

A discussion of Basel II and operational risk in the context of risk perspectives

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ABSTRACT: The Basel II Capital Accord, established in 2007, provides guidelines for operational risk management, including requirements for a capital charge. The quantitative analysis for the capital charge requires inclusion of both quantitative and qualitative information, an implementation that has proven challenging for the banking industry. A contributing factor may be the interpretation and communication of risk and uncertainty, which are affected by the underlying risk perspective. Identified ambiguities in the Basel II Capital Accord indicate confusion regarding the underlying risk perspective, including uncertainty. Hence, raising the question of the underlying risk perspective and whether the Basel committee has consciously chosen this risk perspective. Answers are found by analysing the required quantitative and qualitative input as well as method, in the context of risk perspectives and key elements; such as uncertainty, accuracy and validity. Establishing awareness and a fundamental understanding of risk perspectives may reduce ambiguities in the Basel II Capital Accord, thus increasing the potential for establishing sound operational risk management.

1 INTRODUCTION

In 2007 the Basel II Capital Accord was implemented, providing guidelines for, inter alia, operational risk management including a requirement for regulatory capital. Operational risk, as defined by the Basel Committee on Banking Supervision [BCBS] (2006: 144) is “the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events”. Such events can e.g. be internal or external frauds or “fat finger” errors potentially leading to severe losses and possibly bankruptcy. The purpose of the guideline is to ensure that banks are able to withstand potentially severe operational losses; attained by robust management of operational risk and a capital designated and calculated for the purpose of covering such potentially critical events.

According to BCBS (2011) the aim of the guideline is to establish a quantitative measure, reflecting the operational risk exposure, as well as promote management of operational risk. The quantitative measure of operational risk can be established using three different approaches (BCBS 2006); the Basic Indicator Approach (BIA), The Standardized Approach (TSA) and the Advanced Measurement Approach (AMA), where AMA is the most comprehensive. The BIA and TSA use income as

the single indicator of operational risk exposure, multiplying the average income over the last three years by a set ratio to calculate the capital charge. Using income as the only indicator of operational risk exposure does not necessarily generate a risk sensitive capital charge as reduced income may be a result of poor risk management rather than low risk exposure. However, the AMA allows banks to develop internal models subject to approval by the national financial supervisory authorities. Hence, the AMA is the relevant method for the discussion of frameworks for management of operational risk in the context of risk perspectives. In addition to internal and external data the AMA requires inclusion of qualitative information in the quantitative risk analysis, represented by scenario analyses and Business Environment and Internal Control Factors [BEICFs] (BCBS 2011), an implementation that has proven challenging for the banking industry. For instance, rather than being used as an input to determine a bank’s risk exposure, BEICFs are often accounted for by making ex post adjustments to the output of the quantitative risk model (BCBS 2011: 10). The way in which the guidelines on AMA are formulated may complicate the implementation of an AMA framework through ambiguities regarding underlying assumptions and methods. A review of the guidelines does for instance reveal

contradicting statements regarding the underlying risk perspective. The guidelines contain formulations indicating that the regulators may believe that, on the one hand, e.g. traditional statistical methods along with sufficient historical observations provide an accurate measure of operational risk with limited uncertainty. On the other hand, regulators emphasize the importance of using scenario analyses and BEICFs, while at the same time implying that using such subjective measures generate more uncertainty. However, in a risk management context, the interpretation of uncertainty is closely related to the underlying perspective on risk; and even though it is rarely debated in the operational risk literature there exist several different risk perspectives. The underlying risk perspective impacts how uncertainty should be interpreted, described and communicated and can be related to several different factors, such as method, input, probability etc. For example; how should a risk analyst communicate e.g. loss event frequency and loss event severity assessments of operational risk to the board of directors in a way that they understand and are able to apply it in their decision making? When asked about uncertainties in presented risk figures, what does he/she answer? There are for instance risk perspectives where uncertainty is subjectively expressed conditioned on the background knowledge the analyst has concerning the problem domain. Another risk perspective interprets uncertainty as the gap between an estimated value and an assumed true value. The fundamental difference in perspectives has practical implications for the design of risk analysis methodologies.

A review of the Basel II Capital Accord has revealed inconsistencies in the way risk and elements of risk are discussed. The questions this paper aims to answer are; has the Basel committee consciously chosen their risk perspective and what perspective does the committee have on risk? Answering these questions is in the view of the authors essential to ensure successful development, implementation and communication of a framework for operational risk management. This paper provides an in depth account of different risk perspectives as basis for discussing the identified ambiguities in the Basel II guidelines and supporting documents.

Section 2 provides an overview of different risk perspectives and characteristics of operational risk. A discussion of the Basel II guidelines in the context of different risk perspectives is the focus in Section 3. Conclusive remarks and suggestions for improvement are provided in Section 4.

2 RISK PERSPECTIVES

Risk can be defined in many ways, and there is no broad consensus on a definition. Interested readers

are referred to e.g. Aven & Renn (2009). In this paper risk is discussed in the context of two different perspectives. The purpose is to illustrate the importance of awareness concerning the underlying risk perspective in the establishment and communication of a framework for risk management to be implemented by banks. The first perspective and interpretation has its basis in traditional statistics where risk is defined using consequences and probabilities (C,P) (see e.g. Kaplan 1991). In the second risk perspective risk is defined using consequences and associated uncertainties (C,U) (Aven & Renn 2009).

The first definition of risk (C,P) uses probabilities to express the uncertainty related to consequences of events. Here it is important to take into account that there are several interpretations of the probability concept. Basically there are two different ways of interpreting a probability (Aven 2011);

- a. As a relative frequency interpreted probability (P_f)
- b. As a subjective probability (P) .

A relative frequency interpreted probability (P_f) is defined by the relative fraction of times an event occurs if the analysed situation is “repeated” an infinite number of times, with reference to the Law of Large Numbers. This approach falls under what we refer to as an objective probability setting where the assessor seeks to estimate a “true”, unknown, value for the probability of some future event. Here, uncertainty means the gap between the estimated value and the supposed true value, and is commonly expressed through confidence intervals. The gap between the estimates and the “true” risk values could be large. Alternatively we can use subjective probabilities (also known as knowledge-based and judgmental probabilities) to express uncertainties, leading to a second-order probability interpretation (Aven 2011). In this case the assessor describes the uncertainties (degrees of beliefs) about what the true value of P_f is. The subjective probabilities are conditioned on some background information and knowledge. Hence, in the (C,P) risk perspective, risk can be described as $(C,P_f^*,U(P_f),K)$, where C is the consequences, P_f^* is the estimated probability, $U(P_f)$ is the uncertainty description of P_f and K is the background knowledge that the estimated probability (P_f^*) and the uncertainty description U is based on (Aven 2011). Applying this perspective, focus is on unobservable quantities, and adherent uncertainty.

The background knowledge that the second-order subjective probabilities (b) are based upon could be wrong or poor. Hence, in a (C,P) risk perspective, where such probabilities are used as a measure of uncertainty, the analyst could be misled

as this knowledge, and the strength of this knowledge, is not a part of the risk description. However, adopting the second risk perspective; (C, U) , the need to look beyond probabilities is acknowledged. In the (C, U) perspective risk is defined by consequences and *uncertainties*; “risk refers to uncertainty about and severity of the events and consequences (or outcomes) of an activity with respect to something that humans value” (Aven & Renn 2009: 6). Here it is acknowledged that the future is uncertain and the aim is to assess the uncertainty about underlying phenomena. According to this definition, risk is a two dimensional combination of (Aven 2011);

- Events and the consequences C
- Associated uncertainties U about events and C , including uncertainty about underlying phenomena influencing events and C .

The uncertainties are described based on some background knowledge, including expert knowledge. A risk description based on this understanding of risk takes the form (C, P, U_i, K) , where P refers to subjective probabilities, U_i represents aspects of uncertainties not captured by P and K is the background information and knowledge on which the assessed uncertainties are based. See Aven (2012) for an even more general formulation of this risk perspective.

The underlying risk perspective impacts the interpretation of uncertainty as well as how risk is understood and communicated. Basically; the two risk perspectives could be used for two different purposes (Aven 2011);

1. (C, P) when the objective is *accurate risk estimation*
2. (C, U) when the objective is *uncertainty descriptions*.

To obtain accurate estimation a large amount of relevant data must be available (empirical evidence). However, operational risk is “the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events” (BCBS 2006: 144); a complex phenomenon, characterized by complex causal interactions especially concerning rare events with potential high severity. Furthermore, the operational environment in a bank is characterized by non-stationarity caused by e.g. new products, new controls etc. Hence, to obtain a large amount of relevant data for the purpose of generating empirical evidence may be difficult. Given the characteristics of operational risk the assumption that such events can be repeated an infinite (a large) number of times under similar conditions is highly questionable. Adhering to the (C, P) risk perspective results are often evaluated in terms of accuracy, and the use of observational data is commonly associated with

objective, or correct results. Objectivity may however, be interpreted in different ways. When used in this paper the term objectivity is associated with an analysis of observed outcomes. Thus, objectivity implies the absence of subjectivity and judgment. Adopting the (C, P) perspective and attempting to assess operational losses using empirical evidence, the non-stationary characteristics in the operational environment may not be reflected, resulting in a backwards-looking approach. The underlying assumptions of the (C, P) perspective may simply not be compatible with the characteristics of the operational risk problem domain, and hence presenting the results derived under this interpretation as accurate may be questionable.

The (C, U) risk perspective is different, here the objective is to describe *uncertainty*, about events and consequences and influencing factors of events and consequences. Hence, adopting a (C, U) perspective increases the ability to reflect complex events dominating operational risk in banking.

Summarized; following the (C, P) risk perspective and adhering to the requirement of empirical data, can make it difficult to reflect the non-stationary characteristics of the operational environment in a bank. The (C, U) risk perspective, however, includes knowledge beyond past observations, acknowledging present uncertainties and the non-stationary characteristics of the operational environment. Hence, it allows for an improved ability to reflect the nature of the operational risks and predict the future operational risk profile. Communicating risk assessments derived from an in depth reflection of uncertainties related to e.g. business environment and internal control factors, increase the awareness as well as understanding of the operational risk a bank is exposed to. Additionally, the (C, U) risk perspective improves the ability to identify key factors of risk and increase the ability to promote sound operational risk management.

3 RISK PERSPECTIVES IN THE BASEL II GUIDELINES ON OPERATIONAL RISK

In the review process of the Basel II guidelines, and related documents, statements about key elements regarding risk perspectives are identified. The chosen key elements that are discussed in the context of risk perspectives are *uncertainty*, *accuracy* and *validity*. The rationale for focusing on these three elements is their inherent bond to the underlying risk perspective. As described in the previous chapter, uncertainty is fundamentally different from different risk perspectives. Furthermore, accuracy and validity also have strong dependency on the risk perspective as these terms are associated with the uncertainty concept. Thus, when using

a risk analysis in a practical context, awareness concerning the underlying risk perspective is very important. The chosen terms are also reviewed in the context of the four required input elements of the Basel II guidelines for AMA; internal data, external data, scenario analysis and BEICFs as well as the chosen or suggested analysis method. Depending on the underlying risk perspective, the development and implementation of a risk analysis framework including necessary input may look very different. Hence, without a common and clear understanding of the applied risk perspective it may be challenging for banks to develop and implement an AMA model.

Basel II is a framework on, inter alia, operational risk, established by BCBS; a committee founded in 1975 by the central bank governors from ten countries, promoting the adoption of strong risk management practices (BCBS 2006). Another forum; the Committee of European Banking Supervisors (CEBS), provides guidelines reflecting a common understanding among European supervisory authorities on the Basel II framework (CEBS 2006). On the 1st of January 2011 CEBS' responsibilities and activities were taken over by the European Banking Authority (EBA). CEBS/EBA has published a guideline on the implementation, validation and assessment of AMA, called GL10 (CEBS 2006).

In this section the Basel II framework, outlined in BCBS (2006) and BCBS (2011), as well as GL10 (CEBS 2006) is analysed in the context of the two described risk perspectives. Where ambiguities are found these are discussed in terms of the potential consequences these may have for the development and communication of frameworks for operational risk management. Evaluating the identified set of unclear statements regarding the underlying risk perspective forms the basis for a conclusion regarding the underlying risk perspective of the Basel committee.

3.1 *Operational risk management framework and measurement system*

According to BCBS (2011: 11) "the Basel II framework requires banks to develop an Operational Risk Management Framework" (ORMF); consisting of a bank's:

- "Risk organisational and governance structure;
- Policies, procedures and processes;
- Systems used by a bank in identifying, measuring, monitoring, controlling and mitigating operational risk; and
- Operational risk measurement system."

The purpose of the Operational Risk Measurement System (ORMS) is to calculate an operational

risk capital charge and should according to the Basel II guidelines be "closely integrated into the day-to-day risk management processes of the bank" (BCBS 2011: 11). Summarized; the ORMS should reflect the nature of the operational risk exposure of the particular bank being analysed (BCBS 2011). This includes reflection of, and responsiveness to changes in key operational risks, related drivers and internal controls, including changes in the internal and external environment. Additionally; the ORMS should be "credible, transparent, well-documented and verifiable" (BCBS 2011: 12).

Extracted from the outlined points of the guideline (BCBS 2011) it can be said that the aim of the Basel II guideline is to:

- Establish a forward looking capital charge that reflects the exposure to operational risk of the particular bank,
- Promote sound management of operational risk.

Furthermore, BCBS (2011: 28) states that "The building of a proper calculation dataset from available internal/external data is critical to the quantification of a bank's operational risk capital charge and for accurately representing its operational risk profile." Additionally, the verification should assure that "ORMF inputs and outputs are accurate, complete, credible, relevant, authorised and accessible" (BCBS 2011: 14). In a supplementary guideline to the GL10 CEBS (2010: 1) acknowledges that "one of the biggest challenges (...) is the establishment of an operational risk framework which, on the one hand, is able to improve the way operational risks are identified, controlled and mitigated and, on the other hand, correctly reflects the level of operational risk an institution is exposed to."

BCBS reveals that internal and external data (past observations) has the main focus in the quantification of the capital charge as well as *accurately* reflecting the operational risk exposure. However, in order to provide an accurate measure of operational risk it must be clear what the accuracy is measured against. An *accurate* operational risk profile is a challenging condition to satisfy, and any claim of accuracy requires validation. To validate an accurately reflected operational risk profile may, for instance, require reconciliation between the identified/predicted risk picture and an actual risk picture (observed events). Hence, such a method is not coherent with a forward-looking approach and may not promote proactive risk management.

The problem seems to be that the Basel II guidelines' focus is on accuracy where input and output are based on what happened in the past and seems to follow the (C,P) perspective on risk. If the Basel II guidelines adopted the (C,U)

risk perspective the guidelines would expressively focus on accounting for the present uncertainties when assessing possible future operational losses. Supporting the (C,U) perspective the guidelines could have differentiated between input that makes sense to be evaluated according to *accuracy* (e.g. past observations), and input that should not be evaluated according to *accuracy* (e.g. new products or new controls which affects past observations' future predictability). Hence, adhering to the (C,U) perspective, valuable information is not left out of the analysis because it is not *accurate*.

3.2 *Input in the analysis and method*

BCBS (2011: 10) states that "A bank should carefully consider how the data elements are combined and used to ensure that the bank's level of operational risk capital is commensurate with the level of risk to which it is exposed." In GL10 CEBS (2006: 120) argues that it should be ensured that the data holds "good enough quality". Furthermore; banks should "demonstrate that they achieve high standards in terms of comprehensiveness, appropriateness and accuracy of the data collected above the thresholds set" (CEBS 2006: 120). Additionally; CEBS (2006: 123) states that institutions using qualitative data as input should provide "sufficient evidence that the qualitative data are relevant to the intended risk objectives" and that everything possible is done to "remove biases". Furthermore, GL10 suggests monitoring the evolution of the correlation between qualitative data and observations over time. Additionally, CEBS (2006: 133) argues that "Institutions should ensure that information that is fed into the risk measurement systems is as accurate and complete as reasonably practicable."

In order to say something about *accuracy* and *good enough quality*, it is necessary to consider the context in which these aspects are assessed. The Basel II guidelines and GL10 poorly determine what data, and in which context the data should comply with these objectives. From a (C,P) risk perspective it may be reasonable to assume that "everything" should be *accurate*. However, adopting a (C,U) risk perspective, *accuracy* may only be relevant for a small fraction of the input elements in the AMA; such as internal loss data. As argued in the previous section; accuracy may not be applicable for all elements required for the AMA. Hence, it should not be stated as a requirement in the Basel II guideline because it may result in valuable information and knowledge being left out of the operational risk analysis.

Focusing exclusively on monitoring the evolution of the model prediction and the observations may promote a reactive approach for analysing operational risk. Such an approach may not

generate forward-looking predictions, and does not acknowledge the non-stationary characteristics of the operational environment as well as the present uncertainties, indicating the (C,P) risk perspective in GL10. Additionally, it may produce predictions (estimates) based on some factors that are not relevant for the future operational environment. Observations from the past cannot alone form the basis for producing predictions relevant for the future. Hence, adhering to a (C,P) perspective we are not using the best available knowledge for assessing future losses, negatively affecting the credibility of the analysis. Adhering to a (C,P) risk perspective the results may indicate a high degree of accuracy, but this requires the availability of a sufficient number of relevant observations, which regarding high severity events (with high impact on resulting capital) is difficult to obtain.

There is a tendency in the Basel II guidelines (BCBS) and GL10 (CEBS/EBA) to promote *sufficient evidence*, which often results in predictions of operational risk exposure being derived from past observations, and scenarios developed from these data. Additionally; *sufficient evidence* may generate the impression that the estimated exposure of operational risk is *accurate* and *complete*, resulting in *objective* estimates. However, when only some of the available knowledge is used, due to this "restriction", the operational risk picture is not complete, and claims of accurate risk estimates may be questionable. In order to approach *accurate* and *complete* information, all available knowledge should be used. If (C,U) was the underlying perspective, some key words, as basis for the input in the AMA model, could e.g. be *knowledge-based*, *communicating uncertainties* and *credibility*.

It is interesting that BCBS stresses that a combination of data elements is necessary when analysing operational risk. Several statements shows that the contents in some parts of the Basel II guidelines and supporting documents may be coherent with the (C,U) risk perspective. However, the majority of paragraphs addressing elements that can be associated with the underlying risk perspective (such as e.g. accuracy) indicates that the (C,P) risk perspective is applied.

3.2.1 *Internal loss data*

Internal loss data are expected to "assist in the estimation of loss frequency", "inform the severity distribution(s)" and "serve as input into scenario analyses" (BCBS 2011: 9). Furthermore, BCBS (2006: 152) argues that "The tracking of internal loss event data is an essential prerequisite to the development and functioning of a credible operational risk measurement system. Internal loss data is crucial for tying a bank's risk estimates to its

actual loss experience.” In order to “generate reliable operational risk measures” for low-frequency events CEBS (2006: 128) suggests collecting historical observations for more than five years for the purpose of ensuring sufficient data. Additionally, CEBS (2006: 128) states that “in the absence of sufficient data, institutions should make conservative risk estimates”. In the same context, scenario generated data are mentioned for constructing data for operational losses.

The purpose of the operational risk capital charge is to make sure that banks are able to withstand the occurrence of high severity events. Internal loss data, however, only reflects what has happened in the past, and does not necessarily reveal future high severity events. The stressed complexity related to low-frequency operational loss events, and the evolutionary state of the banking industry affects the relevance of historical observations potentially making such events less relevant. Non-stationary characteristics of the operational environment may result in severe events not reoccurring. Hence, increasing the required period of collecting internal data may be necessary for enabling statistical analysis under which requirements for accuracy are met, but at the cost of data relevance.

Risk *estimates* may refer to an analyst seeking to find a measure that is close to an assumed, true value, derived from the relative frequency probability interpretation, which falls under the (C,P) risk perspective.

3.2.2 External data

External data are to be “used in estimation of severity distributions” because it “contains valuable information to inform the tail of the loss distribution(s)” and it is also “essential input into scenario analysis” (BCBS 2011: 9). Furthermore, BCBS (2006: 153) states that the bank must use external data in the ORMS “... especially when there is reason to believe that the bank is exposed to infrequent, yet potentially severe, losses.” GL10 argues that external data can be an appropriate “source for capital calculation purposes, particularly when institutions have limited internal loss data, e.g. on new businesses” (CEBS 2006: 126). Furthermore, GL10 also promotes public sources of external data for finding additional information, e.g. about “severe tail events, especially on their causes” (CEBS 2006: 126).

An essential question to ask is why (or how to justify that) a bank is not exposed to infrequent, severe losses? This highlights the lack of awareness of the present uncertainties, revealing a perspective on risk coherent with the (C,P) risk perspective. One cannot know for certain that a bank is not exposed to infrequent severe losses. In a (C,U) risk perspective one would carefully consider why

infrequent, potentially severe, losses should not be included in the analysis.

In GL10 CEBS/EBA suggest the use of external data for the purpose of finding additional information about *causes*. The focus on *causes* indicates a possibility for a risk perspective more coherent with the (C,U) perspective, where causes are essential.

3.2.3 Scenario analyses

According to BCBS (2011: 9) scenario analyses should be “a part of the ORMF” and serve as “input into the AMA model”. Furthermore, BCBS (2006: 154) also states that “A bank must use scenario analysis of expert opinion in conjunction with external data to evaluate its exposure to high-severity events. This approach draws on the knowledge of experienced business managers and risk management experts to derive reasoned assessments of plausible severe losses. For instance, these expert assessments could be expressed as parameters of an assumed statistical loss distribution.” Additionally, the Basel II guideline “acknowledges that the scenario process is qualitative and that the output from a scenario process necessarily contains significant uncertainties. This uncertainty, together with the uncertainty from the other elements, should be reflected in the output of the model producing a range for the capital estimate. The Committee recognises that quantifying the uncertainty arising from scenario biases poses significant challenge and is an area requiring further research” (BCBS 2011: 9). It is also stated that scenarios should be “designed to reduce possible subjectivity and biases as much as possible” and the scenarios’ assumptions “should be based as much as possible on empirical evidence” (CEBS 2006: 126).

BCBS’ statements about scenario analyses provide a good illustration of the ambiguities regarding the underlying risk perspective adhered to under the Basel II guidelines. On the one side, BCBS enhance the inclusion of *expert opinion* and *reasoned assessments of plausible severe losses*, which could be appropriate and expected under the (C,U) risk perspective. However, on the other side, the last part of BCBS’ quote on *expert assessments could be expressed as parameters of an assumed statistical loss distribution* may indicate application of the (C,P) risk perspective as the assessment is then comparable to that of a data analysis. In a (C,P) risk perspective the expert assessment may be assigned on an overall, general level, e.g. expert assessment may be used to assess the exposure to an event directly. However, an expert is much more likely to give a well-reasoned assessment on causes of events, rather than on the event itself, especially when dealing with complex events. Adopting a (C,U) risk perspective, the expert assessment would

be assigned on a much more detailed level. Hence, at such a level it could be argued that the expert is more likely to handle problems associated with biases, and hence provide credible assessments on whether causes are present or not.

Furthermore, BCBS reveals the adoption of the (C,P) risk perspective, when stating that the model should produce a *range for the capital estimate* to reflect the *uncertainty*. Such a statement does not make sense under the (C,U) risk perspective as the analysis' results under this perspective is an expression of uncertainty. Hence, this quote from BCBS may suggest that uncertainty is not present or reduced if scenario analyses are not used; i.e. if the analyses are carried out using solely internal and external data as input. However, past observations given in the form of internal and external data points will not reflect changes in the operational environment (e.g. new/improved controls or products) in the future prediction. A *range for the capital estimate* may aid in reflecting uncertainties in the scenario analysis, but the implication that such uncertainty is not present when using historical observations is questionable. Hence, if a range for the capital estimate should be used to reflect uncertainties when carrying out scenario analyses, there is no reason why the same approach should not apply when using historical observations. I.e. predicting the future using past observations includes more uncertainty than acknowledged in the Basel II guidelines, because the basis for *producing a range for the capital estimate* is not sufficiently comprehensive.

GL10 (CEBS/EBA) also indicates a (C,P) risk perspective when stating that assumptions in scenarios should be founded on *empirical evidence* (CEBS 2006). While the intention to ensure that assumptions are valid is sound, requiring empirical evidence may exclude valid arguments and relevant input from the analysis. In order to base anything on *empirical evidence*, observations must be compared (tested) to the predictions made with e.g. a model. However, by the time it is proved empirically, the non-stationary characteristics of the operational environment may already have affected the future relevance of observations. If a (C,U) perspective was adopted, all (relevant) knowledge, including experts, would be the basis for decisions regarding scenarios for the purpose of not excluding relevant factors of the operational risk profile.

3.2.4 BEICFs

BCBS (2006) focuses on the need to capture the key BEICFs for the purpose of being more forward-looking and reflecting the controls and operating environment of a bank, as well as identifying improving and deteriorating actions. Furthermore, BCBS (2006: 154) states that BEICFs “needs to

be justified (...) based on experience and involving the expert judgment of the affected business areas”. Additionally, according to BCBS (2011: 9) “Incorporating BEICFs directly into the capital model poses challenges given the subjectivity and structure of BEICF tools. The Committee has observed that BEICFs are widely used as an indirect input into the quantification framework and as an ex post adjustment to model output.” In GL10 CEBS (2006: 127) expresses that “it might not be possible to justify the appropriateness of the sensitivity of risk estimates because of a lack of empirical evidence on the relationship between the BE&ICFs and the operational risk exposure” when ORMS is implemented for the first time. In the same context CEBS (2006: 127) states that the implementation methods “should at least be qualitatively justified”. GL10 also promotes incorporating key BEICFs that significantly influences the operational risk profile; that is “forward-looking and closely aligned with the quality of the institution's control and operating environment” (CEBS 2006: 127).

The statement about *subjectivity* and *structure* of the BEICF tools and that BEICFs are usually included by ex post adjustments may reveal that the guidelines are based on the (C,P) risk perspective. In a (C,U) risk perspective BEICFs would be given a higher priority because BEICFs often describe root causes of loss events and failures in control activities, used to prevent and mitigate losses (Andersen et al. 2013). Hence, BEICFs are a fundamental part of the foundation for assessing a bank's risk exposure, and should be included throughout the analysis rather than as an add-on (Andersen et al. 2013). The practice of carrying out ex post adjustment of BEICFs might be a consequence of what seems to be understood as the most accurate way of quantifying future losses; using objective (empirical) data, coherent with a (C,P) risk perspective. However, BEICFs can be included at an earlier stage, at the same level as internal and external loss data. As a result; loss event frequency and loss event severity assessments can be based on more information and knowledge. Hence, reflecting a more comprehensive and credible exposure to operational risk, adopting a (C,U) risk perspective.

Additionally, the statement from BCBS about *experience* may be interpreted in different ways; one interpretation is an analyst's or an expert's specific and extensive experience within the analysed object, and hence valuable input into the analysis. Another interpretation of *experience* is to justify BEICFs upon experienced loss events, i.e. past observations (empirical evidence). The first interpretation is consistent with the (C,U) risk perspective. However, taking into consideration

previously reviewed statements it appears more likely that CEBS/EBA interpret BCBS' *experience* as *empirical evidence*.

Furthermore, GL10 reveals a lack of consistency concerning risk perspectives, by stating that BEICFs should be *forward-looking*, indicating a (C,U) risk perspective. Forward-looking BEICFs may acknowledge and reflect factors about the future that may not be revealed in past experience. Hence, the objectives of *forward-looking* and *empirical evidence* can be difficult to align.

3.2.5 Method

For AMA models BCBS (2011: 7) promotes "flexibility" and desires "to explore how best to obtain risk sensitive estimates of operational risk exposure." Furthermore, "These differences in modeling approaches, whether reflected in different correlation estimates, distributional assumptions, or other critical features of the model, clearly affect the AMA methodology of individual banks and, ultimately, the amount of capital resulting from the application of the AMA" (BCBS 2011: 7). One of the general criteria suggested by CEBS (2006: 122) for the AMA models is "The model should be robust in the sense that it includes all significant drivers of the institution's operational risk profile and it should be sensitive to material changes in the institution's operational risk profile." Furthermore, GL10 promotes the development of a model that is credible and justifiable and promotes evaluation of "the accuracy of the operational risk capital figures" (CEBS 2006: 128).

BCBS' first quote signalize a flexible framework coherent with the (C,U) perspective. However, the examples in the next quote; "different correlation estimates, distributional assumptions, or other critical features of the model" as well as "clearly affect (...) the amount of capital resulting from the application of the AMA" (BCBS 2011: 7), provides examples of terminology that could indicate an underlying (C,P) perspective. If (C,U) were the underlying perspective, *predictions* instead of *estimates* would be used, and uncertainties of operational risk management would be emphasized. CEBS/EBA implies that (C,U) is the underlying risk perspective; stressing inclusion of *significant drivers* and that the model should be sensitive to material changes and *as stable as possible*; which can be interpreted as the model generating reliable predictions. Accuracy, however, as already stressed, is a challenging condition to satisfy, and implies the (C,P) perspective. If accuracy should be assured, by e.g. empirical evidence as suggested in other parts of the Basel II guidelines (BCBS) or GL10 (CEBS/EBA), it would generate backwards-looking predictions and significant drivers would be left out when analysing future loss events.

4 CONCLUSION

The Basel II guidelines' requirement on inclusion of internal and external data, scenario analyses and BEICFs suggesting that decisions and measures should be based on all the available knowledge, not only historical data, could be considered to conform with the (C,U) perspective. It is apparent from the input requirements stated in the Basel II guidelines that the BCBS is aware of the non-stationary characteristics of the operational environment. However, difficulties arise when the credibility of the analysis is assessed in terms of *accuracy*, where subjective input is considered to increase uncertainty, clearly indicating a (C,P) perspective on risk. Following the (C,U) perspective of risk, one would acknowledge the uncertainty associated with the appropriateness of past observations for the prediction of future losses. Hence, the purpose is to increase the credibility and ability to handle quantitative consequences of high severity events, while generating decision support. Additionally, if the (C,U) risk perspective was adopted, *prediction* rather than *estimation* could be a better word to use considering that all four input elements should be used in order to generate reliable predictions of the exposure to operational risk.

Hence, the analysis does not indicate a consciously chosen risk perspective, but it reveals an underlying (C,P) perspective in large parts of the Basel II guidelines. GL10 does reveal some correlations as well as ambiguities with the Basel II guidelines, when it comes to risk perspectives. Considering the identified ambiguities in the risk communication in the Basel II guidelines it is not surprising that the industry is struggling with the development of risk measurement frameworks that fully comply with the guidelines.

Operational risk is a complex phenomenon, and events reflected in past observations, are not necessarily relevant for events occurring in the future. Hence, past observations and *empirical evidence* may not be the appropriate way of ensuring the reflection of the operational risk profile. By including all (relevant) knowledge in the analysis of operational risk the basis for the prediction of future losses is more comprehensive, improving the ability to reflect an evolving operational environment. Including BEICFs at an earlier stage, as suggested by Andersen et al. (2013), improves the abilities of reflecting such changes. Hence, the "reality" addressed when adopting a (C,P) risk perspective, an approach based on observations and *empirical evidence*, is another "reality" than when the (C,U) perspective and a knowledge-based approach is adopted. More (relevant) knowledge in addition to internal and external data is favourable, and could generate a

“*model reality*” that better reflects the nature of operational risk.

It may be argued that how the assessor define risk is not so important for actual risk assessment or risk management, as long as the assessor is precise on what is described and the terminology is consistent and includes awareness on the adopted perspective’s limitations. However, in conformity with Aven (2012), this paper’s authors argue that the underlying risk perspective strongly influences how risk is analysed, and seriously affects the risk management and decision making. Hence, it may be in the interest of BCBS, operational risk managers in banking, as well as other stakeholders (including clients), to increase the awareness of risk perspectives in the continued work with developing risk management standards for the banking industry.

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