

Risk Measurement and Disclosure in Islamic Finance and the Implications of Profit Sharing Investment Accounts¹

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The paper discusses key issues in the measurement and control of risks in Islamic Financial Services Institutions, particularly the implications of profit sharing investment accounts (PSIA) for risk measurement, risk management, capital adequacy and supervision. Cross country data on a sample of banks reveal a considerable smoothing of returns paid to PSIA, despite wide divergences in risk. This suggests that the sharing of risks with PSIA is fairly limited in practice, although, in principle, well-designed risk (and return) sharing arrangements with PSIA can serve as a powerful risk mitigant in Islamic finance. Supervisory authorities can provide strong incentives for effective and transparent risk sharing and the associated product innovations, by linking the extent of capital relief on account of PSIA with appropriate supervisory review of the risks borne by the PSIA (equivalently the extent of displaced commercial risk assumed by the shareholders), and by requiring adequate disclosure of these risks. A value-at risk (VAR) methodology is proposed for measuring these risks.

1. Introduction and Summary

Globalization, changes in regulatory environment, and the growth in Islamic financial institutions and markets, together call for strengthened risk management in Islamic Financial Services Institutions (IFSIs), in order to enable them to compete effectively and remain sound and stable. This is because, the IFSIs face a unique mix of risks that arise both from the contractual design of instruments based on shari'ah principles, and the overall legal, governance, and liquidity infrastructure governing Islamic Finance.

Fundamental to effective risk management, however, is a process of appropriate risk measurement that recognizes the specific mix of risk factors in Islamic Financial Contracts. The issues of risk measurement and disclosure are central to adapting the New Basel Capital Accord (Base 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.

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The purpose of this paper is to review selected issues in the measurement of risks in IFSIs, and consider, in particular, the implications of profit sharing investment accounts (PSIA or investment account for short) for risk measurement, risk management, capital adequacy and Supervision. The paper examines, using cross section data on a sample of banks, the relationship among the returns on PSIA, the returns on bank deposits generally in the banking system, the return on assets and equity, and the level of risks. The analysis shows that in practice there is considerable smoothing of returns on investment accounts despite wide divergences in risk, and hence very little risk sharing with investment accounts. The paper proposes a specific approach to measure the actual sharing of risks between shareholders and investment accounts holders, based on value-at-risk (VAR) methodology. The main conclusions of the paper are as follows: 1). Appropriate management of PSIA, with proper measurement, control, and disclosure of the extent of risk sharing with investment accounts holders, can be a powerful risk mitigant in Islamic finance. 2). Supervisory authorities can provide strong incentives for effective overall risk management, and transparent risk sharing with PSIA, by linking the size of capital relief on account of PSIA to a supervisory review of bank policies for risk sharing, and by mandating the disclosure of risks borne by PSIA and of the displaced commercial risk borne by the shareholders, as part of the requirements for granting capital relief. The evolving standards for capital adequacy, supervisory review, and transparency and market discipline are consistent with these proposals.

Several key conclusions and policy messages can be highlighted at the outset.

- The unique mix of risks in Islamic Finance and the potential role of investment account holders in sharing some of the risks, call for a strong emphasis on proper risk measurement, and disclosure of both risks and risk management processes in IFSIs.
- Effective risk management in IFSIs (and a risk focused supervisory review process) requires that a high priority be given to proper measurement and disclosure of
 - Aggregate banking risks (to reflect the volatility of *muḍārabah* profits accruing to Investment account holders)
 - Specific types of risks (to control effectively the extent of credit, market, operational and liquidity risks)
 - Facility specific risks (to properly price individual facilities by measuring the full range of risks embedded in each facility)
- Progress in risk measurement, disclosure, and risk management will, however, require a multi-pronged effort:
 - To strengthen accounting standards and harmonize them with prudential standards;

- To initiate a systematic data compilation process to enable proper risk measurement, including through developing central credit and equity registries suitable for Islamic finance
- To build a robust governance and creditor/investor rights infrastructure that would foster Islamic money and capital markets—based on innovative uses of asset securitization-- as a foundation for effective on balance sheet risk management, including through transparent apportioning of risks to investment account holders.
- To foster this transformation of investment accounts into an effective risk mitigant (in addition to collateral and guarantees) through product innovations supported by proper disclosure and reserving policies that makes transparent the extent of risk being borne by the Investment accounts, and the risk-return mix being offered.
- To provide supervisory incentives for effective risk sharing with PSIA, by linking the capital relief on account of PSIA to the extent of actual risks shared with PSIA, and by requiring adequate disclosure of these risks as a basis for capital relief.

All this will set the stage for eventual adoption of more advanced capital measurement approaches envisaged in Basel II and their adaptations for Islamic finance as outlined in the relevant IFSB standards. The paper highlights some of the measurement issues and policy considerations in promoting effective risk sharing between owners and investment accounts holders, and proposes a value-at risk methodology for measuring and monitoring such risk sharing.

2. Background

Recent work on risk issues in Islamic finance has stressed that features of IFSIs, and the intermediation models that they follow, entail special risks that need to be recognized to help make risk management in Islamic Banking truly effective.² Hassan (2000) noted 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. In a similar vein, recent studies in the Islamic Development Bank discuss the special risks in IFSIs (Chapra and Khan (2000) and Khan and Ahmed (2001)). These studies survey the risk management practices of IFSIs, and note that the new Basel Capital Accord (Basel II) provides 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.. These studies also highlight a set of issues in Islamic Jurisprudence (“*fiqh*” Issues) that need to be resolved to facilitate

² In many documents, the term Institutions Offering Islamic Financial Services (IIFSs) is used rather than Islamic Financial Services Institutions (IFSIs); In this paper, the terms IFSIs, IIFSs , and Islamic Banks will be used interchangeably for convenience.

effective supervision and risk management. A recent World Bank study (El-Hawary and others(2004)) considered the appropriate balance of prudential supervision and market discipline in Islamic finance, and the related implications for the organization of the industry. In parallel, recent studies from the IMF focus on financial stability implications of Islamic banks (Sundararajan and Errico (2002), Marston and Sundararajan (2003), and V.Sundararajan (2004)). These studies also stress the importance of disclosure and market discipline in Islamic finance; they also note that in addition to the unique mix of risks, for a range of risks, Islamic Banks may be more vulnerable than conventional counterparts, owing in part to the inadequate financial infrastructure for Islamic Banks, including missing instruments and markets, and a weak insolvency and creditor rights regime, factors that limit effective risk mitigation.

Therefore, systemic stability in financial systems with Islamic Banks requires a multi-pronged strategy to bring about:

- Suitable regulation and disclosure framework for IFSIs;
- Robust financial system infrastructure and adequate macro-prudential surveillance in order to provide the preconditions for effective supervision and risk management; and
- Strengthened internal controls and risk management processes within IFSIs.

Accordingly a comprehensive risk-based supervision is needed for IFSIs, supported by a clear strategy to build up risk management processes at the individual institutions' level, and robust legal, governance and market infrastructure at the national and global levels. In recognition of this need, international community has established the Islamic Financial Services Board (IFSB), headquartered in Kuala, Lumpur, to foster good regulatory and supervisory practices, help develop uniform prudential standards, and support good practices in risk management. (See "IMF Facilitates Establishment of IFSB"; IMF news brief no.02/41, May, 2002. <http://www.imf.org/external/mp/sec/nb/2002/nb241.htm>)

IFSB has advanced the work on capital adequacy framework and risk management in IFSIs, through the issuance of draft consultative papers on these topics in 2005 (see IFSB 2005a and 2005b). In addition, work is underway (in various IFSB working groups and task forces) on corporate governance standards, on disclosure standards to promote transparency and market discipline, and on additional guidelines on prudential and legal framework for Islamic banks. Recent discussions coordinated by the IFSB have again reinforced the importance of building a robust financial infrastructure for Islamic finance -- which constitutes the precondition -- to support the sound functioning and effective supervision of Islamic Banks.

Among the preconditions, the need for adequate institutional Infrastructure for liquidity management is now increasingly recognized as critical for effective

supervision and soundness in Islamic finance. This is because, the absence of efficient Islamic money market instruments suitable for liquidity management by banks and monetary operations by central banks, has weakened Islamic Banks' profitability and incentives for risk management. In order to address this issue, IFSB is planning to establish a task force on Islamic money markets that would develop guidelines to strengthen systemic liquidity infrastructure for Islamic Finance. In particular, recent developments in Islamic financial markets, particularly the emergence of innovative asset securitization as a tool for Shari'ah-compatible sovereign bond issues, augurs well for the further development of Islamic money and capital markets and more effective risk and liquidity management based on trading in these instruments (See IOSCO (2004), for a survey of recent developments in Islamic Capital markets). Money and capital market development along these lines will in turn require supporting legal, accounting and governance infrastructure that is robust. Implementation of these wide ranging policy and operational reforms would, however, require a comprehensive and well sequenced strategy for the medium term development of Islamic financial markets and institutions. The development of enabling infrastructure for Islamic money and capital markets is particularly important in such a strategy. This would at the same time facilitate greater reliance on equity type instruments by IFSIs, greater use of investment funds of different risk-return combinations catering to the varying needs of investment depositors, and more active issuance and trading of securitized assets for risk and liquidity management.

The development of IFSIs, playing active roles in both banking and capital markets, requires an integrated approach to both regulation and risk management, and a significant reliance on transparency and market discipline to reinforce supervision. Regulatory approach has to integrate the elements of both banking supervision and securities regulation, owing to the diverse range of activities of IFSIs spanning banking and payment services, and capital market activities to support both customers' needs and risk management purposes. The IOSCO's Islamic Capital Market Fact Finding Report notes that there is consensus that the conventional securities regulation framework (based on IOSCO objectives and principles) equally applies to Islamic Capital Market with the addition of some form of Shari'ah approval or certification process, and enhanced disclosure relating to Islamic capital market products. The report, however, recognizes that while conventional principles of securities regulation can be applied to the Islamic capital market, individual jurisdictions may perceive a need for more specific guidelines to ensure that the unique aspects of Islamic capital market products are appropriately regulated. Similarly, while basic Basel core principles of effective banking supervision apply equally well to IFSIs, 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 practices assume particular importance in view of the role of investment accounts and capital market activities of IFSIs.

In particular, the three - pillar framework of Basel II and the language of risks it introduces, while ideally suited to the needs of Islamic finance, would need to be adapted to its operational characteristics. This would require a medium term effort involving: i). Strengthening existing supervisory framework to achieve full compliance with Basel Core Principles of Banking Supervision; (ii) Developing appropriate risk measurement and disclosure procedures supported by systematic efforts to build up data bases needed for risk measurement; (iii) in parallel, building up the core elements of financial infrastructure and risk management instruments to support sound development of Islamic finance. 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. Key issues in measurement and monitoring of specific risks in Islamic finance are first reviewed before considering disclosure and supervision issue

3. Measuring Risks in Islamic Finance

3.1 . *Mudārabah* Risk

The way risks are shared between investment account holders who invest on a *mudārabah* basis, and the bank as a *mudārib*, plays a crucial role in Islamic finance. The share of unrestricted investment accounts in the total deposits of Islamic Banks varies considerably from near zero (holding only demand and savings deposits) to over 80% in some banks (Table 1). The implications of such profit & loss sharing deposits for risk measurement, disclosures, and bank governance generally has been a topic of several studies (See Clode Michael (2000) and AAOIFI (1999)). In this section, we will highlight specific risk measurement issues that need to be addressed in monitoring risk-return trade off in investment deposits. The focus is on the financial risks faced by the unrestricted investment accounts; for restricted investment accounts, the risks for banks & depositors are those attributable to the specific assets to which the investment account returns are linked, and the risk measurement issues discussed in this paper can be readily applied to the relevant asset portfolio. Both restricted and unrestricted investment account holders also face fiduciary risks—risks of negligence and misconduct—reflected in the quality of internal controls, corporate governance, and risk management processes of the IFSIs acting as *mudārib*.

In its most general form, risk is uncertainty associated with a future outcome or event. To an investment account holder in an Islamic bank the risk is the expected variance in the measure of profits that is shared with the depositor. This variance could arise from variety of both systemic and idiosyncratic (i.e. Bank specific) factors. Actual risk in the investment account is dampened in practice by profit equalization reserves (PER). Such reserves are used to reduce or eliminate the variability of return on investment deposits, and offer returns that are aligned to market rates of return on conventional deposits or other benchmarks. In addition, banks may use investment risk reserves to redistribute over time the incomes

accrued to the investment accounts. Nevertheless, from an investor's point of view, the true risk of *muḍārabah* investment in a bank can be measured by a simple Profit – at – Risk (PAR) measure. For example, standard deviation of the monthly profit as a percentage of assets, σ_p , provides the basis for a simplest measure of risks of holding an investment account.

From a monthly time series of *muḍārabah* profits (as a share of assets), its variance (and the standard deviation σ_p) can be calculated, and assuming normality, Profit at Risk can be calculated as

$$\text{PAR} = Z\alpha \sigma_p \sqrt{T}$$

where $Z\alpha$ = is the constant that gives the appropriate one-tailed confidence interval with a probability of $1-\alpha$ for the standard normal distribution (e.g. $Z_{.01} = 2.33$ for 99% confidence interval).

T = holding period or maturity of investment account as a fraction of month.

Such aggregate PAR for a bank as a whole provides a first cut estimate of risks in unrestricted *muḍārabah* accounts. Such risk calculations could also be applied to individual business units within the bank (also for specific portfolios linked to restricted investment deposits). In addition, if specific risk factors that affect the variation in *muḍārabah* profits can be identified, this σ_p can be decomposed further in order to estimate the impact of individual risk factors, and this would help refine the PAR calculation. In practice, however, profit equalization reserves (PER) and investment risk reserves are actively used by IFSIs to smooth the return on investment accounts. As a result, risks in investment accounts are absorbed, in part, by banks themselves, insofar as profit equalization reserves is strongly positively correlated with net return on assets (gross return on assets minus provisions for loan losses), -- i.e. PER is raised or lowered when the return on assets rises or falls, and hence the investment accounts are insulated from both gains and losses. Such absorption of risks by bank capital is referred to as “displaced commercial risk” by AAOIFI (1999). The correlation between PER and the asset return could, therefore, be viewed as an indicator of “displaced commercial risk”. Thus, the precise relationship between the risk to investment account holders and the aggregate risk for the bank as a whole arising from the variability of net return on assets (gross return net of specific provisions) depends upon the policies toward profit equalization reserves and investment risk reserves; These policies determine, in effect, the extent of risk sharing between investment accounts and bank capital. These relationships and an empirical analysis of the determinants of return on investment accounts (RIA) are presented in Appendix 1, and further discussed in section 4.

Against this background, the true risks borne by investment account holders can be made transparent by disclosing the definition of *muḍārabah* profits, the level and variations in these profits and in profit equalization reserves, as well as policies toward establishing PER that will determine its variance as well as its correlation

with the asset return. At the same time, transparency of internal controls and governance arrangements, including risk management processes, would also be important to provide assurances of integrity of IFSIs as a *muḍārib*. The measurement of such fiduciary risk could be subsumed under operational risk measurement discussed in section F below. For a discussion of appropriate practices in defining *muḍārabah* profits, see AAOIFI, Financial Accounting Standard No.6, and the Framework Of the Rate of Return (October 2001, and revised 2004) issued by the Bank Negara Malaysia. For examples of estimation of such earnings and profits-at-risk measures for Islamic Banks, see Hakim (2003) and Hassan (2003).

3.2 Credit risks in Sales Based Contract

Murābahah and other sales based facilities (*istiṣnāʿa*, *ijārah*, *salam*, etc.) dominate the asset side of Islamic banks, ranging from 80% to 100% of total facilities. Equity type facilities still constitute a negligible proportion of assets in most banks. Thus, credit risk – the losses in the event of default of the borrower or in the event of a deterioration of borrower’s repayment capacity – is the most dominant source of risks in an Islamic Bank as in conventional banks. The method of measurement of credit risks in conventional banks apply equally well to Islamic banks, with some allowance required to recognize the specific operational characteristics and risk sharing conventions of Islamic Financial Contracts.

Credit risk can be measured based on both the traditional approach that assigns each counter party into a rating class (each rating corresponds to a probability of default) as well as more advanced credit value-at-risk (Credit VAR) methods discussed later in the section. The basic measurement principle under both these approaches is to estimate the expected loss on an exposure (or a portfolio of exposures) owing to specified credit events (default, rating downgrade, some non-performance of specified covenant in the contract etc...) and also, to calibrate unexpected losses (deviations from the mean) that might occur at some probability level. Expected losses are provisioned and regarded as an expense that is deducted from income, while unexpected losses (up to a tolerance level) are backed up by capital allocation. The risk weights attached to various exposures on the bank’s asset side (in the New Basel Capital Accord, for example) in effect represent the banks’ or supervisor’s Judgement on the unexpected losses on the exposures that should be absorbed by capital. The calculation of loss – both expected and unexpected – in an individual loan will require estimates of:

- Probability of default (or probabilities of rating down grades from one rating class to another);
- Potential credit exposures at default (or at the time of rating transition);
- Loss given default (or reduction in the value of the asset following a rating transition).

Proper measurement of these three components of credit risk, and calculating unexpected losses are the fundamental requirements of the New Basel Capital Accord (Basel II). Measurement of these components for the case of sales-based contracts – *murābahah* and *salam* – is discussed below.

The default could be defined in the same way as for conventional Banks, based on financial condition of the borrower and the number of days the contract is overdue.³ Estimation of the probability of default is traditionally based on ex-ante assignment of ratings to counterparty exposures or a portfolio of exposures of a particular variety (such as all commodity *murābahas* for a class of goods). This can follow any one of the traditional approaches: credit scoring, industry analysis, cash flow/ financial statement analysis; A modern approach that can be used for larger listed companies is based on market information on equity prices. Observed market value of firm's equity and estimated volatility of equity prices can be used to estimate the likelihood of default using the option pricing approach to bankruptcy prediction.⁴ In practice various methods can be combined during the risk management process in order to arrive at a credit rating and the associated probability of default based on historical experience. The estimation of probabilities – or correct assignment of ratings – will however require historical data on loan structure and performance, borrower characteristics and on broader industry and macroeconomic environment; and thus the ratings will change over time as financial conditions and environment changes.

In many countries, supervisory authorities have relied on five rating categories – one high quality (performing loans) and four low-quality ratings (watch, substandard, doubtful, and loss),-- and assigned specified provisioning percentages for each rating to reflect expected losses. Thus, total provisions as a percentage of loans, or share of loans classified as bad and doubtful (non performing loans), or non-performing loans net of provisions as a percentage of total loans, etc. are the commonly used ex-post measures of credit risk that applies to all banks. Many large internationally active banks have developed their own internal rating systems that allow for more ratings categories. An examination of a sample of Islamic banks suggests that they typically compile and disclose classification of various Islamic facilities according to asset quality based on categories typically used by supervisors such as, “current”, “substandard”, “doubtful”, etc. But only a few Islamic banks disclose internal or external ratings of assets or of details of provisions for different facilities and other more detailed credit risk measures (Table 1).

Since the ratings assigned to counterparty could change overtime due to changes in circumstances, credit risk measurement falls into two types – Default

³ Basel II definition (para 452).

⁴ For a survey of new approaches to credit risk measurement and an overview of traditional methods see Saunders(2001).

Model and Mark to Market Model. Default Model recognizes only two states of the world: a firm is either performing or defaults; in the Mark to Market Model, a firm's credit rating changes from one rating class to another with some probability over a time horizon, and this changes the present value of the loan (i.e., expected cash flows discounted by the risk-adjusted discount rate corresponding to the new rating class will change as the loan migrates from one rating to another). The computation of expected and unexpected losses, the core of risk measurement, will of course depend upon the model chosen, which in turn depends upon data availability.

Losses will clearly depend upon the potential credit exposures at the time of default (exposure at default (EAD)). In the case of simple contracts with a specified schedule of repayments, exposures at the time of default will depend mainly on contractual terms relating to scheduling of Instalments and the size of deferred payments net of any initial advance payment or projected prepayments if allowed. In general, exposure at default would be facility specific, depending upon the extent of discretion that the borrower can exercise in drawing down lines of credit, prepaying already drawn accounts, or any specific events that affect the value of contingent claims (e.g., guarantees to third parties). In *murābahah*, and *salam* Contracts, exposure at default in most cases would simply be the nominal value of the contract. In long-term *ijārah*, and *istiṣnā'*⁵ a contracts, EAD will depend upon projected environmental factors that will be facility specific.

Losses will ultimately depend upon the rate of recovery following default, or in a mark to market model, the reduction in the value of the loan if ratings change. Loss given default (one minus recovery rate time's exposure at default) is likely to depend upon ease of collecting on the collateral, value of the collateral, enforceability of guarantees if any, and most importantly on the legal environment that determines creditors rights and the features of insolvency regime. For example, the juristic rules for *murābahah* imply that "in case of insolvency, creditor should defer collection of the debt until he becomes solvent".⁵ The precise interpretation of such considerations would determine the length of time needed to recover overdue debt. In addition, there could be additional legal risks owing to difficulties in enforcing Islamic Finance contracts in certain legal environments.⁶ Moreover, the inability of Islamic Banks to use penalty rates as a deterrent against late payments could create both higher risk of default and longer delays in repayments.⁷ Finally, the limitations on eligible collateral under Islamic Finance – or excessive reliance on commodities and cash collateral – may exacerbate market and interest rates risks generally, and reduce the potential recovery value of the loan if commodity collateral proves too volatile in value. For these reasons, LGD in

⁵ AAOIFI (2001), Financial Accounting Standard Number 2, Appendix B.

⁶ Djojosedjito (2003).

⁷ Chapra and Khan (2000)

murābahah facilities could be different, probably higher, than in conventional banks, thereby affecting size of losses and capital at risk.

Given the estimates probability of default, or probabilities of transition from one rating class to another (Transition Matrix), and the estimated loss given default (or change in value of loan for any given transition from one rating class to another), the expected and unexpected losses can be readily computed. For example, in the Default Model, expected loss is given by:

Expected Loss = $P \times \text{LGD} \times \text{Exposure}$, Where LGD is expressed as a proportion of exposure. The unexpected loss can be calculated based on assumptions on the distribution of default and recoveries. Assuming that LGD is fixed, and that borrowers either default or do not default, the default rate is binomially distributed, and the standard deviation of default rate is:

$$\sigma = \sqrt{P(1-P)}$$

Therefore a measure of unexpected loss on the loan is:

$$\text{Unexpected loss} = Z\alpha \sqrt{P(1-P)} \times \text{LGD} \times \text{Exposure}.$$

$Z\alpha$ above is a multiple (for example, a normal deviate) that limits the probability of unexpected losses to a specified probability level. This is the value-at-risk for this credit facility, representing the amount of capital needed to cover the unexpected loss in this exposure. In the case of Mark to Market Model, the calculation of expected loss and unexpected loss takes into account the prospects for both upgrades as well as downgrades of the loan, and considers the change in value of the loan for each possible change in the rating of a facility from its current level, and the corresponding probability of rating transition.⁸

While similar considerations apply in the case of *salam* contracts for calculating counter party credit risk, there is an additional commodity price risk embedded in these contracts that should be added to the credit risk. The commodity price risk will arise even when the counter party does not default, and when there is default (e.g. Delivery of substandard good, or delayed delivery of good, etc) the commodity price risk could be included as part of the loss given default. Thus potential loss in a *salam* contract is the sum of loss due to credit risk, and the loss due to commodity price risk when there is no credit risk. In addition there could be a correlation between these two types of risks (for example due to common factors such as draught that could affect both commodity price risk and counter-party credit risk), which is ignored for the time being for simplicity. In the absence of liquid commodity markets as well as Sharī'ah-compatible hedging products to mitigate price risks, commodity price risk can be measured by calculating the value-at-risk of commodity exposures in different maturity buckets using historic

⁸ See Wilson (1998), and Caouette, Altman, and Narayanan (1999) for detailed illustration.

data on prices. While commodity exposures can be treated as part of market risk measurement for capital allocation purposes, it is important to compute this market risk separately for each *salam* contract or for a portfolio of *salam* contracts and add it to the credit risk so that the full risk in each contract (or portfolio of contracts) can be properly measured and taken into account in the pricing the contract (or the facility). Also, the estimated commodity price risk should be regularly monitored as price volatility could change over time due to shifts in macroeconomic and market – specific conditions.

Finally, credit risk of a portfolio of exposures and facilities could be lower or higher depending upon the extent of diversification or concentration in specific credit categories. The credit risk measurement can take into account the benefits of diversification by computing the joint distribution of default events based on correlations between different classes and segments of the portfolio i.e. correlations between defaults among counterparties and joint probability of default of any pair or group of counterparties can be estimated. This can form the basis for valuing the loan portfolio and computing the expected loss in the loan portfolio as a whole, based on the joint distribution of components of the portfolio. In some models, default rates and transition probabilities can be made a function of macroeconomic variables. The probability distribution of gains and losses of the loan portfolio, or the loan facility can then be used to compute both expected and unexpected losses (at a given probability level). In case of loans to a diversified group of individuals and small businesses, with standard Instalments and commodity leases, supervisors and banks might treat the class of loans as a retail exposure with smaller risk weight (reflecting lower Value-at-Risk due to diversification effects). At the same time credit concentrations by sectors and rating classes should be monitored as alternative indicators of credit risk.

3.3 Equity Risks in *Muḍārabah* and *Mushārah* facilities

These are equity type facilities, typically a very small share of total assets in part reflecting the significant investment risks that they carry. In a sample of Islamic banks examined the share of *muḍārabah* and *mushārah* facilities and traded equities varied from 0% to 24%, with a median share of about 3%. A measure of the potential loss in equity exposures that are not traded can be derived based on the standard recommended in Basel II (paragraph 350); Given the net equity exposures, the loss can be estimated by using the probability of default corresponding to a debt exposure to the counterparties whose equity is being held, and applying a fairly high loss given default such as 90 % to reflect the equity risks. A measure of both expected and unexpected loss (UL) could then be computed from these parameters. In addition, *muḍārabah* facility may need to be assigned an additional UL due to operational risk factors, with the extent of operational risk adjustment depending on the quality of internal control systems to monitor *muḍārabah* facilities on the asset side. High quality monitoring would be very important in Islamic banks, since the finance provider cannot interfere in the

management of the project funded on *muḍārabah* basis. In the case of *mushārah*, the need for operational risk adjustment may be less, insofar as the bank exercises some management control. If the banks' equity interest in a counter party is based on regular cash flow and not capital gains, and is of long-term nature linked to customer relationship, a different supervisory treatment, and a lower LGD could be used. If, however, equity interest is relatively short term, relies on capital gains (e.g. traded equity), a VAR approach, subject to a minimum risk weight of 300 % could be used to measure capital at risk (as proposed in Basel II).

3.4 Market Risks and Rate of Return Risks

The techniques of market risk measurement in the trading books of Islamic Banks should be broadly identical to those in conventional banks. The trading book, in Islamic Banks, however, is likely to be limited, to traded equities, commodities, foreign exchange positions, and increasingly various forms of *sukūks*. A large share of assets of Islamic Banks also consist of cash and other liquid assets, with such short-term assets typically exceeding short-term liabilities by a large margin, in part reflecting limited availability Shari'ah compatible money market instruments. Against this background, exposure to various forms of market risk can be measured by the traditional exposure indicators such as:

- Net open position in foreign exchange;
- Net position in traded equities;
- Net position in commodities;
- Rate-of-return gap measures by currency of denomination;
- Various duration measures of assets and liabilities in the trading book.

Most Islamic Banks compute and often disclose liquidity gap measures – gap between assets and liabilities at various maturity buckets – and hence the computation of rate-of-return or re pricing gap should be fairly straightforward. More accurate duration gap measures may also be available in some banks. (For a discussion of gap and duration measures and their availability in banking statistics, see IMF(2004) Compilation Guide For Financial Soundness Indicators. Duration measures are important indicators of financial soundness, but they are not readily available in many banking systems). Impact on earnings of a change in exchange rate, equity price, commodity price, or rates of return can be directly obtained by multiplying the appropriate gap or other exposure indicators by the corresponding price change. Such a simple approach will not, however, suffice for computing the impact of changes in interest rates on equity type exposures of fixed maturity (such as *muḍārabah* and *mushārah*). The impact of changes in the rates of return on the expected rate of profits (i.e. *muḍārabah* and *mushārah* income) would need to be first computed, or equivalently the equity exposures should be adjusted by a multiplicative factor (that a supervisor can specify) before computing gaps in each maturity bucket. In the presence of longer maturity assets & liabilities, change in

the present value of assets (in the sense of discounted value of projected future cash flow) due to shifts in rates of return would be a more accurate measure of market risk than the estimated change in earnings in a reference period, and this can be calculated using various duration gap measures. See Baldwin (2002) for a discussion of duration measures in the context of Islamic Banking.

Such gap measures may not, however, capture the maximum losses that could occur (at some probability level), particularly in Islamic Banks. They do not properly recognize other market related risks arising from changes in spread over benchmark rates, or twists in the yield curve, or shifts in market volatility, which could affect potential losses. For these reasons, market risk is commonly measured by various value-at-risk (VAR) measures. This is particularly important, given the likely importance of equities and commodities in Islamic Bank balance sheets, which have potential to cause large losses. For example, for both commodities and equities, VAR based on 99 % confidence level (one-sided confidence interval) could be computed. VAR could be based on quarterly equity returns (*muḍārabah* or *mushārah* profit rate) net of a risk free rate, or quarterly or monthly changes in commodity prices.

In most Islamic Banks, the rate-of return risk in the banking book is likely to be much more important than market risk in the trading book. The rate-of-return gap and duration gap applied to the banking book would provide measures of exposures to changes in benchmark rates of return, and the impact of these changes on the present value of bank earnings. For example, a simple stress test of applying a 1 % point increase in rates of return on both assets and liabilities maturing/ or being reprised/ at various maturity buckets would yield a measure of potential loss (or gain) due to a uniform shift in term structure of rate of return.

Alternatively, the impact on present value of earnings of shifts in rate of return can be calculated directly

from duration measures:

$$\text{Impact of change in rate of return} = (D_A - D_L) \Delta i_r$$

Where: D_A = duration of assets

D_L = duration of liabilities

Δi_r = change in rate of return

Another important source of risk is the possible loss due to a change in the margin between domestic rates of return and the benchmark rates of return (such as LIBOR), which may not be closely linked to the domestic return. Many Islamic banks use an external benchmark such as LIBOR to price the mark up in *murābahah* contracts, in part reflecting the lack of reliable domestic benchmark rate of return. If domestic monetary conditions change requiring adjustments in returns on deposits and loans, but the margin between external benchmark and

domestic rates of return shift, there could be an impact on asset returns. This is a form of “Basis risk” that should be taken into account in computing the rate-of-return risk in the banking book (and also market risks). Existence of this basis risk highlights the importance of developing a domestic rate of return benchmark so that both deposits & assets can be aligned to similar bench marks.

3.5 Liquidity Risk

This risk is interpreted in numerous ways such as extreme liquidity, availability of liquid assets to meet liabilities, and the ability to raise funds at normal cost. This is a significant risk in Islamic Banks, owing to the limited availability of Shari‘ah compatible money market instruments and LOLR facilities. Standard measure of liquidity risk is the liquidity gap for each maturity bucket and in each currency. The share of liquid assets to total assets or to liquid liabilities is also a commonly used measures. While the availability of core deposits which are rolled over, and not volatile, provides a significant cushion for most Islamic Banks, the remaining volatile deposits can not be readily matched with short-term liquid assets, other than cash and other low-yielding assets;

In addition, specific aspects of Islamic contracts could increase the potential for liquidity problems in Islamic Banks. These factors include: cancellation risks in *murābahah*, the Shari‘ah requirement to sell *murābahah* contracts only at par thereby limiting the scope for secondary markets for sale based contracts, the illiquidity of commodity markets, and prohibition of secondary trading of *salam* or *istiṣnā‘* contracts. (See Syed Ali 2004)

3.6 Operational Risk

This is defined as “the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events. This includes legal risk, but excludes strategic and reputation risk”.⁹ Such risks are likely to be significant in Islamic Banks due to specific contractual features and the general legal environment. Specific aspects that could raise operational risks in Islamic banks include the following: (1) The cancellation risks in non binding *murābahah* and *istiṣnā‘* contracts, (2) problems in internal control systems to detect and manage potential problems in operational processes and back office functions, (3) technical risks of various sorts, (4) the potential difficulties in enforcing Islamic Finance contracts in a broader legal environment, (5) the risk of non-compliance with Shari‘ah requirements that may impact on permissible income, (6) the need to maintain and manage commodity inventories often in illiquid markets, and (7) the potential costs and risks in monitoring equity type contracts and the associated legal risks. In addition, 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.

⁹ Basel II, paragraph 644.

The three methods of measuring operational risks proposed in Basel II would need considerable adaptations in Islamic Banks owing to the specificities noted earlier. 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. In contrast, the standardized approach 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 *mudārabah*, 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.

4. Overall Risk of an Islamic Bank and Approaches to Risk Mitigation

Potential losses due to each category of risk could be quantified and aggregated to derive the total impact of the different risks, and examine the adequacy of capital to absorb the risks. However, it is unlikely that the unexpected losses will exceed their upper bounds at the same time for different types of risk, and the arithmetic total of individual risks will be an overestimate of the aggregate VAR for the bank as a whole. Such an aggregate VAR is, however, important for informing investment account holders of Islamic Banks, who are expected to share in the overall risks. An overall risk measure could be obtained from historical distribution of earnings, and calculating earnings volatility, as already discussed.

A key issue for Islamic Banks is to manage the risk sharing properties of Investment Account- both restricted and unrestricted- in order to mitigate some of the risks to share holders. Thus, in addition to collateral, guarantees, and other traditional risk-mitigants, the management of risk-return mix, particularly of unrestricted investment account holders, could be used as a key tool of risk management. Appropriate policies toward profit equalization reserves (and possibly investment risk reserves) coupled with appropriate pricing of investment accounts to match the underlying risks, would improve the extent of overall risk sharing by these accounts. Under current practices, reserves are passively adjusted to provide a stable return to investment account holders, effectively not allowing any risk mitigation through investment account management. For example, many banks with sharply divergent risk profiles and return on assets, seem to be offering almost identical returns to investment account holders, that is broadly in line with the general rate of return on deposits in conventional banks. These relationships are analyzed empirically using data from a sample of 14 Islamic Banks in 8 countries (and for two time periods for each bank). A simple correlation analysis of data on net return on assets (RA-SP), return on equity (RE), return to investment accounts (RIA), general market return on deposits, and capital to asset ratio, suggests that (see Charts 1, 2, 3, and 4, Appendix 1):

- Return on investment accounts is uncorrelated with net return on assets, as well as with return on equity, in contrast to a positive & significant relationship that would be expected if the return on assets were shared between investment accounts and bank owners, without adjustments in various reserves.
- Return on investment accounts is significantly positively correlated with general market return on deposits, suggesting significant reliance on profit equalization reserves (and investment risk reserves) in order to align the returns on investment accounts with market rates.
- Return on equity is strongly positively correlated with net return on assets.
- Multiple regression analysis of return on investment accounts and its determinants (Table 1) shows that return on investment accounts is significantly and positively related to market return on deposits, even after taking into account any sharing of returns with equity holders. Surprisingly, however, a higher (or lower) net return on assets, for any given level of deposit rates and capital asset ratios, seems to reduce (increase) the return on investment accounts, with the change in the asset returns being absorbed by adjustments in the return on equity.

Thus evidence is consistent with a significant amount of return smoothing, and a significant absorption of risks by bank capital (and thus, only a limited sharing of risks with investment accounts). This raises a broader issue of how best to measure empirically the extent of risk sharing between unrestricted investment accounts and bank capital. A specific framework for such measurement, based on Value-at-Risk (VAR) methodology is suggested in the Appendix to this paper.

Effective investment account management would, however, require disclosure of overall risks facing these account holders (and share holders), and offering them a range of products with different risk-return combinations. This in turn would require more active management of assets, with greater reliance on securitizing loans originated by banks and trading of these loans in the market to match the risk and maturity profile of assets with risk and maturity profile of liabilities. Such on-balance-sheet risk management based on securitization would seem a more feasible alternative for Islamic Banks than the use of derivatives and other more standard off-balance-sheet risk management tools that are available for conventional banks. This is because, shari'ah compatible futures, options, and swap markets are not yet available, and could take time to develop. Thus new product innovations, based on innovative uses of Islamic asset securitization, would facilitate development of products with specific risk return combinations for restricted investment accounts and better control of the risks in unrestricted investment accounts.

Another challenging issue for Islamic Banks is to recognize the specific bundling of risks in individual facilities, and the associated correlation among risks, and price the risks for each facility in a centralized and integrated manner.

For example, *murābahah* and *salam* facilities will have a mix of operational risk, credit risk, and commodity price risk, and these should be estimated and aggregated at the facility level in order to price the facility accurately. Aggregation of all different risks by type of risks is, in any case, important for ensuring adequacy of capital and effective control of different types of risks.

5. Disclosure Regime For Islamic Banks

Discussion above suggests that for IFSIs, both aggregate measures of Value-at-Risk for banking organization as a whole, as well as measures of specific types of risks need to be measured and disclosed. For comparison, Table 2 provides of summary of current disclosure practices of a sample of 15 Islamic Banks, based on the published annual reports.

The disclosure practices of Islamic Banks are highly varied, and Supervisor's authority to impose disclosure norms is also highly varied. Nevertheless, the AAOIFI Financial Accounting standards (FAS) – in particular FAS No. 1, which establishes the content of financial statements to be published – provide a sound basis for further developing prudential disclosures. Such further development should have two key purposes:

- Develop consumer- friendly disclosures to inform investment account holders on the inherent overall risks that they face, and the related reserving policies.
- Develop market-oriented disclosures to inform public at large, particularly other professional counterparties, including regulators (who will require more details, not publicly disclosed) on capital, risk exposures and capital adequacy, along the lines of Pillar III of Based II.

The current AAOIFI standards, and the supervisory disclosure rules do not cover the quantitative risk measures of the type discussed in Section III. Development of new disclosure standards particularly on credit risk and equity risk exposures would, however, require significant further development of databases to calculate the underlying parameters, such as PD, LGD and EAD, and VAR measures at both aggregate and disaggregated levels. While data for market risks can be built over time by individual banks, data bases needed for credit risk measures can however, benefit from cooperative approaches among Islamic Banks.

In particular, cooperative approaches, coordinated by supervisory authorities, to build credit registries for Islamic Finance facilities, or include Islamic Finance data in existing credit registries, could lead to better credit risk measurement, and facilitate the adoption of core elements of Basel II in due course. In some countries with Islamic Banks, the central banks operate public credit registries to support their supervision functions, but the extent to which Islamic facilities can be separately identified in the registries is not clear. (For a survey of credit reporting systems around the world see Miller (2003)). There is now increasing recognition

that the credit registries with appropriate modifications in data content could facilitate systematic credit risk measurements. (See Artigas (2004) for a discussion of the type of data needed in Credit Registers to make them useful for strengthened credit risk measurement envisaged under Basel II).

A work programme that emphasizes market discipline (Pillar III) and core elements of supervision (Pillar II), both adapted to facilitate better risk management by Islamic Banks, is the first step before planning the adoption of more advanced capital measurement approaches of Based II. Giving priority to phasing in consumer and market disclosures would be an appropriate initial step in such a transition. Strengthening the supervisory review process (Pillar II) would require a strategy to achieve compliance with Basel Core Principles. This is also an essential step in encouraging improved risk measurement and disclosure. In many countries with Islamic banks, available information on Compliance with Basel Core Principles seem to suggest that the disclosure requirements for banks relating to risk management processes and detailed risk exposures need strengthening; Moreover, the introduction of charges for market risk is relatively recent, and supervision of market and other risks is still under development.

6. Summary and Policy conclusions

Application of modern approaches to risk measurements, particularly for credit risk and overall banking risks is important in Islamic Finance for at least four reasons:

- To properly recognize the unique mix of risks in Islamic Finance contracts;
- To ensure proper pricing of Islamic Finance facilities, including returns offered to investment account holders;
- To manage and control various types of risks;
- To ensure adequacy of capital and its effective allocation, according to the risk profile of the IFSI.

The preliminary review of current state of financial reporting and disclosure in IFSI's suggest, that systematic future efforts at data compilation would be needed particularly to measure credit and equity risks with some of accuracy. The situation is similar for many conventional banks, but the need to adapt new measurement approaches is particularly critical for Islamic Banks because of the role investment account holders play, the unique mix of risks in Islamic finance contracts, and the need to more actively use security markets and securitization products for risk management. For these reasons, rapid progress in consumer friendly disclosures to inform investment account holders of the risk-return mix they face, and market-oriented disclosures to inform markets of capital adequacy, risk exposures and risk management, are important.

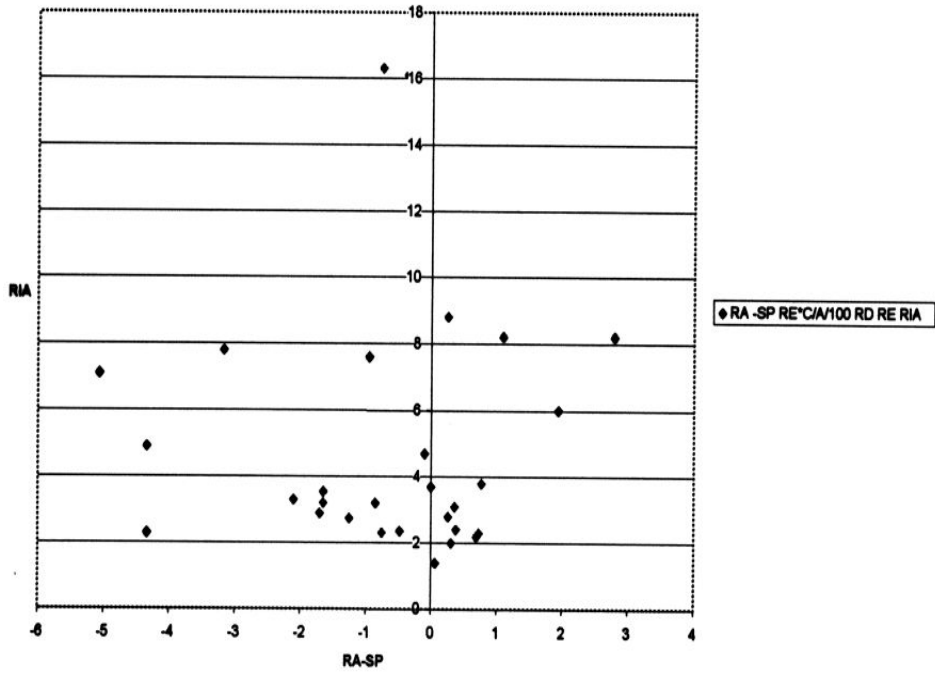
In addition, managing the risk-sharing property of investment accounts through proper pricing, reserving, and disclosure policies would greatly enhance risk management in Islamic Finance. This requires, measurement and disclosure of aggregate value at risk of *muḍārabah* income in the consolidated balance sheet of IFSIs, and greater use of asset securitization in order to offer assets of specific risk return characteristics to investment account holders. Also a measure of the extent to which the risks to share holders are reduced on account of risk sharing with investment account holders should be the basis of any capital relief or lower risk weights on the assets funded by investment accounts. For example, the proposed capital adequacy standard for Islamic banks (IFSB 2005b) calls for supervisory discretion in determining the share “ α ” of risk-weighted assets funded by PSIA that can be deducted from the total risk-weighted assets for the purpose of assessing capital adequacy. This share “ α ” represents the extent of total risk assumed by the PSIA, with the remainder absorbed by the shareholders on account of displaced commercial risk.

These observations suggest several policy and operational considerations and proposals:

- Appropriate measurement of credit and equity risks in various Islamic Finance facilities can benefit from systematic data collection efforts, including by establishing credit (and equity) registries. Such registries for Islamic Finance facilities can be developed by including data on Islamic Finance contracts in existing credit registries, or by developing registries specifically for Islamic contracts. Such a move could be a very useful first step toward adopting the evolving prudential standards for Islamic finance; the latter, in turn, is based on adaptations of new Basel capital accord to incorporate the specific features of Islamic finance, and serve as a transitional step toward more advanced capital measurements in due course.
- IFSIs would require both centralized and integrated risk management that helps control different types of risks while allowing disaggregated risk measurements to price specific contracts and facilities, including the risk-return mix offered to investment account holders. This integrated approach to risks would need to be supported by appropriate regulatory coordination and cooperation among banking, securities and insurance supervisors.
- IOSCO Securities Regulatory Principles and Basel Core Principles for Effective Banking Supervision should be adapted to the specifics of Islamic Finance, by issuing additional guidelines and guidance on specific issues. Fully implementing these Core Principles in the context of Islamic Finance is critical to more advanced risk and capital measurement approaches and the associated disclosures.

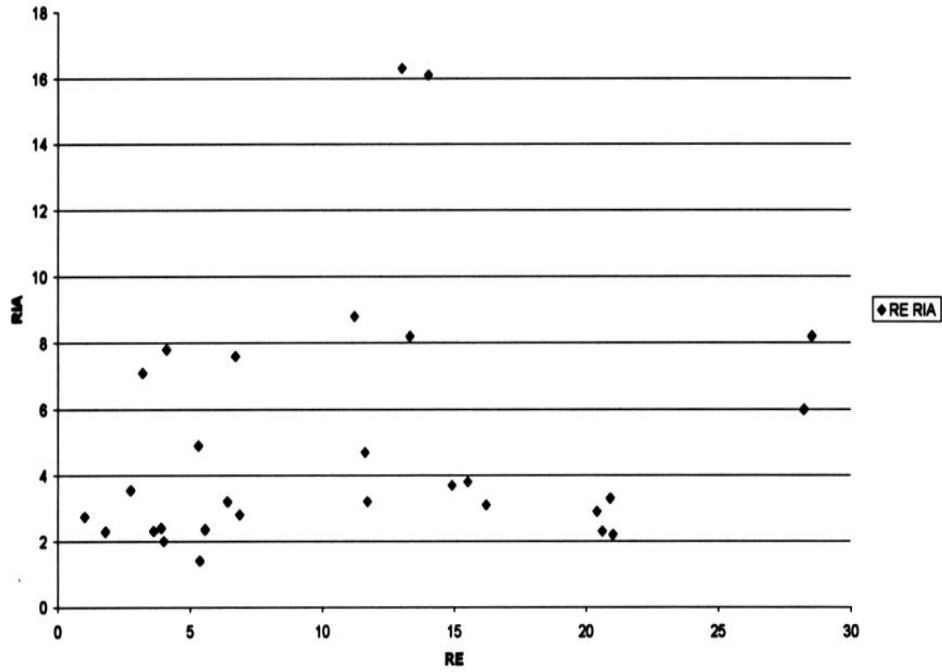
- Given the special nature of investment accounts, with its links to return on assets, fostering adequate Asset Liability Management -- ALM is critical. In the absence of hedging instruments and rate of return benchmarks, effective ALM requires appropriate development of asset securitization, promoting Islamic Money markets through innovative uses of such securitization, and establishing bench mark rates of returns through effective monetary operations.
- Financial system infrastructure needs to be strengthened in order to provide the foundations for market development and to facilitate effective risk management: First, Capital markets need to be fostered with an emphasis on asset securitization, by developing the needed preconditions relating to governance, accounting, and creditor rights. This would facilitate securitization of bank loans, and the development of investment -account products as claims on such securitized asset pools, whose risk levels can then be made transparent and closely managed. At the same time Islamic Money markets and systemic liquidity arrangements should be strengthened, based on innovative uses of asset securitization.
- Disclosure regime for IFSIs needs to become more comprehensive and transparent, with a focus on disclosures of risk profile, risk-return mix and internal governance. This requires coordination of supervisory disclosure rules and accounting standards, and proper differentiation between consumer friendly disclosures to assist investment account holders, and market-oriented disclosures to inform markets.
- Supervisory review process should monitor and recognize the actual extent of risk sharing by investment account holders in assessing capital adequacy, and thereby encourage more effective and transparent risk sharing with investment account holders. Disclosure of risks borne by PSIA and shareholders should be a requirement for granting capital relief on account of PSIA. The measurement of these risks, and estimation of appropriate capital relief can be based on VAR methodology as discussed in the Appendix.

Chart 1: Net Return on Assets (RA - SP) Against Return on Investment Accounts (RIA)

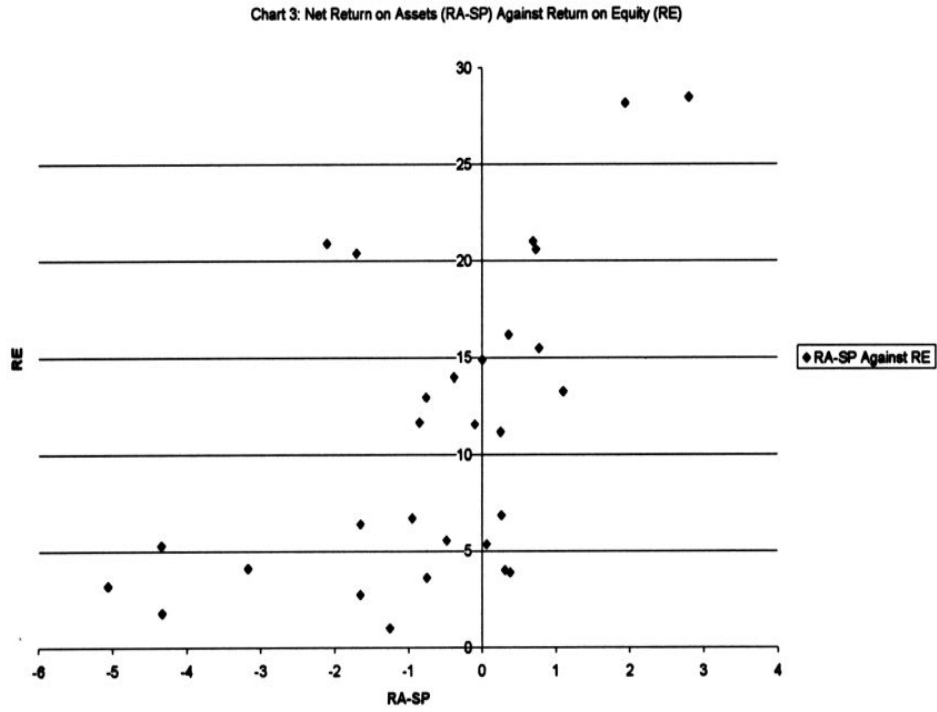


Note: Correlation Coefficient = 0.0251, not significantly different from zero.

Chart 2: Return on Equity (RE) Against Return on Investment Accounts (RIA)

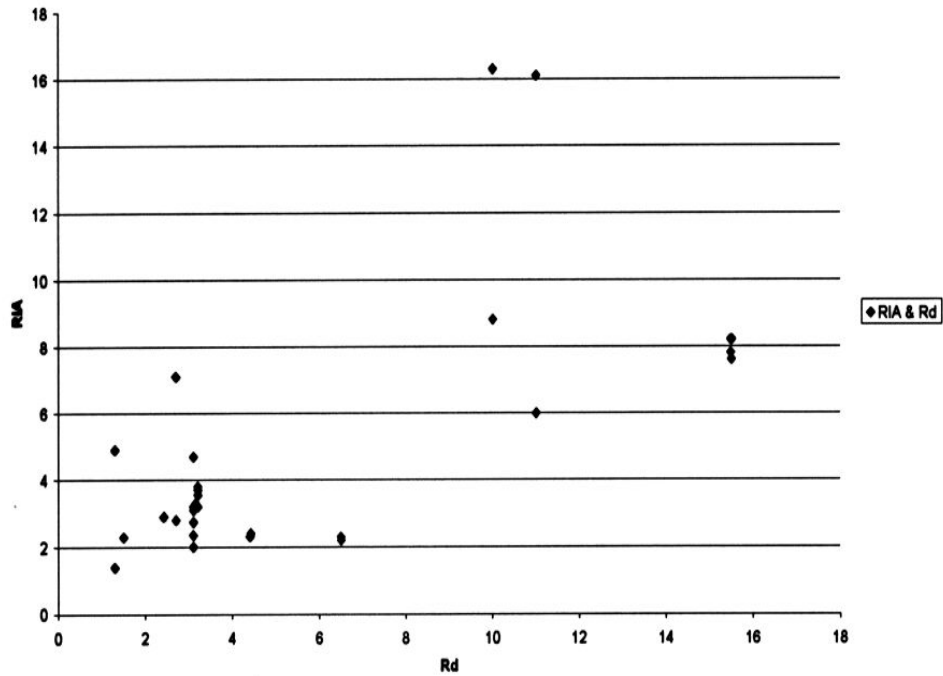


Note: Correlation Coefficient = 0.179, not significantly different from zero.



Note: Correlation Coefficient = 0.580, significantly different from zero.

Chart 4: Return on Investment Accounts (RIA) against General market deposit rate (Rd)



Note: Correlation Coefficient = 0.654, significantly different from zero. With t-statistics of 4.487; An increase in market deposit rate of 1 percentage point leads to an increase in investment account return of 0.5 percentage points.

Table 1: Determinants of Return on Investment Accounts (Standard Error in Parenthesis)

1. $RIA = 2.67 - 0.13(R_A - S_P) + 0.14 Re + 0.09 C/A$
(1.94) (0.52) (0.12) (0.10)
ADJ. $R^2 = -0.0441$, SEE = 3.88
2. $RIA = 1.80 - 1.10(R_A - S_P) - 0.05 Re + 0.84 Rd - 0.26 C/A$
(1.29) (0.38) (0.08) (0.15) (0.09)
ADJ. $R^2 = 0.5463$, SEE = 2.55
3. $RIA = 0.67 - 0.59(R_A - S_P) + 0.05 Re + 0.57 Rd$
(1.38) (0.38) (0.09) (0.13)
ADJ. $R^2 = 0.4177$, SEE = 2.90
4. $RIA = 1.28 - 1.15(R_A - S_P) + 0.814Rd - 0.24 C/A$
(0.86) (0.36) (0.13) (0.08)
ADJ. $R^2 = 0.5590$, SEE = 2.52
5. $RIA = 1.21 - 0.48(R_A - S_P) + 0.584 Rd$
(0.98) (0.32) (0.12)
ADJ. $R^2 = 0.4332$, SEE = 2.8592

Note: Ordinary Least Square (OLS) Regression based on data for 14 Islamic Banks in 8 Countries, for two time periods, yielding total of 28 observations. Insofar as RIA and RE are jointly determined, OLS will not yield consistent estimates. Alternative estimation methods using Instrumental Variables will be used when data set is expanded to include other exogenous variables and additional observations.

Table 2: Disclosure practices of Islamic banks

Items of Disclosure	Comments
Risk management framework and practices	Disclosures are presented at a very general level, occasionally mentioned the existence of specific committees, such as ALM committee
Classification of facilities by asset quality, and data on NPLs	All banks disclose classification of facilities by supervisory categories such as current, substandard etc. Only some banks (30%) disclose NPLs. Only one bank mentioned the use of internal rating system.
Specific provisions	Most banks (94%) disclose this as a total, Provisions as % of assets varied from less than 1% to 6%.. Only some banks(30%) disclose provisions classified by facilities.
Sectoral distribution of credit, and connected exposures	Many banks (66%) disclose this
Large exposures	Very few banks (6%) disclose this
Capital adequacy	All banks disclose capital asset ratios – ranging from 2.5% to 38.4%; while many (66%) disclose regulatory capital to risk weighted assets
Value-At Risk (VAR)	None disclose this; One bank reported using VAR.
Liquidity ratios	All banks disclose various liquid asset ratios. Ratio of liquid assets to short term liabilities ranged from 13% to 144%.
Maturity Gap	Many banks (64%) disclose gaps at various maturity buckets
Deposit composition: Share of Investment deposits to total deposits	Generally disclosed, ranging from 0% to 95%, with some banks (36%) reporting no investment deposits
Composition of facilities: Share of equity type assets to total assets	Generally disclosed. Share of equity, varied from less than 1% to about 23%, with significant year to year change in some banks
Return on Assets	Generally disclosed; large variation from 0.5% to 4.3%

Items of Disclosure	Comments
Return on Equity	Generally disclosed; Large variation from 0.7% to 58%
Return on unrestricted Investment deposits	All banks disclose this, with returns ranging from 1.45% to 16.35%, depending on country and bank.
Commodity inventories	Only some (30%) disclose this
Return on restricted Investment Deposits	Very few (only one bank in the sample) disclose this
Profit equalization reserves	Some banks disclose (30%)
Net open position in foreign exchange	Many banks (66%) disclose; the ratio as % of capital varied from 0 to 100%
Foreign currency liabilities to total liabilities	Many (66%) disclose; the ratio varied from 0 to 100%
Net position in equities to capital	Generally disclosed, with ratio ranging from 0% to 4%
Gross income to assets	All disclose, varies from 1% to 8%
Personnel expenses to total assets	All disclose, varies from 30% to 65%
Operational expenses to total assets	All disclose, varies from less than 1% to 5%

Source: Based on Annual Reports of 15 sample banks covering the years 2002 and 2003; Percentages of sample banks that disclose a particular item is shown in parenthesis.

Appendix

Measurement of *Muḍārabah* Profits and Calibrating Risk Sharing between Investment Account Holders and Bank Owners-A VAR methodology

Accounting Definitions

Relationship between *muḍārabah* income and overall return on bank assets is first explored based on available accounting standards. Drawing on this relationship, a methodology to measure the risks facing investment account holders, and the risk sharing between bank owners and investment account holders is suggested.

According to Financial Accounting Standards Number 6 (FAS 6) of the Accounting and Auditing organization of Islamic Financial Institutions (AAOIFI), when a bank commingles own funds ($K=$ Capital) with *muḍārabah* Funds ($DI=$ Unrestricted Investment Deposits), profits are first allocated between *muḍārib*'s Funds and the fund's of investment account holders, and then the share of Islamic Bank as a *muḍārib* for its work in deducted from the share of profits of the investment account holders.

In addition, FAS 6 states that profits of an investment jointly financed by the Islamic Bank and unrestricted investment account holders shall be allocated between them according to the contribution of each of the two parties in the jointly financed investment. Allocation of profit based on percentages agreed upon by the two parties is also juristically acceptable, but the standards call for proportionate contribution.

The minimum standards for calculating the rate of return – specified by Bank Negara Malaysia in the “Framework of the Rate of Return” (2001, and 2004) calls for the share of profits to depositors (and to the Bank as *muḍārib*) be uniform across banks as specified in the framework documents, and provides an uniform definition of profit & provisions to ensure a level playing field. Profit is defined as income from balance sheet assets plus trading income minus provisions, minus profit equalization reserves, minus the income attributable to capital, specific investments, and due from other institutions. This is the *muḍārabah* income (RM) distributable between investment depositors and bank (as *muḍārib*). Provisions are defined as general provisions plus specific provisions & income-in-suspense for facilities that are non-performing. The framework then distributes *muḍārabah* Income between depositors and bank as *muḍārib* and then by type and structure of deposits;

In addition, both AAOIFI standards and the rate of return Framework of BNM recognize Profit Equalization Reserve and Investment Risk Reserve. Profit Equalization Reserves (Rp) refer to account appropriated out of gross income in

order to maintain certain level of return for depositors; and this is apportioned between investment account holders and shareholders in the suitable proportions that applies to the sharing of profits. Investment risk reserves are reserves attributable entirely to investment account holders, but maintained specifically to equalize rate of return over time.

Measuring Risks in Investment Accounts and Risk Sharing

Measuring risks and risk sharing based on these definitions, *muḍārabah* Profit (RM) can be written as (ignoring Investment Risk Reserves for simplicity).

$$R_M = A(R_A - S_p) - AR_p - K R_K$$

Where R_A = return on assets, R_p = Profit Equalization Reserves (as a % assets).

S_p = Provisions as a % of assets

R_K = Return on Capital assigned for the purpose of computing distributable Mudaraba income.

Rate of Return for Investment Account holders (R_I) can then be calculated by applying the agreed share on *muḍārabah* income.

$$R_I = \alpha RM / DI = \alpha [A (R_A - S_p - R_p - K R_K)] / DI \quad (1)$$

The total return on capital can be calculated to ensure that total income accruing to banks' own funds -- equal to assigned return on capital plus income earned as a Mudarib -- provides as required return on equity of R_E .

$$R_E = (1 - \alpha) RM / K + R_K \quad (2)$$

Combining (1) & (2)

$$R_I = \frac{A (R_A - S_p - R_p - K R_E)}{DI} \quad (3)$$

$$R_K = \frac{1}{\alpha} R_E - \left(\frac{1 - \alpha}{\alpha K} \right) A (R_A - S_p - R_p) \quad (4)$$

Risk in investment deposit returns can be calculated based on the variance of R_I .

$$\begin{aligned} \text{VAR} (R_I) = & (A/DI)^2 [\text{VAR} (R_A - S_p) + \text{VAR} (R_p) - 2\text{Cov}(R_A - S_p, R_p)] \\ & + (AK/DI)^2 \text{VAR} (R_E) \end{aligned} \quad (5)$$

Similarly, the risk in return to capital can be computed by calculating the variance of R_K and its components based on equation (4).

Thus, true risk for investment depositors is given by equation (5), while actual risk in any one period can be further dampened by setting aside Investment Risk Reserves – treated as equity of investment account holders – for smoothing the returns over time. The choice of the level of R_p and the assigned return on capital

R_K will redistribute the returns between investment depositors and bank owners; the policy on profit equalization reserves-- reflected as the correlation between R_A - S_p and R_p -- will also impact on the level and distribution of risk to investment depositors & bank owners. Investment Risk Reserves will provide additional mechanism to smooth returns and redistribute risks on investment accounts.

In the above framework, return to equity owners is assumed to equal a desired target level, which could vary depending on the level of risks, and market returns on alternative investment opportunities. Thus the risks to returns on investment accounts -- *mudārabah* risks summarized in equation (5) above, -- is a function of three components: 1), aggregate banking risks given by variability of net return on assets (R_A - S_p), 2), bank policy that determines variability of profit equalization reserves and its correlation with net return on assets; and 3), the variability of desired return on equity. This variability is assumed to be exogenous and uncorrelated with specific asset returns (admittedly an unrealistic assumption, used only for simplifying the presentation).

Using this framework, the sharing of risk -- risk defined as unexpected losses (UL), measured by a profit at risk measure as illustrated in Section III A of the text-- between account holders and owners can be calculated as follows:

First, at a given probability level the unexpected losses, UL_C on the total return to capital (R_k) can be calculated assuming that returns on investment accounts R_I is determined based on market returns independently of bank income, as in conventional banks. Then at the same probability level, unexpected losses UL_I , on the total return to capital can be computed assuming that R_I is allowed to share in bank's profits & losses based on a set of policies governing profit equalization reserves, assigned return to capital, investment risk reserves, and other market considerations. In practice, both UL_C and UL_I can be computed based on historical data that reflect actual policies, and actual return experience of investment accounts and general market rates of return.

Risks transferred to Investment Account Holders (UL_D) can then be measured as

$$UL_D = UL_C - UL_I$$

This measure of risk transfer (UL_D) can form the basis for defining the risk weight adjustment (the share " α " in the IFSB capital adequacy formula in IFSB 2005b) for the assets backed by investment accounts in the capital adequacy calculation for Islamic Banks.

Determinants of Return on Investment Accounts: Some Evidence

Data on returns to investment account holders (RIA), gross return on assets (R_A), specific provisions as percentage of assets (S_p), return on equity (R_E), capital

to asset ratio (C/A), share of investment deposits in total deposits (IAD/TD) and profits equalization reserves as percentage of assets (PER) were collected for 16 Islamic banks in 9 countries for selected time periods. In addition data was compiled on market rate on deposits (R_d) including conventional banks, and rate of inflation (π) in the respective periods in the countries where the Islamic banks are located. This data is used to examine the relative impact of bank specific and general economic conditions on the determination of return on investment accounts. Because of missing data, the regression analysis noted below is based on data for only 14 banks in 8 countries.

Simple correlations among RIA , R_{A-Sp} , RE , and R_d are presented in Charts 1 - 4. The multiple regression analysis of the determinants of RIA , based on equation (3) above is presented in Table 1. The evidence, overall, confirms the hypothesis that return on investment accounts are mainly driven by general market return on deposits, and that bank equity generally absorbs the risks due to variability of net return on assets, resulting in a significant smoothing of returns or only limited risk sharing with investment accounts.

Therefore, the proposals for capital relief on account of risk sharing with investment accounts need to be sharpened by linking actual capital relief to the actual extent of risks shared with investment accounts. Establishing such a link would require a supervisory review process that verifies the extent of risks actually transferred to investment accounts, and a requirement to disclose the risk sharing as qualifying criteria to receive capital relief.

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