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OPERATIONAL STRUCTURE FOR ISLAMIC EQUITY FINANCE

LESSONS FROM
VENTURE CAPITAL

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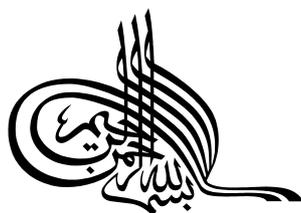


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Abstract

Abstract: Experiences show that fixed-income short-term instruments (like murabahah, mark-up financing) are the dominant modes of financing used by Islamic banks. Various explanations are given to explain the lack of use of profit-sharing modes by Islamic banks. The research paper addresses this issue by examining the operational structure of financial institutions and their implications regarding managing risks arising in financing. To accomplish this, the concept of complementarity is used. Complementarity implies that the structure of institutions depends on several other linked parts that fit together to produce an equilibrium condition. If one or some of the complementary parts are missing, then the institution or system is not profitable or may not be sustainable. To arrive at a model that Islamic financial institutions can adopt for equity financing, different stages of the financing cycle are examined. The appropriate organizational structures for debt- and equity-financing are identified by analyzing credit, liquidity, and operational risks involved. The paper shows that the organizational structure of venture capital firms is appropriate model for minimizing the risks involved in equity financing. The growth and success of equity-based Islamic institutions will depend on the availability of human capital with skills needed to manage the inherent risks of equity financing.

FOREWORD

The Islamic Research and Training Institute (IRTI) of the Islamic Development Bank (IDB) was established in 1401H (1981G) “to undertake research for enabling the economic, financial and banking activities in Muslim countries to conform to *Shari’ah*”. In order to discharge its responsibilities, IRTI pays special attention to basic and applied research in the areas of Islamic economics, banking, and finance relying on its in-house research capabilities and mobilizing external scholars.

When the idea of Islamic banking was launched some three decades ago, it was proposed that Islamic banking would adopt profit-sharing modes of financing (*mudarabah* and *musharakah*). Experience, however, shows that Islamic banks predominantly use fixed-income instruments like *murabahah* and *ijarah* on the asset side. While some explanations have been given to explain this trend, this paper examines the issue by investigating the operational structures of institutions. The paper examines various risks in equity and debt modes of financing and discusses the appropriate institutional model that can mitigate these risks. Using the concept of complementarity, the research paper explains why Islamic banks choose relatively less risky debt instruments. The paper argues that right institutional model that can manage the risks arising of equity financing is that of venture capital. Thus, to increase equity financing, institutions that can manage the risks in equity financing need to be established.

It is widely accepted that equity financing should take a more prominent role in the Islamic financial sector. To increase the size of the equity based institutions researchers and practitioners need to understand the nature of Islamic instruments and the risks associated with them and develop appropriate institutional models that can mitigate these risks. This paper is one of first attempts to address the institutional aspects of equity financing in an analytical way. I hope that the publication of this research paper will stimulate further research along these lines.

Bashir Ali Khallat
Acting Director, IRTI

Operational Structure for Islamic Equity Finance: Lessons from Venture Capital

1. Introduction

When Islamic banking was launched some three decades ago, it conceived to replace interest based financing with the two-tier *mudarabah* model. Proponents of Islamic banking pointed out the advantages of profit-sharing modes of financing over the conventional interest based financing. Experiences, however, show that fixed-income instruments (like *murabahah* and *ijarah*) are the dominant modes of financing used by Islamic banks on the assets side of the balance sheet.¹ Some advocates of Islamic banking are critical of the dominance of fixed-income modes of financing (Chapra 1985, p.171 and Siddiqi 1983, p.139). They apprehend that using fixed-income instruments not only represents the *status quo* but also may not conform to the true spirit of Islamic principles as they negate the basic principle of risk sharing of *Al-ghurm bi al ghunm* (entitlement to return associated with the liability of risk). Furthermore, an implication of shying away from long-term equity financing is that the Islamic banks are not performing an important role in financial intermediation that spurs economic growth. Though an Islamic financial system cannot be one that is characterized as “pure profit-sharing”, there is a desire to have a balanced mix between equity and debt financing (Al-Jarhi 1999).

Different explanations have been given to explain the negligible use of equity modes of financing (*mudarabah* and *musharakah*) by Islamic banks.² While the asset-liability structure, the preference of the borrowers towards fixed modes and short-term investments, lack of facilitating environment, etc. are among some factors given, the foremost argument explaining the insignificant use of equity financing relates to the moral hazard problem. The financiers apprehend that the entrepreneur may take actions that benefit him/her at their own cost once financing is done. Some of the actions of the entrepreneur that can hurt the monetary returns of the investors are not exerting the optimal effort, taking actions that yield private benefit, threat to leave the

¹ Note that Islamic banks use profit-sharing mode (*mudarabah*) on the liability side of the balance sheet. The discussion regarding the use of debt/equity financing relates to the asset side of the balance sheet throughout this paper.

²For discussions on the structure of asset-liability structures in Islamic banks and explanations of the lack of profit sharing modes of financing see Ahmad (1998), Ahmed (2002), Aggarwal and Yousef (2000), Haron (1998), and Khan (1995).

project midway, and spending resources on perks or stealing (Kaplan and Stromberg 2000). A survey on Islamic modes of financing reports that the primary reason that inhibits financiers to use equity financing is the apprehension that entrepreneurs will be dishonest in reporting the actual figures of profit.³ Some Islamic economists have suggested that creation of an appropriate Islamic environment is necessary for facilitating the use of equity modes of financing.⁴ The suggestion, however, is an external factor that is not in direct control of financial institutions. In this paper, we examine the internal institutional factors that may explain the phenomenon. Among others, the paper discusses the operational structures that can resolve the moral hazard problem inherent in equity financing.

The paper studies the operational structures of financial institutions to address two related issues. First, the paper explains why Islamic banks have failed to use equity financing under the present operational design. Second, an institutional structure that may facilitate the use of equity financing will be suggested. Operational ‘structure’ is entailed in the nature and process of the financing cycle of financial intermediaries (raising funds, selecting and structuring investments, managing investments, and exiting investments) with special reference to management of risks. We will use the concept of *complementarity* to address the above-mentioned issues. Complementarity indicates that several linked parts fit together to produce an equilibrium condition. If one or some of the complementary parts are missing, then the institution or system may not be operational or sustainable.

The paper explains why Islamic banks are using fixed-income debt financing even with higher expected return on equity financing. There are several complimentary factors that jointly give a higher rate of return on equity relative to the debt financing. Partial adoption of some of these factors makes the expected risk-adjusted profit lower than what is expected under debt transactions. As organizational structures of banks do not provide all the factors needed for equity financing, banks have been avoiding equity financing. An institutional structure that encompasses all

³In a survey of 23 banks, Khalil, Rickwood, and Murinde (2002) find that misreporting the outcome by the agent is the prime reason that prevents banks from adopting *mudarabah* financing contracts.

⁴ For example Chapra (1985, p. 227) points out the prevalence of a “morally conscious and justice oriented Islamic environment” for implementation of, among others, equity based Islamic banking. He further mentions financial sector and tax reforms that would facilitate equity financing (pp. 87-89)

the complementary factors is needed to provide equity financing. The paper argues that the organizational structure of a venture capital firm entails these factors and enables the use of equity financing.

A couple of issues related to the scope and focus of the paper needs to be clarified. First, discussing the internal factors that may facilitate the use of equity financing does not imply that the external factors are not important or relevant. Changing the external factors is a long process and beyond the control of financial institutions. The paper examines the internal factors and outlines what can be done within the financial institutions to increase equity financing under the existing environment. Second, the paper is not proposing that Islamic banks should reorganize themselves into equity-financing type of firms. Islamic banks are performing vital functions in the economy by serving the clientele both on their assets and liabilities sides. This research indicates that equity financing is not a viable option for Islamic banks under the current operational structure and underscores that to increase equity financing in an economy, institutions that can manage the risks involved in such financing need to be established.⁵

The paper is organized as follows. Section 2 briefly discusses the nature and the management of the main risks arising in financial intermediation. Specifically, we identify the nature of liquidity, credit, and operational risks inherent in financing and the ways to redress them. After outlining the different stages of the financing cycle in Section 3, we discuss risk management strategies under debt and equity financing. Section 4 describes the general framework of operational structures of financial institutions. Section 5 introduces the concept of complementarity to identify factors that suit debt and equity financing. Section 6 discusses the implications of complementarity on organizational structures and deliberates on the two issues referred to above. Specifically, we explain why Islamic banks have failed to use equity modes under the current institutional design and what organizational structure is needed to do so. Section 7 concludes the paper.

⁵ Al-Suwailem (1998) also maintains that venture capital is a potential model of using *musharakah*.

2. Financial Intermediation and Risks

Though different theories of financial intermediation exist, a contemporary view holds that the main function of financial institutions is to manage the risks associated with financing (Allen and Santomero 1997, Heffernan 1996, p.163, Scholtens and Wensveen 2000). There are different ways to classify risks. One broad classification is that of business and financial risks. While business risk arises from the nature of a firm's operations and is mainly affected by the product market variables, financial risk occurs due to movements in the financial market variables. The latter risk is usually associated with leverage and the risk that obligations and liabilities cannot be met with current assets.⁶ Specific risks that financial institutions face are, among others, credit risk, liquidity risk, operational risk, market risk, and legal risk.⁷ Note that while the former three risks are endogenous in the sense that they arise from within the organization and depend, to a large extent, on how the business of the institution is managed, the latter two risks are exogenous as they originate externally. We focus here on the nature and management of the internally controllable endogenous risks in the financial intermediation process.

Credit risk is the risk that counterparty will fail to meet its obligations timely and fully in accordance with the agreed terms. This risk is associated with the quality of assets and the probability of default. Resolving the asymmetric information has direct implications on the severity of credit risk that financial institutions face. Friexas and Rochet (1999) identify three information problems that may arise in financing. The adverse selection problem is an *ex-ante* problem arising before firms are chosen for investment as the firm owners/managers have more information on the project than the investors. The investors are in disadvantageous position to sort out the good projects for investment. The adverse selection problem, as such, is also called the sorting problem.

The moral hazard problem is an *interim* problem arising during the time of funds utilization once the investment has taken place. This may appear in terms of incentive problems of the project/firm manager. The manager may take steps to

⁶ For a discussion on business and financial risks see Jorion and Khoury (1996, p. 2) and Gleason (2000, p.21).

benefit him/her at the expense of the investors. Finally, *ex-post* problem arises when the investor may have to incur auditing costs to ascertain the actual returns of entrepreneur (the costly state verification problem). As the choice of the quality of the asset depends on selecting the good projects (or reduction of the adverse selection problem) and probability of default increases with moral hazard problems, managing credit risk is closely associated with the minimizing of these information problems. Operational structures and strategies of financial institutions will determine how the problems arising from information asymmetries are resolved.⁸

Liquidity risk can arise in financial intermediation due to the different maturity profiles of liabilities and assets. One function of a financial institution is liquidity transforming whereby liquid liability is transformed into illiquid assets (Diamond and Dybvig 1983). Liquidity risk arises in the process of transformation, if there is insufficient liquidity for normal operating requirements. Under such situations, the ability of the institution to meet its liabilities when it falls due decreases. One aspect of asset-liability management in financial institutions is to minimize the liquidity risk. This risk can be controlled through various measures including proper planning of cash-flow needs, seeking newer sources of funds to finance cash-shortfalls, diversification of assets, and setting limits of certain illiquid products.

Operational risk may occur from various sources. It can be defined as “the risk of direct or indirect loss resulting from inadequate or failed internal processes, people and systems or from external events” (BCBS, 2001, p. 2). In this paper, we will focus on operational risk arising from ‘people’ or human capital. The *human capital risk* results from the lack of skills and incompetence of the management and officials of the institution. In particular, if the managers and officials of a financial institution lack the knowledge and the skills to manage the risks arising in financial intermediation,

⁷ See Koch (1995) and Heffernan (1996) for a discussion on different types of risks that financial institutions face.

⁸ Different theories explain the existence of financial intermediaries using the asymmetric information problems arising in financing. Benston and Smith (1976) maintain that financial intermediaries exist as they can minimize the transactions costs of financing. Diamond (1984) and Hellwig (1991) identify the role of financial intermediaries as ‘delegated monitors’. Again, monitoring is used broadly and includes screening of projects (to minimize adverse selection problem), oversee the behavior of the borrower (to mitigate moral hazard problem) and to undertake auditing whenever necessary. Financial institutions have a comparative advantage in monitoring and improve the efficiency of contracts by reducing

then the operational risk increases and returns become uncertain. To sum up, operational risk will be determined by the appropriateness of knowledge and skills of employees and liquidity risk stems from maturity profiles of components of the balance sheet of an institution. Finally, an important determinant of credit risk is the ability to mitigate the asymmetric information problems inherent in investment operations.

3. Financing Cycles of Debt and Equity Financing

In order to evaluate appropriate operational structure and strategies that benefit different modes of financing on the asset side of a financial institution, we examine the 'financing cycle' of these instruments and the risks associated with their use. The 'financing cycle' involves raising funds, selecting and structuring investments, managing investments, and finally exiting investments to recover returns.⁹ Note that while the first element of the financing cycle relates to the liability side of the balance sheet, the latter three aspects concern the asset side. We discuss below the nature of the financing cycle of a debt-based financial intermediary (commercial bank) and equity-based financial intermediary (venture capital firm) in details. In doing so, we also discuss the nature and management of endogenous (credit, liquidity, and operational) risks of these institutions.

3.1. Debt Financing Commercial Banks

While banks offer a variety of other services,¹⁰ we adopt the definition of a bank given by Friexas and Rochet (1999, p. 1) as "an institution whose current operations consist in granting loans and receiving deposits from the public". The details of the functions of a bank in different stages of its financing cycle are given below.

Raising Funds: Banks raise their funds by offering transaction (demand) and nontransaction (saving, fixed) deposits, and nondeposit investment products (mutual

information asymmetries. Leland and Pyle (1977) show how entrepreneurs can give signals to the financiers to resolve the adverse selection problem.

⁹ The financing cycle is adopted from the 'venture capital cycle' outlined by Fenn et.al. (1995) and Gompers and Lerner (1999 and 2001).

¹⁰ For different services and functions that banks perform see Rose and Fraser (1988, Chap. 7) and Rose (1999, Chap. 1)

funds, stocks, pension fund reserves, etc.).¹¹ Deposits represent IOUs on the banks that are payable to the depositors on demand.¹² Individuals, businesses, governmental bodies and institutions deposit their funds with banks for various reasons. These include safekeeping, liquidity, access to a safe and efficient payment system, and earning returns. Though people/institutions can choose from an array of deposits, transaction (checking) accounts constitute a significant part of the total liabilities as one of the main reasons depositors use banks is the liquidity and payments functions that they perform (Freixas and Rochet 1999, p.2).

Selecting and Structuring Investments: Businesses seek loans from banks for a variety of reasons. When someone requests a loan, his/her creditworthiness is assessed in different steps. A bank official first interviews the customer to assess his/her character and sincerity of purpose. In many cases, site visits may also be taken. If the bank officials are satisfied with the preliminary round of information, the customer is required to submit all relevant documents that are scrutinized by the credit analysis division. A satisfactory collateral is among the final steps to assess the creditworthiness of a customer. As such, bank officials determine the value of the property or asset that is pledged as collateral against the loan. Upon the recommendation of the credit analysis division, the loan committee approves the loan.

If the customer turns out to be creditworthy, a loan agreement is signed between him/her and the bank. When the loan is structured, the needs of the customer and the bank are kept in mind. Specifically, repayment schedule should enable the customer to repay in a comfortable way. The bank can protect itself by imposing certain covenants or restrictions on certain borrowers' activities that threaten the repayment of the bank's funds. A well-structured loan agreement will also include the course of action in cases where the borrower faces problems in payments.

Managing Investments: Once the disbursement is made, banks use different *loan review* procedures to ensure that the terms of the loan are complied with. The bank maintains customer profiles that record the performance of the client over time. The bank keeps track of the payments record and evaluates the quality and the condition of

¹¹ For details see Rose (1999, Chap. 12).

¹² Most nontransaction deposits can be withdrawn only at a cost.

the collateral and financial status of the borrower on a periodic basis. The loan review procedure becomes more frequent, when the overall economy slows down and some specific loans are in trouble.¹³ Loan reviews help the management not only to identify problem loans, but also to assess the overall risks of the institution. It also enables the bank to check if the loan officials are adhering to its loan policies for advancing loans.

Exiting Investments and Recovering Returns: In debt contracts, the returns from investment are recovered, when the borrower pays off the capital and interest in due time. In case borrowers fail to do so, banks undertake other strategies to recover their due funds. *Loan workouts* are used to tackle the loans in trouble. Loan workout is a process of recovering the bank's funds from problem loan situation by investigating the causes of the problem and work with the borrower. When the problem loans become serious, the bank may seek a revised loan agreement through which the loan is rescheduled so that the normal operations are restored. In case nonperforming loans cannot be recovered by rescheduling, the bank may resort to the liquidation of the collateral to retrieve its funds.

3.1.1. Risk Management in Debt Financing Operations

The objective of banks is to generate income by achieving “an optimum combination and level of assets, liabilities, and financial risk”, and as such, asset and liability management (ALM) “lie in the financial heart of a bank” (Van Greuning and Bratanovic, 1999). As pointed out, the risks considered are those that originate internally (i.e., credit, liquidity, and operational risks). We discuss below the nature and management of these risks in debt financing institutions.

The promise of banks to provide liquidity to the depositors introduces financial risks and makes liquidity management an integral part of the banking practice. Evolution of liquidity strategy theories of banks illustrates the changing nature of liquidity risk management over time.¹⁴ Before 1930s, the *commercial loan theory* maintained that banks focus on short-term self-liquidating loans that match the

¹³ Loans in trouble can either be problem loans or nonperforming loans. Problem loan is a situation when either the borrower misses one or more promised payments or the value of the collateral goes down significantly. When commercial loans are past due for 90 days it is termed as nonperforming loan. This time limit, however, may vary from country to country.

¹⁴The historical development discussed here is taken from Koch (1995, p. 481).

maturity of the deposits. A bank was considered liquid, if the loan portfolio was entirely short-term. The *shiftability theory* asserted that any liquid asset could be used to meet deposit withdrawals. The growth of treasury bonds constituted the bulk of the liquid assets that could be sold in the secondary markets prior to maturity. During the early 1950s, the *anticipated income theory* tied loan payments to a borrower's expected income. To meet liquidity requirements, loans were structured in a way so that the timing of the payments of the principal and interest matched a borrower's cash flow and ability to pay. More recently, the liability side of the bank is also used under the *liability management theory* under which banks borrow from the money market and capital markets to satisfy liquidity needs. Thus, both sides of the balance sheet are now used to manage liquidity of banks and asset-liability management (ALM) has become an important operational feature of commercial banks.

As discussed above, credit risk can be mitigated by resolving the asymmetric information problems arising in financing. The direct way to resolve the adverse selection problem is to scrutinize and verify information on proposals. Similarly, the moral hazard problem can be reduced by monitoring the borrowers and carrying out auditing whenever necessary. All these activities, however, are costly both in terms of time and money. Commercial banks have devised debt contracts that resolve some of these information problems cost effectively. The information problems and the credit risk are minimized by financing firms that have a track record and an acceptable guarantee/collateral. Banks prefer contracts that offer higher interest rate and collateral. This implies that given the same risk features, a bank will prefer a borrower who can offer a better marketable collateral. Thus, the banks use, among others, collateral to sort out the quality of borrowers and reduce the adverse selection problem. Collateral along with a fixed interest payment on debt also mitigates the moral hazard and costly state verification problems.¹⁵ If a borrower fails to repay the dues, the bank can liquidate the collateral to collect its claims. Note that instead of auditing costs, the bank incurs liquidation costs in this case.

¹⁵ For a discussion on debt contracts that involve collateral see Bester (1987), Chan and Kanatas (1985), and Wette (1983). For a theoretical discussion on how collateral resolves the moral hazard problem, see Freixas and Rochet (1999, Chap. 4).

Given the characteristics of a debt contract backed by collateral, there is no incentive for the banks to actively participate in the activities of the entrepreneur. Commercial banks “act as sleeping partners in their usual relationship with borrowers” and “ignore the actions the borrowers are taking in order to obtain the highest return” (Friexas and Rochet 1999, pp. 108-9). Given this inactive role, the professional skills that bankers require are mainly related to the management of financial risks inherent in banking operations. Specifically, the bank needs, among others, employees who have the skills to do asset and liability management (ALM) and mitigate the credit risk. Important skills needed in this regard include the ability to assess the quality of the collateral or guarantees and familiarity with loan review and workout procedures. Operational risk in terms of human capital risk will arise if the management and officials of the bank lack these basic banking skills.

3.2. Equity Financing Venture Capitalists

It has been argued above that commercial banks use debt contracts to finance firms that have a good track record and an acceptable collateral. This approach minimizes the information related problems of adverse selection and moral hazard. Firms seeking financing from equity funds and venture capitalists are, however, those that cannot raise funds from conventional sources due to the severity of risks and lack of track record and acceptable collateral. Venture capitalists providing funds mainly in the form of equity have devised procedures to mitigate risks inherent in equity financing. Note that due to the high risks involved and the long-term investments of the funds, investors expect the risk-adjusted return on private equity to be higher than risk-adjusted return on other investments (Fenn, et.al. 1995). Given this, the criterion the equity financiers use for making investment decisions is the expected end-value of the project. To understand the operations of venture capital firms we discuss the stages of financing cycle next.

Raising Funds: Venture capital is a limited partnership between managers of the institution and investors, in which the latter provide their funds to the venture capitalists (general partners) on a limited liability basis. Though the general partners tolerate some degree of oversight from the limited partners through an advisory board, the managers, for most part, work without any interference from the investors.

Investors lock in their funds for a long period of time with an expectation of a higher rate of return. Venture capital partnerships are usually for specific sectors for limited but long time-periods (7 to 10 years). Reputation, assessment of venture capitalist institution's management skills, and expected rate of return plays important role in mobilizing funds.

Selecting and Structuring Investments: Selecting the right investment projects basically means resolving the adverse selection problem. Venture capital institutions receive a large number of requests for funding and the management sorts out the proposals to pick the promising ones. Fenn et.al. (1995) report that typically venture capitalists choose approximately 1 percent of the applications received. The adverse selection problem can be resolved by collecting as much information as possible in the sorting process. To do this successfully, the proposals pass through different layers of screening. The prospective projects that survive the initial screenings go through a final comprehensive review before the venture capitalist decides to engage in the project. This final all-encompassing review would include visit to the site, meeting with the employees and other stakeholders, the prospects of the product in the markets, etc. Different valuation techniques are used to estimate the worth of the firm at the terminal period of investment.¹⁶

After a firm is chosen for investment, the next step is to structure a contract that takes care of the business, financial, and governance aspects of operations. Various types of securities, like common stock, convertible preferred stock, and subordinated debt with conversion privileges or warrants are used for investment purposes.¹⁷ Many venture capitalists use convertible preferred stocks that have options of converting to common stock (Fenn et. al. 1995 and Lerner and Hardymon 2002). The financial part of the contract outlines, among others, the venture capitalist's share in the total equity of the firm, which in turn determines the share of expected profit.¹⁸ The profit share can be arrived at by the implied rate of return that the financier expects from the deal. In order to have control over the project and protect its interest,

¹⁶ For a review of different valuation techniques see Lerner and Hardymon (2002, Chap. 13).

¹⁷ The compatibility of these contracts with *Shariah* principles, however, needs to be studied.

¹⁸ The venture capitalist's ownership share is determined by projecting the portfolio company's value at a future date and then determining the share that gives it the required rate of return (Fenn, et.al 1995, p. 31).

the venture capitalist typically has majority share in the firm. The firm is controlled through participation in the board of directors. Financing is usually arranged in successive stages of development of the project. Financing of each stage depends on the performance in the previous one.

On the governance aspects, the contract specifies the managerial incentive structure that would attempt to remedy the managerial moral hazard problem. One way to do this is to have stock ownership included in the compensation package of the managers so that their income is linked to the profitability of the firm. Another component of the incentive structure would be to give the venture capitalists the right to change management in cases of poor performance. This can be done if the venture capital firm has control over the firm. One way of doing so is to have majority ownership in the portfolio company.¹⁹

Managing Investments: After the investments are made, the venture capitalists play an active role in overseeing the operations and management of the firm. To be profitable, the investor must ensure that value is added to the firm. To do so, the financier not only monitors the firm, but also provides different consulting and managerial inputs. The venture capitalist is aware of the financial condition of the firm and takes appropriate actions when necessary. In cases where performance is not up to expectations, the venture capitalist takes control of the firm and replaces the management. Experience shows that unless venture capitalists have control over the management of the firm, they risk losses (Becker and Hellman 2000). Hellman and Puri (2000) find that venture capitalists promote professionalization in the firms they invest.

Exiting Investments and Recovering Returns: While venture capitalists compensation includes a fixed management fee, the bulk of the income is the performance-related return generated at the time of exiting the investment. Along with adding value to the firm, the means to exit and its timing is an important determinant

¹⁹ Other than watertight monitoring mechanism staging investments, venture capitalists also resort to other means to control and minimize the risks. These include vesting and covenants to protect the returns of the investor and have control over the firms they invest in. See Lerner and Hardyman (2002) for a discussion.

of return to investors. As such, an exiting strategy is an integral part of the investment process. Fenn et.al. (1995) outline three possible exit routes that venture capitalists can take. First, the issuance of public offerings (IPOs) through which the venture capital firm sells its shares. Issuing IPOs is preferable to the venture capitalists as it facilitates highest valuation of the firm. However, this option is possible only if there is an efficient stock market in operation. Second exiting strategy is private sale of the firm to some interested buyers. The benefit of this alternative for the venture capitalist is that it gets cash and can terminate its involvement in the firm. The third way to exit is to sell the shares of the investors to the sponsors/managers of the firm. The buyback plan by the firm can be included in the contract so that the venture capitalist can always resort to this alternative, if other alternatives do not materialize.

3.2.1. Risks in Equity Financing

Given the different stages of venture financing cycle, we can now discuss the nature of endogenous risks and their resolution by the financiers. When the intermediary invests in a firm, it acts as an active partner in the operations of the firm. Credit risk that venture capitalists face is different from that of the commercial banks as returns on the investment are not predetermined. In case of equity financing, credit risk would be the failure of the financial intermediary to realize its profit share when it is due. As discussed above, venture capital institutions use various strategies to reduce the credit risk. These include, among others, using financial instruments like convertible preferred stocks and providing funds in stages. Other than the profitability of the firm, the return also depends on the exit strategy and timing. Furthermore, the venture capitalists actively participate in the activities of the firm to mitigate the moral hazard and costly verification problems. Compared to traditional banks that mainly try to resolve the credit risk through debt contracts backed by collateral, venture capitalists resolve this risk in a more direct way by engaging with firms in a more direct and comprehensive way.

The nature of liability in venture capital fund and the implications of it on liquidity risk and ALM is different from that of a commercial bank. As funds of investors are locked in for a long period of time, the venture capitalist does not have to actively involve in ALM to maintain enough liquidity to meet the withdrawal

demands of the investors. Hence, liquidity risk in venture capital is minimal. Furthermore, venture capitalists engage resources not only to finance firms, but also provide nonfinancial services. These include intensive monitoring and control, providing management assistance and reputational capital (Gilson and Black 1999). Specifically, the venture capitalists study prospective markets and technologies and assist in the management of the firms by providing contacts, knowledge, and skills. They also provide network related to accounting, investment banking, legal issues, and marketing (Davila et.al. 2000 and Cumming and MacIntosh 2001). In other words, equity financing requires skills to manage both financial and business risks. Operational risk in terms of human capital risk will exist, if a financial institution goes into equity financing without these skills and expertise.

Table 1: Banks vs. Venture Capital Firm: Main Features, Financing Cycle, and Risks

Features (asset side)	Commercial Bank	Venture Capital Firm
Type of Contract	Debt	Partnership
Participation in the project	Passive	Active
Control over the entrepreneur	Indirect (through covenants)	Direct (Covenants and Board membership)
Maturity of liabilities	Mainly short-term	Long-term
Maturity of Assets	Mixed, mainly short-term	Long-term
Skills Required	Managing financial risks (Basic skills)	Managing financial and business risks (Comprehensive skills)
Nature of the Financing Cycle		
Raising Funds	Deposits	Long-term Equity
Selecting & Structuring Investments	Credit Worthiness Collateral	Prospects of value-added
Managing Investments	Loan Review Procedures	Active Participation
Exiting Investments and Recovering Returns	Loan Workouts Liquidation of Collateral	Sale of its Share in the Project
Risks and their Management		
Liquidity Risk	Present (Short-term Liability)	Not Present (Long-term Liability)
Credit Risk	Nonpayment of dues Value of collateral	Mismanagement of Project End-value of the project
Operational (Human Capital) Risk	Lack of basic banking skills	Lack of comprehensive skills
Main Risk Management Strategy	Asset Liability Management (ALM)	Reducing the business and financial risk of projects

Additional exit risk arises in a failed venture capital investment, if the project is funded by both equity and debt, as the lenders have priority of claim on assets. In this situation, the venture capitalists will get a part of their money back in case of excess liquidation value (an unlikely scenario).²⁰ The main features of debt and equity

²⁰ I am grateful to one of the anonymous referees for pointing this out.

based institutions, along with their financing cycle and risk related issues are summarized in Table 1.

4. A Framework of Operational Structures of Financial Institutions

In this section we will examine the operational structure of financial institutions involved in debt and equity financing. The operational structure entails the main elements of the activities and operations of an organization that is related to the achievement of its objective function. As the objective of financial institutions is to maximize the profit by mainly managing risks in financing, the organizational structure of financial institutions will include various aspects of the financing cycle, the nature of risks arising in financing, and strategies to manage them. We assume that the objective function of financial institution is to maximize the profit with the least risk. Specifically, the objective function of financial institutions can be stated as the maximization of the risk-adjusted expected profit $\Pi_r=(\Pi/\sigma)$, where Π is the expected profit and σ is the risks facing the financial institution. As noted earlier, the risks considered are endogenous ones only (viz. liquidity, credit, and operational risks). Before discussing the variables that affect the objective function and how they relate to the financial cycle and risks of financing, we outline the assumptions that will be used in the analysis. These are as follows:

1. Equity financing is tied to long-term projects and debt financing has shorter-term maturity.
2. A 'maturity premium' is attached to longer-term assets/liabilities. Longer-term assets/liabilities pay higher rate of return compared to those which are short-term. The rate of return on deposits are positively related to their maturity not only due to the time value but also because of the usually positively sloped yield curve (Rose 1999, p. 391).²¹ One reason why long-term investments are given higher rates is the liquidity premium that compensates for the price risk. The longer the holding period, the greater the uncertainty of the price at which the asset can be sold affecting liquidity (Bodie et.al. 1996, p. 434).

²¹ For example, the interest paid by small banks ranged from 2.77 percent for interest-bearing checking accounts to 5.63 percent for certificates of deposits of under \$100,000. The corresponding figures are 2.06 percent and 5.55 percent for larger banks (Rose 1999, p. 395).

3. The risk-adjusted rate of return on equity financing is higher than that of debt financing. Historically, it has been observed that the average rate of return on stocks is greater than that on long-term government bonds, which in turn is more than the return on short-term treasury bills. Like stocks, the rate of return on private equity is also greater than that on debt instruments.²²
4. Control and monitoring of assets are costly. Specifically, robust monitoring and control would involve more costs than doing so in a weaker way.
5. Comprehensive skills (to manage business and financial risks) are scarce and costlier than basic skills (to manage financial risks only).

For a financial intermediary, the risk-adjusted expected profit is a function of following variables:

$$\Pi_f = f(M, T_d, T_a, K, R, H), \quad (1)$$

where,

<u>Variable</u>	<u>Interpretation</u>
$M = (m_e, m_d)$	Modes of financing (m_e -equity, m_d -debt)
$T_d = (l_d, s_d)$	Maturity of liabilities (l_d -long-term, s_d - short-term)
$T_a = (l_a, s_a)$	Maturity of assets (l_a -long-term, s_a -short-term)
$K = (k_r, k_w)$	Monitoring and control of the assets (k_r -robust, k_w -weak).
$R = (r_e, r_d)$	End-value returns (r_e -ease to dispose assets/collateral, r_d -difficult to dispose assets/collateral)
$H = (h_c, h_b)$	Expertise and skills (h_c -comprehensive, h_b - basic)

We first link the variables listed above to the different stages of the financial cycle discussed in Section 2 and then examine their implications for different risks. While maturity of liabilities (T_d) relates to *Raising Funds* in the financing cycle, maturity of assets (T_a) and modes of financing (M) are associated with *Selecting and Structuring Investments*. Similarly, monitoring and control of assets (K) has to do with

²² Bodie et.al (1996) shows that over the period 1926-1993, the average rate of return was 12.31 percent on stocks, 5.35 percent on government bonds, and 3.73 percent on treasury bills. Estimates for a sample of 30 liquidated venture capital firms during the period 1969-82 shows a mean return of 18.2 percent Fenn et.al (1995). Similarly, the average return of venture capital firms that were established in 1982 and still active in 1989 is estimated to be 17.6 percent (Gompers and Lerner, 2000, p. 92). Empirically it has been found that rate of return on equity is much higher than can be explained by the risk-premium. This is termed as the 'equity premium puzzle' in the literature. See Kocherlakota (1996) and Mehra and Prescott (1985) for a discussion on equity-premium puzzle

Managing Assets and end-value returns (R) is linked to the *Exiting Investments and Recovering Returns* of the financing cycle. Note that the ease/difficulty of disposing assets will, to a large extent, depend on the legal and financial environment in which the financial institution operates. For example, ensuring property rights and their quick recognition under the legal system implies cost-effective transfer of assets when needed. The details of the relationship between the variables and the risk-adjusted expected profit are discussed below.

Longer-term maturity of the liabilities (l_d) increases the cost of funds and affects the expected profit negatively. Similarly, holding assets for longer-term (a_s) has positive impact on the profitability of the financial institution, as the expected return from these assets is higher. The relationship between the maturities of the liabilities (T_d) and assets (T_a) determines the *liquidity risk* facing a financial institution. Specifically, when short-term liabilities are used to finance long-term assets (s_d, l_a), there is a mismatch between the maturity of the assets and liabilities. In this case, the liquidity risk increases affecting the risk-adjusted expected profit adversely. In all other combinations [i.e. (l_d, l_a), (s_d, s_a), (l_d, s_a)], the liquidity risk will be small.

The nature of credit risk and the resulting impact on the risk-adjusted expected profit will depend on the mode of financing used (M), the ability of the financial institution to tackle the moral hazard problems by monitoring and exerting control over the assets (K), and the final recovery of the returns (R). As discussed above, debt financing (m_d) requires relatively weaker monitoring and control of the assets (k_w). In case of default, returns are recovered by liquidating the collateral. Realizing the value of the collateral will depend on the ease with which it can be sold (r_e). Equity financing (m_e), however, requires robust monitoring and control (k_r) to mitigate the credit risk. The recovery of funds would be ensured, if exit through the sale of its shares is easy (r_e). Stronger control of assets affects profitability adversely as monitoring is costly both in terms of man-hours and investment in bank's capability to restructure the finally distressed firm. If equity financing is done with weak control on assets (k_w) and difficulty of disposing the asset (r_d) then the credit risk increases reducing the risk-adjusted expected profit. Note the role of the end-value returns (R) in the two modes of financing. While in debt contracts, banks may be concerned about

the ease/difficulty of disposing assets occasionally (i.e., in case of default), in case of equity financing, the financial institutions need to be concerned with this variable all the time as they have to deal with disposing the assets as a matter of practice. The variable R , however, depends on the legal framework and the existence of certain financial institutions/markets that are not in the control of individual financial institution.

Finally, if the management lacks the appropriate skills (H) to run the business of financing in terms of managing the relevant (credit and liquidity) risks, then the operational risk of the financial institutions increases and the risk-adjusted expected profit will decline. Specifically, operational risk arises when there is a mismatch between the mode of financing and the skills required to minimize the risks associated with it. As discussed earlier, debt financing (m_d) requires banking skills needed to manage financial risks. Equity financing (m_e), however, requires more comprehensive banking, business, and project related expertise to mitigate both financial and business risks. We call the former skills related to banking as basic (h_b) and the ones required for equity financing as comprehensive (h_c). The comprehensive skills (h_c) are costlier than basic skills (h_b) as the former requires professionals with varied different backgrounds that are relatively more scarce. If a financial institution uses equity financing, but does not have human resources who can assess, monitor, control, and sell the projects efficiently, then the risk-adjusted expected profit may be adversely affected due to operational risk.

5. Complementarity and Operational Structures

In order to comprehend the relationship between operational structure and the use of different modes of financing, we discuss the complementary factors that must exist in a financial institution to enable it to manage the risks associated with the financial instruments. In this section, we first define the concept of complementarity and then discuss the operational structures necessary to manage the risks arising in equity and debt financing.

5.1. Complementarity²³

The concept of complementarity goes back to Edgeworth who defined two activities to be complements, if and only if, increasing the level of one activity leads to a higher marginal return from increasing the level of the other activity. Note that complementarity is not used in its traditional narrow sense relating to inputs, but in a broader sense relating to ‘groups of activities’ (Milgrom and Roberts 1990, p. 514). Complementarity exists when “elements of a system reinforce each other in terms of contributing to the functioning of the system” (Hackethal and Tyrell 1998). An institution or system that entails strong complementarities of different aspects of its operations will not be able to achieve the benefits by changing only few elements of the system.²⁴ A fully coordinated change of all the complementary elements are needed to make the change successful and achieve the goals of the institution.

To understand the concept of complementarity, assume $f(x,y)$ to be a monotonic function with $x_1 > x_0$ and $y_1 > y_0$. In general, complementarity indicates that effect on the value of $f(.)$ is smaller when x is changed without changing y than when both x and y are changed together. We can distinguish between weak and strong complementarity as follows.²⁵ Weak complementarity between x and y would exist when the following condition is fulfilled:

$$f(x_0, y_0) \leq f(x_1, y_0) \leq f(x_1, y_1). \quad (2a)$$

The variables x and y would be strong compliments when the following condition holds good.

$$f(x_1, y_0) < f(x_0, y_0) < f(x_1, y_1). \quad (2b)$$

²³ The concept of complementarity is largely adopted from Hackethal and Tyrell (1998) and Milgrom and Roberts (1990 and 1995).

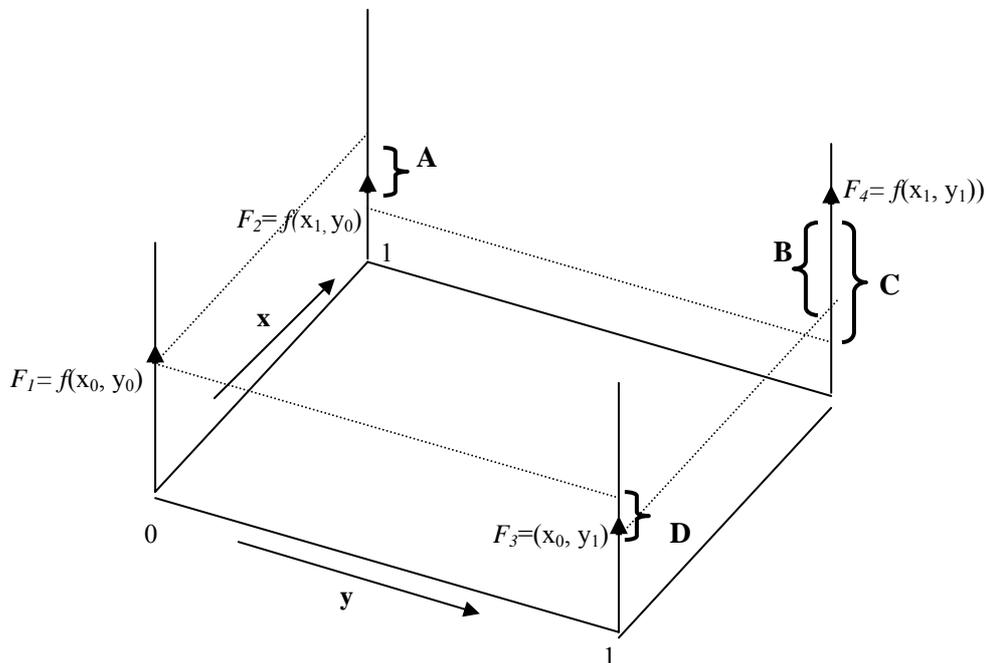
²⁴ See Becker and Hellman (2000), Milgrom and Roberts (1990, 1994, 1995) and Hackethal and Tyrell (1998) for a discussion on the application of complementarity to systems and institutions.

²⁵ Lattices are used to define complementarity when discrete numbers are used. The general definition of complementarity using lattices is given in Appendix A. See Kolman et. al. (2000) for discussion on lattices and complementarity. I am grateful to an anonymous referee for providing simple definition of weak and strong complementarities used in this paper.

That is, the effect on the function $f(\cdot)$ is negative when one variable changes with the other remaining constant. As negative number is less than a positive one, the general condition of complementarity that the marginal change in the function $f(\cdot)$ when one variable changes is less than when both variable changes still holds.

Following Hackethall and Tyrell (1998), we use the concept of strong complementarity defined above in our analysis. Figure 1 depicts a function that fulfills strong complementarity. To keep the example simple, let the components of the vector (x, y) (i.e., x and y) take values of 0 and 1. Figure 1 shows that for $x_0=0, y_0=0$, the value of the function is F_1 . This represents $f(x_0, y_0)$ in Equation 2b. When x is increased to 1 ($x_1=1$) keeping y unchanged at $y_0=0$, the value of function decreases to F_2 ($f(x_1, y_0)$ in Equation 2b). Similarly, when y is increased to $y_1=1$ keeping $x_0=0$, the value of the function is F_3 . With $x_1=1, y_1=1$, we achieve F_4 (corresponding to $f(x_1, y_1)$ in Equation 2b).

Figure 1: Supermodular Function and Complementarity between x and y



5.2. Complementarity and Operational Structure for Different Modes of Financing

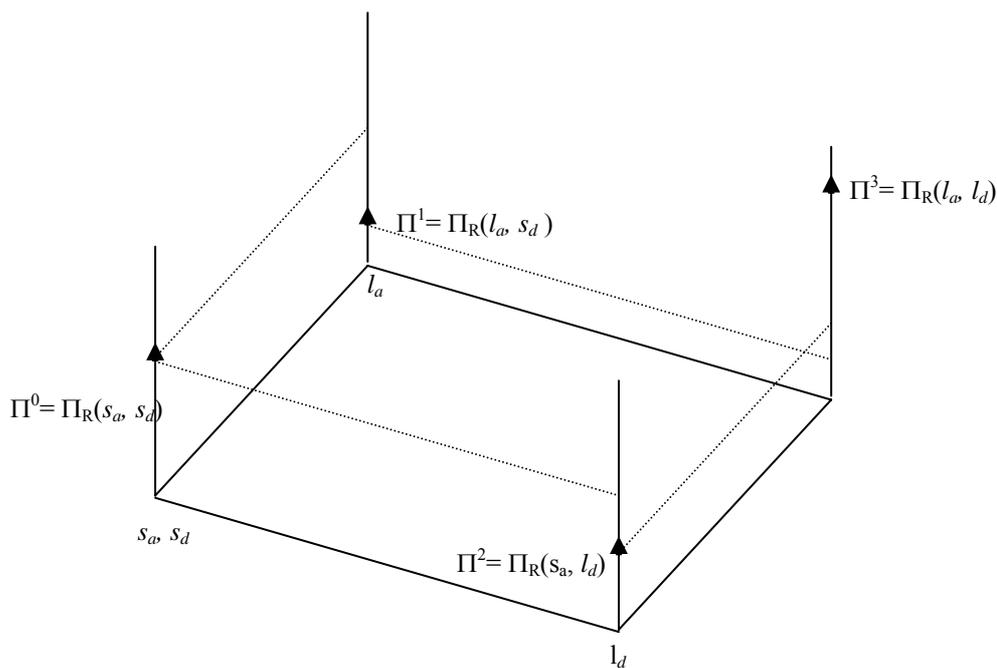
As mentioned above, the operational structure of financial institutions entails the factors that affect the nature and process of the financing cycle with special reference

to management of risks arising in intermediation. In particular, we discuss the nature of liquidity, credit, and operational risks in financing and their implications on the risk-adjusted profitability of financial institutions under different modes of financing. We point out the variables and optimum operational strategies that are complementary in the management of these risks. We have assumed that equity premium exists, implying the risk-adjusted expected profit is greater than that of debt financing. The returns from equity financing are, however, generated when all the factors that can mitigate the risks arising in equity financing are in place. In our discussions, we take debt financing as benchmark and examine the implications of equity financing relative to this case.

5.2.1. Liquidity Risk

As pointed out above, liquidity risk appears when there is a mismatch between the maturity of the liabilities and assets of a financial institution. We assumed that while equity financing requires long-term commitment, debt financing involves short-term maturities. To finance assets using equity modes on financing, the liabilities need to be of long-term maturity to avoid liquidity risks. Thus, there is a complementary relationship between the maturities of assets and liabilities. This is shown in Figure 2 below.

Figure 2: Complementarity and Liquidity Risk



We start with the benchmark case of debt financing. With short-term liabilities and short-term assets, the risk-adjusted profit of debt financing is shown at $\Pi^0 = \Pi_R(s_a, s_d)$ in Figure 2. If the liabilities are long-term (l_d), while the assets are short-term debt (s_a), then the profitability of the financial institution is reduced, as the financial institution has to pay a maturity premium on the former without gaining from the latter. This is shown by $\Pi^2 = \Pi_R(s_a, l_d)$ in Figure 2. Similarly, if the liabilities are short-term, but the assets have long-term maturity, then the risk-adjusted profit declines as liquidity risk increases. This lowers the risk-adjusted profit as shown by $\Pi^1 = \Pi_R(l_a, s_d)$ in Figure 2. If the financial institution can invest in assets for longer terms (i.e., equities) that are financed by long-term liabilities, then the risk-adjusted profit for the bank increases to $\Pi^3 = \Pi_R(l_a, l_d)$ in Figure 2. Note that $\Pi^3 > \Pi^1$ as risk-adjusted profit is higher for equities than debt due to the equity premium.

The above analysis shows that risk-adjusted profit decreases due to increased liquidity risks if a financial institution invests in assets that have long-term maturity with short-term liabilities. As banks deal mainly with deposits that are short-term (s_d), complementarity between assets and liabilities indicates that it is optimum (in terms of risk-adjusted profit) to use assets that have relatively short-term maturity. Complementarity also implies that the funds should be available for investment for longer periods of time in order to use equity financing.

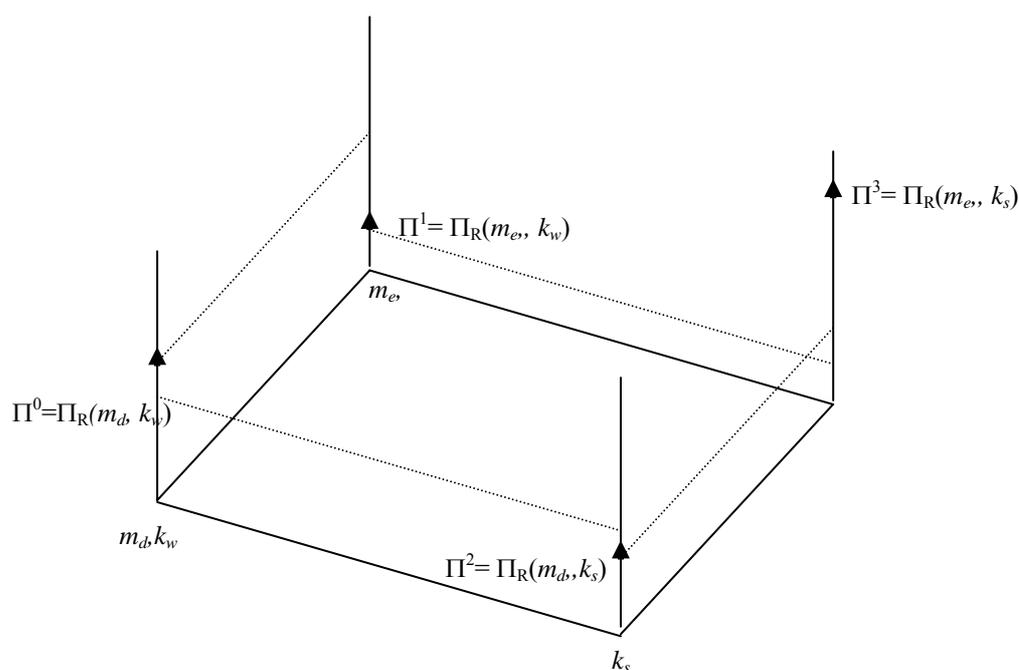
5.2.2. Credit Risk

We now examine the complementary factors required for managing credit risk under different modes of financing. Credit risk was the one arising when the counterparty would fail to meet its obligations timely and fully in accordance with the agreed terms. There are two aspects of managing the credit risk after the investments are made. First, reducing the moral hazard problem by monitoring/controlling assets to prevent deterioration of their value. Second, ensuring the returns from investment at the conclusion of the transaction by disposing of the asset at the highest possible price at an appropriate time.

The complementary relationship between modes of financing and control and monitoring of assets is shown in Figure 3. We start with the benchmark case in which

debt financing (m_d) occurs with weak monitoring and control of assets (k_w). Figure 3 shows that this combination gives a risk-adjusted profit of $\Pi^0 = \Pi_R(m_d, k_w)$. If there is robust monitoring and control of assets (k_r) under a debt contract (m_d), the cost of monitoring increases without any additional increase in the returns from the debt. This will reduce the risk-adjusted profit to $\Pi^1 = \Pi_R(m_d, k_r)$ as shown in Figure 3. Similarly, if the financial institution uses equity financing (m_e) with weak monitoring and control (k_w), risk-adjusted profit decreases to $\Pi^2 = \Pi_R(m_e, k_w)$. This is because the credit risk increases as the probability of the moral hazard problem increases. When equity financing (m_e) is combined with strong monitoring and control (k_r), the financial institution can reap the equity premium $\Pi^3 = \Pi_R(m_e, k_r)$ by mitigating the moral hazard problem associated with equity financing.

Figure 3: Complementarity and Credit Risk



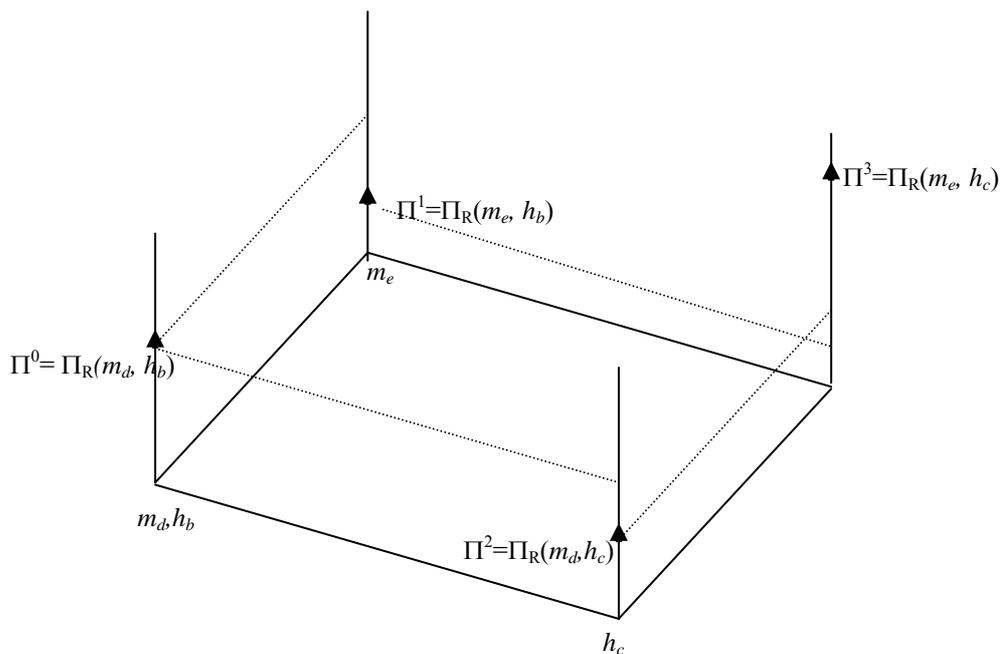
The other complementary factor that determines the profitability relates to the ability to exit investments with ease to reap returns. In debt contracts, credit risk is mitigated by, among others, monitoring to ensure that the terms of the loan contract are followed and the value of the collateral remains intact. Only in cases of default, the bank liquidates the asset in which case the ease/difficulty of doing so is important. In case of equity financing, however, credit risk is minimized by actively engaging in the improvement of the assets and recovering returns through the sale of its share in

the project at the appropriate time. If it is difficult to dispose the assets at a fair price, then even with strong monitoring and control, the returns of the financier will suffer. The availability of the means by which the financial institution is able to dispose its share in the project will then be another complementary factor needed for equity financing. While the financial institution can sell its share either to the entrepreneur or other interested parties, one way in which the value of a firm can be enhanced is by launching it in the stock market by issuing initial public offerings (IPO). The latter would be possible if a well-functioning and efficient stock market exists.²⁶

5.2.3. Operational Risk

Appropriateness of skills related to financial instruments used will determine the operational risk of the financial institutions. As pointed out, institutions that use debt-based instruments (m_d) will require the basic banking skills to deal with managing mainly financial risks (h_b). Equity financing (m_e) requires comprehensive knowledge of managing both financial and business risks (h_c). These comprehensive skills are costlier than basic skills (h_s) as a variety of expertise is required in the former than in the latter. The complementary relationship between the modes of financing and skills are shown in Figure 4.

Figure 4: Complementarity and Operational Risk



²⁶ For a discussion on the importance of stock markets for venture capital see Black and Gilson (1997) and Becker and Hellman (2000).

The benchmark case is that of debt financing that requires basic banking skills (shown by $\Pi^0 = \Pi_R(m_d, h_b)$ in Figure 4). If the financial institution opts for equity financing without acquiring professionals with comprehensive skills, the risk-adjusted expected profit will decline due to the presence of operational risks (shown by $\Pi^1 = \Pi_R(m_e, h_b)$ in Figure 4). Similarly, if a financial institution hires professionals with comprehensive skills, but uses debt financing then the risk-adjusted profit decreases as the labor costs increase (shown by $\Pi^2 = \Pi_R(m_d, h_c)$ in Figure 4). If the financial institution uses equity financing and employs professionals with comprehensive skills, then it can earn a higher risk-adjusted profit $\Pi^3 = \Pi_R(m_e, h_c)$ on equities as shown in Figure 4.

6. Complementarity and Operational Structures: Implications for Equity Financing

We can now assess the operations of Islamic banks in the light of complementarity of the factors associated with the management of risks inherent in financing. We evaluate their operational structures and respond to the two questions posed in the introduction. The first question relates to why Islamic banks have used equity modes of financing in a limited way and the second seeks to find the appropriate operational structure that would enable institutions to do so. Before addressing these questions we outline the operational structure of Islamic banks in the light of the above analysis.

From the operational point of view, Islamic banks have institutional structures similar to conventional commercial banks.²⁷ This is not only reflected in the similarities in their balance sheets, but also in their treatment by regulatory authorities in most countries where they operate. The liability side of Islamic banks is predominantly demand deposits that can be withdrawn at any time. The saving/investment deposits can also be withdrawn, sometimes at a cost. Thus, liabilities of Islamic banks are mainly of short-term maturity (s_d).²⁸ On the asset side,

²⁷ Though Islamic investment banks exist, most Islamic banks are modeled like commercial banks.

²⁸ Data on the structure of deposits is scarce. While Ahmad (1997) outlines the structure of deposits of several Islamic banks in a scattered manner, Kireyev (2001) reports that in Sudan that has Islamic banking system in a more aggregate manner. He finds that the current and investment/savings deposits were on the average around 45 percent and 15 percent respectively in 1997-2000.

fixed income debt instruments dominate assets of Islamic banks.²⁹ Being debt, most of the assets in Islamic banks have short-term maturity (s_a).³⁰ As pointed out above, debt contracts do not require strong monitoring and control as an asset is tied to the contract as collateral. In Islamic banking, the nature of debt is qualitatively different from that of conventional banks as in the former debt is tied to some underlying assets/goods. The underlying asset/good in the transactions acts as collateral and there is no need for Islamic banks to undertake strong monitoring and control (k_w). Being similar to commercial banks, the management skills of Islamic banks relate to banking (h_b). As Islamic banking is a relatively recent phenomenon, most of the managers in these institutions have background and experience in conventional banks. The organizational structure of an Islamic bank can be summarized as follows.

Islamic Bank (conventional):	$\Pi_B = f(m_d, s_d, s_a, k_w, h_b).$	(3)
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Here we did not specify the variable R (ease/difficulty to dispose asset/collateral) in Equation 3. This variable is relevant for Islamic banks only in exceptional cases of default. In such cases, the bank may repossess the asset/good and may sell it to collect its dues.

From the discussions on venture capital above, we have seen that equity financing requires the following operational structure.

Venture capital firm:	$\Pi_E = f(m_e, l_d, l_a, k_r, h_c).$	(4)
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The use of equity financing on the asset side (m_e) requires investment for longer period of time (l_a). The complementary relationship between the assets and liabilities to mitigate the liquidity risk indicates that financial institutions must have liabilities with long-term maturity (l_d). Similarly, there is a need for robust monitoring and control of the assets (k_r) to manage credit risk inherent in equity mode of financing. To do so, comprehensive skills (h_c) are required not only to manage the business and

²⁹ Iqbal et.al (1998) report that fixed-income instruments (*murabahah* and *ijarah*) account to 75.03 percent and profit sharing modes of financing (*mudarabah* and *musharakah*) 13.78 percent of the total assets for 10 Islamic banks.

financial risks occurring in equity financing but also to sell the project to ensure good returns on investment. The latter will depend on another complementary factor in equity financing, which is the ease with which assets can be disposed (r_e).

The above discussions show the complementary operational factors needed for equity financing. If one or more of these factors are lacking, then the risk-adjusted profit of the financial institution decreases (either adverse effect on profitability or an increase in the risks). Given the above framework, we now seek to understand why Islamic banks have failed to use equity modes of financing. If Islamic banks use equity financing under the current institutional format, the following structure is implied:

Islamic Bank (equity financing):	$\Pi_{BE} = f(m_e, s_d, l_a, k_w, h_b).$	(5)
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Using equity financing for assets (m_e) implies that investment is of longer-term duration (l_a). With deposits in Islamic banks that are essentially of short-term maturity (s_d), equity financing increases liquidity risk. Furthermore, with their backgrounds in conventional banking (h_b), Islamic bankers do not have the comprehensive skills to evaluate, monitor, and control the assets. This increases both the operational and credit risks. Thus, the use of equity financing under the current operational format increases the overall risk of making the returns from investment uncertain. This gives an economic rationale as to why Islamic banks are reluctant to use equity modes of financing. Given the nature of liabilities and banking skills of the managers, the optimum strategy for Islamic banks is to use debt instruments. They are not equipped with the factors that can mitigate the liquidity, credit, and operational risks inherent in equity mode of financing.

The second issue relates to the appropriate operational structure that will facilitate the use of equity financing. The discussion shows that the operational format of venture capitalists is more appropriate to deal with the nature of risks inherent in equity financing. While venture capitalists mainly finance high-risk firms, the basic framework of the financing cycle and risks in equity financing applies to other

³⁰ Khan and Ahmed (2001) report that 68.8 percent of assets of 12 banks have maturity of less than one

intermediaries using equity financing. Specifically, liquidity risk needs to be mitigated by locking in funds from investors for longer periods of time (l_d). Credit risk is controlled by active participation in projects so that they can be closely monitored and controlled (k_r). Managing equity financing also requires comprehensive skills (h_c) that enable the management of business and financial risks.

The above discussions reveal that in order to use equity-modes of financing a reorientation in the operations of Islamic financial practice is required at the instrument and institutional levels. The proponents of Islamic banking envisage the use of *mudarabah* mode of financing on the asset side. *Mudarabah* instrument, however, implies sleeping partnership on the part of the financier requiring no control over the enterprise.³¹ Our discussion shows that this mode of financing is not appropriate to resolve the credit risk inherent in equity financing. Active participation of the financier is needed in the project not only to minimize the moral hazard problem, but also to add value to the project. The appropriate mode for equity financing on the asset side is *musharakah*, as this instrument allows the active participation of the financier in the activities of the project. Thus, instead of the two-tier *mudarabah* model, Islamic financial institutions engaged in equity financing would take the format of *mudarabah-musharakah* model. Furthermore, conventional venture capital firms use various contracts like convertible preferred stock, subordinated debt, etc. in financing projects. There is a need for development of alternative Islamic instruments that can fulfill the investment needs in equity financing.

At the institutional level, our analysis shows that institutions will be able to use equity instruments if they are modeled like venture capitalists and investment banks rather than commercial banks. One feature of these institutions is that they lock in funds from investors for longer periods of time. Furthermore, the managers of financial institutions should not only be able to evaluate projects and add value to them by active participation, but also be familiar with the process of disposal of their shares at the appropriate time so that the returns are maximized. Equity financing can

year.

be done by these specialized entities or as a subsidiary of a larger institution that is managed like investment banks and venture capital firms rather than conventional banks.

Though the paper focused on the internal institutional features affecting equity financing, some external factors will affect the growth on this sector. Specifically, regulatory environment that encourages investment in private-equity and facilitates their operations are important factors determining the standing of equity-based institutions. Among others, tax regimes, regulations related to the permissibility of institutional investors, etc. will be important determinants in the growth of funds provided to equity financing.³² Another important institutions that will encourage equity financing is a well-functioning stock market.

7. Conclusion

Even though profit-sharing modes of financing was regarded as the hallmark of Islamic finance by the proponents, Islamic banks have used these instruments on a very modest scale. This paper seeks to explain why Islamic banks have failed to use equity instruments on a wider scale and suggests the necessary conditions to enhance the use of equity financing in financial institutions. This is done by looking at the operational structures of financial intermediaries that entail the financing cycle and the management of risks. Specifically, we identify the factors that enable the management of liquidity, credit, and operational risks in debt and equity financing.

The paper identifies certain factors in operational structures that complement each other under different modes of financing. It is shown that given the liabilities and skills of the managers, it is optimum for Islamic banks to use debt-based short-term instruments. The nature of risks in equity financing is qualitatively different from that of debt financing. To deal with these risks a different operational structure is required. To minimize the liquidity risk, funds must be available for longer periods of time. Financiers manage credit risk in equity-based financing by judicious structuring,

³¹ One of the main differences between *mudarabah* and *musharakah* contracts is that while in the latter the financiers actively takes part in the management of project, in the former the financiers do not play any role. The financiers, however, can monitor the activities of the *mudarib* or managers of the project.

³² See Fenn et.al (1995, pp. 10-11) for a discussion on regulations and taxes on the private equity market in the US.

strong monitoring, and control of projects. They play an active role in advising and participating in the activities of firms to ensure that value is added before exiting by selling off their shares. Management of risks in equity financing requires comprehensive skills to understand and handle both the financial and business risks.

Islamic banks are performing an important role in the financial intermediation serving the needs of different groups of clientele. Their operational structure, however, is not suitable for equity financing. Equity financing can be enhanced in an economy by establishing institutions that can manage the risks arising from using the mode of finance. Specifically, equity financing would require use of *musharakah* as an instrument of financing instead of *mudarabah*. *Musharakah* contracts would allow financiers to monitor and actively participate in the activities of the project. Similarly, the institutional orientation of the financial institutions has to be similar to that of equity-based institutions like venture capital, investment banks, and universal banks. The growth and success of these equity-based Islamic institutions, however, will ultimately depend on the availability of human capital with comprehensive skills needed to manage the inherent risks of equity financing. Scarcity of professionals who can manage both business and financial risks will remain the main bottleneck in expanding the use of equity modes of financing by Islamic financial institutions. To overcome the scarcity of professionals who can manage these risks, there is a need for more research and training on different operational aspects of the financing cycle involving *musharakah* instrument.

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Appendix A

Formally, complementarity can be expressed in form of lattices.³³ A lattice is a partially ordered set (L, \leq) in which every subset $\{x, y\}$ consisting of two elements has a least upper bound (LUB) or supremum and greatest lower bound (GLB) or infimum. LUB $(\{x, y\})$ or $\sup(x, y)$ is called the ‘join’ of x and y and denoted by $x \wedge y$. Similarly, GLB $(\{x, y\})$ or $\inf(x, y)$ is called the ‘meet’ of x and y and denoted by $x \vee y$. A real valued function $f(\cdot)$ on a lattice L is *supermodular* and its arguments are complements if for any x and y in L , the following condition holds,

$$f(x \wedge y) - f(y) \geq f(x) - f(x \vee y) \quad (1a)$$

or

$$f(\sup(x, y)) - f(y) \geq f(x) - f(\inf(x, y)) \quad (1b)$$

Intuitively, the equation means that increasing the component of x of a vector (x, y) when at the same time component y is increased, has an effect on the value of the function $f(\cdot)$ that must not be smaller than the effect from increasing x but not y .

³³ For a discussion on lattices see Kolman et.al. (2000).

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