremely sensitive and fragile to anomalies common in historical loss data. And ironically, these internal models, fully intended to help manage risk, have actually created a significant new uncertainty [i.e. model risk] for banks [emphasis added]”.

Ames et al (2015) and Zhou et al (2014) discuss the reasons for the fragility of current modelling techniques, recommending that, because usable data is so scarce, regulators should relax the soundness standard criteria demanded by Basel II (i.e. 99.9% confidence level over a 1-year horizon). Having investigated several methods of improving models, such as “imposing an upper bound on a single loss”, Zhou et al (2014) conclude that

“Although the effort in improving utilization of loss data information should be continued, by noting the insurmountable difficulties caused by data sufficiency or data quality issues, and the “limited” improvement by alternative approaches, we suggest that risk managers and regulators should reconsider the importance of LDA or how it is applied in the capital planning process [emphasis added]”.

As these issues have been very well-documented and addressed by, among others, Cope et al (2009), Opdyke and Cavallo (2012) and Zhou et al (2014) it is not the purpose of this paper to add to these critiques. Instead this paper, as a contribution to the debate on changing regulations around approaches to estimating ORRC, will consider some of the underlying assumptions to current approaches especially related to “the increase in the number and severity of operational risk events during and after the financial crisis” identified by the BCBS (2014). In particular, the paper will question the assertion made by the Institute and Faculty of Actuaries (IFOA) in its (generally unsupportive) response to the BCBS consultation

“We would also emphasise that operational risk tends to be idiosyncratic, i.e. very specific to individual firms, with different banks having different exposures and levels of control. […] The idiosyncratic nature of the risk makes the implementation of an effective standardised approach challenging since often too much, or too little, capital will be held at a desired confidence level for a specific bank’s risks [emphasis added]” (IFOA 2015).
The paper argues that the largest Operational Risk losses experienced by banks in the past five years are NOT idiosyncratic but are the result of fines imposed on multiple banks by multiple regulators at roughly the same time for the same misconduct. Since it is the largest losses that dominate estimations of ORRC, the paper argues that these ‘systemic operational risk events’ should be explicitly recognised in any new regulations. In particular the paper demonstrates that the largest of these losses are incurred by the world’s largest and Systemically Important Banks (SIBs) and, as with credit and liquidity risks, this concentration should be considered in any revision of ORRC rules.

After discussing a number of Operational Risk Loss Databases, the paper analyses a number of specific cases of so-called Systemic Operational Risk Events (SOREs), such as LIBOR and the mis-selling of mortgages prior to the GFC. The paper then discusses some of the problems of modelling this loss data, in particular, how some of the standard modelling assumptions, such as ‘stationarity’, are not applicable to these large losses. After discussing the topic of accounting provisions and their relationship to operational risk losses, the paper makes a proposal for a ‘Fundamental Review of Operational Risk’, similar to that already underway for Market Risk (BCBS 2014c).

Systemic Risk

The capital adequacy requirements of Basel II are designed to achieve (at least) two purposes: first to minimize the possibility of failure of an individual bank; and second to minimize the threats to the stability of the financial system as a result of the failure of an individual bank - so-called ‘systemic risk’. Gordy and Heitfield (2009) identify the link between systemic risk and capital adequacy regulations, in particular Basel II:

“Bank solvency regulation is intended to reduce systemic risk and deadweight loss associated with bank failures, and to address moral-hazard problems arising from implicit or explicit government guarantees that interfere with effective market discipline. Bank supervisors in most countries impose minimum capital adequacy standards on banks as an important component of banking regulation”.

The Basel II regulations of 2004 introduced the concept of Minimum Capital Requirements (MCR) for Operational Risks concentrating on the ‘micro-prudential’ dimension of those risks. The events of the Global Financial Crisis (GFC), however, have highlighted the need for regulators to consider systemic risks and much of the set of regulations known as Basel III (BCBS 2010) address systemic risk through macro-prudential measures. However, the systemic or macro-prudential dimension of Operational Risk has not yet been considered to any extent by regulators. This paper questions that stance and argues that, in addition to bank-level supervision, there is an important systemic dimension to Operational Risk that should be addressed by regulators (McConnell and Blacker 2013).

Following the GFC, academics, such as Schwarcz (2008, 2011) and regulators, such as the Financial Stability Board (FSB 2009), have begun to reconsider the concept of systemic risk, expanding from a traditional definition based on a ‘domino model’ of credit defaults to one that encompasses concepts such as ‘interconnectedness’ and ‘networks’. One of the major new concepts developed is that of the Systemically Important Financial Institution (SIFI), sometimes known as the ‘Too Big To Fail’ bank (FSB 2009). In Basel III (Basel 2010), regulators have developed new rules on capital adequacy including additional capital for SIFIs and introducing new capital adequacy requirements for ‘liquidity risk’.
Operational Risks were at the heart of some of the events leading up to the GFC and, as Cruz et al (2015) note, the consequences were felt by multiple firms at the same time:

“As an effect of the great financial crisis of 2008, **most large financial firms were sued by clients for many reasons**, for example, because mortgages were irregularly granted or funds in large asset management were unduly keeping mortgage-backed securities and, therefore, **suffered large financial losses in the post crisis** [emphasis added].”

The Global Financial Crisis was by any measure a Systemic Risk event, that had multiple root causes and multiple consequences but one that did not follow a simple ‘domino’ model of ‘credit contagion’ (Bessis 2002). Tarullo (2012) identifies the 'domino effect' as just one of four ways "how distress in a financial firm can create risks to overall financial stability", the others being: a system wide ‘fire sale’ of assets to obtain liquidity; alternatively the “contagion effect”, whereby market participants conclude from one firm's distress that “other firms holding similar assets or following similar business models are likely themselves to be facing similarly serious problems”; and lastly failure of essential infrastructure, such as a Clearing Counterparty (CCP).

As the complex events of the GFC have been analysed, the concept of systemic risk has been expanded but as yet no consensus definition of systemic risk has emerged (IMF 2010, Besar et al 2009). Proposed definitions range from the total failure of the entire financial system to a "chain of significant losses to financial institutions" (Schwarcz 2008). For the purposes of this paper, the definition by Schwarz (2008) will be used as it reflects events, such as the GFC, without attributing root causes to such events, merely that there were large losses that were linked in some way.

Even though the Financial Crisis Inquiry Commission, which was set up to investigate the events of the GFC (FCIC 2011), concluded that the events were ‘manmade’ and hence essentially resulting from Operational Risks as defined by Basel II, regulators have not yet considered the systemic impact of Operational Risks post-Basel II (McConnell and Blacker 2013). Nor is the GFC the only situation where there is a “chain of significant losses” to banks, as for example with the LIBOR and PPI scandals. This paper discusses a number of such system-wide events, here called Systemic Operational Risk Events (SOREs).

**Operational Risk Loss Data**

**Operational Risk Loss Databases**

In June 2015, the Conduct Cost Project (CCP 2015) released its annual analysis of “conduct costs” and concluded that costs, for the 16 large banks in the survey in the period 2010 to 2014, totalled over £ 205 billion (some $ 300 billion). Of this total some £160 billion related to ‘conduct costs’, such as fines and agreed settlements for redress and a further £ 45 billion as associated provisions and contingent liabilities. The CCP database also contains extensive qualitative information on the losses that have been captured, which Ames et al (2015) argue is necessary for undertaking sound Scenario Analysis.

In a different analysis of operational losses, the 2014 annual summary from the Operational Riskdata eXchange Association (ORX) reports Gross Operational Losses for the period
2008 to 2013 as totalling over €133 billion (some $150 billion). The ORX summary (ORX 2014) notes that some $93 billion of this total is attributable to the Basel II Loss Event Type Level 1 category ‘Clients, Products & Business Practices’ (CPBP) which is described as (BCBS 2004 Annex 7)

“Losses arising from an unintentional or negligent failure to meet a professional obligation to specific clients (including fiduciary and suitability requirements), or from the nature or design of a product”.

The CPBP category is by a long way the largest group of losses in the ORX summary, accounting for over 60% of Gross Losses in the ORX database (ORX 2014).

Although the CCP costs are equivalent to the ORX category of CPBP, it is not possible to compare the ORX total ($93 billion) with the CCP total ($320 billion) for several reasons, not least:

- Different Periods: CCP includes losses for 2014, which will be available in the 2015 ORX report; it should be noted that both databases show a rising level of losses in the latter periods, mainly as a result of the regulatory fines discussed in the paper;
- Different Banks: while ORX reports data collected from some 60 banks, CCP analyses publicly available data from 16 of the world’s largest banks;
- Different Sources: while ORX collects self-reported and deliberately anonymised data submitted by its member banks, CCP relies on public sources, such as annual reports and regulatory announcements;
- Provisions and Contingent Liabilities: whereas ORX collects losses that have been realised and accounted for in a member bank’s accounts (as required by Basel II), CCP also collects data on provisions and contingent liabilities, or likely losses in future.

Using a large database of operational risk loss events reported by US banking organisations to the US Federal Reserve for stress testing purposes, Abdymomunov (2014) also identified the predominance of CPBP events in that database

“CPBP event type losses have very heavy-tailed distributions for most banks and it is the event type category with the largest share of losses in the entire industry. CPBP event type comprises 72% of the total industry losses in our sample. The large losses in this category are mainly litigation losses [emphasis added]”

It is not the purpose of this paper to attempt to reconcile these very different numbers not least because (quite properly given the anonymity guaranteed to its members) ORX does not provide individual loss level data to non-members for research purposes. However, it is obvious from the summary data that (a) CPBP/Conduct Cost losses are very significant, and hence will contribute significantly to, even dominate, estimated Operational Risk Regulatory Capital; (b) provisions for future operational losses are large and are not currently considered when estimating ORRC and (c) operational risk losses appear to be concentrated in a subset of banks, particularly those identified as Systemically Important Banks (SIBs) by the Financial Stability Board (FSB 2014).

Large Operational Risk Losses
It is a stylised fact that large losses dominate the estimation of ORRC (Jobst 2007, Embrechts et al 2003, Abdymomunov 2014, Ames et al 2015, and Cruz et al 2015). Ames et al (2015) point out the importance of ‘extreme events’, which, because of the models that are typically used “individual large events tend to drive [model] parameters, determining just how fat the modelled severity “tail” will be [… And] operational risk capital is effectively sized, not to cover many occurrences, but the single worst case [emphasis added]”

Ames et al (2015) note that while the industry, through groups such as ORX, has accumulated many hundreds of thousands of observations classified by predefined event types and business lines “the data remain largely opaque, difficult to assess for relevance, difficult to use for modelling and not so helpful when it comes to learning from other institutions’ experience”. This is particularly true of the ‘large losses’ that dominate the estimation of capital. Ames et al also suggest that

“Although there is no publicly available data indicating what percentage CPBP accounts for in terms of overall capital held for operational risk, we suspect that **CPBP is the dominant driver of overall operational risk capital**; it has certainly been a most important area of concern since the 2008 financial crisis. For the purpose of capital assessment, it would seem to make sense to focus more on this particular event type, and look toward systematically improving the data to better differentiate between products, flagging litigated events, etc.”

As data is not available from ORX at the level of the individual loss and only the largest banks are so far being analysed by CCP at the bank level, in order to analyse the root causes of individual losses at the level of individual banks, McConnell (2015) developed a dataset which contains publicly available data on ‘large’ losses that could be categorised as resulting from operational risk events as defined by Basel II, concentrating on those that fit the CPBP definition. The dataset consists of large operational risk events (> $10 million) that were collected from published sources, including banks’ annual reports and market updates, regulators’ announcements of fines and settlements, news reports and academic sources, such as the Conduct Cost Project (CCP 2015).

Embrechts et al (2003) warn that while “actuarial techniques in principle could be used for estimating (high) quantiles of unknown loss distributions […] estimation of high quantiles is an inherently difficult problem”. They point out that

“We have seen that the stylized facts of historical operational risk losses in general [but not in every loss type category] are not in accordance with i.i.d. modeling assumptions. For repetitive and stationary losses the standard actuarial methods and their refinements can be employed to derive capital charges. The crux, however, pertains the non-repetitive and non-stationary case. And it is exactly the losses of the latter category which jeopardize the existence of financial institutions [emphasis added]”.

It is precisely the cases of non-repetitive and non-stationary large losses that are discussed in this paper and to do so Embrechts et al (2003) argue that “only preliminary explanatory

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2 The reason that the threshold of $10 million was selected as a ‘large’ loss is based on the fact that ORX defines a ‘large loss’ as over € 10 million (ORX 2014).
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analysis will show for which business line and event type actuarial techniques can readily be applied”. In this paper, such explanatory analysis will not be undertaken for every event type but for the CPBP event type in which large losses are particularly concentrated. Before considering the wider problem of modelling ORRC for large Systemic Operational Risk Events, the next sections analyse operational risk losses incurred as a result of the LIBOR and FX manipulation scandals, building from specific cases to the more general.

LIBOR Manipulation

Deutsche Bank – April 2015

On 23rd April 2015, the Board of Deutsche Bank announced a “joint settlement of all remaining investigations with US and UK regulators over interbank offered rates benchmarks” (Deutsche 2015). The settlement included payments of fines imposed by four regulators and the bank stated that it had “disciplined or dismissed individuals involved in the trader misconduct”. The fines to be paid to each regulator were:
1. Financial Conduct Authority (FCA) - £ 226.8 million;
2. US Department of Justice (DOJ) - $ 750 million,
3. US Commodity Futures Trading Commission (CFTC) - $ 800 million ; and
4. New York State Department of Financial Services (NYDFS) - $ 600 million.

In total, these fines amount to some $2.52 billion, the largest fine arising from the so-called LIBOR manipulation scandal to that date. But rather than discuss the details of the misconduct that led to the fines, which is described in McConnell (2013, 2014, 2015), the issue of interest here is how should these fines be reflected in the estimation of Operational Risk Regulatory Capital for Deutsche and other banks? McConnell (2013) notes that such fines can be classified as Operational Risk Events, and can be mapped directly onto the Basel II Loss Event Type classification in the CPBP category, in particular "Market Manipulation" in the Level 2 Category "Improper Business or Market Practices" (Basel 2004 Annex 7). Within the ORX database such a loss would be classified under the category EL0402 (ORX 2011).

As a first step, under Basel II rules for approval to use an Advanced Measurement Approach (AMA) to estimate Minimum Capital Requirements for Operational Risk (Basel 2004), such fines (and associated costs) must be recorded in a database of Internal Loss Data (ILD). The Basel Committee’s ‘Principles of Sound Management of Operational Risk’ (PSMOR) requires that “the bank adequately documents the methodology by which loss data are captured and considered for all material risks in all of its positions, portfolios and business lines” (BCBS 2014b). The first question that arises is whether each fine should be recorded and used individually or should the combined figure be recorded?

The Basel II rules on multiple losses related to a single loss event are non-proscriptive leaving it to each bank to put in place policies such that

“A banking organization that uses the LDA [Loss Data Approach] should have a clear, well-documented policy for addressing losses that are closely related or positively correlated, including procedures for applying the aggregation principle and criteria for determining when multiple losses should be aggregated and treated as a single event. This policy should establish clear guidelines for deciding the circumstances, types of data, and methodology for aggregating
In the case of the Deutsche LIBOR fines, the losses would almost certainly be categorized as ‘closely related and positively correlated’ as they are part of a “joint settlement” and “part of an industry-wide investigation into past submissions for interbank offered rates benchmarks” (Deutsche 2015). In particular, the losses cannot be considered to be ‘independent’ as in justifying the fines, each regulator referenced other regulators, as for example the US Department of Justice

“The investigation leading to these cases has required, and has greatly benefited from, a diligent and wide-ranging cooperative effort among various enforcement agencies both in the United States and abroad. The Justice Department acknowledges and expresses its deep appreciation for this assistance [emphasis added]” (DOJ 2015).

In other words, the regulatory agencies that levied the fines treated the settlement as a single event and hence for modelling purposes, the operational risk loss to the bank would best be represented by the combined fine.

**Deutsche Bank – December 2013**

On 4th December 2013, the European Commission (EC) fined several international financial institutions a total of € 1.7 billion for

“Participating in illegal cartels in markets for financial derivatives covering the European Economic Area (EEA). Four of these institutions participated in a cartel relating to interest rate derivatives denominated in the euro currency [emphasis added]” (EC 2013).

Deutsche was one of the banks in this particular settlement, and was fined some € 466 million for misconduct relation to EURIBOR (Euro Interbank Offered Rate), and some € 260 million for participating in a ‘cartel’ to manipulate the YEN TIBOR (Tokyo Interbank Offered Rate). The Deutsche Board announced that “as part of a collective settlement, it has reached agreement with the European Commission on a resolution of its investigations into the submission of interbank offered rates [emphasis added]” (Deutsche 2013). The point here is that the Board and management of Deutsche considered the negotiations to address the accusations to be a single integrated effort and not multiple and independent negotiations with each regulator individually.

The Deutsche fine of December 2013 totalled some $ 0.96 billion, and was the largest fine imposed on the banks involved in the “illegal cartel” (EC 2013). Before moving on it is worth noting that the severity of the fine for an individual bank was not related to the profits made through manipulation, nor the size of the bank, but by “taking into account the banks' value of sales for the products concerned within the EEA, the very serious nature of the infringements, their geographic scope and respective durations” (EC 2013). As Deutsche had been discovered to have been involved longer than the other banks fined, some three years, their fines were correspondingly larger. This has important implications for how such fines should be handled in Scenario Analysis exercises by other banks as the losses cannot be ‘scaled’ by firms size alone to consider as a potential loss. This, as Embrechts et al (2003) argue, means that individual events should be understood in depth before consideration of their potential replication in another bank’s capital calculation.
One Event or Two?

From an capital modelling perspective, it is appropriate to ask whether these two fines, i.e. $2.52 and $0.96 billion, should be considered as two ‘operational risk events’ or one, totalling some $3.48 billion? From a modelling perspective this is an important question as the severity of losses due to ‘extreme events’ is the major contributor to operational risk capital in the most often used models. For discussions of ORRC models, see, for example, Cruz (2002), Jobst (2007), Cruz et al (2015) and in particular for those models that use some variant of Extreme Value Theory (EVT) see Cruz (2003), Embrechts et al (2003, 2004) and McNeil et al (2005).

Aside from the fact that the fines were levied some 16 months apart, there is little reason to consider that the events should be treated as being distinct. In fact, the manipulation of EURIBOR and TIBOR, in addition to LIBOR, are reiterated as reasons for the April 2015 fines. See, for example, the rationale for the fine on Deutsche by one of the regulators, the UK Financial Conduct Authority (FCA Deutsche 2015).

As shown in Table 1, between 2012 and 2015, various banks and brokers have been fined by regulators for misconduct as regards manipulation of LIBOR and other interest rate benchmarks. In this context it should be noted that Deutsche’s second fine (of $2.52 billion) took some time to resolve because, as the FCA noted that “Deutsche Bank failed to deal with the Authority in an open and cooperative way, and to disclose to the Authority information relating to Deutsche Bank of which the Authority would reasonably expect notice [emphasis added]” (FCA Deutsche 2015).

Under Basel II rules for AMA accreditation, banks are required to reflect ongoing changes to the value of losses incurred in a single loss event, specifically decreasing the loss for recoveries, such as from insurance (Basel 2004, Ames et al 2015). This would imply that the value of a loss could also be increased as further fines and actions to redress are accumulated. In this case, the original loss could be increased by the second related fine and potentially other fines in future. In modelling terms, such a loss would be best represented as resulting from one large event that evolved over time.

Idiosyncratic or Systemic Event?

As losses are discovered and sometimes disclosed, individual banks that use an approved AMA (Advanced Measurement Approach) model are required to incorporate their own losses into their Internal Loss Database. These losses are then used, along with other key data elements, to estimate Operational Risk Regulatory Capital according to Basel II rules. As part of their mandated use of Scenario Analysis, banks are required to consider incorporating losses incurred by other banks, so-called External Loss Data (ELD), into their AMA models, scaling the losses, if appropriate, to include within their ORRC estimations.

However, the process of modelling ORRC to meet Basel II requirements has proved to be far from satisfactory. Academic and regulatory studies have found that the internal operational loss data collected at the individual bank level is often not sufficient to compute ORRC at the ‘soundness level’ required by Basel II, i.e. to a 99.9% confidence over a 1-year horizon, see in particular, Jobst (2007), Zhou et al (2014), Ames et al (2015) and Cruz et al
A Basel study on Operational Risk industry practices, found that in some banks, over twenty times as much External Data is used in models as Internal Data (BCBS 2009). In such circumstances this means that, for many banks, ORRC modelling is a qualitative rather than quantitative process, which in itself may be a source of inefficiency in capital usage and allocation.

For the purposes of computing ORRC, the fines described above will normally be recorded within the internal loss database of Deutsche bank, and also on external loss databases, such as ORX or SAS OpRisk Global Data, as two small or one larger fine. For Basel II purposes, the event(s) will be treated as idiosyncratic and unique to Deutsche, and will be used to populate a loss distribution of Deutsche losses for modelling purposes. As the April 2015 fine ($2.5 billion) is the largest such loss experienced by the bank and the December 2013 fine is also in the Top 5 (see Table 1) their inclusion, because they are ‘extreme’, will have a significant impact on the ORRC value estimated by Deutsche’s Operational Risk Capital model (Kalkbrenner 2008).

However, when viewed from a systemic rather than an individual firm perspective, the Deutsche fine is not unique nor idiosyncratic. Table 1 shows a list of fines totalling some $10.3 billion which were imposed by various regulators on banks relating to manipulation of a number of interest rate benchmarks, especially LIBOR.

<table>
<thead>
<tr>
<th>Year</th>
<th>Bank Holding company</th>
<th>Fines ($ billion)</th>
<th>Regulator/Lead Regulator</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>Barclays</td>
<td>0.46</td>
<td>Commodity Futures Trading Commission</td>
</tr>
<tr>
<td>2012</td>
<td>UBS</td>
<td>1.50</td>
<td>Commodity Futures Trading Commission</td>
</tr>
<tr>
<td>2013</td>
<td>Citigroup</td>
<td>0.09</td>
<td>European Commission</td>
</tr>
<tr>
<td>2013</td>
<td>Deutsche Bank</td>
<td>0.96</td>
<td>European Commission</td>
</tr>
<tr>
<td>2013</td>
<td>JPMorgan Chase</td>
<td>1.06</td>
<td>European Commission</td>
</tr>
<tr>
<td>2013</td>
<td>Rabobank</td>
<td>1.10</td>
<td>Commodity Futures Trading Commission</td>
</tr>
<tr>
<td>2013</td>
<td>Royal Bank of Scotland</td>
<td>0.61</td>
<td>US Department of Justice</td>
</tr>
<tr>
<td>2013</td>
<td>Royal Bank of Scotland</td>
<td>0.52</td>
<td>European Commission</td>
</tr>
<tr>
<td>2013</td>
<td>Societe Generale</td>
<td>0.62</td>
<td>European Commission</td>
</tr>
<tr>
<td>2014</td>
<td>Barclays</td>
<td>0.04</td>
<td>UK Financial Conduct/Services Authority</td>
</tr>
<tr>
<td>2014</td>
<td>Lloyds</td>
<td>0.38</td>
<td>UK Financial Conduct/Services Authority</td>
</tr>
<tr>
<td>2014</td>
<td>UBS</td>
<td>0.14</td>
<td>Swiss Banking Regulator</td>
</tr>
<tr>
<td>2015</td>
<td>Barclays</td>
<td>0.12</td>
<td>Commodity Futures Trading Commission</td>
</tr>
<tr>
<td>2015</td>
<td>Deutsche Bank</td>
<td>2.52</td>
<td>US Department of Justice</td>
</tr>
</tbody>
</table>

Table 1 – Regulatory Fines for Manipulation of Interest Rate Benchmarks

While individual banks incurred one or more fines from one or more regulators on one or more occasions, these fines can nevertheless be seen as being “closely related or positively correlated” (Federal Reserve 2014) as they are a result of:

- Identical benchmarks: the same group of traders and brokers manipulated the same global benchmarks, i.e. LIBOR, EURIBOR and TIBOR (McConnell 2013, 2014). The benchmarks were used by banks and other financial institutions across the system and hence when manipulated, the impact was system-wide.
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- Collusion among banks and brokers: by the nature of the manipulation, and the structure of the LIBOR submission process (McConnell 2013, 2015), multiple traders in multiple banks were needed in order for manipulation to be successful.
- Same business lines: the same Trading and Sales business lines in different banks were involved in the efforts to manipulate the benchmarks – the so-called ‘small world’ effect (McConnell and Blacker 2013)
- Coordination among regulators: the regulators involved in the investigations shared information between themselves openly and transparently, often referring to the exact same evidence for different fines. Regulators also coordinated the announcement and calculations of fines, often using identical language when fining different banks.
- Concerted action by regulators: as regards efforts to mitigate similar risks in future, such as reorganising the administration of financial benchmarks (Wheatley 2012).

There is some evidence that traders and senior managers pressured LIBOR submitters in their own banks to try to influence the benchmark for their own purposes but, on their own (McConnell 2013), such idiosyncratic efforts often only caused the associated submission to be questioned by the benchmark administrator, the British Bankers’ Association (BBA). Manipulation for profit, which constituted the vast majority of attempts to manipulate benchmarks, requires collusion, or at least silent acquiescence, from other market players and hence are examples of systemic, in addition to firm-level, misconduct (McConnell 2013).

Foreign Exchange Benchmark Manipulation

Before considering the implications of the LIBOR scandal on the problem of modelling ORRC, this section will briefly summarise another scandal that affected the Trading and Sales business lines of major banks – the manipulation of the WMR Foreign Exchange benchmark.

In November 2014, banking regulators from around the world announced, in a concerted move, the first round of fines against banks for their roles in manipulating the most used Foreign Exchange (FX) rate benchmark, the so-called WMR 4 O’clock Fix (FCA Barclays 2015). This was followed by a second round of even larger fines by regulators in May 2015. Like LIBOR, the manipulation of FX rate benchmarks was not a localised event and unscrupulous traders in some of the largest global banks deliberately and systematically manipulated currency rates to gain advantage for themselves and their firms.

Table 2 shows a list of losses due to fines by regulators for manipulation of the WMR Foreign Exchange benchmark (McConnell 2105).

<table>
<thead>
<tr>
<th>Year</th>
<th>Bank Holding Company</th>
<th>Fines ($ billion)</th>
<th>Regulator/Lead Regulator</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>Bank of America</td>
<td>0.25</td>
<td>Commodity Futures Trading Commission</td>
</tr>
<tr>
<td>2014</td>
<td>Citigroup</td>
<td>0.38</td>
<td>UK Financial Conduct/Services Authority</td>
</tr>
<tr>
<td>2014</td>
<td>Citigroup</td>
<td>0.35</td>
<td>US Office of the Controller of the Currency</td>
</tr>
<tr>
<td>2014</td>
<td>Citigroup</td>
<td>0.31</td>
<td>Commodity Futures Trading Commission</td>
</tr>
<tr>
<td>2014</td>
<td>HSBC</td>
<td>0.36</td>
<td>UK Financial Conduct/Services Authority</td>
</tr>
<tr>
<td>2014</td>
<td>HSBC</td>
<td>0.28</td>
<td>Commodity Futures Trading Commission</td>
</tr>
</tbody>
</table>
Table 2 – Regulatory Fines for Manipulation of Foreign Exchange Benchmarks

Without going into the same level of detail as for LIBOR, Table 2 shows, for example, the case of UBS, the largest Swiss bank, which was fined a total of $0.85 billion by three regulators, on the same day, in November 2014. This was followed by a further fine by the US Department of Justice (DOJ) in May 2015 to make an overall total of almost $1.2 billion for the manipulation offences. As with Deutsche and the LIBOR manipulation fines, the fines on UBS, although five months apart, used exactly the same evidence and thus the different regulators came to the same conclusions.

Like LIBOR, the fines can be seen as being “closely related or positively correlated” (Federal Reserve 2014) as they are a result of the same factors: i.e. identical benchmarks; collusion among banks and brokers; by traders from the same business lines; and cooperation and concerted action by regulators. The FX manipulation scandal was, like LIBOR, approached by regulators as a system-wide investigation. For example, the FCA noted that it worked closely with other regulators in its investigations and, on the same day as the fines, the regulator announced that it “will carry out an industry-wide supervisory remediation programme for firms to drive up standards across the market” (FCA 2014).

One Systemic Event or Two?

The LIBOR and FX benchmark manipulation scandals are so similar and resulted in similar sets of operational risk losses, of $10.3 billion, it is appropriate to ask the question: are the two events actually a manifestation of a single root cause and hence should be treated as a “closely related or positively correlated” single event? The arguments in favour of combining the two different scandals into one large event are strong:

1. The traders and trading groups involved in manipulation in each bank were located within the same Trading and Sales organisations, albeit not at the ‘desk level’.
2. The sales and support groups (such as market commentators) would in many instances be common across the two trading groups, since sales groups in large banks tend to be organized by client, dealing with the same client for FX, interest rate and other products (McConnell 2014).
3. The regulators involved, especially the US Department of Justice and the FCA, treated the events from the same regulatory perspective, such as, for example, the FCA charging Deutsche (LIBOR) and Barclays (FX) of breaches of its ‘Principle 3’

---

Table 2 – Regulatory Fines for Manipulation of Foreign Exchange Benchmarks

<table>
<thead>
<tr>
<th>Year</th>
<th>Bank</th>
<th>Fine (billion)</th>
<th>Regulator</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>JPMorgan Chase</td>
<td>0.37</td>
<td>UK Financial Conduct/Services Authority</td>
</tr>
<tr>
<td>2014</td>
<td>JPMorgan Chase</td>
<td>0.35</td>
<td>Commodity Futures Trading Commission</td>
</tr>
<tr>
<td>2014</td>
<td>JPMorgan Chase</td>
<td>0.31</td>
<td>Commodity Futures Trading Commission</td>
</tr>
<tr>
<td>2014</td>
<td>Royal Bank of Scotland</td>
<td>0.36</td>
<td>UK Financial Conduct/Services Authority</td>
</tr>
<tr>
<td>2014</td>
<td>Royal Bank of Scotland</td>
<td>0.29</td>
<td>Commodity Futures Trading Commission</td>
</tr>
<tr>
<td>2014</td>
<td>UBS</td>
<td>0.39</td>
<td>UK Financial Conduct/Services Authority</td>
</tr>
<tr>
<td>2014</td>
<td>UBS</td>
<td>0.29</td>
<td>Commodity Futures Trading Commission</td>
</tr>
<tr>
<td>2014</td>
<td>UBS</td>
<td>0.17</td>
<td>Swiss Banking Regulator</td>
</tr>
<tr>
<td>2015</td>
<td>Barclays</td>
<td>2.30</td>
<td>US Department of Justice</td>
</tr>
<tr>
<td>2015</td>
<td>Citigroup</td>
<td>1.27</td>
<td>US Department of Justice</td>
</tr>
<tr>
<td>2015</td>
<td>JPMorgan Chase</td>
<td>0.89</td>
<td>US Department of Justice</td>
</tr>
<tr>
<td>2015</td>
<td>Royal Bank of Scotland</td>
<td>0.70</td>
<td>US Department of Justice</td>
</tr>
<tr>
<td>2015</td>
<td>UBS</td>
<td>0.34</td>
<td>US Department of Justice</td>
</tr>
</tbody>
</table>

---
4. The regulators’ investigations were related in the sense that investigations into the manipulation of LIBOR led directly onto the FX investigation because suspicions were raised during exploration of traders’ communications.

5. There is a common legislative approach to addressing the issues, in particular making benchmark manipulation (in general) a criminal offence in the UK (Wheatley 2012).

However, while at face value, the two events have much in common, the FX manipulation scandal involved additional examples of serious abuse of customers’ trust. In its judgment against Barclays, the US Department of Justice summarised the extent of misconduct that, in addition to attempting to manipulate the WMR Fix, Barclay’s staff engaged in misconduct that involved:

i. “intentionally working customers’ limit orders one or more levels, or ‘pips’, away from the price confirmed with the customer;

ii. including sales mark-up, through the use of live hand signals, to prices given to customers that communicated with sales staff on open phone lines;

iii. accepting limit orders from customers and then informing those customers that their orders could not be filled, in whole or in part, when in fact the defendant was able to fill the order but decided not to do so because the defendant expected it would be more profitable not to do so; and

iv. disclosing non-public information regarding the identity and trading activity of the defendant’s customers to other banks or other market participants, in order to generate revenue for the defendant at the expense of its customers” (DOJ Barclays 2015).

Similar accusations were made by the DOJ about other banks, demonstrating that not only manipulation but other illicit practices were common across the system and that the regulators considered such misconduct to be systematic. It is obvious that serious misconduct (such as triggering customers’ stop losses) is symptomatic of a much wider breakdown in corporate governance than (merely?) manipulating WMR. For those reasons, this paper will continue to treat the two events as independent, but recognises that there is a very fine line between the two events. At the time of writing, regulatory responses to this type of misconduct are still emerging and may narrow or possibly widen the perception of differences between the two events (PRA 2015).

But LIBOR and Forex manipulation scandals were not the only events in which very large fines were levied on multiple banks for the same or similar misconduct.

**Systemic Operational Risk Events**

Table 3 below shows losses (in $ billion) by Bank and by ‘Systemic Risk Classification’ (SRC). The SRC columns relate to the following classification of events (McConnell 2015):

- **BRM** – Benchmark Rate Manipulation: events related to fines and other costs for manipulation of LIBOR and other Interest Rate Benchmarks such as EURIBOR and TIBOR;
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- **FSP** – Firm Specific: events that are idiosyncratic and related to fines for an individual bank by a single regulator and NOT related to a systemic event;
- **FXM** – Foreign Exchange Manipulation: events related to fines for the manipulation of the most used Foreign Exchange benchmark the ‘WMR 4 o’clock Fix’ or ‘Spot Fix’;
- **MFA** – Mortgage Foreclosure Abuse: events related to fines and agreed settlements for redress for the abusive foreclosure of mortgages, following the Global Financial Crisis;
- **RMB** – Residential Mortgage Backed Securities: events related to fines and agreed settlements for abuse of mortgage origination processes and distribution of mis-rated RMBS securities, prior to the Global Financial Crisis;
- **SML** – Sanctions and Money Laundering: events related to fines and agreed settlements for illegal sanctions busting and abuse of Anti-Money Laundering (AML) legislation; and
- **TAX** – Tax Avoidance/Evasion: events related to fines and agreed settlements for supporting clients in avoiding or evading Tax Evasion legislation.

Note this table does not show the complete list of identified Systemic Operational Risk Events in McConnell (2015), in particular those related to PPI (Payment Protection Insurance) and IRHP (Interest Rate Hedging Products) will be discussed separately when considering Provisions below.

Of particular interest is the column FSP (Firm Specific) losses, which are the typical idiosyncratic losses identified by Basel II. As can be seen these losses amount to some $15.7 billion or 8.7% of the total. In other words, the bulk of large losses (>91%) are a result of events that occur to multiple bank(s) at around the same time and have the same ‘root cause’, such as collusion to manipulate a benchmark. It can be seen from Table 3 that some banks are recorded as having 100% FSP losses, i.e. there are no losses due to this particular group of systemic operational risk events but to others not shown, such as PPI. Only JPMorgan Chase has a large percentage that resulted from firm-specific losses (FSP %), in particular the large fines incurred as a result of the Madoff and ‘Whale’ scandals (McConnell 2014a). However, even these FSP losses for JPMorgan amount to less than 25% of the bank’s total losses, and the remaining 75% are the result of systemic events.
<table>
<thead>
<tr>
<th>Bank Holding Company</th>
<th>BRM</th>
<th>FSP</th>
<th>FXM</th>
<th>MFA</th>
<th>RMB</th>
<th>SML</th>
<th>TAX</th>
<th>Total</th>
<th>% Total</th>
<th>SIFI</th>
<th>FSP %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bank of America</td>
<td>4.4</td>
<td>0.4</td>
<td>11.8</td>
<td>61.8</td>
<td>0.0</td>
<td>78.4</td>
<td>43.4%</td>
<td>2</td>
<td>5.6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barclays</td>
<td>0.6</td>
<td>0.1</td>
<td>2.3</td>
<td>0.3</td>
<td>0.3</td>
<td>3.6</td>
<td>2.0%</td>
<td>3</td>
<td>2.1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BNP Paribas</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8.9</td>
<td>8.9</td>
<td>4.9%</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BNY Mellon</td>
<td>0.9</td>
<td></td>
<td></td>
<td></td>
<td>0.9</td>
<td>0.5%</td>
<td>1</td>
<td>100.0%</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Citigroup</td>
<td>0.1</td>
<td>1.7</td>
<td>2.3</td>
<td>2.2</td>
<td>8.7</td>
<td>15.0</td>
<td>8.3%</td>
<td>3</td>
<td>11.1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commerzbank</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.5</td>
<td>8.3%</td>
<td>3</td>
<td>11.1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Credit Suisse</td>
<td>0.9</td>
<td>0.5</td>
<td>2.6</td>
<td>4.0</td>
<td>8.9</td>
<td>4.9%</td>
<td>3</td>
<td>11.3%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deutsche Bank</td>
<td>3.5</td>
<td>1.0</td>
<td>3.8</td>
<td>0.6</td>
<td>8.9</td>
<td>4.9%</td>
<td>3</td>
<td>11.3%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goldman Sachs</td>
<td>0.7</td>
<td>0.3</td>
<td>3.2</td>
<td></td>
<td>4.1</td>
<td>2.3%</td>
<td>2</td>
<td>15.7%</td>
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<tr>
<td>HSBC</td>
<td></td>
<td>0.6</td>
<td>0.6</td>
<td>1.9</td>
<td>3.1</td>
<td>1.7%</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>ING Bank</td>
<td></td>
<td>0.6</td>
<td>0.6</td>
<td>0.3%</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>JPMorgan Chase</td>
<td>1.1</td>
<td>6.2</td>
<td>2.0</td>
<td>2.0</td>
<td>18.5</td>
<td>0.1</td>
<td>16.5%</td>
<td>4</td>
<td>20.8%</td>
<td></td>
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</tr>
<tr>
<td>Lloyds</td>
<td>0.4</td>
<td></td>
<td></td>
<td></td>
<td>0.6</td>
<td>0.9</td>
<td>0.5%</td>
<td>0</td>
<td></td>
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<tr>
<td>Mitsubishi UFJ</td>
<td></td>
<td>0.6</td>
<td>0.6</td>
<td>0.3%</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morgan Stanley</td>
<td></td>
<td>1.3</td>
<td></td>
<td>1.3</td>
<td>0.7%</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rabobank</td>
<td>1.1</td>
<td></td>
<td></td>
<td></td>
<td>1.1</td>
<td>0.6%</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Royal Bank of Scotland</td>
<td>1.1</td>
<td>1.4</td>
<td>0.1</td>
<td>0.1</td>
<td>2.7</td>
<td>1.5%</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Santander</td>
<td>0.7</td>
<td></td>
<td></td>
<td></td>
<td>0.7</td>
<td>0.4%</td>
<td>1</td>
<td>100.0%</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Societe Generale</td>
<td>0.6</td>
<td></td>
<td>0.1</td>
<td></td>
<td>0.7</td>
<td>0.4%</td>
<td>1</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Standard Chartered</td>
<td></td>
<td>1.0</td>
<td>1.0</td>
<td>0.5%</td>
<td>1</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>State Street</td>
<td>0.0</td>
<td>0.1</td>
<td>0.7</td>
<td></td>
<td>0.8</td>
<td>0.4%</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>4.8%</td>
</tr>
<tr>
<td></td>
<td>1.8</td>
<td>0.0</td>
<td>1.2</td>
<td>0.9</td>
<td>0.8</td>
<td>4.7</td>
<td>2.6%</td>
<td>1</td>
<td>1.0%</td>
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<tr>
<td>UBS</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Wells Fargo</td>
<td>0.1</td>
<td>0.9</td>
<td>6.7</td>
<td></td>
<td></td>
<td>7.6</td>
<td>4.2%</td>
<td>1</td>
<td>1.0%</td>
<td></td>
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</tr>
<tr>
<td>Total by Systemic Event</td>
<td>10.3</td>
<td>15.7</td>
<td>10.3</td>
<td>17.2</td>
<td>107.3</td>
<td>16.0</td>
<td>3.9</td>
<td>180.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>%</td>
<td>5.7%</td>
<td>8.7%</td>
<td>5.7%</td>
<td>9.5%</td>
<td>59.4%</td>
<td>8.9%</td>
<td>2.2%</td>
<td></td>
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</tr>
</tbody>
</table>

Table 3 Systemic Operational Risk Losses (in $ billion) by Bank and Systemic Risk Classification
Frequency of Loss Events

In modelling ORRC, the date on which a loss is recognized is a key data element. That is because models that have adopted a Loss Distribution Approach (LDA), typically consider both the Frequency and Severity distributions of the losses in their estimation (Cruz et al 2015). As the exact date on which a particular loss occurs is not always obvious the Basel Committee notes that banks generally assign one of three dates to an individual operational risk loss: date of occurrence, date of discovery, or accounting date. (BCBS 2009). For many of the losses discussed here the date on which the fine or settlement was announced by regulator(s) or the firm itself is used as the relevant date because as BCBS (2009) notes that “litigation cases are a notable exception [to the general use of date of discovery date] for which banks lean towards the accounting date or the date on which the case is settled, if different from the accounting date”.

But does a single date make sense for events that involve multiple losses, such as LIBOR or FX benchmark manipulation? Using the Deutsche example at the top of the paper, there are two losses announced ($1.7 billion in December 2013 and $2.52 billion in May 2015) but these events are obviously “closely related or positively correlated” and part of the evolution of the same event. So if treated as one event which date should be used and why is it important?

Cruz et al (2015) point out that “legal” cases, such as regulatory investigations, pose a particular problem because both the timing and severity of (potentially a number of) losses are uncertain. Regulators (BCBS 2009) require that banks need to have a clear procedure on how to handle those large, long-duration losses, but differences in policies between banks could lead to inconsistencies in the capital held (Cruz et al 2015).

If we consider the date on which the fine/settlement was announced by regulators and banks, the losses resulting are not distributed randomly, as is required, for example, if a Poisson distribution was assumed for Frequency. Figure 1 shows a plot of LIBOR and FX losses by the date of announcement of fines.

![Figure 1 – LIBOR and FX fines by Date of Announcement](image-url)
Dahen and Dionne (2007) note that the “Poisson regression model supposes equidispersion (equality between the conditional average and variance) [which] may not be compatible with operational loss data”. As shown in Figure 1, the fines are ‘clustered’ and many of these particular losses occur on the same date, or very close by, which appears to violate one of the assumptions of the Poisson distribution that is most often used in modelling frequency in capital modelling. Ames et al (2015) argue that events, such as large legal/regulatory losses, are “neither independent from one another, nor do they support the notion that frequency is independent from severity”.

**Other Systemic Operational Risk Events**

Table 3 shows a number of Systemic Operational Risk Events other than LIBOR and FX, which resulted in large fines and settlements for the banks shown. The RMB (Residential Mortgage Backed) column relates to extremely large fines and settlements as a result of the mis-selling of mortgages and mortgage derivatives, in particular Collateralised Debt Obligations (CDOs) prior to the Global Financial Crisis (McConnell and Blacker 2011). These fines, which total almost 60% ($107 billion) of the overall losses in Table 3, were levied mainly on US banks, see, for example, one of the fines of almost $17 billion on Bank of America (DOJ Bank of America 2014).

It should be noted however that these fines were levied not only on BOA itself but also for misconduct by banks that BOA had acquired during the turmoil of the GFC, in particular Countrywide Financial and Merrill Lynch. Similarly, fines of over $18 billion were levied against JPMorgan Chase, much of which was the result of misconduct by firms that the bank had acquired during the GFC, in particular Bear Stearns and especially Washington Mutual (FCIC 2011). When considering such fines, it is moot point whether the losses should be attributed to the current bank organisations (BOA and JPMorgan) for operational risk capital purposes, since the fines were in large part due to now-defunct firms. Clearly, whichever way this question is resolved, the impact on the ORRC calculation of banks that incorporate these losses as part of External Data or Scenario Analysis will be significant. The lesson is that the root causes of each large loss that is incorporated into an ORRC estimation must be thoroughly understood to ensure that excess capital is not calculated.

The column MFA (Mortgage Foreclosure Abuse) relates to fines and settlements for illicit conduct as regards foreclosing of delinquent mortgages after the GFC and totals some $17 billion or 9.5% of the total losses in Table 3. It should be noted that unlike RMB, these fines and settlements were levied against banks that continue to operate so may be considered as deficiencies in current risk management processes. It should also be noted that for the MFA event, substantial fines were also levied against non-bank mortgage-servicing companies such as OCWEN (CFPB 2013).

The losses in the columns SML (Sanctions and Money Laundering) and TAX (Tax Avoidance/Evasion) are large fines on international banks by (mainly US) regulators for abuses of Sanctions, Anti-Money Laundering, and Tax legislation. It should be noted that investigations by US authorities on similar illegal activities are continuing.

**Stationarity**

A χ2 test of the loss data shows that the frequency distribution of these particular losses does not indicate a Poisson distribution (p < .001). However, the large number of periods (bins) that are empty or have less than 5 events also renders the χ2 test inappropriate in this instance.
Embrechts et al (2003) note that many of the actuarial models used to estimate ORRC, are based on i.i.d. assumptions, and, in particular, this implies that “the time aspect beyond correction for inflation is negligible and that there are no significant structural changes in the observed data as time evolves”. They observe that for operational risk “loss occurrence times are irregularly spaced in time and loss amounts very clearly show extremes”. This observation is borne out by Figure 2 which is a plot of individual Losses from Table 3 by Year, which displays the “irregularity [that] seems to go beyond randomness as for instance observed in a homogeneous Poisson process or even renewal process” described by Embrechts et al (2003). This data appears to fail the condition of stationarity as both the mean loss and standard deviation of losses rise in each of years from 2010 to 2014. Embrechts et al (2003) observe that in many cases, there will be such “structural changes in operational risk data as time evolves” and such structural changes will be difficult to model for capital purposes.

![Figure 2 – Losses by Year](image)

The reason for this rise in the total size of losses can be attributed to the fact that regulators have over time, and as their expertise has expanded, imposed larger fines, as can be seen by the rising extreme value in each year. Not seen in Figure 2 but illustrated for example in the data in Figure 1, such losses are not random but tend to appear towards the end of the financial year, when banks are looking to tidy up their accounts before their annual reports. The May 2015 FX settlement is somewhat different, occurring in mid-year, but settlements were expected toward the end of 2014 for these banks but were held up by negotiations on admissions of criminal responsibility between a number of banks and various regulators.

The key point here is that the process of arriving at a settlement of such large systemic events is through protracted negotiations between banks and regulators, individually or as a group, and hence neither the timing nor the severity are ‘random’, but to some extent are chosen by a bank. This was illustrated by the example of Barclays which reportedly changed its negotiation position in late 2014 by pulling out of the November 2014 settlement with “the FCA and the CFTC to try to seek ‘a more general co-ordinated settlement’ with other regulators that are investigating its activities” (Reuters 2014).
Provisions and Operational Risk

Brandt (2012) notes that Operational Risk is “dominated by infrequent large events and the largest losses often take years to be realised, with the consequence that severity modelling is limited in precision”. Cruz et al (2015) also point out that “usually some of the largest [operational risk events], will have a large time gap between the inception of the event and the final closure, due to the complexity of these cases”. Such legal/regulatory events typically have a life cycle that runs over several years from the legal discovery process through to acceptance of the case by a judge, through to eventual settlement. At any stage, a case may be thrown out of court or dropped by regulators, with no fines but nonetheless incurring legal costs. Alternatively, a case may proceed (usually slowly) to a settlement that is often large and in the cases described here often imposed on multiple defendants. The progress of regulatory investigations is similar to private lawsuits, except that a loss is almost certain (even if the severity is unknown) as the regulator(s) are both prosecutors and judges in such cases (although many regulatory settlements have to be approved by judges to be enacted by the parties).

This raises the tricky question of how potential losses for such complex cases should be recorded in Internal and External Databases, or assessed during Scenario Analysis, for the purposes of estimating ORRC. While firms regularly set aside accounting provisions or reserves to cover such losses, Cruz et al (2015) argue that often announcements of provisions against litigation may not be good indicators of potential losses in a settlement

“Firms can set up reserves for these losses (and these reserves should be included in the loss database), but they usually do that only for a few weeks before the case is settled to avoid disclosure issues (i.e., the counterparty eventually knows the amount reserved and uses this information in their favor) [emphasis added].”

And there is little consistency in approach within the industry as “banks’ practices in this area [i.e. Scenario Analysis] tend to be strongly influenced by accounting or provisioning practices, which could generate results that are inconsistent with a bank’s true operational risk profile” (BCBS 2009).

While it may be difficult for a bank to estimate its own future losses due to private litigation or regulatory action, as this requires additional input from legal and accounting experts who may be loathed to give an opinion that may result in leaking sensitive information to prosecutors, for other firms it is virtually impossible to make an expert assessment of such provisions and in turn how they could be applied to their own situations. The difficulty is exemplified by the PPI and IRHP operational risk events.

PPI and IRHP

The Payment Protection Insurance (PPI) and Interest Rate Hedging Product (IRHP) cases are described in McConnell and Blacker (2012) and Blacker and McConnell (2015). In both of these cases, the largest UK banks, after a prolonged legal process, agreed to provide redress to millions of customers who were mis-sold banking products. In neither case were fines levied against the banks involved but the banks entered into agreements with the FCA to provide redress to wronged customers. The redress, and associated costs, are Operational Risk losses that can be mapped to the Basel II Loss Event Type classification of CPBP, in particular, as regards the Level 2 categories of "Selection, Sponsorship & Exposure", "Fiduciary Breach" and "Product Flaws" (Basel 2004 Annex 7).
Table 4 shows the ‘initial’ provisions that were set aside to cover the losses when the first redress agreements were signed in 2011 (McConnell and Blacker 2012) and additional provisions that were announced subsequently (Guardian 2015). It should be noted that, unlike fines, it is difficult to be precise because estimates on provisions are typically made by industry experts as not all banks update information on their provisions against litigation except in annual reports and then often only at a gross level. Furthermore, the total provision numbers change regularly as quarterly and annual financial reports are announced. It is an area of Operational Risk Management (ORM) that could benefit from further academic and regulatory study.

<table>
<thead>
<tr>
<th>Bank Holding Co.</th>
<th>Initial Estimate 2011 ($ billion)</th>
<th>Initial Estimate 2013 ($ billion)</th>
<th>Subsequent Update 2013 ($ billion)</th>
<th>Total PPI ($ billion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bank of America</td>
<td>0.65</td>
<td>0.72</td>
<td>1.38</td>
<td></td>
</tr>
<tr>
<td>Barclays</td>
<td>1.83</td>
<td>0.70</td>
<td>5.53</td>
<td>6.22</td>
</tr>
<tr>
<td>Citigroup</td>
<td>1.16</td>
<td>0.70</td>
<td>5.53</td>
<td>6.22</td>
</tr>
<tr>
<td>HSBC</td>
<td>0.73</td>
<td>0.33</td>
<td>2.91</td>
<td>3.24</td>
</tr>
<tr>
<td>JPMorgan Chase</td>
<td>0.08</td>
<td>0.08</td>
<td>0.08</td>
<td>0.08</td>
</tr>
<tr>
<td>Lloyds</td>
<td>0.58</td>
<td>6.24</td>
<td>9.62</td>
<td>15.86</td>
</tr>
<tr>
<td>Royal Bank of Scotland</td>
<td>1.69</td>
<td>0.51</td>
<td>4.33</td>
<td>4.84</td>
</tr>
<tr>
<td>Santander</td>
<td>0.35</td>
<td>0.51</td>
<td>0.58</td>
<td>1.08</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5.17</strong></td>
<td><strong>10.16</strong></td>
<td><strong>23.69</strong></td>
<td><strong>33.85</strong></td>
</tr>
</tbody>
</table>

Table 4 PPI and IRHP Provisions Initial and Updated

The key point here, however, is that initial estimates of PPI at the time of the high court judgement on PPI (McConnell and Blacker 2012) have more than trebled in less than three years (from $10 to approximately $34 billion). It must also be remembered that, in general, provisions do not represent the total costs of the litigation as accounting standards require that

“Provisions should be recognized in the balance sheet when, and only when, an enterprise has a present obligation (legal or constructive) as a result of a past event. The event must be likely to call upon the resources of the institution to settle the obligation, and, more importantly, it must be possible to form a reliable estimate of the amount of the obligation [emphasis added]” (Cruz et al 2015).

In other words, accounting standards do not allow for provisions to account for any uncertainty in the severity of future losses, even though uncertainty is recognized. In general, this means that provisions will underestimate losses and more accurate information on the severity of losses will only emerge over several years (Cruz et al 2015).

The primary reason why provisions for PPI have been increasing over time has important implications for the management of operational risk events. In large part, the increase in provisions (i.e. ‘unrealised’ operational losses) is due to a new phenomenon,
the emergence of professional ‘claims management’ companies that, for a fee if successful, will pursue a claim for redress on behalf of a customer (McConnell and Blacker 2012). In its 2013 annual report, the UK Financial Ombudsman Service (FOS) reported that it had received some half million new complaints in 2013, some 78% of which were for PPI redress of which 44% were resolved within three months (FOS 2013). This is an enormous workload, involving half of the FOS staff and many millions of man-hours of work within the banks resolving the disputes.

The FOS also reported that over 70% of new PPI cases were brought to their attention by ‘claims management’ firms. The rise of professional claims management companies raises serious issues of reputational risk for financial institutions in that, by aggregating and publishing details of operational errors, whether settled or not, pressure will be brought to bear on financial institutions to settle claims sooner rather than later. FOS (2011) suggests that with disputation infrastructure already in place and the possibility of good returns for their efforts, claims management firms are just waiting for the "next big thing". In other words, the severity of losses in future cases will not be ‘random’ but will depend on, for example, how many customers sign up with a claims management company?

The progression of the PPI and IRHP scandals illustrates a number of important points about the extent of losses incurred in systemic operational risk events:

1. The total extent of losses are difficult to estimate at the outset, mainly because the number and size of possible claims are unknown.
2. The extent of any particular loss is not pre-determined but a result of a protracted negotiation process between customers and their banks, sometimes through third party bodies, such as the UK Financial Ombudsman.
3. The extent of losses is also impacted by the increasing presence of ‘claims management’ companies that have swamped organisations, such as the UK Financial Ombudsman, with many more claims for redress (and hence losses) than would have been expected from individual customers.
4. Resolution of losses takes time - several years at least in many of the cases described here.

The prolonged and uncertain trajectory of such legal/regulatory cases raises serious questions about how banks should incorporate projected losses into their ORRC models. Obviously those banks directly involved in redress processes must incorporate future estimates of losses in their Scenario Analysis process. But, as Cruz et al (2015) note, the difficulty of estimating provisions (never mind future losses) raises questions of “transparency and industry consistency” as regards modelling.

More importantly, the prolonged timescale of such events raises questions about the usefulness of the ‘1-year’ horizon in Basel II. If losses from an event are likely to crystallise (in accounting terms) over several years and potentially grow over that time, then the 1-year horizon may severely underestimate the call upon a bank’s operational risk capital over the period. In many cases, early in a long litigation process, it would be quite reasonable to assume that the likelihood of a large loss in the following year would, in fact, be negligible. In effect, the losses are ‘expected’ but the timing and severity of the losses are unknown over the period.
This argues for consideration of a different measure for ORRC in such situations, such as Expected Shortfall (ES), which Cruz et al (2015) suggest can be “viewed as an average of losses larger than or equal to” a chosen Value at Risk (VAR) and provides “information not only about the probability of the default but also about its severity”. Cruz et al (2015) provide a guide to the literature on ES, in particular the work of Artzner et al (1999), and a discussion of the benefits and disadvantages of VAR and ES as ‘risk measures’.

The Basel II rules require banks to estimate regulatory capital at “the 99.9% confidence level, which is equivalent to finding enough capital to protect against losses in the worst year in a 1,000 year period” (Cruz et al 2015). However, in the cases of the largest losses it is not the worst year that is important but is the cumulative losses over a period of years. It is an assumption of Basel II that if capital is utilised for losses in a particular year, then it can be replenished relatively easily for the following year(s). Given the difficulties experienced by the largest banks, especially SIBs, in going to investors for the additional capital required by Basel III (Euromoney 2013), it would appear more prudent to estimate capital requirements, for all risk types, over a forward period and develop a robust capital plan to meet those requirements.

In the cases discussed here, Expected Shortfall may capture the losses better than a 1-year VAR, especially if the horizon was extended, to say 5 years, and the confidence level reduced, for example to that used in estimation of Market Risk (e.g. 99% or even lower). As with Market Risk, capital could, for example, be increased/reduced by monitoring of model performance, such as back-testing on projected versus actual annual losses. It is not however the purpose of this paper to detail arguments for and against such proposals but, as described later, to call for a ‘Fundamental Review of Operational Risk’, similar to that already underway for Market Risk.

**Systemically Important Financial Institutions**

Table 5 below summarises the losses in Table 3 by the SIFI (Systemically Important Financial Institution) band in which each bank is positioned by the Financial Stability Board (FSB 2014). Note the top 3 bands (i.e. 2-4) account for over 85% of the total losses. In other words, the losses described here are concentrated amongst the most risky Systemically Important Banks (SIBs).

<table>
<thead>
<tr>
<th>SIFI Band</th>
<th>Total Losses ($ billion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>32.9</td>
</tr>
<tr>
<td>3</td>
<td>36.3</td>
</tr>
<tr>
<td>2</td>
<td>91.0</td>
</tr>
<tr>
<td>1</td>
<td>17.1</td>
</tr>
<tr>
<td>0</td>
<td>3.5</td>
</tr>
</tbody>
</table>

Table 5 Systemic Operational Risk Losses by Bank and Systemic Event

In some respects, it could be that the largest banks in the world are under the most intense public scrutiny and that it is possible, but unlikely, that there are idiosyncratic

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4 Note Band 0 refers to banks that incurred losses in systemic events but are not classified as SIFI by the FSB or like Lloyds Bank have been removed from the classification.
losses of the same magnitude that are not publicly reported, for example by Reuters or Bloomberg. In the losses summarised in Table 3, there is a bank category of ‘Other’, not shown, which totals some $11 billion (5% of total), and covers large losses such as the almost $5 billion fraud at the Korean bank Busan Savings (Thirlwell 2011). It is possible, but highly unlikely, that there are ‘hidden’ idiosyncratic losses of the same magnitude as those analysed here that have not been published in the financial media since news organizations, such as Reuters and Bloomberg, will invariably publish such market sensitive information for large losses.

Before moving on to discuss the implications of these findings it is worth noting the relationship between losses and bank size shown in Figure 3 which shows a mildly positive correlation ($r = 35\%$) between Total Losses and Bank Assets, but much of the relationship remains unexplained. If true, this low correlation argues against using bank size as the chief ‘scaling factor’ when incorporating such large losses as part of another bank’s Scenario Analysis exercise.

![Figure 3](image.jpg)

**Figure 3** – Total Losses ($\text{\$ billion}$) by Bank Assets ($\text{\$ trillion}$)

A question arises from this relationship and the data in Table 3, why do the largest banks in the world account for the bulk of these operational risk losses? One of the reasons suggested is that these banks all follow a Universal Banking business model and operate in multiple business lines in multiple banking centres around the world (Blacker and McConnell 2015). Their ‘scale’ and ‘reach’ means that they will have many more opportunities for triggering operational risk events than other non-universal banks. In addition, their central role as market makers in many global financial markets increases the likelihood of market manipulation, somewhere in their vast organisations. This would argue for using a measure of ‘interconnectedness’ (FSB 2009) as an input to decisions on the use of External Data for capital modelling purposes.

For example, a bank that operates in only one country would be unlikely to be as deeply involved as large international banks in manipulation in the LIBOR and FX markets,
which needs enormous trading positions to make manipulation profitable (McConnell 2013). That, however, does not mean that local banks could not be involved in manipulating local benchmarks as, for example, was the case of the fine on Rabobank in the BRM (LIBOR) column in Table 3.

The domination of the losses (almost 90%) by banks that have already been identified as ‘Too Big to Fail’ (FSB 2014) would argue strongly for treating these banks differently to other banks as regards the rules for estimating Operational Risk Regulatory Capital. And as instituted for credit and liquidity risks in Basel III (Basel 2010) it might be appropriate to identify ‘additional’ capital charges for Operational Risk for these banks. On the other hand, if these large losses were to be removed from the estimation of ORRC for non-SIFIs, then the modelling could be made simpler, potentially removing the need for the non-SIFI banks to use more complex AMA models. In other words, one size does not fit all banks and the use of suitably calibrated standardised approaches may be appropriate for non-SIFI banks.

**Macro-prudential Regulation**

Operational Risk has traditionally been considered an ‘internal’ risk (Curry 2012) and one that, aside from ‘external’ events such as terrorist attacks, banks can, if not eliminate, work towards minimizing the consequences for its shareholders. And, following from that perception, operational risks have been considered as being idiosyncratic to the firm and hence regulation has concentrated on ensuring firms have robust processes for managing internal operational risks. This is so-called micro-prudential regulation.

Despite the fact that the initial impetus for explicitly managing operational risk was the failure of Baring Bank in 1995 (Cruz et al 2015), until recently the idea that operational risk alone would bring down a major financial institution was considered unlikely. However, following the huge fines imposed on some of the largest banks in the USA, Thomas Curry, head of the Office of the Comptroller of the Currency (OCC) and a senior US regulator, reported that

> “Given the complexity of today’s banking markets and the sophistication of technology that underpins it, it is no surprise that the OCC deems operational risk to be high and increasing. Indeed, it is currently at the top of the list of safety and soundness issues for the institutions we supervise [emphasis added]” (Curry 2012).

Since the GFC, regulators have intensified their supervisory activities in areas such as cyber-crime (Duggan 2015) and product mis-selling and benchmark manipulation (FCA 2015). Regulators do not appear however to have considered seriously the possibility that multiple firms may be impacted by an event (say by one cyber-attack) or be fined for misconduct at the same time, thus increasing systemic risk. This has, however, been recognised by regulators as regards credit, market and liquidity risks by the introduction of macro-prudential initiatives that affect all banks, such as for example mandating ‘central clearing’ for most derivatives (Dodd Frank 2010) and changing the management structures of LIBOR benchmarks (Wheatley 2012).

Though not explicitly considered as a macro-prudential initiative, to help resolve the issue of incorporating external data into internal models, Ames et al (2015) have proposed that, for
“Low-frequency high-severity event types as CPBP where the banks shares a more common exposure say to litigation [...] regulators could specify certain parameters, such as the type of distribution and the shape parameter (exponent) that defines tail density, i.e., the degree to which fat tails dominate severity”.

In other words, regulators would collect loss data from across the industry, develop models for certain event types and then mandate that individual banks use common parameters as the basis for them “to scale the distributions to their operations, and to determine appropriate frequency assumptions” (Ames et al 2015).

But while helping to resolve some of the major issues around modelling external data, the proposal does not address other concerns raised about ORRC modelling. For example, Ames et al (2015) argue that the Basel II Event Type taxonomy is ambiguous, since “most events do not occur in isolation but are the result of (or enabled by) multiple causes” and in modelling loss distributions, practitioners are forced to identify a “primary cause”. While this is not always easy for internal small losses, it poses very difficult questions as to classification when the largest losses are considered.

For example, in the LIBOR and FX manipulation cases, there were very many ‘root causes’ no one of which can be considered ‘primary’. Each attempt to manipulate a benchmark by a submitter was fraudulent (possibly best classed as an ‘internal fraud’) but requests by a trader to a submitter to manipulate the benchmark was a breakdown in internal processes and each attempt by a trader to induce traders at other banks to manipulate a benchmark could be considered to be an external fraud. And in the FX case, sharing details of customers’ orders with others was an abuse of the CPBP category, specifically ‘misuse of confidential information’. Since the Unit of Measurement (UOM) to which a large loss is allocated will have a material impact on the capital estimated for that UOM, the decision as to which event type to use is non-trivial (Ames et al 2015).

But, while classifying losses (not necessarily into a single category) is necessary to perform quantitative analysis for capital purposes, it is ultimately not the objective. The goal of ORM is to proactively manage operational risks and estimating and allocating capital is just one step to achieving that goal. To properly manage operational risks, it is necessary to understand their ‘root causes’ and regulators are in an ideal position to do just that since they are the authorities responsible for investigating large events and apportioning blame, in the form of fines and follow-up actions, such as installing monitors.

One of the criticisms of industry databases is that while it is sometimes possible to extract data for relevance, “it is often difficult or impossible based on the limited information available” (Ames et al 2015). While this may be true of industry databases, as a result of how and why they have been developed, it is not in general true for large losses. In fact, there is copious information available on the losses described here, in the form of official inquiries, internal inquiries within firms, judgements by regulators and academic analysis. It is just that this data is not managed or analysed in any systematic manner.

There is therefore a role for a macro-prudential regulator to analyse in-depth the root causes of largest operational risk events, such as those described here and to provide guidance to micro-prudential regulators on how to identify and manage emerging
operational risks. This is a role performed by, for example, the European Systemic Risk Board (ESRB) currently concentrating on emerging credit risks. The ESRB was set up in the aftermath of the GFC and was assigned ten major tasks, of which a number are important in this context, including:

- “Identifying and prioritising systemic risks;
- Issuing warnings where such systemic risks are deemed to be significant and, where appropriate, make those warnings public;
- Issuing recommendations for remedial action in response to the risks identified and, where appropriate, making those recommendations public; etc.” (ESRB 2015).

No micro-prudential regulator has jurisdiction outside of their national borders, except for the activities of their national banks overseas, so risks that emerge across borders are not currently picked-up until too late to take mitigating action. Examples of such supranational risks were the creation, mis-rating and mis-selling of securities before the GFC and manipulation of LIBOR and FX benchmarks which crossed international borders. The central role of Credit Rating Agencies (CRAs) as a source of ‘endogenous’ risk in the US mortgage securitisation system also provides a prescient example of failure of system-wide processes (McConnell and Blacker 2011). Such historical events provide an argument for having a macro-prudential, in addition to a micro-prudential, perspective on banking products.

A Fundamental Review

In December 2014, the BCBS issued its third consultative document on the subject of a ‘Fundamental Review of the Trading Book’ (FRTB) (BCBS 2014c). These proposals, which have been also been referred to as ‘Basel 3.5’, would fundamentally change the way that internal models that are used to estimate capital for Market Risk will operate. In summary, the proposed changes will entail:

- Modification of the definition of the ‘Trading Book’;
- Using Expected Shortfall (ES) as an alternative to Value at Risk (VAR)
- Incorporation of ‘liquidity risk’ into internal models and estimation of liquidity risk over multiple horizons;
- Introduction of new capital floors; and
- Making Standardised Approaches (SA) more risk sensitive, through recognition of ‘risk factors’ that have different ‘liquidity horizons’.

It is of interest from an Operational Risk perspective that the weaknesses of the VAR measure have been recognised in the BCBS proposals and the Expected Shortfall (ES) measure promoted, although the option of using VAR has not been removed entirely. The BCBS argues that

“The revised ES model [for Market Risk] comprises an ES for a base horizon for all risk factors and a collection of incremental ES for subsets of risk factors with longer liquidity horizons, and the aggregation of these ES measures with an assumption that factor shocks are not correlated across liquidity horizons” (BCBS 2014c).

This recognises that for Market Risk, capital should be dependent on multiple ‘risk factors’, which change over different time horizons and which are better measured by an
ES than a VAR measure. In terms of the operational risk events discussed in this paper, especially the long-duration legal cases, the same logic could apply.

In order to address fundamental weaknesses of the methods currently used to estimate ORRC under Basel II, such as lack of available data and lack of a systemic perspective, the following proposals are made:

- In line with the fundamental review of Market Risk, the Basel Committee should initiate a consultation on a ‘Fundamental Review of Operational Risk’ (FROR).
- Such a review should include deep analysis of the historical experience of estimating ORRC under Basel II and consultation on, at least, the following issues related to the estimation of ORRC:
  - Recognition that different risks emerge over different horizons, rather than a fixed ‘1-year’ horizon.
  - Consideration of relaxing ‘soundness criteria’ in line with the more realistic models used in Market Risk;
  - Identification of ‘risk factors’ for Operational Risk, especially the difference in loss experience of Systemically Important Financial Institutions (SIFIs);
  - Development of models that would estimate ORRC on the basis of an Expected Shortfall measure over a longer horizon and potentially a lower confidence level;
  - Recognition that accounting provisions are strong indicators of future losses and developing methods for explicitly incorporating provisions into ORRC models.
- Methods for estimating ORRC for the bulk of banks that do not suffer systemic losses, should be simplified by use of a new Standardised Approach that incorporates recognition and weighting of relevant ‘risk factors’, such as ‘interconnectedness’.
- Development of the terms of reference for macro-prudential regulation of emerging operational risks that cross national regulatory borders.
- The concept of ‘stress testing’ of ORRC estimates by banks, especially SIBs, should be expanded, such as for example, considering potentially significant events, such as mis-selling of products such as pension plans.
- Increased recognition of the importance of ‘qualitative criteria’ in the estimation of ORRC, by introducing and weighting risk factors, such as the use of qualitative risk management tools, such as Scenario Analysis.

Given, as with Market Risk, the costs involved in changing to new methods, the Committee should ensure a comprehensive and unhurried review and consultative process with the difficult objective of both improving and simplifying the estimation of ORRC.

**Summary**

The difficulties of modelling Operational Risk Regulatory Capital (ORRC) have been identified since well before the Basel II regulations were finalised. The difficulties stem from the paucity of data available to model risk capital at the soundness criteria required to conform to Basel II (i.e. 99.9% confidence level over a 1-year horizon). It is also a stylised fact that estimation of ORRC is, because of the ‘fat tailed’ distribution of such losses, dominated by the largest losses.
One of the underlying assumptions of Basel II is that operational risk losses are idiosyncratic to the firm and are independent of one another. This paper considers that assumption and using a dataset of large losses demonstrates that the largest losses, in fact, result from fines for misconduct, such as the manipulation of the LIBOR benchmark and hence related to the largest category of Operational Risk losses (‘Clients, Products & Business Practices’ or CPBP). In these Systemic Operational Risk Events (SOREs), multiple banks are fined by multiple regulators at the same time for the same misconduct. In other words, the largest events are far from random and independent but are ‘correlated’ at the system-level. And at this systemic level, the data violates commonly used modelling assumptions concerning frequency distribution and stationarity. And thus new paradigms for modelling Operational Risk at this level is needed.

The paper argues that regulators, therefore, should consider the ‘systemic’ dimension of observed Operational Risk events in particular the need for macro-prudential, in addition to micro-prudential, regulation. And in line with the current review of capital estimation for Market Risk, it is proposed that the Basel Committee should institute a similar ‘Fundamental review of Operational Risk’.

**Declaration of Interest**

The author report no conflicts of interest. The author alone is responsible for the content and writing of the paper.
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