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Operational Risk in Islamic Banks: Issues of Risk Measurement

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Abstract

The issue of risk measurement is central to adapting the New Basel Capital Accord (Basel II) for both conventional and Islamic banks. Risk measurement is also crucial to an effective disclosure regime that can harness market forces to reinforce official supervision. This paper will assess key issues in measuring operational risk in Malaysian Islamic banks. In particular, this paper will focus on risk measurement using Basic Indicator Approach (BIA) and Standardized Approach (STA), and how they significantly different in determining operational risk capital charge. These approaches is dependent on bank's gross income level and its distribution. The result shows that Islamic banks get small capital relief when using STA instead of BIA. This finding indicates that the more sophisticated approach used by bank in calculating its operational risk capital charge, the more accurate capital is required for the institution to hold.

Keywords: Capital adequacy standard, Islamic banking, Operational risk, Risk management

JEL Categories: E58, G18, G21, G28, G3

1. Introduction

In many countries where Islamic banks coexist with conventional banks, there is a pressure to apply the same regulation for both types of banks and a common legal framework is generally developed. No separate regulatory laws have yet been set to govern the operations of Islamic banks, which have been trying to benefit from the support that the conventional framework can provide. It is common for Islamic banks to operate under the laws governing commercial banks, which in many instances do not support specific or tailored issues that are inherent only to Islamic banking. Iqbal et al. (1998) suggest a 'functional approach' to regulate financial institutions, where the functions performed by Islamic banks are analyzed and attempts are made to modify regulation in a way to provide them with better support.

In a global world economy, Islamic banks have to face key challenges in order to effectively compete with conventional banks. This implies that Islamic banks will need to follow up quickly and abide international standards as well. For instance, Basel II which set standards for capital adequacy and sound banking practices has become a key stone for safety that reflects supervisory concerns. Therefore, the adoption of international standards by Islamic banks will help enhance their credibility and fuel their growth worldwide.

In line with the developments in the conventional banking system worldwide, the Islamic financial institutions with special reference to Islamic banking institutions are also required to prepare to embrace the New Basel Capital Accord (Basel II) implementation (that it will come into force in 2006). By adopting Basel II, Sundararajan and Errico (2002) believe that this accord can reflect the Islamic banks' true risk; and Islamic banks can adapt the supervisory regime and enhance market discipline by encouraging sound disclosure of policies. Furthermore, Basel II is a welcome development for Islamic banking since it offers a timely and important opportunity for the IFSB to play its part in the ongoing efforts to strengthen the international financial architecture as well as to promote financial stability and market development of Islamic banking.

The issue of risk measurement is central to adapting the New Basel Capital Accord (Basel II) for both conventional and Islamic banks. Risk measurement is also crucial to an effective disclosure regime that can harness market forces to reinforce official supervision. Among the financial risks faced by a bank is operational risk. Operational risks, as argued by Van Greuning and Iqbal (2008), are related to a bank's organization and functioning, including computer-related and other technologies, compliance with bank policies and procedures, and measures against mismanagement and fraud. Unlike market and credit risk, which tend to be isolated in specific areas of our business, operational risk are inherent in all business processes.

In Basel II, operational risk is given particular emphasis, i.e. it should be measured using statistical models. While basic Basel II core principles of effective banking supervision apply equally well to Islamic banks, risk measurement and risk management practices need specific adaptations to recognize the characteristics of Islamic banks, and the disclosure of risk profile, and risk management assume particular importance in view of the role of investment accounts of Islamic banks. This will set the

stage for adopting more advanced capital measurement approaches as envisaged in Basel II, but tailored to the specific operational characteristics of Islamic finance, including the role of investment accounts.

Therefore, this paper will assess key issues in measuring operational risk capital charge in Malaysian Islamic banks by using Basic Indicator Approach (BIA) and Standardized Approach (STA). These approaches is dependent on bank's gross income level and its distribution.

The rest of the study is structured as follows. Section two appraises the conceptual framework of banking risk. Section three reviews the nature of operating risk in greater detail. This section also discusses the operational risk exposure of Islamic banking institutions that arises from the different nature of the financing and investment activities of the banks. Section four will focus on measurement of operational risk capital charge by using BIA and STA and follows by section five, the results of calculation of operational risk capital charge and section six concludes.

2. Conceptual Framework

2.1 Risks in Islamic bank

The concept of risk in Islamic banking and finance can be best understood when viewed from two dimensions: (a) prohibition of *gharar* and (b) freedom of contract. According to *shariah*, *gharar* is any elements of chance involving asymmetric information, uncertainty, risk or even speculation leading to illicit profits, such as is excluded by the religious and consequently by the mortal percepts of Islam. Islam offers full freedom of contracts to economic agents as long as the resulting contract is within the boundaries defined by *shariah* which mainly exclude *riba* and *gharar*. Given the freedom of contracts and the understanding of *gharar*, Islam fully recognizes risk generated by financial and commercial factors and elements extrinsic to the formation of the business. Among the Islamic financing methods and financial products which involve risks are *murabahah*, *bay' muajjal*, *bay' as-salam*, *bay' istijrar*, *ijarah*, *istisna'*, *mudharaba*, and *musharakah*.¹

In conventional banks, depositors have a fixed claim upon the bank's assets, according to predetermined interest rates together with a return of their capital. The conventional bank must therefore service its obligations to depositors irrespective of its actual profitability (realized profit). Consequently, any uncertainty in the income streams generated by and change in the value of the bank's assets is borne by the shareholders alone. Islamic banks, in contrast, are structured on the principle of risk sharing. This applies to the sources of fund and may also apply to the uses of fund. With respect to *mudharabah*, holders of profit sharing investment accounts (which take the place of conventional interest bearing bank deposit accounts) are essentially stakeholders with a type of limited term equity investment. The return on their investment in the bank is uncertain, since they share in the profit generated by the bank alongside the

¹ See Huq and Parveen (2006) for detail discussion on Islamic financial products and risk associated with them.

shareholders. This also exposes the investment account holders to the risk of losing any or all of their initial investment.

2.2 Key issues in risk management

Risk management is now recognized as a key activity for all corporations; banks, financial institutions, and others. Many of the disastrous losses of the 1990s would have been avoided if good risk management practices had been in place. There are two general approaches to risk management strategies for bank as well as other organization, i.e. *risk decomposition* and *risk aggregation*. The former involves managing or identifying risks one by one and handle each one separately. The latter involves reducing risks through risk diversification. In practice, banks used both approaches when they manage market and credit risks.

The ability of a bank to absorb unexpected losses, i.e. risks is critically dependent on the amount of equity and other forms of capital held. Capital is a cushion to protect the bank from an extremely unfavorable outcome. Banks are often subject to banking regulations which are mainly designed to protect depositors and ensure a stable banking and financial system by setting capital requirements for banking institutions based on international standards, for instance the new Basel II capital requirements which are scheduled to be implemented starting in 2007.

Basel II is based on three “pillars”. In Pillar 1, the minimum capital requirement for credit risk in the banking book is calculated in a new way that reflects the credit ratings of counterparties. The general requirement in Basel I that banks hold a total capital equal to 8% of risk-weighted assets remain unchanged. The capital requirement for market risk is also remains unchanged from the 1996 Amendment². However, there is a new capital charge for operational risk. A risk-weighted asset for operational risk is defined as 12.5 times the calculated operational risk capital.

Pillar 2 which is concerned with the supervisory review process allows regulators some discretion in how rules are applied but seeks to achieve overall consistency in the application of the rules. It places more emphasize on early intervention when problem arise. Supervisors are required to do far more than just ensure that the minimum capital required under Basel II is held. Part of their role is to encourage banks to develop and use better risk management techniques and to evaluate these techniques.

Pillar 3 which is concerned with market discipline requires banks to increase disclosure to the market of their risk assessment procedures and capital adequacy. Also, in some instances, banks will have to increase their disclosure in order to be allowed to use particular methodologies for calculating capital. The banks will be subjected to added pressure to make sound risk management decisions if shareholders and potential shareholders have more information about those decisions.

² In 1995, the Basel Committee issued a consultative proposal to amend the 1988 Accord. This became known as the “1996 Amendment” which requires financial institutions to hold capital to cover their exposure to market risks as well as credit risks. It was implemented in 1998.

3. Operational Risk

3.1 The concept

Operational risk is often considered as a residual risk given the fact that any risk faced by a bank that is not market risk or credit risk falls under this category. To produce an estimate of operational risk, we could then look at the bank's financial statements and remove from the income statement (a) the impact of credit losses and (b) the profits or losses from market risk exposure. The variation in the resulting income would then be attributed to operational risk. Operational risk is the risk of loss resulting from inadequate or failed internal processes, people, and systems or from external events (Basel Committee on Banking Supervision, 2001). This definition includes legal risk,³ but does not include reputational risk⁴ or the risk resulting from strategic decisions. Some operational risks result in increases in the bank's operating cost or decreases in its revenue. Other operational risks interact with credit and market risk.

The Basel Committee on Bank Supervision has identified seven categories of operational risk associated with:

- i. *Internal fraud*: an act of a type intended to defraud, misappropriate property or circumvent regulations, the law or company policy, excluding diversity/discrimination events which involve at least one internal party.
- ii. *External fraud*: an act of a type intended to defraud, misappropriate property or circumvent the law by a third party.
- iii. *Employment practices and workplace safety*: an act inconsistent with employment, health or safety laws or agreements, from payment of personal injury claims or from diversity/ discrimination events.
- iv. *Client, products and business practices*: an unintentional or negligent failure to meet a professional obligation to specific client (including fiduciary and suitability requirement) or from the nature or design of a product.
- v. *Damage to physical assets*: the loss or damage to physical assets from natural disaster or other events.
- vi. *Business disruption and system failures*: disruption of business or system failures.
- vii. *Execution, delivery and process management*: failed transaction processing or process management from relations with trade counterparties and vendors.

The financial impact associated with an operational event that is recorded in the institution's financial statements consistent with Generally Accepted Accounting Principles (GAAP). Financial impact includes all out of pocket expenses associated with an operational event but does not include opportunity costs, foregone revenue, or cost related to investment programs implemented to prevent subsequent operational risk losses. Most banks have always had some framework in place for managing operational

³ Legal risk is the risk of loss resulting from failure to comply with laws as well as prudent ethical standards and contractual obligations. It includes the exposure to litigation from all aspects of an institution's activities.

⁴ Basel II, paragraph 644. Working Paper on the Regulatory Treatment of Operational Risk

risk. However, the prospect of new capital requirements has led them to greatly increase the resources they devote to measuring and monitoring operational risk.

Basel II requires banks to keep capital for operational risk in addition to improving the way banks calculate credit risk capital. The regulators are introducing a capital charge for operational risk for three reasons. First, in an increasingly complex environment banks face many risks arising from the possibilities of human and computer error (failure). Second, regulators want banks to pay more attention to their internal systems to avoid catastrophes like that at Barings Bank. Third, the effect of the Basel II credit risk calculation will be to reduce the capital requirements for most banks and regulators want another capital charge to bring the total capital back to roughly where it was before.

The accord asks a minimum capital requirement which has to be detected against credit risk, market risk and operational risk, as well as other type of risks. In particular, it has stated a figure of 12% of minimum capital requirement that would produce a capital amount in line with the operational risk actually faced by large and complex banking institutions. In the same time, it allows different calculation approaches for the regulatory capital, rising in complexity and decreasing in capital requirements. Banks have three alternatives or approaches for determining operational risk regulatory capital. They are the BIA; STA; and the advanced measurement approach (AMA). The use of these approaches depends on the sophistication of the bank.

3.2 Operational risk in Islamic banking institutions

Following Basel II, operational risk is defined as the risk of losses resulting from inadequate or failed internal processes, people and systems or from external events. This includes but unlimited to legal and *shariah* compliance risk, but excludes strategic and reputational risks. Such risks are likely to be significant in IIFS due to specific contractual features and the general legal environment. In addition, the increasing use of structured finance transactions, for instance, securitization of loans originated by banks as way of risk management of bank's asset could expose banks to additional legal risks. Additionally, failure to comply with *shariah* is also a form of operational risk and if IIFS fail to do so, they will betray the trust of investors and therefore should be responsible for the lost income (Iqbal, 2004). Archer and Abdullah Haron (2007) identify that operational risks faced by Islamic banks can be divided into three categories:

- i. Operational risks that are consequential upon various kinds of banking activities, and which are somewhat similar for all financial intermediaries, whether *shariah* compliant or not. However, the asset based nature of financing products in Islamic banking such as *murabahah*, *salam*, *istisna'* and *ijarah* may give rise to forms of operational risk in contract drafting and execution that are specific to such product.
- ii. *Shariah* compliance risk – that is (a) risk relating to potential non-compliance with *shariah* rules and principles in the bank's operations (b) the further risk associated with the Islamic bank's fiduciary responsibilities as *mudarib* toward

fund providers under the *mudarabah* form of contract according to which in case of misconduct or negligence by *mudarib* the fund invested by the fund providers become a liability of *mudarib*.

- iii. Legal risks arising either from (a) the Islamic bank's operations or (b) problems of legal uncertainty in interpreting and enforcing *shariah* contracts.

According to Sundararajan (2005), there are specific aspects that could raise operational risks in Islamic banks as follows:

- i. the cancellation risks in non-binding *murabahah* and *istisna'* contracts; (*shariah* non-compliance risk);
- ii. problems in internal control systems to detect and manage potential problems in operational process and back office functions;
- iii. technical risks of various sorts;
- iv. the potential difficulties in enforcing Islamic finance contracts in a broader legal environment; (*shariah* non-compliance risk);
- v. the risk of non-compliance with *shariah* requirements that may impact on permissible income; (*shariah* non-compliance risk);
- vi. the need to maintain and manage commodity inventories often in illiquid markets;
- vii. the potential costs and risks in monitoring equity type contracts and the associated legal risks; and
- viii. increasing use structured finance transactions – specifically, securitization of loans originated by banks to manage risks on the asset side could expose banks to additional legal risks.

IFSB's exposure draft recommends that the proposed measurement of capital to cater for operational risk in IIFS may be based on either the Basic Indicator Approach or the Standardized Approach. Under the Basic Indicator Approach, a fixed percentage of 15% of annual average gross income, averaged over the previous three years, is set side. Under the Standardized Approach, this percentage varies according to the Line of Business (LOBs) from 12% to 18%.⁵ It is further recommended that due to different structure of LOBs for IIFS, at the present stage, the former to be used by IIFS.

3.3 Regulatory capital for operational risk

a. The Basel Capital Adequacy Framework (Basel I and Basel II)

Under the 1988 Accord, the Committee recognizes that the capital buffer related to credit risk implicitly covers other risk. The broad brush approach in 1988 Accord delivered an overall cushion of capital for both the measured risk (credit and market) and other (unmeasured) banking risk. However, the New Basel Capital Accord (Basel II) is focusing on sensitive risk other than credit and market risk. Further, developing banking practices such as securitization, outsourcing, specialized processing operations and reliance on rapidly evolving technology and complex financial products and

⁵ 12% for retail banking, asset management and retail brokerage, 15% for commercial banking and agency services, and 18% for corporate finance, trading and sales, and payment and settlement.

strategies suggest that these other risks are increasingly important factors to be reflected in credible capital assessments by both supervisors and banks. Therefore, in Basel II includes the operational risk as residual risks.

The new accord (Basel II) departs from the old accord (Basel) in several important aspects. In the new accord, a risk that has not previously been measured is added; operational risk. Additionally, if a bank's models to measure operational and other risks are approved by the national supervisor, the bank will be allowed to use them to determine its own amount of regulatory capital. In Basel II, the incentives to reward banks that possess such models are built in the form of reductions in levels of regulatory capital, which can lead to more capital at work and hence a higher yield. Therefore, Basel II introduces approaches for operational risk that have not been measured before.

The rising interest of supervisor and banking industry in the recent years for operational risk is due to the growth of e-commerce, large-scale mergers and acquisitions and the use of more highly automated technology which test integrated system and provoke a number of situations increasing operational risks.

Basel II uses a three pillars concept (i) minimum capital requirement (addressing risk), (ii) supervisory review and (iii) market discipline – to promote greater stability in the financial system.⁶ The three pillars of the Basel II play an important role in the capital framework for operational risk.

The **first pillar** presents the calculation of the total minimum capital requirement for credit, market and operational risk. The capital ratio is calculated using the definition of regulatory capital and risk weighted assets.⁷ The capital ratio must be no lower than 8%. It deals with maintenance of regulatory capital calculated for three major components of risk that a bank faces: credit risk, operational risk and market risk. The CAR as stipulated by Pillar 1 of Basel II is as follows:

$$CAR = \frac{\text{Tier 1} + \text{Tier 2}}{\text{Risk-Weighted Assets}_{(\text{Credit Risk} + \text{Market Risk} + \text{Operational Risk})}}$$

Other risks are not considered fully quantifiable at this stage. The credit risk component can be calculated in three different ways of varying degree of sophistication, namely standardized approach, Foundation Internal Rating – Based Approach (IRB) and Advanced IRB. For operational risk there are three different approaches, namely Basic Indicator Approaches (BIA), Standardized Approach (STA) and Advanced Measurement Approach (AMA). And for the market risk the preferred approach is value at risk (VaR).

The **second pillar** deals with the regulatory response to the first pillar, giving regulators much improved 'tools' over those available to them under Basel I. It also provides a

⁶ The Basel I accord dealt with only parts of each of these pillars. For example: with respect to the first Basel II pillar, only one risk, credit risk was dealt with in a simple manner while market risk was an afterthought; operational risk was not dealt with at all.

⁷ Risk weighted assets are determined by multiplying the capital requirement for market risk and operational risk by 12.5% (i.e. the reciprocal of the minimum capital ratio of 8%) and adding to resulting figures of the sum of risk- weighted assets for credit risk.

framework for dealing with all the other risks a bank face, such as systemic risk, pension risk, concentration risk, strategic risk, reputation risk, liquidity risk and legal risk which the accord combines under the title of residual risk. The **second pillar** of the Basel II recognizes the supervisory review process as an integral and critical component of the capital framework. Pillar 2 sets out a framework in which banks are required to assess the economic capital they need to support their risk and then this process of assessment is reviewed by supervisors. Where the capital assessment process is inadequate and/or the allocation insufficient, supervisors will expect a bank to take prompt action to correct the situation.

Supervisor will review the inputs and assumptions of internal methodologies for operational risk in the context of the firm wide capital allocation framework. The failure to properly manage operational risk can result in a misstatement of an institution's risk-return profile and expose the institution to significant losses. A bank should develop a framework for managing operational risk and evaluate the adequacy of capital given in the framework. The framework should cover the bank's appetite and tolerance for the operational risk, as specified through policies for managing this risk, including the extent and manner in which operational risk is transferred outside the bank. It should also include policies outlining the bank approach to identifying, assessing, monitoring and controlling/mitigating the risk.

Then the **third pillar** greatly increases the disclosures that the bank must make. This is designed to allow the market to have a better picture of the overall risk position of the bank and allow the counterparties of the bank to price and deal appropriately. It has the potential to reinforce capital regulation and other supervisory efforts to promote safety and soundness in bank and financial system. Market discipline imposes strong incentive on bank to conduct their business in a safe, sound and efficient manner. It can also provide a bank with an incentive to maintain a strong capital base as a cushion against potential future losses arising from its risk exposures. To promote market discipline, bank should publicly and in a timely fashion, disclose detailed information about the process used to manage and control their operational risk and the regulatory capital allocation technique they use.

Under the standardized framework, Basel II sets clear guidelines for the calculation of adequate bank capital for operational risk. The balance sheet underlying the rules of the accord, however, belongs to a conventional bank whose structure as well as nature completely differs from that of an Islamic bank, both in terms of assets and liabilities. No specific requirements addressing the particularity of Islamic banks' balance sheet structure were introduced under Basel II.

Recent studies on risk issues in Islamic banking and finance stress that features of Islamic banking institutions and the intermediation models that they follow require recognition of special risks to help make risk management in Islamic banking truly effective. As a result of the particular nature of Islamic banking activities, the risks borne by these institutions differ to a greater or lesser extent from those outlined in Basel I and II. For instance, Hassan (2003) notes that the traditional approach to capital adequacy and supervision based on 1988 Basel Capital Accord (Basel I) did not adequately capture the varied risks in Islamic finance facilities.

On the other hand, Chapra and Khan (2000), and Khan and Ahmed (2001) acknowledge Basel II for providing scope for proper recognition of risks in Islamic banking products through a more risk sensitive system for risk weighting assets and stronger incentives for effective risk management. In similar vein, El-Hawary et al. (2004) recognize the appropriate balance of prudential supervision (Pillar II) and market disciplines (Pillar III) of Basel II for Islamic banking institutions. Based on both of the pillars, risk measurement and management becomes a crucial element to produce an effective disclosure regime that can connect market forces to reinforce official supervision.

Given the importance of adaptation of more advanced capital measurement approaches as envisaged in Basel II, but tailored to the specific operational characteristics of Islamic banking activities, serious attempts are made by the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI) and the Islamic Financial Service Board (IFSB) to develop a better capital adequacy standard/framework that addresses the risk profile of Islamic banks.

b. AAOIFI Proposal

The risks that arise from Islamic banks' operations differ from the conventional risks faced by their peers and are not accounted for in Basel II. In 1999, AAOIFI issued the '*Statements on the Purpose and Calculation of the Capital Adequacy Ratio for Islamic Banks*'. This was the first initiative towards developing a tangible framework that properly addresses the risks faced by Islamic banks. The document proposed a method for calculating the capital adequacy ratio for Islamic banks. Much of the suggested methodology is based on Basel II standards with the key difference relating to the liability side of Islamic banks' balance sheet. Islamic banks fund their financing and investment activities through three types of accounts in addition to shareholders' equity: current, saving and unrestricted investment accounts. The current and saving accounts are very much similar to conventional banks but the investment account requires less protection (Turk Ariss and Sarieddine, 2007).

Investment accounts of Islamic banking institutions are of two types, namely restricted and unrestricted. The former cannot be considered as part of banks' source of funds since this type of funds are invested according to clients' directives and not at the discretion of the banks. Therefore, AAOIFI recommends that restricted investments accounts be included as off-balance sheet items. The implication is that such investment funds will not be included in the calculation of CAR. On the contrary, the latter should be included on the balance sheet of Islamic banks and have to be considered in the calculation of CAR.

Another difference or particularity of Islamic banks' activities is that the unrestricted investment account holders agree to share in the profit and loss with the bank. This implies that such funds cannot be guaranteed by assigning them 100% weight in calculating the CAR, or else this will violate the *shariah* principle of participation and further leads to non-*shariah* compliance risk which is part of operational risk in Islamic banks.

In conventional banking institutions, shareholders assume all risks arising from financing activities. If a bank's CAR is below requirement (8%), shareholders must increase equity capital (another possibility is the bank shift its asset allocation to a less

risky distribution and might reduce profitability). In contracts, in Islamic banks, although unrestricted investment account holders share risks with shareholders, their fund cannot be considered as equity. The rationale is that investment depositors can withdraw their funds upon maturity and reduce the sources of funds available to the bank, but the equity base remains unchanged if shareholders withdraw their funds by selling their shares to other investors (Turk Ariss and Sarieddine, 2007).

Another reason that explains why restricted investment accounts cannot be classified under equity or Tier 1 capital is that such account bearers have no voting rights. In conclusion, unrestricted investment accounts lie in between deposits and equity, and they should properly acknowledge for capital adequacy purposes. Therefore, AAOIFI proposed a risk sharing scheme between the investment account holders and the shareholders in the calculation of CAR of Islamic bank:

$$CAR = \frac{Total\ Capital}{RWA_{(Capital\ and\ Current\ Accounts)} + 50\%(RWA_{(Unrestricted\ Investment\ Accounts)})}$$

The limitation of the approach developed by AAOIFI is that it has basic similarities with Basel II and it simply focuses on the sources of funds of the Islamic banks, thus, ignoring the importance of detailing the calculation of risk weighted assets.

c. *IFSB Capital Adequacy Standard and Operational Risk Management*

Islamic Financial Services Board (IFSB) released an exposure draft number 2 in March 2005 focusing the suggestion for introducing the capital adequacy standard (CAS) for financial institutions offering Islamic banking services (IIFS).⁸ This proposal recommended a capital adequacy standard based on the Basle Committee on Banking Supervision's documents (Basel II) with the necessary modifications and adaptations to cater for the specifications and characteristics of the *shariah* compliant products and services. The document encompasses the minimum capital adequacy requirements based predominantly on the standardized approach with respect to credit risk and the basic indicator approach with regard to operational risks of the Islamic financial services (Pillar 1) and the various applicable measurement methods for market risk set out in the 1996 Market Risk Amendment. This document does not address the requirements covered by Pillar 2 (supervisory review) and Pillar 3 (market discipline) of Basel II as these two issues will be covered by separate standards. The CAS is scheduled for finalization in the year 2005 and is expected to be implemented with effect from the year 2007.

Like the AAOIFI proposal, the IFSB capital adequacy framework serves to complement the Basel II in order to cater for the specificities of Islamic banking institutions. However, while the AAOIFI focuses on the sources of funds of an Islamic bank, IFSB goes a step further by considering the uses of funds and assigning appropriate risk weights to each asset item. The major contribution of the IFSB is to acknowledge that

⁸ The term "IIFS" as used in the exposure draft refers to such financial institutions that mobilize funds as deposits and investment accounts in accordance with *shariah* rules and principles.

the uses of funds for Islamic banks, which are by nature *shariah* compliant, differ from the typical asset side of the balance sheet of a conventional bank. Additionally, the provisions for operational risk and the treatment of profit sharing investment account (PSIA) are also justified.⁹

For instance, the assets funded by either unrestricted or restricted investment accounts should be excluded from the calculation of CAR since the capital is not guaranteed by bank and any losses are to be borne by the investment account holders, and thus do not command a regulatory capital requirement. The calculation of CAR is as follows:

$$CAR = \frac{\text{Tier 1} + \text{Tier 2}}{RWA_{(Credit Risk + Market Risk + Operational Risk)} - RWA_{funded by PSIA (Credit Risk + Market Risk)}}$$

Thus, under the CAR framework, the IIFS's minimum capital requirement is assessed according to their exposure to credit risk, market risk and operational risk. Within this context, the IFSB has proposed two different methods to fine-tune the IIFS capital charges to better reflect financial risk diversities among individual credit exposures: a standardized and an internal ratings-based (IRB) approach to credit risk. The standardized approach to credit risk is based on externally provided risk assessments such as the rating assignments by external credit assessment institutions (ECAIs). IIFS is also encouraged to utilize the internal model of risk assessments (self-assessments). Value-at-risk (VaR) approach is used to measure market risk, whilst basic standard indicator (BIA), standardized approach as well as advanced measurement approach are used to measure operational risk.

The introduction of CAS attracts the interest of many researchers. The interest focuses on two aspects. First, the introduction of capital adequacy standard should address the supervisory review and market discipline, (see, Kahf (2005) and Hassan and Dicle (2005), El-Hawary et al. (2004), and Sundararajan and Errico (2002)). It is due to the different nature of risks and limited capacity for risk mitigation in IIFS. The second aspect is the specific characteristics of Islamic banks. As argued by Khaf (2005), there are qualitative similarities of treatment of credit risks between conventional and Islamic banks in Basel II, yet highlights issues that need special attention with regard to Islamic banks namely, unrestricted deposits should be related as equity, and the capital requirement for operational risk should be lower as these will be shared between equity holders and owners of unrestricted deposits.

4. Methodology: Measurement of Operational Risk

4.1 Basel's Approaches for Calculation Operational Risk Capital Charge

Given the complexity of operational risk, it is difficult to quantify it. Most of the operational risk measurement techniques are simple and experimental. The banks, however, can gather information of different risks from reports and plans that are published within the institution (like audit reports, regulatory reports, management

⁹ The PSIA (commonly referred to as investment accounts and special investment accounts) is a pool of investment funds placed with an IIFS on the basis of *mudharabah* and can be categorized on unrestricted PSIA or restricted PSIA.

reports, business plans, operation plans, error rates, etc.) A careful review of these documents can reveal gaps that can represent potential risks. The data from the reports can then be categorized into internal and external factors and converted into likelihood of potential loss to the institution.

Correct determinations of banks' risks are highly recommended by Basle II. This concerns, in particular, operational risks, which are all those management events that may determine unexpected losses. It is necessary to develop valid model or approach to measure, and consequently, predict such operational risks. Table 1 demonstrates Basel II approaches for operational risk measurement.

Table 1: Approaches for Calculation Operational Risk Capital Charge

Approaches	Measurement	Formula
Basic Indicator Approach (BIA)	Percentage of gross income (GI) for the whole bank	$K_{BIA} = \lfloor (GI_{1..n} \times \alpha) \rfloor / n = 15\%$
Standardized Approach (STA)	Percentage of gross income (GI) per business line	$K_{STA} = \{ \text{year } 1-3 \text{ max } \lfloor (GI_{1-8} \times \alpha_{1-8}) \rfloor / 3$
Advance Measurement Approach (AMA)	model-like approach framework of business lines and risk event types	$K_{AMA} = \sum_{i,j} \alpha_{i,j} * PE_{i,j} * LGE_{i,j} * EI_{i,j}$ (example AMA : parameters to be determined by the bank)

Bank using the **Basic Indicator Approach** have to hold capital for operational risk equal to a fixed percentage (denoted alpha) of a single indicator. The current proposal for this indicator is gross income. The charge may be expressed as follows:

$$K_{BIA} = \lfloor (GI_{1..n} \times \alpha) \rfloor / n$$

where,

- K_{BIA} = the capital charge under the Basic Indicator Approach
- GI = annual gross income, where positive, over the previous three years
- n = number of the previous three years for which gross income is positive
- α = 15% which is set by the Committee, relating the industry wide level of required capital to the industry wide level of the indicator.

In the **Standardized Approach**, bank's activities are divided into eight business lines. Within each business line, there is a broad indicator specified that reflects the size or volume of banks' activities in that area. The indicator serves as proxy for the scale of business operations and thus the likely scale of operational risk exposure within of these business lines.

Table 2: Beta Factors in Standardized Approach

Business Lines	Indicator	Beta Factors (%)
Corporate Finance	Gross income	$\alpha_1 = 18\%$
Trading and Sales	Gross income	$\alpha_2 = 18\%$
Retail Banking	Gross income	$\alpha_3 = 12\%$
Commercial Banking	Gross income	$\alpha_4 = 15\%$
Payment and Settlement	Gross income	$\alpha_5 = 18\%$
Agency Services and Custody	Gross income	$\alpha_6 = 15\%$

Asset Management	Gross income	$\gamma = 12\%$
Retail Brokerage	Gross income	$\delta = 12\%$

Within each business line, the capital charge is calculated by multiplying the indicator by a factor (denoted *beta*) assigned to that business line. Beta will be set by the Committee and serves as a rough proxy for the industry-wide relationship between the operational risk loss experience for a given business line and the aggregate level of the indicator for that business line. It should be noted that the indicator relates to the data reported to the business line, not the whole institution, e.g. in corporate finance, the indicator is the gross income generated in the corporate finance business line. If a bank is unable to allocate an activity to a particular business line, it is proposed that income related to that activity should be subject to the highest beta factor for which the bank reports activity. One of the main weaknesses of this approach is the issue of negative income. As mentioned by Archer and Abdullah Haron (2007), a negative capital charge in any one year for one business line is offset against the positive capital charges for the other business lines in that year, unless the total for the year is negative, in which case the input of the year to the three-year calculation is zero.

The total capital charge is calculated as the simple summation of the regulatory capital charges across each of the business lines. The total capital charge may be expressed as follows:

$$K_{STA} = \{ \text{year } 1-3 \text{ max } | (GI_{1-8} \times \alpha_{1-8}) / 3$$

where:

- K_{STA} = the capital charge under the Standardized Approach
- GI_{1-8} = annual gross income in a given year, as defined above in the Basic Indicator Approach, for each of the eight business lines
- α_{1-8} = a fixed percentage, set by the Committee, relating the level of required capital to the level of the gross income for each of the 8 business lines.

Overall, BIA and SA approaches represent too little science. Allocating capital based on simple aggregate activity measures, fails to distinguish between well-run and poorly-run unit units.

The **Advance Measurement Approach** (AMA) is the most risk sensitive of the approaches currently being developed for regulatory capital purpose. The regulatory capital requirement for the operational risk under AMA would be based on operational risk derived from the bank's internal risk measurement system. This risk estimate would be subject to a floor based on the Standardized Approach capital charge for operational risk. Thus, under the AMA bank would be allowed to use the output of their internal operational risk measurement system, subject to qualitative and quantitative standards set by the Committee. While the institution may use multiple tools in an AMA framework, they must all have the same objective of identifying key risks. The three broad types of AMA approach currently under development, which comprises of three different approaches, namely Internal Measurement Approach (IMA), Loss Distribution Approach (LDA), and Scorecard Approaches.

4.2 The data

The Islamic bank data for the empirical analysis are from the particular banks' Annual Report. The sample of the study consists of 15 Islamic banks from year 2004-2007.¹⁰ Because of both approaches are measured as the annual three-year average positive gross income as a proxy, hence we only get the average data gross income for the year 2006 and 2007.¹¹

5. Results

5.1 BIA and STA: Calculation of operational risk capital charge

A bank has three choices of approaches, the BIA, STA and AMA. BIA is the simplest approach that can be applied by all Islamic banks, either they are not qualified for or are not obliged by their regulator to use one of the sophisticated approaches, namely STA and AMA. In order to be eligible to use STA, Islamic banks need to fulfill a set of qualifying criteria. The Islamic banks that use the STA are required to map its overall annual gross income into eight business lines which are pre-determined by the Basel II. The gross income of each business is scaled by a fixed scaling beta factor. Beta is determined by Basel II, and its value contingent upon a business line's riskiness (Sundmacher, 2007). It is generally assumed that Islamic bank which moves along the spectrum of the approaches will benefit from a decreasing capital charge. In addition, the use of one of the more sophisticated approaches is assumed to result in a better alignment of actual risks taken by the institutions and the minimum capital charge the institution is required to hold.

Table 4: Capital Charge under the Basic Indicator Approach and Standardized Approach (RM '000)

Banks	BIA '06	STA '06	BIA '07	STA '07
BIMB	126056.00	108786.25	142218.00	123362.76
Muamalat	72683.00	65087.60	93110.45	83195.69
Affin Islamic Bank	19755.00	17483.08	25683.30	23104.73
Alliance Islamic bank	12097.00	11000.96	17751.15	15343.00
AmIslamic Bank	30882.00	25520.83	65531.15	54270.01
CIMB Islamic	8545.00	8235.71	29598.85	27482.32
EONCAP Islamic	28958.00	26566.50	38056.45	35895.31
Hong Leong Islamic	31627.00	27078.61	45405.80	38869.60
HSBC Amanah	28921.00	25403.52	41314.65	35978.95
Maybank Islamic	156416.00	139738.10	190807.55	169034.41
OCBC Al-Amin	14871.00	12875.76	20585.60	17157.27
Public Islamic	66573.00	54323.23	89312.70	91338.45
RHB Islamic	51218.00	45088.00	57179.80	50740.00

¹⁰ Although, Central bank of Malaysia listed 17 Islamic banks in its lists, we have constraint to include the rest because they recently incorporated in Malaysia such as Al Rajhi Banking & Investment Corporation (Malaysia) Berhad and Kuwait Finance House (Malaysia) Berhad. The date of incorporation for both bank , Al Rajhi Banking & Investment Corporation (Malaysia) Berhad and Kuwait Finance House (Malaysia) Berhad on 22 December 2005 and 10 November 2004.

¹¹ STA is calculated as the three-year average of the simple summation of the regulatory capital charges across each of the business lines in each year.

Standard Chartered	8073.00	7592.14	17896.00	16762.32
Citibank	4743.00	4702.26	6577.20	6220.49

Based on Table 4, Maybank Islamic scores the highest capital charge for operational risk for year 2006 as well as 2007 regardless of approach employed (rationale of the score, i.e. highest gross income and this issue will be discussed further later). Besides capital charges for BIA and STA, the table also implicitly indicates that Islamic banks get small capital relief when using STA instead of BIA. Thus, we may conclude that Islamic banks face this scenario when they are moving from using BIA to STA. The scenario might happen when the bulk of gross income is generated in low-beta business lines such as retail banking, asset management and retail brokerage that beta factor for all these are 12%.

Table 5: Capital under the Basic Indicator Approach (BIA)

Year	Gross Income (GI) (RM '000)	Alpha	Scaled GI (RM '000)
2004	687248	15%	103087.2
2005	884999	15%	132749.85
2006	948875	15%	142331.25
Total GI	2521122	Total scaled GI	378168.3

Table 5 shows that the total three-year gross incomes (GI) for the bank is RM2.5 billion, of which RM687 million are generated in 2004, RM884 million (2005) and RM948 million (2006). The total scaled gross income (GI) is RM378 million, resulting in operational risk capital charge of RM126 million (total scaled GI divided by 3 years). Therefore, if bank used BIA for its capital calculation, the minimum amount of capital it must hold is RM126 million.

**Table 6: Capital under the Standardized Approach (STA):
Focus on Low- Beta Business Lines (2004 – 2006)**

Year 2004			
Business line	GI	Beta	Scaled GI
Retail Banking	481926	12%	57831.12
Commercial Banking	173987	15%	26098.05
Agency Services	31335	15%	4700.25
Total GI	687248	Total Scaled GI	88629.42
.			
Year 2005			
Business line	GI	Beta	Scaled GI
Retail Banking	614315	12%	73717.8
Commercial Banking	241912	15%	36286.8
Agency Services	28772	15%	4315.8
Total GI	884999	Total Scaled GI	114320.4
Year 2006			
Business line	GI	Beta	Scaled GI
Retail Banking	630744	12%	75689.28
Commercial Banking	267013	15%	40051.95
Agency Services	51118	15%	7667.7
Total GI	948875	Total Scaled GI	123408.93

Table 6 signifies capital charge under STA. While the total GI remains unchanged at RM2.5 billion (sum of GI for 2004 – 2007), the total scaled GI is marginally smaller at RM326 million (sum of scaled GI for 2004-2007) compared to BIA's. The resulting capital charge in this scenario is RM109 million (total scaled GI divided by 3 years) which is RM17 million lower than the capital charge that was determined using BIA. Despite the fact that the bank benefits from a slight capital relief, it is not guaranteed that this decrease is sufficient to at least to off-set the compliance costs incurred by qualifying criteria of STA.

5.2 BIA vs STA

Before we go further, it is necessary to make a simple *t*-test for calculation operational risk capital charge by using Basic Indicator Approach (BIA) and Standard Approach (STA). The test is used to determine the difference between the two approaches in calculating operational risk capital charge. The hypotheses are as follows:

$$H_0: \text{BIA} = \text{STA}$$

$$H_1: \text{BIA} \neq \text{STA}$$

Table 3: Result of T-Test of Operational Risk Capital Charge Year 2006 and 2007
Paired Samples Statistics

		Mean	N	Std Deviation	Std. Error Mean
Pair 1	ORbia06	44094.533	15	44782.50138	11562.792
	ORsta06	38632.170	15	39343.34027	10158.407
Pair 2	ORbia07	58735.243	15	51374.83039	13264.924
	ORsta07	52583.687	15	45772.50922	11818.411

Paired Samples Correlations

		N	Correlation	Sig
Pair 1	ORbia06 & ORsta06	15	.999	.000
Pair 2	ORbia07 & ORsta07	15	.997	.000

Paired Samples Test

		Mean	Paired Differences Std. Deviation	Std. Error Mean
Pair 1	ORbia06 & ORsta06	5462.3633	5684.27447	1467.6734
Pair 2	ORbia07 & ORsta07	6151.5560	6753.89553	1743.8483

Paired Samples Test

		Paired Differences 95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
		Lower	Upper			
Pair 1	ORbia06 & ORsta06	2314.5171	8610.2096	3.722	14	.002
Pair 2	ORbia07 & ORsta07					

Since the calculated value of t fall in the rejection region, we may reject H_0 at 5% level of significance. It is interesting to note that the calculated t value, 3.722 for pair 1, year 2006 using BIA and STA is more than the two-tailed rejection region value, 0.002. The output of t -test for year 2007 is also same as 2006 which the t value is 3.528 more than two tailed rejection region value, 0.003 resulting the value of t fall in the rejection region. Based on the sample evidence, we may conclude the two approaches that use to measure operational risks capital charge relatively give different result although the same proxy, i.e. gross income, is employed as bank's operational risk. Hence, there is a significant different between two approaches in determining operational risk capital charge.

5.3 Appropriateness of gross income as proxy for calculation of operational risk capital charge

Due to the fact that Islamic banking institution' shareholders should be liable for any losses due to operational risk and the bank capital charged for it, therefore this type of risk should be measured carefully. The three methods of measuring operational risks proposed in Basel II (Section 4.1) would need considerable adaptations in Islamic banks owing to the specificities noted earlier.

BIA approach uses a gross income as a proxy measure of exposure to operational risk. According to Archer and Abdullah Haron (2007) it requires banks to hold capital for operational risk equal to the average over the previous three years of a fixed percentage of positive gross income.¹² Years in which gross income is negative are ignored. The proposed percentage is 15%. However, the use of gross income as the basic indicator for operational risk measurement could be misleading in Islamic banks, insofar as large volume of transactions in commodities, and the use of structured finance raise operational exposures that will not be captured by gross income (Sundararajan, 2005).

In contrast, STA that allows for different business lines would be better suited, but would still need adaptation to the needs of Islamic banks. In particular, agency services under *murabahah*, the associated risks due to potential misconduct and negligence, and operational risks in commodity inventory management, all need to be explicitly considered for operational risk measurement (Sundararajan, 2004 & 2005).

Operational risk is considered high on the list of exposures of Islamic banks. A survey conducted by Khan and Ahmed (2001) shows that the managers of Islamic banks

¹² Gross income is defined (for conventional banks) as "net interest income plus net non-interest income". This measure should: (i) be gross of (a) any provision and (b) operating expenses including fees paid to outsourcing services provider (however, fees received for providing outsourcing services should be included and (ii) exclude (a) realized profits/loss from the sale of securities in the banking book and (b) extraordinary or irregular items as well as income derived from insurance (Simon Archer & Abdullah Haron, 2007).

Gross income is defined (for Islamic banks) as the sum of : (a) net income from financing activities (e.g. selling price less purchase price in *murabahah* and *salam*, lease rental in *ijarah*), gross of any provisions and operating expenses and depreciation of *ijarah* asset (b) net income from investment activities (c) fee income (e.g. commissions and agency fees) LESS: (d) IAHs' share of income and exclude extraordinary income from insurance activity (Simon Archer & Abdullah Haron, 2007).

perceived operational risk as the most critical risk after mark-up risk. The survey finds that operational risk is lower in fixed income assets of *murabahah* and *ijarah* and the highest one in *diminishing musharakah*. The relatively higher ranking of the instruments indicate that banks find these contract complex and difficult to implement.

With regard to different business lines as in STA, Islamic banks may choose contract-based instruments in addition to the business lines because each contract or financing mode inherent certain risk at the different level of scale. Hence, Islamic bank also need complementary guidance in managing risks, particularly relating to the specificities of financing mode or contract-based instruments. Each contract should be assigned different beta factors, e.g. the more complicated structure and difficult to implement, the higher operational risk it perceives, hence higher beta factors were assigned.

6. Conclusion

The Basel II's rationale for introducing three increasingly sophisticated approaches in calculating operational risk capital charge is to create an incentive for banks to improve their risk management and measurement methods. In addition, Islamic banks will benefit from lower capital throughout the process from gradating from the least to the most sophisticated measurement tools. While the resulting hypothetical capital charge might have been more in line with the bank's actual risk profile over the observation periods, thus would have provided a better buffer once the losses were announced, but the true sources of the operational risk losses would not have been detected. Therefore all methodologies might not only have provided the institution with reactive measure to absorb losses once they were detected, but might captured either the traders' fraudulent behaviour or the control deficiencies in the bank.

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