Towards an Interest-Free Islamic Economic System

A Theoretical Analysis of Prohibiting Debt Financing

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The Islamic Foundation, U.K.

and

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I dedicate this work to
my parents
Masood Ahmed Khan and Hamida Khanum
whose untiring care and endless love have constantly surrounded me and been a powerful source of inspiration of which this is a partial reflection.

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Karachi

Waqar Masood Khan
Foreword

There have been a number of significant contributions in the last ten years which have shown that an interest-free Islamic system is not only viable but is, potentially, far superior to the traditional interest-based system.1 The present study, *Towards an Interest-Free Islamic Economic System*, by a young and brilliant economist, Dr. Waqar Masood Khan, is perhaps the most rigorous and the most convincing in establishing this proposition. While most of the other studies have relied heavily on equity considerations, this study has shown quite convincingly that even on grounds of pure efficiency an interest-free financial system performs better than the one based on interest.

The author has developed a model which allows a comparison of two schemes, i.e. a fixed return scheme (FRS) and a variable return scheme (VRS). While the first scheme is the backbone of the Western financial system, the pacesetter of financial operations all over the world, including the Muslim countries, it is prohibited under the Islamic system for moral as well as economic reasons. Islam permits variable return on financial contracts. In view of this categorized and unequivocal prohibition of interest in all its forms, a Muslim society that is committed to establishing its socio-economic relations on Islamic values is bound to search for an alternative to the fixed return scheme. The near-consensus amongst Islamic economists suggests that while Islam wants to discard all fixed

return schemes in respect of loan/investment operations it aims at establishing an economy where equity participation becomes the chief mode for financial operations. Dr. Waqar Masood Khan has shown, with academic rigour, that under a set of plausible conditions, even within the parameters of an otherwise secular economy, a variable return scheme performs better than a fixed return scheme, thus establishing the superiority of the Islamic system over the traditional one. This constitutes a seminal contribution from a young budding Islamic economist.

However, Dr. Khan is not dogmatic in his approach. He points out that the traditional banking system though un-Islamic, is not entirely without merit. Similarly, an interest-free system should not be taken as a panacea for all economic ills, nor should the changeover be considered a costless, painless transition. He has pointed out the benefits as well as the costs of the two schemes in an entirely objective manner.

The strength of the interestless system lies in its ability to distribute risk more widely. The author has shown that this leads to an all-equity situation which is pareto optimal. He has demonstrated that debt financing is inferior to equity financing. If this is so, why then does one find that in the real world the scene is dominated by debt financing while on moral and social counts the answer has never been difficult to find? The author has also offered a convincing and economic answer to this important question.

The variable return system has some stringent requirements which place it in a disadvantageous position in the real world. The most crucial requirement turns out to be the ability of the financier to monitor the real performance of the project. The information requirements of a variable return system are much more than those of the fixed return system. Since in practice the investor can observe the performance of the project costlessly, while the financier has to incur some extra costs on monitoring, this asymmetrical information in the credit markets provides an incentive to the investor for under-reporting the results of the project. Since debt has the characteristic of minimizing the informational requirements of a financial contract, it becomes a more attractive instrument of financing. Therefore, the practical dominance of the interest-ridden system is a result of the ‘moral hazard’ in the variable return system.

At the same time, since information costs are a deadweight loss to society, the variable return system may lead to a loss in society’s output. This loss has to be weighed against some other benefits of the new system, some of which have been mentioned by the author, such as greater stability of the system, possible increase in investment due to non-requirement of collateral, increase in expected return due to higher risk-taking, saving of resources required for deposit insurance in an interest-based system, etc. This brings into sharp focus only certain aspects of the benefits of the new system. The reader would have to refer to other literature on the subject to evaluate every economic, social and moral benefit of the interest-free system.²

Towards an Interest-Free Islamic Economic System, based as it is on the doctoral research undertaken by Dr. Khan in the University of Boston, constitutes an important contribution in the theory of finance as well as in the theory of Islamic economics. His analysis is as applicable to a secular economy as it is to an Islamic economy. His contribution to the theory of finance lies in developing a model which is capable of explaining the capital structure of a firm, finding a pareto optimal solution under varying conditions of financial contracts and devising an optimal monitoring strategy for the lender under different situations. He has also offered a new and convincing explanation of the paradoxical results of the Miller-Modigliani theorem. His contribution in the field of Islamic economics lies in developing a rigorous model for analyzing the implications of the Islamic injunctions prohibiting interest and establishing the superiority of an equity-based Islamic system of financing.

Some Islamic economists may have certain reservations about the technique employed by the author. They may feel that the framework and the parameters used in the study remain almost exclusively secular. While the usefulness of this approach cannot be denied, the richness of the Islamic approach which integrates the moral and the economic remains

² See Chapra, Siddiqi and Ziauddin, et al., given in footnote No. 1.
far greater than what could be captured in the study because of the limitations of the technique. Islamic economics considers values as an essential component of economic analysis and as such the exclusion of the moral aspects of the contractual liabilities is bound to miss some of the features of the Islamic system. A model which has to formally incorporate cheating and dishonesty as essential elements of the system and had, as a matter of fact, to settle with the ‘optimal’ level of cheating, even though positive, is bound to remain ‘sub-optimal’ in the Islamic framework of analysis. It deserves to be appreciated that the author had to take note of the practical situation prevailing in present-day Muslim countries where unfortunately dishonesty is widespread. It most probably was this realisation which influenced him to incorporate the element of cheating and dishonesty in the system without which he might have thought the analysis would remain unrealistic. Despite all the sympathy for this realism, as well as its usefulness in the present-day situation, it must not be ignored that Islam aims to establish a society where cheating and dishonesty are minimized and finally eliminated. When one allows for an honest world, the moral hazard problem which introduces the deadweight loss in the variable return system may be eliminated. The reader should keep in mind the distinction between prevalent conditions in the so-called Muslim countries and the characteristics of the Islamic system, a distinction which has to be kept in view, whatever the weaknesses of the present-day world.

His analysis of the practical experience in Pakistan, although partial and somewhat premature, is illuminating. His prescription for the requirements of the new system are extremely useful and enlightening. They are most timely and deserve serious consideration from all policy-makers, not only in Pakistan, but in every part of the world where experiments in Islamic banking are being made in the public or the private sector.

I take this opportunity to extend my very warm congratulations to him on producing such a valuable and path-breaking work. I hope and pray that Brother Masood Khan and other colleagues will carry forward this important line of analysis.

Towards an Interest-Free Islamic Economic System is be-

ing sponsored by the International Association for Islamic Economics as its first publication. The Association was formed in 1984 as a result of the sustained efforts of Islamic economists during the last decade to promote Islamic economics in teaching, research and application. The Association was formally launched at a conference held in the Turkish republic of Northern Cyprus in July, 1984 and is presently enlisting the support and co-operation of all those economists who are interested in further developing the nascent discipline of Islamic economics. As President of the Association, I take genuine pride in offering Dr. Waqar Khan’s research on an interest-free financing system as this addresses itself to one of the major problems with which Muslim economic policy-makers as well as practitioners of Islamic banking are confronted.

I take this opportunity to thank Brother Umar Zubeir, Dr. Anas Zarqa, Dr. Nejatullah Siddiqi, Dr. M. Umer Chapra and Dr. Munawar Iqbal for their sustained support and co-operation in promoting the activities of the Association in general and in enabling the Association to publish the present study. May Allah bless their efforts.

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7 Dhu’l Qa’dah, 1405
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Khurshid Ahmad
Preface

It is now over two years since I completed this work as my Ph.D. thesis at Boston University. During this time, many changes have taken place both in my thoughts about the Islamic financial system and in the efforts at Islamization in the Islamic world. Space will not allow me to dwell upon these at any length but I will, however, make brief comments on both of these aspects.

First, I feel strongly that the domain of the definition of Ribā is much broader than what so far jurists and Islamic economists have hitherto accepted. A number of rationales for the prohibition of Ribā are noted in Chapter 2. The most pursuasive argument is that it is unjust to demand a reward without participating in the risk of enterprise. If I use this definition then a large number of economic transactions, in an abstract sense, can be brought into the domain of Ribā. Why can a doctor charge a fixed fee without ensuring that the recommended prescription has the desired effect on the patient? Why should a lawyer charge a fixed fee without being able to guarantee the successful defence of the client? Why should a labour union contract for a fixed wage rate without caring for the profitability of the enterprise? The typical answer is that these are cases where the recipient of a fixed reward provides definite benefits to the other party and as such it is justified. This argument does not have a sound basis since the only difference between the cases cited above and the lending-borrowing case is that in the latter the endowment of the lender is money capital whereas in the other the endowment is some kind of human capital.

Second, after the completion of a long series of measures introduced for the elimination of Ribā from the financial sector in Pakistan, one is left with a frustrating feeling about the whole system. I have looked very closely at the efforts of
Islamization. To say the least, the whole exercise has resulted in merely a change in terminology without even laying the foundations of the system. In the past five years, there has not been a single experiment of a truly Islamic financial arrangement.

The experience of Pakistan is nevertheless very useful for future generations. One benefit of this exercise is the widespread realization that a sweeping change like the introduction of an Islamic financial system can never be brought about through legislation. We must face the fact that a majority of Muslims engaged in modern banking do not believe that this institution is repugnant to the Islamic spirit. Real progress will have to come from a change in the attitudes of those who are heavily engaged in the present system.

My argument is that isolated efforts of Islamization are not very promising. Islamic ideology is pervasive and accordingly, Islamization should proceed in a balanced manner, covering not only legislation but also changes in the minds of Muslims.

I am grateful to Prof. Khurshid Ahmad for inviting this work for publication. I assume responsibility for any errors.

Karachi
6 Dhu'l Qa'dah, 1405
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Waqar Masood Khan

CHAPTER 1

Introduction

Islam, though a religion, has its own way of organizing society. Islamic ideology is pervasive and covers all aspects of human life. Thus Islamic scholars have built up the social, political, and economic dimensions of an Islamic system. The basic principles for the organization of these institutions are contained in the Holy Qur'an, in the teachings of the Prophet Muhammad, peace be on him, and the manner in which the first four caliphs ruled the first Islamic society of the seventh century A.D.

After the decline of the Islamic state the practice of Islam became a private and personal affair. In the recent past, however, there has been a resurgence throughout the Islamic world. This resurgence has demanded the reorganization of all social institutions according to Islamic principles. Thus several countries have shown signs of movement in the direction of Islamization. An important change is also taking place in the economic system of these countries. Much effort has been devoted to eliminating non-Islamic elements from the functioning of the economic system. One of the most important and significant requirements of an Islamic economic system is the prohibition of interest from the economy.

In this work our objective is to rigorously investigate the implications of prohibiting interest from the economy. Our analysis is partial, in the sense that only one aspect, i.e. the prohibition of interest, in the Islamic economic system is considered.

Another limitation of the present analysis is that we look only at the production side of the problem. However, as we argue in Chapter 3, this is not too restrictive in drawing some preliminary conclusions.
The core of the thesis is contained in Chapters 3, 4 and 5. Chapter 2 briefly discusses the Islamic attitude toward interest and the rationale behind its prohibition. It also examines the Islamic alternatives to interest in the financial system.

Chapters 3 and 4 are the fundamental basis for this thesis. In Chapter 3 we develop an analytical framework that enables us to compare the Islamic scheme with the traditional scheme. Under a set of assumed conditions we show the superiority of the Islamic scheme. The most important requirement for this result to hold, besides risk aversion on the part of investors, is the absence of informational asymmetry — or any form of ‘moral hazard’ — in the credit market.

In Chapter 3 we argue that the predominant role played by interest-based transactions or debt in modern credit markets can be explained by the presence of a ‘moral hazard’ in these markets. We have shown that, given the presence of informational asymmetry in the credit market, interest-based financial instruments minimize the informational requirement of a financial contract. Since information collection is costly, interest-based contracts are attractive on account of minimizing the information costs associated with any contract. This is a new explanation for the role of debt in the capital structure of firms.

Given the results of Chapter 4 we maintain that the successful implementation of the Islamic financial system depends on information availability in the economy. Since the information costs are a deadweight loss to the society, it seems that society will have to forego some output in a non-productive activity. But these costs have to be weighed against the benefits of greater risk-spreading achieved through the Islamic scheme.

In Chapter 5 we look at the efforts of Islamic economists devoted to the development of a model of interest-free financial intermediation. We review the work of some prominent scholars in this area and offer comments on their work on the basis of our results in Chapters 3 and 4. This chapter also contains a description of the recently initiated practice or applications of Islamic economics. We also devote considerable space to the experience of Pakistan, which has gained prominence in its Islamization efforts. Also discussed is the role of Banker’s Equity, a financial institution, in introducing Islamic financial schemes. We also give various suggestions for resolving the problems of short-term finance and replacing some non-Islamic elements in the existing financial schemes.

The major result of this work is that the success of the Islamic financial system crucially depends on the level of information availability in the financial markets. Given the present practices in the financial markets and the moral values in most societies including Muslim societies, not much can be hoped for, at least in the very short run. The outlook becomes further blighted when one realizes that other institutions that are equally undesirable in the Islamic society are showing no signs of change in the direction of Islamization.
CHAPTER 2

Prohibition of Ribā in Islam and its Alternatives

Introduction

In this chapter our objective is to discuss the problem of prohibiting Ribā in Islam. We see that the orthodox view that defines Ribā as the commonly-known interest on all kinds of loans, seems to dominate the Islamic world. We also point out the rationale behind this prohibition, as given by various jurists of Islam. Later, we present a description of the Islamic alternatives to Ribā in the economy. We conclude with some comments on the potentials of these alternatives for building a new financial system.

The Meaning of Ribā and its Prohibition in Islam

One of the integral parts of an Islamic financial system is the prohibition of Ribā from the economy. The injunctions regarding the prohibition of Ribā are contained in the Holy Qur’ān, the basic source of Islamic ideology. It is the opinion of a number of Islamic jurists that the Qur’ānic verses that instruct the followers of this law are clear and reflect the severity of the admonition to those who do not abide by them. There are five verses in the Qur’ān that prohibit the use of Ribā:

Those who swallow Ribā can’t rise up save as he ariseth whom the devil hath prostrated by [his] touch. That is because they say: trade is just like Ribā, whereas Allah permitteth trading and forbiddeth Ribā. He unto whom
an admonition from his Lord cometh and [he] desists [in obedience], he shall keep that which is past, and his affair henceforth is with Allah. As for him who returneth [to Ribā] such are the rightful owners of the fire. They will abide therein (II: 275).

Allah hath blighted Ribā and made Šadaqāt [charities] fruitful. Allah loveth not the impious and the guilty (II: 276).

O, you who believe, keep your duty with Allah and relinquish what remains of Ribā, if you are believers (II: 278).

But if you do [it] not, then be apprised of war from Allah and His Messenger; and if you repent, then you shall have your capital. Wrong not, and you shall not be wronged (II: 279).

O, you who believe, devour not Ribā, doubling and redoubling, and keep your duty with Allah, that you may be successful (III: 129).

In all these verses the word ‘Ribā’ is used, which in Arabic generally signifies increase, excess, growth, rise and the like. But here the word Ribā is referred to in a specific context. In the pre-Islamic period the word Ribā was used conventionally to identify a class of business transactions. The common feature of these transactions was that a fixed amount was required over the principal due (4).

One form of transaction was that a person sold a product to someone on the agreement that a specified price was payable at some future date. If at the end of the stipulated time the price was not paid by the buyer, then the seller would increase the price and extend the payment period (5).

Another form was that Arabs used to lend money to each other on the agreement that after a specified period of time the borrower would repay an excess amount over the principal sum due (5).

Yet another form was that Arabs would make a loan to someone on the basis of a monthly fixed return over the principal sum and if at the end of the loan period the borrower was unable to repay they would increase the monthly fixed return (5).

These kinds of transactions are researched by the early jurists of Islam in a quest for the kind of Ribā prohibited in Islam.

As far as financial transactions are concerned there is no dispute among Islamic jurists that the word referred to in the above Qur’ānic verses means an excess of money demanded over the principal sum loaned for a specified period of time (12).

However there is another class of non-financial transactions that is also classified as Ribā, on the basis of an explicit injunction from the Prophet, peace be on him. This type of Ribā is known in Islamic jurisprudence as Ribā al-Faḍl. This refers to the barter trade of identical commodities. There is an authentic Ḥadīth: (6)

Abū Sa‘īd Khudrī said: The Prophet Muḥammad, peace be on him, has said that gold in return for gold, silver in return for silver, wheat in return for wheat, barley in return for barley, dates in return for dates and salt in return for salt, can be traded if and only if they are in the same quantity and that it should be hand to hand. If someone gives more or takes more, then he is engaged in Ribā and accordingly has committed a sin.

There is disagreement among jurists as to whether the injunction applies only to the six commodities mentioned above or whether there is some general principle which emerges covering a whole class of commodities (6).

Since this kind of Ribā is not our concern we will not discuss these differences here.

It is important to note that the chastizement proposed for the sinners of Ribā is quite severe. Thus one is led to ask what is so evil in Ribā that justifies such an admonition.

Islamic jurists have given several justifications for the prohibition of Ribā and admonition to those who do not abide by this prohibition. One class of reasoning is primarily concerned with the social and individual evils that result in a society which allows Ribā. It is argued that at the individual
level Ribā creates selfishness, miserliness, greed and malevolence. The very act of lending money on the basis of Ribā reflects the fact that the lender only cares for the principal and Ribā on it that has to be paid by the borrower under all circumstances. These arguments get more heated when the borrowing party is a person who needed the loan to meet an unforeseen accident or emergency.

The same argument carried to the social level implies that a society consisting of people who have the above-noted characteristics, is bound to produce an atmosphere where not only most of the individuals have diametrically-opposed social interests but their individual interests are also divergent. In such a society there will be a class of people that accumulates most of the society's wealth and is hostile towards the rest of the people. Therefore the institution of Ribā leads to a highly unstable society (7).

Several efforts have been made by scholars in pointing out the economic evils associated with the institution of Ribā. However, due to the mixing of moral issues the arguments presented are not theoretically sound. Jurists who have tried to support the prohibition of Ribā on economic grounds are usually guilty of the inclusion of moral issues. Saud (11) and Uzair (23) have presented a somewhat better case.

Although the Qur'ānic verses are clear about the prohibition of Ribā, and as far as financial transactions are concerned there has never been disagreement among jurists, in the recent past there was a controversy over the type of financial transactions that come under this injunction.

In the early sixties, Jaffer Shah and Yaqoob Shah (8), argued that another common feature of the financial transactions prohibited on account of Ribā was that these transactions were mainly for consumption purposes, and were demanded by the poor people. As such, it was claimed that the production loans prevalent in the present financial system cannot be treated as involving Ribā. Two arguments supporting this claim were presented: (i) there is no evidence in history that during the time of the introduction of this injunction loans for production purposes were in existence, and (ii) present production loans are in fact a collaboration between the lender and the borrower to increase the wealth of both parties.

Furthermore, unlike consumption loans, the lender in the case of a production loan (saver) is economically weak and the borrower (investor) is economically the stronger party. As such there is no possibility of exploitation. This group claims that debt financing for business capital is the outgrowth of industrialization and as such it was non-existent at that time. Accordingly production loans should be excluded from the application of this injunction.

In reply to the arguments raised by this group, Maulana Maududi and Maulana Usmani have argued that in the first place it is not logical to argue that only those forms of Ribā are prohibited which existed at that time. For this would have the implication of granting legitimacy to several unanimously agreed prohibitions in Islam,* since the terms used for those prohibitions had specific meanings but covered a whole class of related things. The extent to which a particular injunction applies is determined by the very essence for which the injunction is devised. The essence for the injunction of Ribā, as we noted earlier, is the fact that it is unjust for the lender to demand a fixed return over the principal loan irrespective of what happens with the loaned money.

There is no direct evidence supporting either side on the existence of production loans during that time. But the orthodox jurists have produced evidence, both from the historical facts and the sayings of the Prophet, peace be on him, that supports their view that the injunction also applies to production loans. In reply to a questionnaire prepared by the Islamic Cultural Institute (9), Maulana Maududi has researched the social, cultural and economic life of the Arab world in the pre-Islamic period. The historical evidence he has produced amply demonstrates that production loans were made during that time. These type of loans were known even in Babylon and ancient Egypt. There, the temples acted as banks and used to give loans to farmers at the time of

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*An interesting case in point cited by Maulana Maududi and Maulana Usmani, is the prohibition of alcohol in Islam. In the Qur'ān the word 'khamr' is used for this prohibition. Khamr was a special kind of alcoholic drink made out of grapes. But in Arabia, all kinds of alcoholic drinks were referred to as khamr. As such there was no dispute in applying this injunction to all kinds of alcoholic drinks, since the essence, as unanimously accepted by all jurists, of the injunction was to prohibit the use of all those things that intoxicate.
harvesting on the basis of a fixed return. There is also
evidence that the loans were made for trade, agriculture, and
for the purpose of running government machinery. Arabs
were in close contact with these neighbouring countries and it
is difficult to believe that they were unaware of these financial
arrangements. In fact Makka was the centre of world trade in
those days.

Maulana Maududi has also noted a saying of the Prophet
which implies that he was aware of the loans for the purpose
of trade. It is an undisputed fact that the Prophet took a
sizeable loan to meet a state emergency. If he took the loan to
meet a state emergency he was naturally aware of the state
loan (10).

In the present thesis we take the view that Ribā is prohibited
in all types of financial transactions. There are two reasons
for this: (i) this is the orthodox view and it seems to be more
powerful and has enough historical support, and (ii) it is the
dominant view in Muslim countries. Efforts to move towards
an interest-free economic system are based on the orthodox
view.

The Islamic Alternatives to Ribā

There are two types of financial contracts which are
presented in Islamic jurisprudence for replacing Ribā-
oriented transactions. These are (i) Shirkah (partnership),
and (ii) Muḍārabah (agency relationship).

There are differences among jurists regarding the conditions
governing these contracts. We will note some important
differences in the following discussion.

Although there are several kinds of partnership contracts
the common feature in all these is that two or more people
enter into a contract by providing capital in different
amounts for running a business with the provision that they
will share in the profit or loss in some pre-determined
proportions (13).

Muḍārabah on the other hand is a contract in which one
party, the owner (Rabbul-Māl) provides capital while the
other party (Dārib) brings labour and effort with the provi-
sion of profit sharing in some pre-determined proportions.

We will confine ourselves to a discussion of Muḍārabah,
since it is analytically more convenient to contrast this contract
with a Ribā contract and also because it has the potential of
replacing the so-called ‘working capital’ available only on the
basis of a Ribā contract in the present banking system. This
topic will be thoroughly discussed later.

In Islamic jurisprudence several terms are used to define
this contract: Qirād, Muqāradah, and Muḍārabah are used to
identify the same contract. It has also been called Commenda.
These terminologies reflect geographical identification of this
contract rather than any other essential difference. The people
of Arabia called it Muqādarah while in Iraq it was known as
Muḍārabah. In the Western world it came to be known as
Commenda (17).

It is unanimously agreed by jurists that the legal validity of
this contract is basically traditional practice (Sunnah) and the
consensus of the community (Ijmā‘).

It has also been noted by the jurists that one of the major
reasons for its acceptance is the resulting ease and efficiency
achieved in the functioning of the economic system. This is
reflected in the following paragraph from a leading jurist,
Sarakhsi’s discussion on Muḍārabah in his seminal work
Al-Mabsut:

[This contract was allowed] because people have a need
for this contract. For the owner of capital may not find
his way to profitable trading activity, and the person
who can find his way to such activity, may not have the
capital. And profit cannot be attained except by means
of both these, that is, capital and trading activity. By
permitting this contract, the goal of both parties is
attained (18).

Unlike the case of Shirkah, there is uniformity of treatment
among jurists regarding the conditions governing the
Muḍārabah contract. Before we discuss these conditions, let
us list different kinds of Muḍārabah contracts. There
are three kinds of contracts, viz (i) money Muḍārabah,
(ii) commodity Muḍārabah and (iii) productive Muḍārabah,
The distinction reflects the form of initial investment and intermediary forms until the final stage of sharing. In money Mudārābah and commodity Mudārābah the form of initial investment provided by the principal is legally accepted money and goods, respectively. For the majority of jurists the latter form of capital is not acceptable, as a basis for Mudārābah, unless the goods are first sold and the resulting revenue is considered as the base capital.

Islamic jurists have generally recommended Mudārābah for exploiting the gains from price differentials that exist in different parts of the world. Thus many jurists have rejected the formation of a Mudārābah contract that required manufacturing of goods and sharing the production, or what is called the productive Mudārābah. But, as Udovitch points out (19), this can be avoided ‘by the employment of a simple device involving sale of the goods in question’, and sharing in the profits afterwards. This type of Mudārābah is approved by the later jurists of the Ḥanafī school. Sarakhsi writes:

For the work stipulated for the agent is the kind of work that the merchants practice in the pursuit of the attainment of profit. It is comparable to buying and selling. Similarly, if the investor instructs the agent to use capital to purchase leather and hide and then cut it into boots, buckets, and leather bags, this is all part of the practice of merchants in the pursuit of the attainment of profit, and its stipulation is permissible in a commenda (Mudārābah) (20).

Mālikī and Shāfi‘ī jurists, two other major schools of thought, have rejected any such kind of contract. They argue that, since the agent performs a productive act he should be compensated by a fixed wage rate and the profit/loss should go to the principal (3). Imām Mālik has rejected it on the ground that it was not the practice of Muslims of his time (14).

Islamic economists have differed from the Ḥanafī school on the legal validity of productive Mudārābah. Indeed the Ḥanafī school, having the largest following in the Islamic world, appears to be more flexible and caters to current economic needs in its formation of Islamic laws.*

Conditions of Mudārābah

(I) Sharing of Profit/Loss: There is no disagreement among Islamic jurists on the conditions governing the responsibilities of principal/agent in the case of profit or loss. The entire loss has to be borne by the principal while the profit has to be shared between them in some pre-specified proportions. This is so because in case of loss the agent has suffered a loss of his effort and labour so he cannot be asked to share any loss of capital. Since the principal, on the other hand, provides capital his loss is the capital lost in the business (15).

(II) Agent’s Responsibilities: Unless specifically restricted from engaging in certain activities, the agent is generally free to act ‘as he sees fit’ for the pursuit of profit. ‘Ḥanafī law distinguishes’, writes Udovitch, ‘two types of contract: a limited mandate and an unlimited mandate commenda. A commenda with unlimited mandate is one in which the investor authorizes the agent to act completely at the latter’s discretion in all business matters. Such authorization is conveyed by investor’s statement to the agent: ‘act with it (the investment) as you see fit’. In this case the agent may:

1. Buy and sell all types of merchandise as he sees fit.
2. Buy and sell for cash and credit.
3. Give goods as Bid‘ah, leave them as a deposit or pledge.
4. Hire helpers as needed.
5. Travel with the capital.

*The flexibility in accommodating various activities in the Mudārābah contract, in the Ḥanafī school, is reflected in the following quotation of Imām Muḥammad, a legend in the Ḥanafī school and a noble student of Imām Abū Ḥanīfah, the leader of the Ḥanafī school of thought:

‘In Mudārābah contract the limits on agent’s activities will be determined by the practice of merchants. Imām Muḥammad has written that the agent has the right to rent a piece of land and from the Mudārābah capital buy the wheat for cultivation on that land. He can also choose the plantation of dates or any other crop. These are legal acts and profit sharing will be according to agreed terms. These are among the practices of merchants and the agent has the right to adopt them.’ (See Siddiqi, ibid., p. 153.)

Siddiqi has considered it as the basis for industrial Mudārābah.
(6) Rent or buy animals and equipment.
(7) Mingle it with his own resources.
(8) Give it as a commenda to a third party.
(9) Invest it in a partnership with a third party.’

Sarakhsi summarizes this as follows:

If the investor says to the agent ‘act with it as you see fit’ then he may practice all of these except the loan. For the investor has consigned the control of this capital to the agent’s discretion in a comprehensive way; and we know that his intention is the inclusion of all that is customary to the practice of the merchants. The agent, thereby, has the right to engage in commenda, a partnership, and to mingle the capital with his own capital because this is of the practice of the merchants (21).

In case of limited mandate commenda the activities of the agent are restricted mainly in his relationship with the third party. In some cases there were geographical restrictions on the domain of the agent’s operations.

(III) **Duration of Business:** There may or may not be a specified contractual period for the business, depending on the agreement between the principal and the agent. However there is little disagreement among jurists regarding cancellation of *Muḍārabah*. The dominant Ḥanafī school allows the cancellation by any party during its currency, provided that the other party is informed of the decision and it will not be harmful to the other party (16). It will be automatically cancelled in case of death, insanity, or apostasy from Islam of either party (22).

**Some Comments**

As we noted earlier, Islamic economists have accepted that version of the *Muḍārabah* contract which has been approved and elaborated on by jurists of the Ḥanafī school. We shall have this contract in mind when talking of an Islamic financial contract in subsequent chapters.

It is important to emphasize at this point that a *Muḍārabah* contract has the potential of forming the basis of an Islamic financial system compatible with modern needs. The provision of forming a *Muḍārabah* or partnership with a third party or mingling one’s own capital, as a part of the responsibilities of an agent, has far-reaching implications for devising an Islamic financial system. It seems clear that present banks under an Islamic system will play the role of agents. They can use the funds of depositors (principal) along with their own equity funds to form *Muḍārabah* or partnership with other investors.

In the last chapter of this book we will see a model of interest-free banking that is organized on the basis of *Muḍārabah* contracts. This will then be compared to the present banking system.

**References, Chapter 2**

CHAPTER 3

Implications of Moving Towards an Interest-Free Islamic Economic System

Introduction

The objective of this chapter is to develop a framework that will allow us to compare the Islamic scheme with the traditional one. This would then be helpful in drawing conclusions about the prohibition of interest from the economy.

In the preceding chapter we have seen that interest payments are prohibited in the Islamic financial system. Thus a financial contract which stipulates a fixed reward for the services of capital, irrespective of the performance of the project, will be a non-Islamic contract. On the other hand, as we noted in the discussion on Muḍārabah, a financial contract that specifies sharing of the return from the project is in the spirit of Islam. These definitions are made more precise in section II.

In section II we start off by giving a careful description of the environment under which our analyses are undertaken. This is done by specifying the assumptions of the model. A brief discussion on the implications of these assumptions also follows.

Under a wide range of assumptions we have shown that the Islamic scheme is superior to the traditional scheme. Given the significance of this result, it is imperative that one should be very clear about the underlying conditions. Thus section III is fully devoted to a critical examination of the assumptions of our model.
We conclude that the result is fairly robust and can only be reversed through significant changes in the environment of the model.

Assumptions, Basic Model and Results

For any theory a careful specification of the environment in which the theory is applicable is an essential prerequisite. Like any other theoretical work we have simplified the economic scenario by abstracting from real-world complications. We, however, will critically examine the underlying assumptions behind the results of our model.

Let us first outline the assumptions governing the environment of our model. These are:

(i) There is one financial institution called a lender.
(ii) The supply of loanable funds is fixed.
(iii) There are n investors in the economy demanding identical loans.
(iv) The credit market clears.
(v) The project’s performance is independent of the financing decision.
(vi) The projects of different investors are uncorrelated.
(vii) Investors are risk averse.
(viii) Both the lender and a typical investor have identical beliefs about the probability distribution of the project return and both can observe it costlessly.

Though a complete discussion on these assumptions is contained in section III we will make some remarks at this stage. The assumptions (i), (ii), and (iv) are merely simplifications. We will argue later that our results are unchanged if these assumptions are relaxed. The assumption regarding the fixed supply of loanable funds, besides being the first attempt at modelling this problem, can be justified by the existing conditions in the countries for which the proposed change is considered.

The assumption about the correlation of investment projects is an important one. We do not have any doubt about its validity under normal economic conditions. When it is not true then we will argue that in general an Islamic scheme will do better than the traditional scheme.

Perhaps the most critical assumptions are (v) and (viii). In (v) we have assumed that the performance of the project is independent of the way the project is financed. This assumption essentially rules out the incentive effects associated with the mode of financing the firm or with its ownership structure. Thus, as we show below, the production function or simply the outcome of the project is independent of the actions of the investor. In other words, the level of ‘effort’ devoted by the investor is identical across different financial arrangements.

In (viii) we have ruled out the possibility of asymmetrical information in the financial market. First, it excludes the possibility of gains that may result from the possession of finer or better information. Second, it avoids the incentives to investors of misrepresentation that may arise from the lender’s inability to observe the performance of the projects. Thus in our model the lender can costlessly observe the project’s performance.

These two assumptions taken together basically avoid the problem of ‘moral hazard’ in the credit market. The fundamental result is indeed sensitive to these assumptions. In the next chapter we will see how the results of this chapter are modified in the absence of these assumptions.

Basic Model

Let L be the fixed supply of loanable funds, then (iv) implies that:

\[ z_n = L \]  (1)

where n is the number of investors and z is the size of the loan.

Let \( z_R \), be the return of the ith investor when he invests z. We assume that R, is a random variable which is identically and independently distributed across different projects with the density \( f(r) \). For simplicity we restrict R to take only the positive real values. Finally R has a finite first two moments, namely its mean, \( E(R) \) and variance \( \text{VAR}(R) \).

Note that the above formulation implies constant returns
to the loan size. This is dictated by the simplicity achieved in modelling. There might be increasing returns to the loan size but we ignore them in order to keep our analysis manageable.

Before we define the two schemes formally let us make a few remarks. The traditional financial scheme we have in mind roughly works as follows: The lender transfers a certain amount of money, called principal, to the borrower on the condition that the principal and a fixed percentage return on the principal is payable on a future date. Although these payments are stipulated as fixed amounts, it is understood in many cases by both the parties that if the earnings fall below the required payments then a lesser amount will be paid. In the present framework we have lumped all types of fixed payments into a single fixed payment that can be thought of as the principal plus the interest. Let $D$ denote this fixed payment, then if $R$ is greater than $D$ the lender will receive $D$, otherwise it is understood that the lender will receive everything, i.e. the entire $R$.

On the other hand the Islamic scheme is the Mu'āradbah scheme described in the last chapter. Thus the lender under this scheme would require a share in the return from the project. In case of loss no party gets anything. It is important to note at this stage that neither of the two schemes requires a collateral from the investors. In other words the lender accepts a default from the investor. In practice this is rarely true of the debt scheme since many of these loans are secured against the collateral. We will say more about it later in this chapter.

In our subsequent discussion we call the traditional scheme a Fixed Return Scheme (FRS) and the Islamic scheme a Variable Return Scheme (VRS). We now formally define the two schemes:

**Definition:** (FRS) A financial contract which specifies the following payoffs for the lender and the investor, respectively, is FRS:

$$P^f = z \min (R, D); \quad Y^f = z \max (R, -D, 0)$$ (2)

Note that $P^f$ and $Y^f$ are random variables and their distribution is determined from the distribution of $R$. The aggregate payoff to the lender is given by:

$$P^f = z \sum \min (D, R)$$ (3)

**Definition:** (VRS). A financial contract which specifies the following payoffs to the lender and the borrower, respectively, is VRS:

$$P^v = (1-a)zR; \quad Y^v = azR, \text{ where } 0 < a < 1$$ (4)

The aggregate return to the lender is given by:

$$P^z = z \sum (1-a)R$$ (5)

Given the specification of these two contracts our problem is to see which contract will be preferred in the credit market. We are interested in the contract which is Pareto optimal. This problem can be attacked in several ways. For instance we can assume that the lender is risk neutral and accordingly looks only at the expected return from the two contracts. But then he can choose $a$ and $D$ such that his expected return from the two schemes is identical. Then at this point the choice of the contract depends on the preference of a typical investor.

Another approach would be to find the pair $(a, D)$ so that a typical investor has identical utility across two contracts. Then at this point we can see the preference of the lender for one of the two schemes.

We take the first approach without assuming that the lender is risk neutral. However we utilize the law of large numbers in looking at the lender’s behaviour.

**Some Asymptotic Results**

In the following two lemmas we will look at the behaviour of expected payoff to the lender as he partitions the total supply of loanable funds in the finest possible way. These two lemmas would be essential in determining the lender’s attitude toward the financial schemes.

Lender’s expected payoff under FRS is given by:

$$E(P^f) = \sum z E \min (R, D) = L \sum E \min (R, D)$$ (6)

while the variance is given by:

$$\text{Var}(P^f) = \text{Var}(\sum z \min (R, D))$$
\[ z^n \text{Var} \min(R_n, D) \]
\[ = z \text{L Var} \min(R_n, D) \]
Thus \( P^f \) is distributed as:
\[ P^f \sim \{ L \text{E min}(R_n, D), z \text{L Var min}(R_n, D) \} \]
Now we have the following:

Lemma 1. Let \( P^f \) be a sequence of identically and independently distributed random variables with the moments given in (8) then
\[ P^f \rightarrow \text{LE min}(R_n, D), \text{as } z \rightarrow 0 \]
Proof: In Appendix 1.

This lemma determines the behaviour of the lender’s payoff as he partitions the available funds into smaller loans. What it says basically is that if the lender extends smallest possible loans then he can reduce the probability of default from any one investor to an arbitrarily small level. In other words, in the presence of a large number of investors if one investor defaults then it’s effect on the lender’s expected payoff is negligible.

Similarly, the lender’s expected payoff under the VRS is given by:
\[ E(P') = L (1 - a)E(R_n) \]
and the variance of return is given by:
\[ \text{Var}(P') = z^n (1 - a) \text{Var}(R_n) \]
\[ = z (1 - a) \text{Var}(R_n) \]
Thus \( P' \) is distributed as:
\[ \{ L (1 - a)E(R_n); z L (1 - a)\text{Var}(R_n) \} \]

And we have a similar result to lemma 1 for the sequence of random returns \( P' \) under VRS.

Since the lender is not assumed to be risk neutral we need to look at his expected utility in order to determine his preference for any contract. Let \( U_b \) be the utility function of the lender. We assume that \( U_b \) is continuous. The following lemma determines the lender’s utility level under both FRS and VRS:

Lemma 2. Let \( P^f \) and \( P' \) be the two sequences of independent and identically distributed random variables converging in probability to \( E(P^f) \) and \( E(P') \) respectively. If \( U_b \) is a continuous function then:
\[ U_b(P^f) \rightarrow U_b(E(P^f)) \text{ as } z \rightarrow 0 \]
\[ U_b(P') \rightarrow U_b(E(P')) \text{ as } z \rightarrow 0 \]

Proof: In Appendix 1.

This is a very important and useful lemma. It establishes the fact that if the lender has a continuous utility function then he will only look at the expected payoff from the two schemes. Notice that the assumptions underlying the two lemmas are much less restrictive than assuming risk neutrality on the part of the lender. The crucial requirement for the lemmas are uncorrelated investment projects and a continuous utility function for the lender. There is another important requirement for these lemmas to hold: the lender’s ability to partition the total supply in the finest way. This essentially requires that the lender be able to extend arbitrarily small loans. One can easily make a case for a critical loan size determined by the associated cost of the loan.

There are two things to be noted. First, though we require a fine partition of the available funds, this does not mean a very small loan. Indeed we can easily show that for each positive \( e \) there is a \( z' \) such that for all \( z < z' \) the probability of realizing the expected return is greater than \( (1 - e) \). Second, if this procedure fails we can expect, in the presence of one lender, that the relative loan size, \( z/L \), will still be very small.

Thus the preference of the lender across two contracts can be determined by looking only at the expected payoff. Consequently the lender will be indifferent across two schemes if he is offered the same expected payoff. Indeed if the bargaining process for choosing a financial contract is continuous, in the sense to be explained below, there will always exist a situation such that the lender is indifferent between two schemes. The following lemma formally gives this fact:
Lemma 3. Fix D and let \( 0 < a < 1 \), then there exists an \( a^* \) such that:

\[
E(P^*) = E(P^*)
\]

**Proof:** In Appendix 1.

There is an important corollary to lemma 3. This will show that the lender will strictly prefer a scheme which offers a higher expected payoff.

**Corollary 1.** For all \( a < a^* \) lender strictly prefers VRS.

**Proof:** In Appendix 1.

In the presence of lemmas 1—3 it is clear that the choice of a financial contract hinges upon the preference of a typical investor. We will now show that the investor’s preference for the contract is determined by his attitude toward risk. If we consider a typical investor to be risk neutral then we have the famous result:

**Proposition 1 (Miller-Modigliani).** Suppose that lemmas 1—3 are true. If a typical investor is risk neutral then the choice of a financial contract is irrelevant.

**Proof:** In Appendix 1.

This is a simple version of the well-known and controversial Miller-Modigliani theorem in the theory of finance, which asserts that the value of the firm, in a given risk class, is independent of its capital structure (Debt-Equity ratio). Here it says that a firm should be indifferent, given the indeterminacy of the financier, between the FRS or VRS financing of its project if it is risk neutral.

Since we have assumed that a typical investor is risk averse it is not easy to determine the choice of contract, granting the fact that the expected payoff to the investors is identical across both contracts. In order to see which of the two contracts is preferred by a typical investor we need to look at the expected utility of the payoff at the point where the expected payoff is identical under two schemes. It is a well-known fact that a risk-averse person would prefer a less risky income stream among those income streams having identical expected payoff. Thus our problem essentially reduces to determine the riskiness associated with payoffs across two schemes. This is accomplished below.

From (2) and (3) we have:

\[
Y^*_i = \max(R_i - D, 0) \text{ and } Y^*_i = a(zR_i)
\]

At \( a^* \) we also have:

\[
E(Y^*_i) = E(Y^*_i)
\]

(11)

Let \( U_i \) be the utility function of the \( i \)th investor. We assume that \( U_i \) is a concave and bounded function. Given (11) an investor prefers VRS if:

\[
E(U_i(Y^*_i)) > E(U_i(Y^*_i))
\]

(12)

**Fundamental Result**

Although we need only show that for a risk averse investor (12) is true we will however, show a somewhat general result and the required result will follow as a corollary. In the next proposition we will make use of the following definition:

**Definition.** For \( 0 < a < 1 \), an a-sharing rule is a function

\[
S : IR \rightarrow IR
\]

Where IR is the set of real numbers such that

\[
0 < S(R) < R \quad (13') \quad \text{and} \quad ES(R) = aE(R)
\]

**Proposition 2.** Let

\[
S^*(R) = \min(R, D')
\]

and

\[
S^*_*(R) = \max(R-D, 0)
\]

Fix \( D \) and \( D' \) and choose \( a \) so that \( S^*(R) \) and \( S^*_*(R) \) are a-sharing rules. Then for any bounded and concave utility function \( U \) and any a-sharing rule \( S(R) \)

\[
E(U(S^*(R))) > E(U(S(R))) > E(U(S^*_*(R))
\]

**Proof:** In Appendix 1.
Proposition 2 identifies the most preferred and the least preferred a-sharing rules for a risk averse investor. But this also allows us to compare the VRS and FRS. We would show that FRS is the least preferred scheme and as such VRS strictly dominates it. The following corollary establishes this fact:

**Corollary 2:** A risk averse investor strictly prefers VRS over FRS.

**Proof:** In Appendix 1.

Now we are in a position to state the most important result of this chapter.

**Theorem 1.** Corresponding to each FRS there is a VRS which improves everyone’s welfare.

**Proof:** In Appendix 1.

We find figures 1 and 2 very helpful in understanding this theorem. In figure 1 we have shown the payoffs to the investor under VRS and FRS. The line $Y_i^*$ shows his payoff under VRS and the line $Y_i^F$ shows his payoff under FRS. Assume that the random project return is uniformly distributed between 0 and 1. Then we can derive the distribution function for both $Y_i^*$ and $Y_i^F$. This is done in figure 2. The lines $F(r)$, $G(r)$ and $H(r)$ give the distribution functions of $R$, $Y_i^*$ and $Y_i^F$, respectively. Note that $G(r)$ and $H(r)$ are the distribution functions with identical expected value. Now a risk averse individual will prefer that distribution which is less risky. It is clear from figure 2 that $G(r)$ is less risky since it is uniformly smooth whereas $H(r)$ takes jumps at the extreme values. The reason for the riskiness of $H(r)$ lies in the fact that it has a positive probability mass at zero, an extreme value.

This theorem is the fundamental result of this chapter. It suggests that under the assumptions (i—viii) the Pareto optimal contract is VRS. The intuitive reasoning behind the theorem lies in the way the risk is being spread across the two contracts. Given the fact that the choice of the contract depends on the preference of a typical investor, once the lender is indifferent, he prefers the one that is less risky. VRS has the characteristic of spreading risk more evenly than FRS, and as such given risk averse investors, VRS dominates FRS. This is the single most important gain of VRS and it has far-reaching implications for the stability of a financial system based on VRS. In Chapter 5 we discuss this issue in more detail.

Barring the transaction costs involved in the process of moving towards VRS arrangements it seems that the move is likely to be Pareto optimal.

This is a somewhat paradoxical result since it demonstrates inferiority of debt, the predominantly used form of financial contract. Note also that in this model full equity is the optimal
choice and as such a combination of debt and equity is also dominated by an equity contract.

Since the above conclusion is central to our analysis in this book it is essential that we must look very carefully at the underlying assumptions. In the next section we critically examine each of the assumptions and see how sensitive is our basic result to model specification.

Critical Examination of Assumptions

The art of theorizing requires certain simplifying assumptions which might not be true. If they are not true and are made for mere simplification then the essential results of a theory should not be sensitive to the assumptions. If, however, a prediction of the theory crucially depends on a particular assumption then that assumption must be realistic or else justified on some other grounds.

In what follows we discuss the role of each assumption in the above result and see how sensitive it is with respect to these assumptions.

The assumptions i, ii, iv, and identical distribution of a project’s return are made for convenience. So long as the law of large numbers holds for each of the several lenders we will get the dominance of the equity contract.

Given a fixed supply of loanable funds, our model is basically a demand side model. We have not explained where this supply of funds comes from. We may interpret this as reflecting given saving decisions. But then one might well argue that these decisions would depend in the first place upon the type of contracts being offered by the financial institutions. This is essentially the problem of determining the effect of introducing the system of profit sharing on the savings behaviour of individuals.

If the financial institutions are engaged in offering only equity financing, i.e. only risky contracts, then one might suggest that the total supply of loanable funds would be smaller than otherwise. The suspicion might arise from the idea that savings incentives will be diluted if only risky assets are offered. Therefore results based on the assumption of a fixed supply of loanable funds cannot be relied upon.

There are two reasons for making such an assumption besides the argument that it is just the beginning effort of formally modelling the interest-free economy. First, though it may be true that the availability of risk-free assets at the individual level induces more savings, it is not clear if aggregate savings in the economy are also affected by the non-availability of such assets. That is the aggregate savings function does not depend on the interest rate. Second, in many of the countries that we have in mind the interest rate is controlled by the government and as such it plays little if any role in determining the level of savings. In fact the savings decisions are based strictly on the level of income. Most of the savings are either in the corporate sector or the public sector. Individual savings constitute a negligible part of the total savings. Therefore it seems natural to start off with the assumption of a fixed supply of loanable funds.

But it remains to be answered if in the model where we do have a variable supply of loanable funds, the Pareto optimal contract will be different. It is not clear in which direction savings are going to change. This is a dynamic allocational problem. The introduction of Islamic schemes would make future income more risky than what it is at any moment of time. Given this increased uncertainty, what changes in the consumption pattern would take place so that the expected utility over time is unchanged? Lyland (5) has shown that if the utility function is characterized by decreasing risk aversion then savings would go up. The idea is that with increased uncertainty and decreasing risk aversion, in order to maintain the same expected utility over time an individual has to cut his present level of consumption.

Lyland’s model does not answer the above question in sufficient generality. It however serves as a good counter example for those who would argue that the introduction of the new system would necessarily lead to a reduction in the supply of loanable funds. Thus we can safely conclude that the nature of the optimal contract would not necessarily change if we allow for the variable supply of loanable funds.

There is no problem in making an assumption like (iv), uncorrelated investment projects, in normal economic conditions. The only occasion where one can doubt the
validity of such an assumption is the downswing of the business cycle when there is an economy-wide recession and declining profitability. But this in fact is a plus for the VRS because losses would spread throughout the credit market. It is ironic that VRS contracts would minimize such losses because there would be no bankruptcies as would be triggered otherwise. We deal with this issue in greater detail in Chapter 5.

We now turn to the assumption regarding the separation of a project’s performance and financing decision. We have assumed that the nature of the contract does not influence the project’s performance. More formally, the production function is independent of whether the funds are obtained through equity or debt.

In principle there can be no objection to such an assumption since the marginal product of a dollar of investment, *ceteris-paribus*, should be independent of whether the dollar is raised through debt or equity. But then this assumption has the implication of ruling out incentive effects associated with the ownership structure of the firm. There are two similar ways in which these incentive effects may arise.

Jensen and Meckling (4) have argued that the behaviour of the manager-owner depends crucially on the ownership structure of the firm. They have demonstrated that a manager behaves differently where he is not the sole owner of the firm than when he has full ownership. The idea is that with the management of any firm the managers derive utility both from pecuniary returns (such as income from the project) and non-pecuniary returns or so-called perquisites (such as air-conditioned office, attractive secretarial staff, purchase of inputs from friends, etc.). There is always an optimal level of such perquisites consistent with the value maximization objective of the firm. When the firm is not managed by the owners then there is an incentive to carry the level of perquisites to a greater than optimal level, since the managers do not bear the entire cost of increased perquisites. Therefore the value of the firm will decline relative to what it would be if the firm is owned by the managers.

On the other hand a similar problem exists if the manager raises funds through debt. But here it is less severe since the manager except in the bankrupt states, on the margin captures full benefits from the project.

Another way of incorporating the incentive effects would be to allow investors actions as an argument in the production function. Actions may be the efforts devoted by the investor. If the investor chooses an optimal level of effort then the supply of effort will be a function of the type of contract offered. Under the assumed conditions and disregarding the problem of monitoring the level of effort, the optimal contract is still VRS since it distributes the risk optimally. But the real problem is that the level of effort is not observable. Under these circumstances the investor will not bring an optimal level of effort in the case of the VRS since he does not pay the full reduction in the value of the firm from a sub-optimal supply of effort. Thus the loss of utility to the investor resulting from lower value of the firm is smaller than the gain he receives from supplying a sub-optimal level of effort. But a debt contract will not produce similar effects since on the margin the above trade-off will be balanced in this contract if the project is successful.

Stiglitz (7), Jensen and Meckling (4) and Grossman and Hart (3), have argued that there is a trade-off between the benefits of risk-spreading under equity and the incentive effects of debt, and in general there is an optimal level of debt-equity ratio corresponding to maximizing behaviour of the firm.

The above consideration falls into the general problem of ‘moral hazard’ which exists in the credit market. In Chapter 4 we discuss it in detail. We will see that the major reason for the preference of debt is the existence of a ‘moral hazard’ problem.

The assumption regarding risk aversion on the part of investors is very important for the main result of this chapter. This is not an unrealistic assumption given the widespread use of outside equity in the capital structure of many firms. Indeed the very existence of the stock market reflects society’s desire to build up institutions for shifting risk to those most suited for this purpose, namely the stockholders.

The assumption of identical beliefs about the distribution of random return is a consequence of rational expectations on each side of the market. If this is not true then it can be shown that debt will be preferred even if the investors are risk
averse. If an investor knows that the probability of default is very low then by getting funds through debt financing he can capture the upper tail of the return distribution. Whereas in case of loss he loses nothing. This is also a kind of incentive problem, (see Stiglitz and Weiss (8)). Here, because of differential information structure, investors have an incentive to undertake more risky projects than those which are in the interests of the financier.

Since these instances are rare, i.e. full debt financing of the firm, it suggests that the assumption of rational expectation is a reasonable one.

Another important assumption of this chapter is the costless observation of the project return by both the lender and borrower. As we argued in the beginning of section II, this assumption and the separation assumption have close links since both avoid the potential problem of ‘moral hazard’ which would otherwise arise.

Since in practice only the investor can costlessly observe the performance of the project, one should ask what is the implication of relaxing the assumption of costless observation by the lender. Thus one needs to look at the choice of financial contract when there is asymmetrical information in the credit market. Indeed it turns out that the predominant role played by debt in the real world can be explained on the grounds of asymmetrical information in the credit market. Debt has the characteristic of minimizing the informational requirement of a financial contract and as such given costly information collection, turns out to be the most attractive instrument of finance. We postpone further discussion of this problem until Chapter 4 where it is our main concern.

An assumption which is implicit in our formulation is the absence of any collateral requirement. In practice many debt schemes, especially in the agricultural sector in LDCs, require collateral. On the other hand, as we saw in Chapter 2, the Islamic scheme does not have any collateral requirement. Our results will be reinforced if we introduce it in the model.

Furthermore, it is clear that the requirement of a collateral restricts the entry of potential investors in the credit market. This is especially true of the agricultural sector where small farmers have virtually no access to the organized credit market because they cannot bring the required collateral (see Agarwal (1)). As such the introduction of an Islamic scheme would help to overcome this problem and consequently there may be a lot more investment activity in the economy.

Another important characteristic of the Islamic financial scheme, that is not captured by our model, is reflected in the fact that such a financial system allows more risk-taking in the economy. To see this assume that bankruptcy is costly. Many investors who plan to undertake risky projects will be denied financing under a debt scheme, because in practice financial institutions operating with fixed liabilities are not allowed to choose a portfolio beyond a specified level of associated risk (e.g. restrictions imposed by the FDIC in the U.S.A.). Whereas under an Islamic financial system it is not necessary to impose such restrictions as financial institutions will not issue fixed liabilities to their depositors. Accordingly these institutions can finance more risky investment and thus assure a higher expected return in the economy. In fact there is a continuous decline in the volume of risky investment in Western Europe, indicating a greater desire for a financial system based on equity financing (see Albach (2)).

Conclusion

In this chapter we have developed a framework that has allowed a comparison of the two schemes. We have shown that under a wide range of assumptions the Islamic financial scheme dominates the traditional scheme.

It has also been demonstrated that the superiority of the Islamic scheme is fairly robust in the sense that small deviations from the assumed conditions will not change the basic result. We have also argued that the volume of overall investment in the economy might be higher given that the Islamic scheme does not have any collateral requirement. Furthermore, the Islamic scheme also encourages more risk-taking in the economy since the financial institutions under this system will not issue fixed liabilities to their depositors. As such one can be optimistic about realizing higher returns in the economy.

Although we have shown the superiority of the Islamic scheme, for our analysis to be fruitful for policy purposes, we
need to explain why the traditional financial scheme dominates the credit market throughout the world. In the next chapter we will argue that our theory is also capable of explaining this phenomena.

References, Chapter 3


CHAPTER 4

Informational Asymmetry, Monitoring, and Financial Contracts: A New Explanation for the Role of Debt in the Capital Structure of a Firm

Introduction

In the last chapter the analytical framework that we developed, enabled us to show that the Islamic financial scheme dominates the traditional scheme, under some given conditions. We have also noted that this result is fairly robust in the sense that small deviations from the required conditions do not affect the dominance of the Islamic scheme. But the internal consistency of our model requires that we should be able to explain the predominant role, in the real world, played by the Fixed Return Schemes.

In the present chapter our objective is to explain why the FRS dominates the credit market. We argue that the dominance of the FRS in the real world can be explained by the presence of some kind of ‘moral hazard’ problem in the credit market.

Our problem in this chapter is the well-known problem of explaining the existence of debt in the capital structure of a firm. Thus we will draw upon the existing theories of optimal capital structure in the theory of finance, but will offer a new explanation for the preference of debt as an instrument of finance.

In the first section of this chapter we review the existing work in this area and indicate the place of the present effort.

The second section formally describes the problem considered and summarizes the results of this chapter.
The third section develops the basic model. A game theoretic framework is constructed to find the optimal behaviour of the lender and borrowers. The concept of Nash equilibrium is used to obtain the optimal responses. Since investors are assumed to be identical the problem can be modelled as a two-person, non-zero, non-cooperative game.

The fourth section compares the two schemes. Some extensions and applications along with some concluding remarks are contained in the last section.

Role of Debt in the Financial Structure of a Firm: A Survey

In modern business organizations capital requirements are so immense that a single source of finance is insufficient. Therefore, we observe that large corporations in general have a diversified ownership structure. Accordingly, it is not difficult to understand the diversified ownership structure. But what is somewhat difficult to understand is that these organizations use different kinds of financing methods.

Why do we observe that firms obtain funds through different forms of financial instruments? In particular, why do firms use both debt and equity to finance their capital needs?

The traditional wisdom until the late fifties, was that the value of the firm can be increased by the prejudicial employment of debt in the capital structure.

Controversy started after the Miller-Modigliani theorem (6) which states that the value of the firm is independent of its financing decisions. This is a paradoxical result, given the fact that most firms have some amount of debt and equity in their capital structure. Many authors have tried to place the role of debt in a firm’s capital structure by relaxing the assumptions of the Miller-Modigliani theorem. In the beginning, efforts centred on the no-bankruptcy and no-tax assumptions. If the probability of bankruptcy is positive (and it is costly to go bankrupt) then firms and individual borrowers cannot have equal access to credit markets. Firms can issue debt at a lower rate than individuals and this raises the value of the firm. On the other hand if debt payments are tax deductible then again, debt would be cheaper relative to equity.

A different line of attack is taken by Stiglitz (11), Jensen and Meckling (4), and Grossman and Hart (1). They have relaxed a somewhat different assumption of the Miller-Modigliani theorem: that the firm’s production function is independent of its financial structure. Stiglitz, Jensen and Meckling consider the situation of an investor who has access to an investment project but does not have sufficient funds to finance it. If the investor raises funds by issuing equity, then as he will have a less than 100 per cent interest in the project he will not manage it as carefully as he would had he been a full owner. If, on the other hand, the investor issues debt his incentive to work will reduce much less since, except in bankrupt states, he gets the full benefits of any increase in profits. Thus to Stiglitz, Jensen and Meckling, debt is a way of permitting expansion without sacrificing incentives. The trade-off for the investor is between equity, which permits the sharing of risks, and issuing debt, which leads to a high market value of the project through the incentive effect. Grossman and Hart (1) have utilized the same idea except for the fact that management/investor has zero shareholding in the firm and as such bankruptcy penalties have a significant effect on their model.

Ross (8, 9) on the other hand has given a different explanation using the signalling model. For Ross, in a world where there are firms of different quality debt is a signal of the quality of the firm. In equilibrium the value of the firm is positively correlated with the debt-equity ratio. The idea is that, given costly bankruptcy it is not in the interest of low quality firms to have more debt in their capital structure.

Our model is different from the above models. Bankruptcy is not costly in our model, neither is there differential tax treatment across different financial instruments. We have assumed that the production function is independent of the financial structure and that there are no quality differences across firms. In other words, our model does not rely on (i) imperfections in the capital market, (ii) differential tax treatment, (iii) incentive effect or signalling potential of debt. Rather we find a role for debt on the ground that it minimizes the information requirement of a financial contract, when the performance of the project is not observable by the financial institution.
A simple example is as follows: Suppose a firm has decided to drill an oil well. Suppose further that the firm has to raise the funds from outside sources. If the firm issues debt then it has to pay a fixed sum of money to the lender (this is like FRS) while if it issues equity then the lender owns a share in the oil well (this is like VRS). Finally, assume that it is costly for the lender in either scheme to monitor the performance of the project. If the lender relies on the reports of the firm there might be an incentive problem: the firm would tend to under-report the project’s performance. Generally with either the FRS or the VRS we would expect the lender to adopt a strategy that would require some amount of on-the-scene inspection. Thus the VRS would entail more inspection costs than the FRS, because under the VRS the lender is not just interested in finding if oil is discovered (as is the case with the FRS) but also in what quantity.

Now if the lender behaves competitively, he will pass on these costs to investors by requiring a higher fixed return (in case of the FRS) and a higher share (in case of the VRS). The expected payoff to the lender can be equalized across both schemes (by changing the equity ratio for a given fixed return). Thus the choice of a financial contract hinges upon the degree to which the firm is risk averse. If the firm is risk neutral then the FRS dominates. In general there is a trade-off between risk sharing under the VRS and higher expected payoff under the FRS. Therefore debt is preferred as it minimizes the information requirement of a financial contract.

Since our motivation for the present analysis is to see the implications of prohibiting debt from the economy, we will argue later in the chapter that the success of this proposal depends on the availability of information in the economy. The implementation of a profit-sharing system as the basis for financial intermediation will force financial institutions to invest additional resources in information-collection activities. These information costs are a deadweight loss to the society, and as such the introduction of the new system may lead to a Pareto inferior outcome.

**Basic Problem and Results**

In this section we informally describe the problem considered in this chapter and summarize the results.

Assume that there is a financial institution extending loans to an investor. Also, as in Chapter 3 the supply of loanable funds is fixed. Moreover, both the lender and the financial institution have identical beliefs about the probability distribution of the return from the project where funds are invested.

Let \( R \) denote the return of the project. We assume that \( R \) is a random variable with finite first two moments. Consider the following contracts:

**Definition:** (FRS). A financial contract which specifies the following payoffs for the lender and the borrower, respectively, is FRS:

\[
P^\text{F} = \min(R, D) \\
Y^\text{F} = \max(R - D, 0), \text{ where } D \text{ is some positive constant.}
\]

**Definition:** (VRS). A financial contract which specifies the following payoffs for the lender and the borrower, respectively, is VRS:

\[
P^\text{V} = (1 - a)R \\
Y^\text{V} = aR, \text{ where } 0 < a < 1
\]

It was demonstrated in the last chapter that in the absence of any kind of ‘moral hazard’ problem, the Pareto optimal contract is the VRS. Our objective now is to show that the predominant role played by the fixed return contracts is the result of moral hazard in the credit market. The type of moral hazard problem we consider is, however, different from the one so far considered in the literature on the theory of finance.

The basic problem considered in this chapter is the following:

When the lender extends a loan to an investor, then the investor observes the return of the project without incurring any costs. While the lender cannot observe the return. If it is prohibitively expensive for the lender to observe the return then the market for financial loans will not exist. There is, in the case of the lender’s inability to observe the project’s
performance, a strong incentive problem: investors will tend to under-report the project's performance. Thus the best strategy for the lender is not to extend any loan.

Although the problem of informational asymmetry is a severe one it does not necessarily lead to market failure for there are things like collateral, auditing, participation in the board of directors of the firm, and other forms of monitoring which to a large extent resolve the problem of informational asymmetry. Furthermore, in a multi-period framework the fear of loosing reputation in the credit market could be a strong incentive for investors to refrain from misrepresentation. Indeed, the types of contracts offered in the credit market resolve the incentive problem.*

Therefore in the present analysis we allow for the possibility of monitoring the performance of the project by the lender at some expense. Later in this chapter we will reflect on the practical feasibility of monitoring investment projects by the financial institutions.

Given the possibility of monitoring, a few questions remain. What types of monitoring technologies are available and what are the characteristics of an optimal monitoring technology? How does the monitoring technology differ across two contracts? Given optimal monitoring technologies across two contracts is there some way to choose one of these? Similarly we look at the behaviour of an investor to find out his optimal response for under-reporting the project return.

We summarize our results below:

(i) The optional monitoring technology is a randomized strategy which gives the probability of monitoring a reported return. It allows investors to under-report only to the extent that the gain from monitoring is equal to the cost of monitoring. The probability of monitoring goes down for a given reported return the higher the cost of monitoring.

(ii) Given a uniform distribution of returns the expected monitoring costs are lower under the FRS. Since these costs are a deadweight loss to the society, this loss is greater under the VRS. This result in general depends on the density of returns. For the densities having smaller mass below D, the FRS dominates, while for others the result would change.

The choice of a particular contract crucially depends on the attitude of the investor towards risk. There is no straightforward dominance of any scheme if investors are risk averse. Though FRS minimizes the monitoring costs it does not spread the risk optimally. Thus for a sufficiently high degree of risk aversion VRS may dominate FRS.

(iv) The above results can be used to seek an explanation of why the Miller-Modigliani theorem does not hold in a world of informational asymmetry. An expanding firm looking for outside sources of finance may find it more attractive to borrow funds on the basis of the FRS rather than issue equity.

The Model

Suppose both the lender and the investor believe that R is uniformly distributed in (d, 1), where d is some positive constant which is different across two schemes.* The assumption of uniform distribution is made for convenience. Though some of the results do depend on this specification, the essential features of the solution are independent.

Let \( G \) be the space of all possible ways of under-reporting the true return. The investor picks \( g \in G \) which translates R into some reported return, i.e.

\[
g: \{d, 1\} \rightarrow \{d, 1\}
\]

(1)

Let \( H \) be the space of all possible ways of monitoring the reported return \( g(r) \). In general \( H \) is a very large space and includes things like collateral, auditing, participation in management, etc. But we restrict \( H \) to include only the ways in which the lender makes a decision whether or not to go for auditing. That is, after looking at the reported return the lender may decide whether it is acceptable or subject it to auditing. In case the lender decides to have it audited he can

*See the literature on the principal/agent problem, (2), (3), (5), (7), (10) and (12). The primary problem is to resolve the conflicting interests of the principal/agent through the nature of the contract.

*This assumption is made to fix a technical problem that arises in the inversion of the investor's under-reporting function.
look at the accounts of the firm or ask the firm to verify its accounts by independent auditors. We assume that monitoring (auditing) is perfect in the sense that once the lender decides to monitor he knows for sure what the true return was. Furthermore there is no separate problem of recovery. Thus the lender picks \( h \in H \) that describes the monitoring possibilities. Note that \( h = 0 \) if he decides not to monitor a given reported return, whereas \( h = 1 \) means he surely monitors. If \( h \) takes a value in the interval \( (0,1) \) then we interpret it as giving the probability of monitoring a given reported return. In other words the lender may choose either a pure strategy \( (h=0) \) or \( (h=1) \) or a randomized strategy. The same is true of the investor. Thus:

\[
h: \{0,1\} \rightarrow \{0,1\}
\]  

(2)

The optimal \( h \) and \( g \) will have different characteristics. They will depend on the cost of monitoring and the optimal \( h \), respectively.

Let \( b \) be some fixed cost of monitoring. The problem of the investor is to choose \( g(r) \), for a given \( h(g,b) \) to maximize

\[
\text{maxE}U(Y) = \text{EU}\{Y(r, g, h(g,b))\}
\]  

(3)

where \( r \) is the observed value of \( R \) and \( Y(.) \) is the payoff to the investor. \( U \) is the utility function. The solution of (3) gives the optimal under-reporting strategy of the investor which is the mapping:

\[
g^*(r): \{d,1\} \times H \rightarrow \{d,1\}
\]  

(4)

On the other hand, the lender's problem is to choose \( h \in H \) for a given \( g(r) \), to maximize

\[
\text{maxE}U(P) = \text{EU}\{Y(h(g,b), g(r))\}
\]  

(5)

The solution to (5) gives the optimal \( h \), which is the mapping:

\[
h^*: \{0,1\} \times G \rightarrow \{0,1\}
\]  

(6)

Equations (3) to (6) define the game whose solution is what we are looking for. The solution (Nash Equilibrium) of the game is the pair \( (g^*, h^*) \) satisfying:

\[
\begin{align*}
\text{E} U \{Y(g^*, h^*)\} &> \text{E} U \{Y(g,h)\} &\text{for all } g \in G \\
\text{E} U \{P(g^*, h^*)\} &> \text{E} U \{P(g,h)\} &\text{for all } h \in H
\end{align*}
\]  

(7)

In what follows we will solve the game explicitly across both the contracts.

**Solution Under VRS**

In this contract the investor observing \( r \), reports \( g(r) \) out of which \( (1-a)g(r) \) is given to the lender. If he is monitored then he looses \( (1-a)(r-g(r)) \), thus his expected payoff is given as:

\[
Y^* = r - (1-a)g(r) - h(g)(1-a)(r-g(r))
\]  

(8)

Although the investor is assumed to be risk averse for a moment we ignore the utility function and maximize (8) over \( g(r) \). The solution of (8) is given by:

\[
g^*(r) = r + (1-h(g))/h'(g)
\]  

(9)

where \( h'(g) = dh(g)/dg(r) \) indicates the change in the probability of monitoring when the investor reports more. Note that we should expect \( h'(g) < 0 \). If the probability of monitoring is unaffected by how much the investor reports then the investor would report the minimum possible return. In fact this is the dominant strategy for the investor. Since there is no explicit penalty for under-reporting an investor looses nothing (in a single period model) by taking a chance for under-reporting to the fullest possible extent.

Therefore a monitoring technology which induces investors to report more should have an inverse relationship with the reported return. As such there will be an implicit penalty in the form of changing probability of monitoring. Thus the investor faces a trade-off between the loss from reporting more and a decrease in the chances of being monitored, when he reports more. The first order condition which gives (9) shows the point where the two things are balanced.

The payoff to the lender under the VRS is given by:

\[
E(P^*) = \int_d^1[(1-a)g(r) + h(g,b)((1-a)(r-g(r)-b))]mdr
\]  

where \( m = 1/(1-d) \)

(10)

Note that \( r \) cannot be an argument in his maximizing problem since he does not observe \( r \). However we can still maximize
(10) by maximizing only the integrand for a given \( g(r) \).

We have assumed that monitoring is perfect in the sense that whenever the lender monitors he knows for sure what the true value of \( r \) is. In particular this assumption has the implication that in equilibrium the lender can figure out the entire \( g(r, \cdot) \) mapping. But this requires that \( g(r, \cdot) \) should be invertible for \( r \). For if this is not possible then the lender would never know the feasibility of monitoring. As such he would never engage in the contract.

Let \( C \) be the costs of monitoring under the VRS, then:

\[
E(C') = \int_{g(r)} bh(g(r))dg(r) \tag{11}
\]

is the expected monitoring cost under the VRS.

Now we have the following proposition giving the solution pair for the VRS:

**Proposition 1.** Let \( (Y', P', g, h, C') \) be the game defined above. Then the Nash solution is given by the pair:

\[
(g^*, h^*) = \{r-b/1-a, 1-exp-((1-a)(1-g(r)-b)/b)\} \tag{12}
\]

and minimizes the expected cost of monitoring.

**Proof:** In Appendix 2.

The optimal strategy of the investor is a pure one. This makes sense since the lender, after observing \( r \) can report anything in the interval \((0,1)\) which is a convex and compact set. Given the optimal strategy of the lender, the best he can do is to under-report only to the extent that the lender is indifferent between monitoring and not monitoring. This can be seen by rewriting \( g^*(r) \) as:

\[
(1 - a)(r - g^*(r)) = b \tag{13}
\]

The left-hand side is the gain from monitoring to the lender while \( b \) is the cost of monitoring.

On the other hand the lender’s optimal strategy is randomized. To see that this makes sense, assume that the lender is restricted to a pure strategy. His optimal strategy would then be to monitor all the time, for if this were not true then the investor would under-report to the fullest extent. This would mean that the return to the lender would be the minimum. Therefore he has to monitor all the time. But even if he monitors all the time the optimal strategy of the investor is still reporting the minimum possible return. Indeed this is the ‘dominant strategy’ of the investor. Furthermore under this equilibrium full monitoring costs have to be incurred. There is also another problem associated with this equilibrium and that is its instability. The instability arises from the fact that in the presence of a small penalty there is no Nash equilibrium. Also, if one investor tells the truth this would render the lender’s strategy sub-optimal.

Thus we have demonstrated that monitoring or no monitoring cannot be optimal. Randomization of the lender’s strategy also induces the investor not to under-report outright. Thus as we expected \( h' < 0 \). This acts like an implicit penalty which gives investors an incentive to refrain from outright misrepresentation.

Another important characteristic of this monitoring technology is its relation to the cost of monitoring. As one would expect, the technology is an inverse function of the cost of monitoring. For a given level of reported return the probability of monitoring decreases as the cost of monitoring increases. Note that for a sufficiently high value of \( b \) no monitoring takes place.

The optimal payoffs of both the lender and the borrower are given by:

\[
E(Y') = (a/2)(1 + b/1-a) + (b/k)(1-exp(-k)) \tag{14}
\]

where \( k = (1-a-b)/b \).

\[
E(P') = (1/2)(1-a-b) \tag{15}
\]

whereas the expected monitoring costs are given by:

\[
E(C') = b(1-(b/1-a-b)(1-exp(-k))) \tag{16}
\]

**Solution Under FRS**

In this contract, the investor observing \( r \), reports \( g(r) \) that is given to the lender. Note that here there is no need for reporting \( g(r) > D \). At most \( g(r) = D \). Thus the investor’s payoff is given by:
\[ Y^i = r - g(r) - h(g(r))(\min(r,D) - g(r)) \]  

maximizing (17) over \( g(r) \) gives:

\[ g^*(r) = \min(r,D) + (1 - h(g(r)))/h' \]  

(18)

The payoff to the lender on the other hand is given by:

\[ E(P^f) = \int d\{g(r) + h(g(r))(\min(r,D) - g(r) - b)\}mdr \]  

maximizing along the same line as in the case of VRS we can get the optimal \( h \).

Let \( C^f \) be the cost of monitoring under FRS, then:

\[ E(C^f) = \int \text{b(h)(g(r))dg(r)} \]  

(20)

gives the expected monitoring costs under the FRS.

We now have the following proposition:

**Proposition 2.** Let \( (Y^i, P^i, g, h, C^f) \) be the game defined above for the FRS. Then the Nash solution is given by the pair:

\[ (g^*, h^*) = \{\min(r,D) - b; 1 - \exp(-(D - b - g(r)) \} \]

(21)

and minimizes the expected cost of monitoring.

**Proof:** In Appendix 2.

The optimal strategies of the lender and the investor are the same except for the parametric differences across the two contracts. Here the extent of under-reporting is \( b \) rather than \( b/1-a \) and the lender does not monitor above \( D - b \). The optimal payoffs corresponding to (21) and the expected monitoring costs are given in Appendix 2.

In the next section, we develop a criterion which allows us to compare the two schemes and which also helps in the selection of a contract.

**Comparison of Two Schemes**

In the preceding section we demonstrated that in the presence of informational asymmetry monitoring costs exist across both the contracts. Thus the choice of the contract should somehow take into account the existence of these costs. In what follows, we argue that the size of these costs indeed determines the choice of the contract.

Given the fact that there is just one financial institution, it seems natural to assume that it only cares for the expected return across the two schemes. Even if it is risk averse an appeal to the law of large numbers, as in Chapter 3, would allow the lender to look only at the expected return. Since the VRS is a continuous scheme in the sense that for every \( D \) there is an a such that the lender’s expected payoff across the two contracts is identical, the choice of the contract again hinges upon the preference of the investor. Thus we first look at the conditions under which the lender is indifferent across the two contracts. This can be accomplished in two different ways:

(i) The lender can equalize the payoffs under the two schemes with the information costs. This means that for every \( D \) we need to find an a such that:

\[ E(P^f) = E(P^i) \]

Then at this point we look at the behaviour of the investor to see which contract will be chosen.

(ii) The lender can equalize the payoffs under the two schemes as well as across the two situations (with or without information costs). This means that he passes on the monitoring costs to the investor in the form of a lower \( a \) and a higher \( D \). Then again at this point we can look at the preference of the investor.

For its computational ease we take the second approach. The following proposition determines the size of the monitoring costs across the two contracts:

**Proposition 3.** Let \( R \) be a uniformly distributed random return. Choose \( a \) and \( D \) so that

\[ E(P^f) = E(P^i) \]

then the expected monitoring costs under the FRS are smaller than under the VRS.

**Proof:** In Appendix 2.

The second condition in the proposition gives a point of
reference by establishing a link between a and D, the parameters of the two contracts.

This is intuitively the best result of this chapter, and also central to our claim that the predominant role played by the fixed-rate transactions in the real world is the result of informational asymmetry in the credit market.

Under the FRS type of transactions since the lender requires a fixed return, only a reported return below that fixed return is suspicious. As such, monitoring will not take place above this return. On the other hand, under the VRS the upper limit on monitoring is much higher. This makes monitoring more frequent under VRS.

There is another interesting difference across the two schemes. Under FRS, continuing the oil drilling example, below D whatever is discovered goes to the lender, whereas under the VRS only (1-a) of discovery goes to the lender. Thus for small values of return there will be little inclination for monitoring under the VRS. But this last fact is disguised by the assumption of uniform distribution. As such, we get a straightforward dominance of the VRS on account of minimizing expected monitoring costs.

In general the result depends on the probability mass of R below D. For the densities have smaller mass below R the above result holds, for others it may reverse.

Assuming that the lender will behave competitively, he will pass on these costs to the investors in the form of higher D and lower a. This fact is established in the following lemma:

Lemma 1. Let (1 - a), (1 - a'), D, and D' denote the share and the fixed return of the lender without and with information costs respectively. If the lender equalizes his return across the two schemes under both situations, then:

\[ a' < a \]
\[ D' > D \]

Proof: In Appendix 2.

Now we are in a position to state the fundamental result of this chapter.

Proposition 4. The choice of a financial contract depends on the investors' attitude toward risk. For a sufficiently low degree of risk aversion the FRS dominates over the VRS.

Proof: In Appendix 2.

Thus we have shown that one of the most important reasons for the preference of the FRS-type of financial contracts is the result of informational asymmetry in the financial markets. A debt contract minimizes the information requirement associated with any financial contract. Given that information collection is costly this contract appears most attractive.

In the next section we will comment on the feasibility of monitoring under the Islamic financial system.

Monitoring in the New Financial System

The analyses in the preceding section are based on the assumption that the lender is in a position to monitor the performance of the project at some expense. Although even under the present financial system monitoring activities do take place, in the new system this activity has to play a crucial role in the functioning of the financial institutions. This is essential because, being a partner or holding a substantial equity of a firm, requires active vigilance of the firm's activities in order to protect one's self-interests.

Information collection industries are usually decreasing costs industries, since this activity requires fixed costs of considerable size. Therefore such an activity can be performed efficiently by a single firm in the industry. If there is a large financial institution as we have assumed in this work, then the resulting monitoring costs can be minimized.

In modern corporations a large amount of equity is owned by individual shareholders. Individual holdings are, however, small relative to the assets of the corporation. This generates an externality: a shareholder acting individually cannot monitor the actions of managers who thus acquire a great deal of decision-making power which may not be in the best interest of all owners. On the other hand when these corporations issue debt, especially to banks, then banks closely watch
the performance of the managers. Since banks' lending is a sizeable proportion of total capital, in order to attract banks' financing, managers agree to refrain from certain actions which they would normally take.* Therefore banks, to a great extent, are able to internalize this externality.

The new system can hope to derive one of its most important benefits from the internalization of this externality. When a financial institution holds a sizeable proportion of a firm's equity, one should expect that the lender would be more cautious in monitoring the firm's activities than when the lender issues debt. Given this increased participation of the financier, one can also expect a better overall performance by those managers who have little, if any, self-interest in the corporation.

But all this depends on the ability of financial institutions to develop effective monitoring methods. This cannot be done in a short period of time. Therefore we have to conclude that, even though monitoring is feasible, the gains from monitoring can only be realized after a long period of time.

Conclusions

In this chapter our objective has been to analyze the choice of a financial contract in the presence of informational asymmetry in the credit market. A new explanation is given for firms using debt to finance their capital structure. The theory is based on the idea that if there are monitoring costs associated with financial contracts then debt minimizes these costs.

We have also developed an optimal monitoring technology which has plausible characteristics. This is a randomized strategy for the lender and allows investors to under-report only to the extent that the cost of monitoring is equal to the gain from monitoring. The technology is a decreasing function of the cost of monitoring and shows that no monitoring will take place if this cost is too high. Furthermore, the inverse relationship between reported return and the probability of monitoring acts like an implicit penalty on under-reporting by the firm.

*See Jensen and Meckling (4).
These information costs are a deadweight loss to the society. It seems that a financial system based on the principle of profit/loss sharing would force financial institutions to invest a considerable amount of society's resources in a non-productive activity, i.e. in closely monitoring the activities of the borrowers. But these losses have to be weighed against the risk-spreading benefits of a profit/loss-sharing system.

There is another important count on which the profit/loss system does a better job than the traditional system. It will be shown in Chapter 5 that the Islamic financial system is more stable than the present system.

The problem of informational asymmetry is, to some extent, over-emphasized in our model. The reason for this lies in the fact that our model is a single-period model. In a repeated framework the incentive to cheat would be reduced as loss of reputation would restrict future access to credit markets. Allowing multi-period transactions may in fact change the entire scenario, if the time horizon is sufficiently long. There may exist financial contracts with the proviso of repeated transactions that provide enough incentives to investors so that information problems may not arise.

References, Chapter 4


CHAPTER 5

Interest-Free Financial Intermediation: Theory and Practice

Introduction

In this chapter our objective is to analyze the working of an interest-free economic system in the light of our results in the last two chapters. We will first present the model of an interest-free financial system as developed by Uzair (22), (23), Siddiqi (19), (20), and Ahmed (2). Later we will discuss the implications of our work for the model of an Islamic financial system as developed by the above authors. The discussion will be followed by comments on the feasibility of the model.

Since the process of Islamization has apparently been going on for several years, especially in the direction of establishing an interest-free financial system, any discussion on the Islamic financial system would be incomplete without mention of the experience of these financial institutions. We will therefore give a brief description of these efforts in general, and in particular Pakistan’s experience will be discussed at length. Our main concern in the case of Pakistan is Banker’s Equity Limited, a financial institution that has introduced various Islamic financial schemes.

The chapter concludes with a brief outline of some unresolved issues and suggestions for resolving them.

An Islamic Model of Interest-Free Banking

Islamic economists and jurists appear to agree that the Muḍārabah type of financial transactions are legal in Islam. They propose that these contracts will be the primary basis
for replacing the present banking system. Uzair, Siddiqi, Ahmed and others have developed the model of interest-free banking which is our focus in this section.

Uzair’s description consists of three parties involved in the system, namely, (a) the actual users of capital, or the entrepreneur, (b) the bank which serves as a partial user of these funds and as an intermediary, and (c) the suppliers of funds, i.e. the depositors with the bank.

There are two contracts involved in the process. The first between the supplier of funds and the bank and the second between the bank and investors.

The bank will receive deposits of various kinds from the public on the basis of Mudarabah and will share the profit/loss with them on the basis of certain mutually agreed terms. The bank will enter into a Mudarabah partnership contract with the depositors in accordance with the nature of their deposits. It will issue them certificates of partnership or treat them as mere current account holders. The bank will use these funds by advancing loans to individual businessmen or firms on the same principle of profit/loss sharing.

In this triangular relationship — principal-Mudarabah bank-entrepreneur — the bank will have direct contact with both the principal and the investors. The Mudarabah bank and its shareholders will share the profit/loss with the enterprise, i.e. the Mudarabah bank after sharing profit/loss with the investors will share its income with its depositors. The standard conditions of Mudarabah contract discussed in Chapter 1 will apply here.

Siddiqi (20), has discussed the determination of equilibrium profit-sharing ratios between depositors and the bank on the one hand and between the bank and investors on the other. He assumes competitive behaviour on the part of each of the three sets of agents. He defines the ‘depositors rate of return’ (DRP) as that percentage of the bank’s profits which is given to depositors and ‘banks rate of profit’ (BRP) as that percentage of investors’ profits going to the bank.

He then defines P as the expected rate of profit to the investors. He postulates that the demand for Mudarabah funds by the investors is a decreasing function of the BRP. Given a certain amount of savings, S, in the bank the supply of Mudarabah advances is an increasing function of the BRP. The equilibrium BRP is determined, for a given P and S, by the intersection of the demand and supply of Mudarabah funds.

An increase in P would increase the demand for Mudarabah funds and, for a given S, this would cause an increase in BRP. This in turn with some lag would probably lead to a higher S, depressing the BRP to its original level. An increase in S would increase the supply of Mudarabah funds and for a given P this would mean a decrease in the BRP, leading to a greater volume of Mudarabah advances.

On the other hand the supply of deposits by the savers is a direct function of the DRP offered by the bank, whereas savers face a nearly perfectly elastic demand for their deposits. The equilibrium volume of savings is thus determined on the supply side of the market. An increase in the BRP or P will increase the quantity of deposits supplied.

Siddiqi argues that both the BRP and the DRP will rise in response to an increase in P, as bankers will have to compete with the non-bank alternatives of investment which would become more attractive in that situation. They might fall together as P falls continuously, but the DRP may lag behind the BRP because of the banks’ eagerness to sustain a supply of bank deposits which enables them to induce demand for advances by accepting a lower BRP. Thus the DRP may be more stable in the long run than the BRP.

Siddiqi then goes on to argue that the savers will not be exposed to short-term fluctuations in P, the investors’ expected rate of profit. In particular he maintains that the DRP is even more stable than P. The idea is that with the change in P, in order to compete with the equity market for supply of funds, banks have to readjust the DRP in the same direction. On the other hand they would tend to maintain a stable rate of return on deposits sufficient to ensure the desirable supply of funds.

For banks as profit maximizers sustaining the supply of savings is far more crucial than rates of profit sharing, especially when operating with a fractional reserve system. The rate of return on deposits may rise during an economic boom in sympathy with the rising profitability
of investments outside the bank but a sound banking policy will resist a downward movement in this rate during a slump as a sizeable contraction in the supply of bank deposits may be disastrous for the banking system, which can always hope in a system of profit sharing to revive demand by accepting a lower BRP (19).

We will comment on Siddiqi’s model in the next section. Uzair has presented the working structure of an Islamic bank. The funding operations of Islamic banks consist mainly of (a) investment deposits and (b) current account deposits. The former corresponds to the ‘fixed or time deposits’ of the present financial system. Since the primary motivation of the depositors in this account is to earn profits, funds in this account can be invested on a Mudārābah basis. The funds are pooled before the investment is made and the bank shares the profit with the depositors on its overall performance. Thus the depositors may actually end up loosing their funds if the bank suffers a loss from its overall operations.

Savings accounts are also treated in the same manner as the current accounts, although funds in this account are not solely motivated by a desire to earn profits.

Current account deposits are held for transactions purposes. Banks provide services of cheques, overdrafts, and the like to the holders of these accounts on payment of a service charge. The depositors in this account do not earn any returns. Funds in this account cannot be used by the banks to finance investment projects, but banks can legally use funds to give loans to some firms to meet short-term liquidity problems.

On the lending side of the operation of banks several instruments are available for long-term investment projects but there are problems in devising instruments for short-term financing.

In the traditional financial system businesses raise funds mainly through the issuance of equity shares, debentures, or by medium and long-term borrowing from banks at the current interest rates. In the Islamic bank the latter two possibilities are excluded.

The major source of industrial finance under the Islamic financial system is equity financing since it conforms to the Islamic principle of profit/loss sharing. Therefore under such a system the banks or other financial institutions provide funds to industry by becoming a partner in the investment project or by buying shares of the company. In most cases the funds constitute redeemable capital of the firm.

It seems that there will be no problem either in the implementation or in the functioning of such a system as far as the long-term financing of industrial projects is concerned. But the real and challenging problem arises when we look at the structure of short-term financing of industry under such a financial system. The demand for so-called ‘working capital’ is a sizeable proportion of total finances to industry and constitutes an important part of the present banking and financial system. Since the present system provides such finance on the basis of a fixed interest rate the problem is to see how an Islamic bank, where interest is prohibited, would handle this type of transaction.

Ahmed (2), and Simon (21), have suggested that these short-term finances should be provided free of charge. However, Uzair maintains that such a proposal is not viable. He argues that any assistance from the bank requires incurrence of certain costs for which it must be compensated. Since the party receiving this type of assistance would normally be getting some benefits, the bank should not go unrewarded.

Uzair categorizes these loans as follows:

(a) short-term loans for one year or a quarter thereof.
(b) short-term loans for one to three months.
(c) short-term loans for one month or less.

For (a) it is suggested that profit sharing should be the basis of rewarding banks since many firms can and do determine their profitability during such periods for internal purposes. In case it is not done then some fraction of the annual profit rate should be applied to the period for which the loan is made.

In (b) either the annual rate should be used or if earnings can be estimated correctly, as in the case of financing imports or purchase of other goods earnings can be figured out from
the difference between the sale and purchase price, profit sharing should be the basis.

In (c) Uzair suggested that a service fee should be charged per transaction. ‘This service charge on a per transaction basis’, Uzair argues, ‘will be different from interest rate because it will not be tied down to the length of time within one month or to the amount borrowed’ (22).

Loans to the agricultural sector are primarily in the nature of short-term loans. These loans are usually provided by special agricultural banks or cooperative societies. The access of conventional commercial banks to the rural population is sometimes rather limited, particularly if the peasants are sceptical about present banking techniques and if, because of maximum lending rate limitations, high administrative costs and excessive default risks, banks find such activities unprofitable.

Under these circumstances a financial system endorsed by the religious leaders could be very helpful. The same principle of profit sharing could be applied to either the output of the farm or to the actual profits.

Banks can participate in agricultural activity in several ways: (i) by supplying inputs to farmers, (ii) by financing the purchase of inputs, (iii) by providing liquidity at the crucial stage of harvesting, or (iv) by extending facilities which would help in achieving efficient marketing of farm output. It is hoped that, though this participation is complex, it will be highly rewarding. Optimism is based on the fact that the bank by forming a partnership with several farmers can internalize a number of externalities which exist in small farm operations such as finding labour during harvesting, the mark-up to the middle man for marketing which reduces farmers’ profit, high input cost, etc. Sharing in profits may also help improve the supervision of loans which is poor under the interest-based system.

Another difficulty faced by the Islamic bank is in the provision of consumer credit. In the present banking system consumer credit plays an important role. A variety of loans are available for this purpose including loans for housing, auto, and purchase of other consumer durables.

Islamic economists, at the outset, point out that in an Islamic society people should not live beyond their means and that no conscious effort on the part of producers or financial institutions will be allowed to create the demand for consumer durables which is the basic cause of living beyond one’s means.

Many Islamic economists have suggested that these loans should be provided without charge. These loans are mostly needed for purposes other than profit earnings. These should be in the nature of what Islam calls Qard Hasan, welfare loans. This however is not a feasible solution when one looks at the basic motivation of business enterprises under normal conditions. Thus other Muslim scholars believe that these loans are productive in the sense of enhancing one’s ability to live a better life, if not productive in the direct sense of yielding immediate profits.

However, there are extreme difficulties in devising remuneration mechanisms for these loans that are consistent with the Islamic principles of finance. Uzair thinks that under the new system only a small number of people will approach commercial banks if employers extend these loans to their employees. The residual demand can be met by the banks through financing purchases of consumer durables and participating on a profit/loss basis with the producers. The bank can again charge a service fee from the borrowers in order to meet administrative expenses. The loans for housing can easily be extended on the basis of profit sharing by sharing in the ownership of the house and its rental value until the loan is repaid.

However, there still exists a demand for consumption loans which cannot be met through the above arrangements. Mannan (16), has suggested organizing people’s credit cooperatives for this purpose. This organization requires its members to purchase shares of a certain amount. The funds so obtained are then granted to its members as consumption loans. The loan is payable in instalments. Ahmed (2), has suggested that expenses of the organization should be met through a tax on each consumption loan made. If some of the funds are unused then these will be invested in profit-yielding ventures.
Comments on the Model

In the preceding section we have presented a theoretical as well as a working model of interest-free banking. We now critically examine it in the light of our work in the last two chapters and the existing literature on the theory of money and banking.

An immediate impression which is fairly easy to draw is that no effort has so far been directed to rigorously investigating the implications of a system of profit sharing as it compares to the present system.

We believe that successful implementation of interest-free banking requires a clear understanding of its merits and demerits compared to the present system. To do so, as we argued in the last two chapters, one needs an analytical framework which allows a comparison of the two systems. It is difficult to believe that the present system, though unMuslim, is entirely without merit inasmuch as it satisfies the needs of those actively engaged in it. A knowledge of its merits would help evolve a system that would take into account these merits and assimilate them into an Islamic framework. If this is not possible, i.e. if one of the merits runs against the spirit of Islam, then the resulting costs of abandoning this merit must be explicitly indicated.

The following comments are a reflection of the above theme.

It is clear that Islamic banking is more in the nature of investment banking, as investment is the predominant activity of the banks. There are several institutions in the present system which perform an identical role (like the money market funds institutions in the U.S.A.). This however does not mean that banks will not perform the usual commercial transactions but only that there has to be a sharp distinction between the two activities. Let us look at Siddiqi’s analysis of interest-free banking at the outset.

Siddiqi’s Model of Interest-Free Banking

Siddiqi’s model is a model of fully-fledged Islamic financial intermediation, i.e. ex-post analysis of Islamic banks when it has started functioning. Only momentarily does he mention the transition, e.g. when he talks about the initial BRP and argues that it will be in the neighbourhood of existing interest rate. There is no mention of the transitional phase and the effect of the new system on the behaviour of any of the three sets of agents that results from a change in the choice available to them. Introduction of financial intermediation based on the principle of profit sharing can be viewed as reducing the number of available financial contracts in the credit market. One needs to examine the implications of this reduction on the grounds of both efficiency and the welfare of participating agents. We do not claim that because of a reduction in choice the agents are necessarily worse off. In fact it is not clear in which direction things are going to change.

The model of financial intermediation is more complex than implied by Siddiqi’s paper. First, there is the decision of savers who make an inter-temporal choice of allocating their expected income into present consumption and savings. Then there is the problem of the bank’s optimal portfolio selection. And finally, there is the decision of investors about borrowing which we have analyzed extensively in the last two chapters.

Siddiqi briefly mentions the first choice and claims that this choice will be unaffected by the new system. He cites some evidence that supports his belief. We have mentioned in Chapter 3 that the effect of this change is not clear at the micro level but at the macro level such a claim is more plausible. In fact there is evidence that shows the dependence of savings on interest rate at the micro level (Boskin (4), Boskin and Lau (5)). Thus there is a need to examine this issue more carefully in the framework of the general working of financial intermediation. In the absence of such an examination, the results based on the above assumptions should be interpreted with great care.

Although Siddiqi assumes profit maximization on the part of the bank, he does not explicitly analyze the bank’s portfolio selection under alternative regimes. Thus his claim that savers will not be exposed to fluctuations in the profit rate has no basis. This issue can only be settled in a framework
which properly weighs the bank's preference for its return and the maintenance of a supply of savings in the bank. There is no reason to believe these two things will work in opposite directions and cancel each other out leaving the DRP unchanged when the investors' profit is decreasing. We are not even sure if Siddiqi is asking the right question. For us the real question in this regard is to find out the relative stability of two different systems, because whether the savers are exposed to drastic changes in economic conditions or not depends on which system is capable of absorbing these shocks. More specifically one should ask which of the two systems is more vulnerable to bank runs, panics and drastically changing market valuations.

Stability of Islamic Financial System: A Digression

In this section we digress for a while to look informally at the problem of stability of the Islamic financial system. There is a great deal of literature both in Monetary Theory and in the Theory of Banking, which can help us draw a preliminary conclusion. There is enough theoretical basis to believe that on this count Islamic banking would be more stable than the present banking system.

There are those who believe that the modern banking system is the primary source of business cycles. F. Hayek, (10), writes:

Nobody has ever asked them to pursue a policy other than that which, as we have seen, gives rise to cyclical fluctuations; and it is not within their power to do away with some fluctuations, seeing that the latter originate not from the policy but from the very nature of the modern organization of credit. So long as we make use of bank credit as a means of furthering economic development we shall have to put up with the resulting trade cycles. They are in a sense the price we pay for a speed of development exceeding that which people voluntarily make possible through their savings and which therefore has to be extorted from them.

And then there are those who believe that the modern banking system is inherently unstable. Henry Simon (21), Lloyd Mintz (18), Irving Fisher (7), and Milton Friedman (8), (9), all have convincingly and forcefully argued about the 'inherent instability' of the fractional reserve system. The argument basically rests on banks' ability under such a system to change the monetary base in the economy, thereby producing destabilizing forces since the decisions of bankers and the central bank cannot be synchronized immediately. Even though the provision of deposit insurance has greatly reduced the problem of bank runs and panics, a host of new problems has resulted including a greater amount of government intervention in financial intermediation.

Indeed the present banking system as it exists today can never operate efficiently without the provision of deposit insurance. Karken and Wallice (13), have shown that in the absence of deposit insurance, full information and complete markets, banks will only hold riskless assets which obviously means that intermediation through banks will be inefficient. Indeed it is not clear what are the realistic market conditions in the absence of deposit insurance which would ensure efficient working of the banking system.

Conce (6) has shown more persuasively how the present banks are inherently unstable without the provision of deposit insurance. He develops a model of a present bank and compares it to a bank which issues money market funds (exactly what an Islamic bank will issue to its depositors). The modern bank issues fixed liabilities to its depositors and invests the proceeds along with its own equity into risky assets. Since the value of the bank's assets is random there is a positive probability that the value of the assets (in a forced sale of its assets in any period) will fall below its fixed liabilities, resulting in bankruptcy. So long as this does not occur depositors can withdraw their money. If this value falls below the fixed liabilities (which might occur if one of the bank's major borrowers defaults, e.g. a new revolutionary government in some Latin American country, which denies the payment of debt owed by the former government to American banks will do exactly that) then a bank panic will
be triggered. Now the welfare of each depositor depends on the actions of other depositors. Thus there will be a tendency to withdraw deposits as soon as possible, because the quicker one gets to the bank the higher the probability of recovering money. The idea is that the bank/depositor contract contains an externality that makes the welfare of a depositor dependent on the actions of other depositors, since the bank issues fixed liabilities to each depositor. Thus the externality magnifies the fluctuations in the value of the bank’s assets — since a forced sale of a bank’s assets must be below the market value (the buyer of the bank’s assets would value it below the market value) — causing instability in the banking system. This problem is even worse in a general equilibrium framework, where the failure of one bank might trigger a sequence of failures through a decline in confidence regarding the safe operation of banks in general.

No such instability exists when a bank, rather than issuing fixed liabilities, issues shares to its depositors. In this case assets acquired by the banks are transparent to investors, they are no more or less stable than the deposits supporting them. If there is a decline in the value of the bank’s assets then it will not be to the advantage of depositors to withdraw their money because their share would consequently decline. Also the welfare of a depositor does not depend on the actions of other depositors because each gets a share in the bank’s value which is independent of whether some withdraw their shares while others do not. In fact there is a greater incentive to remain in the bank when it suffers a decline in the value of its assets because otherwise it will mean acceptance of a loss on initial deposit, whereas retaining shares in the bank will give hope for a revaluation of the bank’s assets in the future. Perhaps the greatest advantage of such a system is that it not only resolves the bank run and panic problem but it also does not require the provision of deposit insurance and other government interventions surrounding banking institutions (see Meltzer (17)).

Another problem with the present banking system under the provision of deposit insurance is that it provides banks with the incentive to go for more risky investments than allowed by regulations, since banks pay a fixed premium and it is very costly to monitor a bank’s portfolio and its associated risk.

Several Islamic economists believe that the Islamic banking system should be based on 100% reserve requirements (see Kahf, M. (12)). This would resolve the problem faced by the central banks under a fractional reserve system in maintaining an optimal quantity of money. (See Jarhi (11) for a detailed analysis of 100% reserve system and fractional reserve system.)

A Note on the Problem of Moral Hazard

Siddiqi assumes a given demand for Mudārakah funds and does not analyze the investors’ optimal choice of financial contract. Thus his analysis does not tell us anything about the welfare of investors after the introduction of Islamic banking. We have been primarily concerned with this issue in the past two chapters. There we have seen implications of this move. We do not want to repeat our conclusion but would like to point out that under present conditions in the credit market the move would entail some cost on this count. The policymakers should be clear about this cost and weigh it against the benefits noted here and in earlier chapters.

At this stage we would again like to point out that, in the theory of optimal contracts — and particularly in the literature on the problem of optimal capital structure of a firm — a fixed return contract dominates because of the incentive effect (see the discussion in Chapters 3 and 4). The presence of debt, for example, in the capital structure of a firm provides incentives for better management relative to the case where the managers sell the ownership to outsiders, as in the case of equity. Therefore, if the financial institutions are incapable of controlling the effort level of the manager/agent then the introduction of profit sharing will greatly reduce the performance and efficiency of the business enterprise. It is ironic that there would be no incentive on the part of either financial institutions or savers to provide funds for the business sector. But this problem will be greatly reduced by the fact that banks by providing a substantial equity to a firm, would be in a position to internalize the externality that
results from small shareholders’ inability to monitor the performance of the managers. If there is a large financial institution, as in our model in the last two chapters, then monitoring might not be very costly; there are economies of scale in information-gathering agencies.

We do not want to exaggerate the above problem. Rather, our concern is to inform Islamic economists that a great deal of research and understanding of the present highly complex financial system is required before one can be certain about the consequences of a new system.

Risk Aversion in Siddiqi’s Model

One final comment about Siddiqi’s analysis is regarding his assumption about the attitude of agents towards risk. He implicitly assumes that all three groups of agents are risk neutral. Thus he only looks at the expected return to each agent in analyzing their reaction to changing market conditions. To us this is a rather strange and very unrealistic assumption given the fact that one of the important benefits of the Islamic financial system stems from its capability of spreading risk in the society. This gain will be non-existent if agents are risk neutral. The reason why Siddiqi did not run into problems, as we pointed out earlier, is that he has assumed given decisions of agents. It is easy to demonstrate that the present system will be more efficient if agents are risk neutral, especially from the viewpoint of producers. If the agents are risk averse then the correct methodology will require that one should look at the probability distribution of returns rather than just looking at the expected returns.

But we agree with many of Siddiqi’s results and believe that his paper is an important step in the right direction.

Uzair’s Analysis

We now turn to offer some comments on the working structure of banking under the Islamic economic system, as presented by Uzair and others.

We have no doubt about the feasibility of this institution as far as long-run lending operations are concerned except for the problems noted earlier regarding informational asymmetry in the credit market. We do not think that the supply of bank deposits for such purposes will be drastically reduced under such a system, at least such a proposition is not supported by the theory just considered. However, there might be a problem in changing people’s attitude because they are so used to the present system that they cannot possibly conceive of any alternative. We agree with Uzair when he points out that these things will become routine with the passage of time and perform just as efficiently as the present system. Thus there is a need for caution during the transitional period. Public opinion can be changed in the right direction through national debates and seminars. The common man should be made aware of the merits and demerits of the two systems. A sweeping change like this can only be sustained if there is popular acceptance from the public.

We have some objections to Uzair’s suggestions for dealing with short-term finances. He suggests that for these loans, if profit cannot be determined for the loan period, then some fraction of annual profit rates should be used for remunerating the bank. We do not understand how this annual rate can be known at the time the loan matures. It seems that Uzair is implicitly allowing for the possibility of using some forecasted return. But this return is known at any time and would act like an interest rate. This is an unacceptable procedure.

In case of loans for a month or less he suggests that a service fee should be charged per transaction. Uzair claims that this is different from charging interest since it is not tied to the length of time within a month or to the size of the loan. This is a misleading argument. First, though the rate is not tied to the length of time within a month its upper limit is a month, thus there is a time dimension. It is analogous to an annual rate which is not tied to the time period within a year. Second, there is an upper bound on the size of such loans since these loans, as Uzair suggested, cannot be more than the average past liquidity position of a borrower with the bank. Therefore we safely conclude that this charge is similar to interest paid on a bank loan.
Islamic Scheme in the Agricultural Sector

We share the optimism of Islamic economists in hoping that a "Muḍārabah" type of banking will be very productive, especially in the agricultural sector. Many Islamic countries are presently agrarian economies. The agricultural sector constitutes the greatest percentage of total value added in these countries. Small farmers in these countries are in poor shape. They suffer liquidity problems which greatly reduce the efficiency of their farms. They have no access to organized credit markets and the usual source of borrowing is the village money-lender (the so-called informal credit market) who charges a much higher interest rate than what exists in the formal credit market. It is no surprise that this informal credit market exists along with the formal credit markets since the poor farmers cannot provide the required collateral which is a pre-condition for access to this market. Agarwal (1) has formally analyzed the problem of bank credit to small farmers by incorporating the transactions costs involved in the process. He concluded that there is a minimum size of collateral below which no one gets credit from competitive banks. He also shows that borrowers of large amounts are better off since the cost per unit of loan for the bank and for the borrower decreases with the size of the loan.

Under these circumstances introduction of a financial system which is capable of avoiding these difficulties would be extremely efficient and productive. An Islamic bank will require no collateral but will share ownership of the farm and its output until the loan is repaid. We have already noted some of the benefits of the bank's operations in the agricultural sector which would result from internalization of various externalities associated with the small-size farm. However, all this is more easily said than done. Indeed radical changes in the present structure of banking are required before any gain can be realized.

The Problem of Consumer Credit

The issue of consumer credit is generally unresolved and no satisfactory procedure is available for some consumption loans. It is difficult to understand Uzair's argument that a small fraction of borrowers will approach commercial banks if employers provide loans to their employees for this purpose. He probably suggests that these loans should be free of charge. We see no incentive on the part of employers (excluding public services) to extend such a service. There is presently no such practice in the world in the private sector. His suggestion of banks participating in the financing of hire-purchase is most practical. These type of arrangements are very common in advanced countries where credit card purchases are essentially based on bank financing. Banks receive a percentage of the sale price from the sellers and allow consumers to repay the loan in instalments with a finance charge (which is exactly the interest rate). Uzair has also suggested that borrowers should be charged a service fee to meet administrative expenses. We however disagree with this proposal. Since the bank is sharing profits with the sellers there is no justification for charging the borrowers a fee. But there remains the problem of default by borrowers on such loans. In advanced nations finance charges are a reflection of the risk premium which is always adjusting to the rate of default on such loans.

In the new system this problem can be avoided in many cases by acquiring ownership of consumer durables during the loan repayment period. However, this problem cannot be eliminated altogether. Only in the long run can the bank/borrower relationship be strengthened through the build-up of reputation. Stiff penalties may be a partial solution.

The proposal to organize people's credit cooperatives is an attractive idea. However there remains the problem, as Karsten (14), has pointed out that "(a) Do savers have enough incentives to deposit their savings in a credit society without receiving any financial rewards apart from the hope that they might one day need a consumption loan? (b) How should the credit society allocate its funds in case of excess demand, probably occurring at a close to zero interest rate (including the tax as a sort of service charge)."
A Suggestion for Determining Profitability in Short-Term Financing

Some of the difficulties noted above in determining the compensation mechanism for short-term financing can be avoided through the following procedure:

A firm should be charged initially on the basis of its expected profitability during a given year. But at the end of the year when the exact profit is known, an adjustment to this effect should be made. If the expected profit was greater than the actual a refund should be made whereas the firm should pay the differential in the other cases.

This is a very practical procedure; one of the best taxation systems, that of the U.S., operates on this principle. During the year, individual deductions are made on the basis of expected income during that year. At the end of the year, individuals and firms file their tax returns to settle accounts with the government.

There will even then be some arbitrariness because a fraction of the yearly rate will be applied to a loan used for a smaller period of time. But this is not a big enough problem to cast doubts on the feasibility of the system.

We offer similar suggestions in our discussion of a financial scheme, in the next section.

Interest-Free Financial Intermediation in Practice

In this section we briefly describe the efforts of several Islamic countries towards Islamization of their financial sector. Since Pakistan is most notable in terms of introducing interest-free institutions we will examine more closely her experience. We will specifically discuss the efforts of Banker’s Equity Ltd., a financial institution, which has devised several interest-free financial schemes. Our discussion is based on the material in Khan (15), Karsten (14), and other reports.

The first formal attempt to put Islamic banking theory into practice took place in the Egyptian delta town of Mit Ghamr in 1962. The years 1965—67, in Egypt saw the opening of eleven banks who attracted more than a million clients; however they were closed down by the government for political reasons (see 3). By then the idea of Islamic banking had spread in the Arab world. The late King Faisal of Saudi Arabia and various international Islamic organizations, such as the Muslim World League, campaigned for the establishment of an international Islamic financial institution to foster economic and social progress in Muslim countries. This led to the establishment of the Islamic Development Bank (IDB) with its headquarters in Jeddah. In the sixth year of its operation the IDB has participated in more than 275 projects in thirty-six countries by financing development projects with interest-free loans. The bank’s sixth annual report puts the amount the IDB has committed to development projects, trade financing, technical assistance (which mainly finances feasibility studies) and the special assistance account for the poorer Islamic countries at 2.18 billion dollars of which 66.7% has actually been disbursed.

Between 1976—79 a number of Islamic financial institutions opened for business. They ranged from Jaame in Johannesburg, set up in 1976 with an estimated 1981 turnover of 250,000 dollars, to more high-powered companies like the Faisal Islamic Bank of Sudan (FIBS), the Islamic Investment Company (IIC), registered in the Bahamas but based in Geneva, the Faisal Islamic Bank of Egypt (FIBE) in 1977, and the Islamic Banking System (IBS) of Luxembourg in 1978. The Bahrain Islamic Bank, the Bait al-Tamweel al-Kuwaiti (Kuwait Finance House) and the Jordan Islamic Bank for Investment and Finance all opened in 1979.

Several other financial institutions, including Dar al-Maal al-Islami (DMI) the most successful bank, have emerged in this area over the past three years. They are based in Saudi Arabia, Kuwait, Sudan, U.A.E., Bahrain, Jordan, Malaysia, India, and notably in Pakistan.

Pakistan is the first country which has constitutionally taken the responsibility of abolishing interest from the economy. The constitution says that the ‘state shall eliminate ribâ‘ (interest) as soon as possible.’

In 1979, the government announced its programme for creating an interest-free economy in Pakistan. In June 1980, Zakât (a wealth tax) and ‘Ushr (a land tax) both required by Islamic law, were instituted. The process of achieving the ob-
jectives of Islamization is a gradual one. Pakistan wants to replace interest with equity participation arrangements that will allow incentives for savings and will encourage efficient resource allocation consistent with Islamic principles.

Five banking laws were amended including the State Bank of Pakistan Act of 1956, the Banking Companies Act of 1962, and the Banking Nationalization Act of 1974. In January 1981 ‘interest-free counters’ were established in about 6,600 branches of the five nationalized banks in Pakistan. Depositors still have the option of choosing between interest-bearing deposits and ‘interest-free’ accounts. The depositors in the latter accounts will share in the profit/loss of the project where the bank has invested these funds.

The government of Pakistan also passed the *Muḍārabah* law to encourage financial transactions on a profit/loss basis. Under this law management companies, banks and other financial institutions can register themselves as *Muḍārabah* companies. A ‘Religious Board’ ensures that the firm’s activities are not opposed to the injunctions of Islam.

In Pakistan, the National Investment Trust (NIT), Investment Corporation of Pakistan, and Banker’s Equity Ltd., issue Participating Term Certificates (PTC). This is the most important financial instrument devised to meet the financial needs of industry on a long-term basis. We will shortly examine this scheme as introduced by Banker’s Equity.

Another important step towards Islamization of financial systems in Pakistan is the operation of House Building Finance Corporation (HBFC) on the basis of interest-free financing of housing projects. HBFC extends loans to individuals and housing companies on the basis of participation in ownership and a share of the rental value during the repayment period.

As far as the performance of these efforts is concerned very limited evidence is available. The reports of international Islamic banks like that of the DMI show tremendous success. Karsten has noted some signs of progress and success. In Pakistan commercial banks have declared dividends on PLS accounts which on average have done a little better than the competing interest-bearing accounts. We, however, are cautious about making any comment on the basis of these figures since they are controlled by monetary authorities and it would not be surprising if there is some bias in exaggerating these figures in order to enhance the public’s confidence in the new system.

An Islamic Financial Scheme Offered by Banker’s Equity

In the light of the theory outlined above we will evaluate the schemes offered by Banker’s Equity (B.E.), a Pakistani financial institution. Although B.E. is organized and run on a purely economic basis, it has two unique features which distinguish it from other financial institutions. First, though its provisions for financial assistance are mainly dictated by the economic feasibility of a project, it does make an allowance if the project generates some non-economic benefits to society. Second, and more importantly, it is trying to devise schemes of financial assistance which are consistent with the Islamic principles of finance. This is the result of an Islamization process currently taking place in Pakistan. Banker’s Equity is playing an important role in accelerating this process.

Banker’s Equity has introduced several instruments of finance including *Muḍārabah*, Participating Term Certificates (PTC), and Equipment Leasing, etc. But the bulk of the finances so far provided are coming through the PTC arrangements. In fact the PTC has some features which are supposed to be close to the Islamic scheme of finance outlined in the preceding chapters.

Banker’s Equity actually plays a role of intermediary financier. The loanable funds acquired by B.E. are actually provided by the commercial banks of Pakistan and the State Bank of Pakistan. Thus funds which are at the disposal of B.E. have to be allocated primarily on the basis of economic feasibility of a particular project. As such, a careful examination of a project’s feasibility is carried out before the financial assistance package is approved.

An important aspect of the loanable funds with B.E. is that they are not lying idle otherwise, as such they have a strictly non-zero opportunity cost, i.e. the banks which provided these
funds could have invested them elsewhere in a profitable manner. This has an important bearing on our later discussion.

In what follows we shall outline the major features of the PTC scheme and evaluate it on the basis of the theory developed in the previous chapters. We have not considered other schemes since they constitute only a small proportion of Banker’s Equity’s financial support offered for various projects.

**Major Features of Participating Term Certificates (PTC)**

Suppose Banker’s Equity has approved a financial assistance package to an investor (firm) for a specific project. Let \( L \) denote the total financial package. The scheme requires that after the sponsor has invested its own share in the project, the PTC should be distributed over a period of time in equal instalments, say of \( X \). Since many projects financed by B.E. are heavy industrial projects, there is a fairly long gestation period before the project goes into commercial production. As such the scheme requires payment of a discount rate, called ‘Pre-Production Discount Rate’, on the PTC funds during this period. Therefore the actual PTC investment at the beginning of production is more than the initial allocation \( L \).

The total PTC funds are given by the equation

\[
P = L + X(1 - r^n)/1 - r
\]

where, \( n = \) Number of years in gestation period.
\( P = \) PTC funds, and \( r \) is the discount rate.
\( r = \) discount rate.

(1) gives the principal PTC funds provided to an investor.

Investors are supposed to repay this amount in all cases, at least in principal. This principal is ensured against collateral required from all investors in the form of a mortgage of all the present and future, movable or immovable, property of the firm.

After the project is executed for commercial production B.E. becomes a partner in the profit and loss of the firm. The scheme adopts the following procedure in sharing the profit/loss:

Let \( R_1 \) be the profits of the firm in the first year of its operation. B.E. requires a share of profits \( 0 < a < 1 \), such that:

\[
aR_1 = bP
\]

where \( b \) is some proportion of the outstanding PTC funds. For an investor to be interested in demanding any funds on the basis of the PTC arrangements we should have:

\[
R_1 > (b/a)P
\]

i.e. total expected profits must be at least equal to a certain proportion of the PTC and this proportion should obviously be greater than what is required by the PTC. Equation (3) in some sense also gives a benchmark (commonly known as cut-off point for project selection) to B.E. for assessing the feasibility of a particular project.

The profits left for the investor are:

\[
R_1' = R_1 - bP
\]

Out of this the firm is also supposed to retire a portion of the principal PTC.

Suppose:

\[
R_1 < (b/a)P
\]

i.e. the firm has not enough profits to pay B.E. its required share. Let:

\[
D = (a/b)P - R_1
\]

denote the deficiency in profits to be paid to B.E. The firm will have to issue additional PTCs equal to \( D \). Thus in the subsequent year if the firm has not retired any portion of the principal PTC, the total outstanding PTC funds are given by:

\[
P_2 = P(1 + (a/b)) - R_1 = P + D
\]

If the firm earns some profits in the subsequent years they have to be shared in the manner discussed above, except that the portion \( D \) has to be retired first.

Now suppose the investor incurs a loss in the first or in any other year of operations. Let \( L \) be the amount of loss. Let \( V \) be the total uncapitalized value of the firm, then \( V = P + E \) (we are assuming that the investor does not have any debt in his capital
structure). Where \( E \) is the equity of the firm (or the paid-up capital). Let \( P = zE \), i.e., \( P \) is some proportion of the paid-up capital of the firm. Now \( z \) is the proportion which determines the share of B.E. in the losses. Thus B.E. will sustain a loss, \( K \), given by \( K = zI \) where \( I \) is the loss to the firm. The way the loss \( L \) is shared is by the postponement of the PTC payments of nearest maturity. The outstanding PTC is now:

\[
P' = P(1 - L/E)
\]

(8)

Although the PTC funds have declined by \( K \), the firm has to issue common stocks in favour of B.E. equivalent to the value of the reduced PTC funds. These shares will rank in the same way as ordinary stocks are ranked in all respects. Thus in the following year the capital structure of the firm changes and it has more equity in its capital structure.

The real loss to B.E. is uncertain. It depends on the market valuation of the common shares (which might, apparently, go down) and the conversion rate of PTCs in common shares.

If there are profits in the subsequent years then 25% of those profits will have to be used to convert the convertible common shares into PTC. For the rest of the profit the same sharing scheme is applicable with some minor modifications.

Banker’s Equity reserves the right to participate in the management (via the Board of Directors) of the firm if the firm shows poor performance or turns out to be economically inefficient in the initial years of its operations.

The above are the major features of PTC financing. There are other provisions which do not form the essence of the scheme, and as such we have omitted their discussion. In what follows we will see how close the PTC scheme is to the Islamic scheme we have studied in the subsequent sections.

**PTC as an Islamic Scheme: A Critical Evaluation**

We will confine our discussion to three major provisions of the PTC scheme and see if they conform to the Islamic scheme, namely:

(i) Pre-Production Discount Rate
(ii) Collateral Requirement for Funds
(iii) Profit/Loss Sharing

It is fairly clear that PTC finances are the kind of finances, which in the Theory of Finance, are known as Preferred Stocks. They are certainly different from common stocks and enjoy privileges not available to common stock holders. They are less variable in terms of their valuations but also earn, on the average, a lower return than common stocks. They constitute redeemable capital of the firm. Other characteristics of Preferred Stocks are well known and need no further discussion.

Before we start a formal discussion of the above three provisions of the PTC, one thing should be made clear at the outset: the PTC constitutes the redeemable capital of the firm and as such the principal has to be repaid under all circumstances. This will be helpful in the following discussion.

(i) **Pre-Production Discount Rate:** From \( 1' \) the total PTC funds are given by

\[
1' \quad L + X(1 - r^{n+1})/1 - r
\]

Though the approved finances are only \( L \), the actual finances turn out to be \( L + X(1 - r^{n+1})/1 - r \); i.e. during the gestation of the project the firm has to pay some interest charges in the form of issuing more PTCs. To see the nature of these additional PTCs let us assume that the firm lasts for just one year after it has gone into production. Now at the end of the year the firm is supposed to pay to B.E.:

\[
B = (1 + b)P \quad \text{where } bP \text{ is the share of profits to B.E.}
\]

(9)

Suppose further, that the firm did not earn any profit that year so it only pays:

\[
B = L + X(1 - r^{n+1})/1 - r
\]

Thus we see that B.E. did not loose anything on the actual \( L \), but earned some interest at the rate of \( r \) which is the pre-production discount rate. As such, PTC during the gestation period of the project acts like debt at compounding interest rate.

As such, we can safely conclude that the provision of discount rate during the gestation period of the project is contrary
to the Islamic spirit. In the next section we will give some suggested alternatives to replace this discount rate.

(ii) **Collateral Requirement:** Since the PTC constitutes redeemable capital of the firm, the principal is payable under all circumstances. As such B.E. requires collateral against the finances in the form of mortgage (in its name) of the property of the firm.

Recall, in Chapter 3 neither of the two schemes we considered required collateral. The Islamic scheme also does not require collateral even in practice. Collateral, whenever required, acts as a barrier for access to the credit market for many investors. Consequently it promotes the interests of only those investors who are already in the market. This has severe implications for income distribution. Indeed, most Islamic economists claim that the collateral requirement is a major cause of inequities in the economic system which generates a group of people who accumulate wealth. This is also considered to be the worst part of the fixed return schemes dominating credit markets throughout the world.

Again it turns out that the collateral requirement does not conform to the Islamic spirit. Later we will give an alternative for the collateral requirement which is closer to the Islamic spirit.

(iii) **Profit/Loss Sharing:** The scheme requires a share in profit equivalent to a percentage of the outstanding PTC funds. Since the Islamic scheme allows profit sharing it appears that this sharing scheme conforms to the Islamic spirit. We argue that this is not true.

We noted in Chapter 3 that a financial contract which specifies a known reward for the services of capital is invalid in Islamic law. Since B.E. requires a percentage of outstanding PTC as its share in profits, this amount is known with certainty and hence it is in the nature of stipulating a known reward. Thus the contract can never qualify as Islamic. Indeed it can be shown that there does not exist a share of profit which is equal to the required share of the PTC loan. Even if

\[ R1 > (a/b)P \quad (10) \]

the actual profits may not satisfy this inequality. So there is a

positive probability that the firm will not meet B.E.'s requirements.

The sharing of loss is somewhat more complex and uncertain. In the event of a loss the amount of PTCs declines by the proportion which it has to the paid capital of the firm. But at the same time, the firm issues in favour of B.E. convertible shares of an equal amount, which rank in the same way as the ordinary shares of the firm. Now as we noted earlier the real loss depends crucially on: (1) the rate of conversion of the PTC to common shares and (2) the market valuation of common shares.

It is common practice in finance that rates of conversion are always a little bit higher than the actual market value of common shares. B.E. will suffer a loss, for sure, if the conversion ratios are no different than the market valuation of common shares and the market valuation of common shares has actually declined after the firm has suffered a loss.

But this is not the end of the story, the common stocks thus acquired are again convertible into PTC and enjoy a privilege which is not available to the current PTCs. This privilege is reflected in distribution of the profits in subsequent years where 25% of the profits have to be allocated to converting these common shares back into PTCs.

One can see that there is a strong asymmetry in the way profits and losses are shared. Of course, asymmetry in sharing is not against the Islamic spirit, but this should be justified on grounds conformable to Islamic principles. One possible justification might lie in the way the project is managed by the two firms. If there is asymmetry in the management the sharing asymmetry may be justified.

Our understanding of this asymmetry lies in the nature of PTC arrangements. Since it is a redeemable source of finance, B.E. is a partner for a while and as such during the period when the PTC funds are intact it should somehow protect its interest by allowing for such an asymmetry. Once the PTCs are retired, for the rest of the project's life it is the firm which enjoys the benefits of the project.

In the next section we will give some suggestions as to how this asymmetry can be minimized and some un-Islamic elements removed from the sharing scheme.
Some Suggestions for Improvements in PTC Arrangements

In this section our objective is to present some alternatives for three major provisions, evaluated in the last section, of PTC finance.

(i) Since the provision of a discount rate appears to be the most un-Islamic aspect of the scheme one is tempted to suggest that it should be removed right away. This could be an alternative but one needs to be careful before making such a proposal. Any suggestion for an alternative to the discount rate should be given only after a careful analysis of the nature of funds available and at the disposal of Banker’s Equity. As we noted earlier, B.E. does not own these funds, rather, it plays the role of an intermediary between the suppliers of the funds and the demanders. The actual suppliers of these funds are the five major commercial banks of Pakistan and the State Bank of Pakistan. The funds provided to Banker’s Equity are not idle funds having no other use. Scarcity of capital in a country like Pakistan is well known and needs no further elaboration. As such there is an opportunity cost associated with these funds which obviously is non-zero. Islam nowhere denies the idea of a return on capital. The idea of return to a factor carries the idea of cost of that factor as well. But the problem is how to determine the cost of capital. In a capitalistic economy, it is determined by the marginal product of capital and believed to be reflected in the market interest rate (in the world of certainty). But there is no such thing as a certain world and as such the marginal product of capital is uncertain and cannot be determined a priori by the use of market interest rate. Thus the alternative to the provision of discount rate should allow for uncertainty in returns even during the gestation period.

Given the above considerations, one can come up with various alternatives for replacing the pre-production discount rate. To us an operational alternative is the following:

(a) If the funds are given for a project which creates another unit in an already existing industry, then during the gestation period rather than a fixed discount rate some type of average profit rate of already existing units should be charged on the funds. This profit is uncertain and truly reflects the marginal productivity of funds in the industry where these funds are invested.

(b) If the funds are given for a project which creates an entirely new industry or for research and development purposes, then some sort of national average profitability should be charged. This would reflect the variable opportunity cost of funds to the nation.

(ii) The collateral requirement should be easy to replace. There should be no collateral, but given Banker’s Equity’s role of intermediary it can obtain mortgage of the property of the project created by its funds. This will be automatically ensured if Banker’s Equity moves more in the direction of being a partner rather than just a lender.

(iii) We have noted in the preceding section that the sharing of profit/loss is not truly Islamic, and that there is a strong asymmetry in the way profit/loss is shared. As far as profit sharing is concerned, we see no other way but to suggest that Banker’s Equity should require a share of the actual profit of the firm, rather than demanding a share equivalent to some proportion of outstanding PTC.

On the other hand, for sharing of losses we have the following suggestions:

(a) The conversion ratios should be identical to the value of the PTC to the common stocks, i.e. these should not be converted on higher than the actual rates as is the common practice in financial management.

(b) In subsequent years, no matter whether there are profits or not, these shares must be converted into PTC at the simple conversion rate. The value of common stocks must be equal to what is reflected in the market.

(c) PTCs so issued, should enjoy no privilege other than what is available to already existing PTCs.

The above procedure allows for the real possibility of a loss even on the principal PTC, which is what is required in the Islamic financial package.
Some Concluding Remarks

In the critical evaluation of Banker's Equity's financial scheme our objective was to be clear about what is the ideal Islamic scheme. We do not think that any official of this organization would claim it to be a truly Islamic scheme. This seems to be the best possible scheme they can come up with, given the present structure of capital markets. In our opinion the shortcomings are a reflection of two inter-related things, both of which are consistent with our theoretical formulations in earlier chapters:

(a) Most firms are interested in obtaining funds from the financial institutions in the form of redeemable capital because, (i) capital in this country is highly subsidized (the present interest rate set by the central bank does not reflect the true opportunity cost of capital), and strong lobbying by these firms provide them access to this cheap source of finance; (ii) the present tax structure makes the use of redeemable capital even more attractive. Another reason for the attractiveness of debt financing may be that for the government it is politically the best way of subsidizing capital in the economy. By charging a low interest rate the amount of subsidization appears to be very small. But if the government subsidizes by giving up a proportion of its profits from the project, it will be politically unfeasible since a sizeable amount will be involved. Therefore the government has to change its policies drastically before any serious participation can be expected from investors.

(b) Being a partner in a firm requires an active participation in all of its operations, ranging from management to marketing, etc. This is very costly and also disliked by the firms. These firms maintain accounting practices that are highly confidential and it could prove fatal for them if this information was shared by someone else.

Bearing the above two facts in mind one can understand the shortcomings of PTC financing. It is a first step in the right direction, it is somewhat careful and cautious and caters to the present attitude in the capital market. As long as its objective is to move eventually to the ideal Islamic scheme, and there is no reason to believe otherwise, its great promise for the Islamization process in the country should be appreciated. What is now needed is a positive response from investors, after all a one-party show can never be the solution. If the business community starts changing its attitude the process can be accelerated.

It is our belief that the business community in this country, as is true anywhere else, is fairly responsive to incentives provided for it. Most investors are not the kind of people who will be in the capital market only once. Rather, they would like to have continuous access to this market. This aspect can be exploited in changing their attitude in the right direction. One needs to devise financial schemes based on the 'Standing Relationship' between the lender and borrowers. This is a challenging research area, but highly rewarding. We expect that there exist financial packages based on the above principle with the characteristic that in the long run the lender and the borrower, rather than having diametrically-opposed interests, behave in the same way and ensure the honesty of the system endogenously.

Conclusions and Direction for Future Research

The President of Pakistan, in 1977 formed a panel of Economists, Bankers, and Islamic Scholars to make recommendations to eliminate interest from the economy. In its report, published in 1980, the panel noted:

For the profit/loss sharing system to be instituted properly, it is necessary that all business enterprises obtaining funds should maintain proper accounts and that this should be done honestly so as to reveal the true working results of the enterprise. The actual position, however, is that most of the enterprises either do not maintain accounts or do not maintain them properly, or keep different sets of accounts for different purposes. Even the accounts of the firms in the corporate sector, which are audited by Chartered Accountants, often fail to reveal their working results because of the widespread malpractice of deflating profits, inflating losses, and showing fictitious losses. . . . The audit is of little avail in
deciphering the true profit/loss position as auditors are mostly concerned with the legality rather than the propriety and veracity of the expenditures shown. . . . Moral values being what they are, the introduction of a profit/loss sharing system can aggravate such malpractices . . . under the profit/loss system there may be a stronger temptation for such [malpractices].

In his comments on this report, Iraadat Hussain, Director and Chairman of the Middle East Bank, writes:

I have no doubt that the Government of Pakistan is conscious of the warning of the committee . . . that the basic prerequisite for the success of this honest and sincere effort is the society cleansed of corruption and evils and the absence of unethical practices in the business community. . . . It would be unfortunate if the honest efforts of the government meet with failure due to the lack of basic virtues as fear of God, honesty, and trustworthiness. God forbid should the efforts of government fail, it will not only harm the banking system in Pakistan but will affect the very concept of application of Islamic ideology which would be difficult to eradicate.

In this work we have given a formal language to the comments noted above. The major result of our thesis is that the Islamic financial system is superior to a non-Islamic system if there is no dishonesty. To us, as to many others, this is not a very surprising result. But at the same time the requirement of honesty, for the success of the Islamic system, is very stringent. Perhaps the most important question raised by this research is whether the efforts of Islamization, especially in one direction, would be successful or not. The answer in the very short run seems to be negative.

But we strongly resent the implication that these efforts should be abandoned. Certainly society will have to pay a very high price for Islamization, and indeed the benefits of Islam, as history shows come after sacrifices are made. One should also allow for the benefits society would supposedly derive from the preservation of a spiritual value. Thus it is the job of policy-makers to weigh the benefit/cost of this policy change.

It is very important that other institutions based on non-Islamic principles should also be changed. This is a long-term effort and one should not expect everything to change in the desired direction overnight. Thus, in the short run costly partial moves can be sustained in the hope of dynamic gains from changing attitudes in society over a longer period of time.

The problem of dishonesty to a large extent is overemphasized in our single-period model. In our opinion dishonesty is a function of the incentive structures afforded by the society, and also in a value-oriented society, of the fear of God. The second factor is by and large exogenous and can only be changed in the very long run. We believe that the short-run costs can be minimized by devising incentive structures that ensure the honesty of agents endogenously.

In the credit market agents transact repeatedly. It is possible, therefore, to devise financial schemes embodying incentive mechanisms, so that agents reveal the truth even if they are not sufficiently afraid of God. This is the area of research where Islamic economists will have to devote most of their energies to ensure the successful replacement of the present financial system.

References, Chapter 5

Appendix 1

Lemma 1: Let $P_z$ be a sequence of identically and independently distributed random variables with mean $\text{LE}(P_z)$ and variance $z\text{Lvar}(P_z)$ then

$$P_z \rightarrow \text{LE}(P_z) \text{ as } z \rightarrow 0$$

**Proof:** For a fixed $\epsilon$ positive, by Chebyshev’s inequality we have

$$\text{Pr}[|P_z - \text{LE}(P_z)| \geq \epsilon \leq (1/\epsilon^2)|\text{var}(P_z)|] = (1/\epsilon^2)z\text{Lvar}(P_z)$$

which goes to zero as $z$ goes to zero.

Lemma 2: Let $P_z$ be a sequence of I.I.D. random variables which converge to $\text{E}(P_z)$ in probability. If $U_b$ is a continuous function then

$$U_b(P_z) \rightarrow U_b(\text{E}(P)) \text{ as } z \rightarrow 0,$$ where $P = \text{E}(P_z)$

**Proof:** Fix $\eta$, a positive number. Let $I$ be an arbitrary interval such that

$$\text{Pr}[P \in I] = 1 - \eta/2$$

Now since $P_z$ converges to $P$ in probability, there exists an $z_0$ such that for all $z \leq z_0$ we have

$$\text{Pr}[|P_z - P| \leq \delta] = 1 - \eta/2 \text{ for all } P \in I \text{ and any positive } \delta. \text{ Since } U_b \text{ is continuous we have for any } \epsilon \text{ positive}

$$|U_b(P_z) - U_b(P)| \leq \epsilon \text{ if } |P_z - P| \leq \delta$$

hence

$$\text{Pr}[|U_b(P_z) - U_b(P)| \leq \epsilon] \geq \text{Pr}[|P_z - P| \leq \delta] - \text{Pr}[P \in I']$$

$$\text{Pr}[P \in I] = 1 - \eta/2 - \eta/2 = 1 - \eta$$
But \( \eta \) is arbitrary and hence the result follows by letting
\[
\eta \to 0
\]

**Lemma 3**: Fix \( D \) and let \( \alpha \in (0,1) \), then there exists an \( a^* \) such that
\[
E(P^\alpha) = E(P')
\]

**Proof**: Define:
\[
h(a) = E(P^\alpha) - E(P') = \alpha E(\min(R,D)) - (1 - \alpha) E(R)
\]
Now \( h(1) = \alpha E(\min(R,D)) \geq 0 \)
and \( h(0) = \alpha E(\min(R,D)) - E(R) \leq 0 \)
since \( E(R') \geq E(\min(R,D)) \)
Furthermore, since \( h \) is continuous there exists an \( a^* \) such that
\[
h(a^*) = 0 \quad \text{as required.}
\]

**Corollary 1**: For all \( a \leq a^* \) the lender strictly prefers the VRS.

**Proof**: Consider again \( h(a) \). Now for \( h(a) \leq 0 \) the VRS dominates whereas for \( h(a) \geq 0 \) the FRS dominates. Since \( h(a^*) = 0 \) \( \text{and } h(a) \text{ is a decreasing function of } a \), \( h(a) \leq h(a^*) \) for all \( a \leq a^* \).

**Proposition 1** (Miller-Modigliani): If investors are risk neutral then the choice of a financial contract is irrelevant.

**Proof**: If investors are risk neutral then they look at their expected return from the two schemes. Now there exists \((D^*, a^*)\) such that
\[
E(P^\alpha) = E(P')
\]
\[
E(Y^\alpha) = E(Y')
\]
The existence is assured by the fact that both of the functions are continuous and by appropriately defining the joint map we can appeal to the fixed point theorem.

Thus the return across both contracts is the same for both the lender and the investor and as such there will be no preference for either of the two schemes. This means that the choice of the contract is irrelevant.

**Proposition 2**: Let
\[
S^*(R) = \min(R, D')
\]
and
\[
S_*(R) = \max(R - D, 0)
\]
Fix \( a \) and pick \( D \) and \( D' \) such that \( S^*(R) \) and \( S_*(R) \) are a-sharing rules. Then for all concave utility functions \( U \) and any a-sharing rule \( S(R) \)
\[
EU(S^*) \geq EU(S) \geq EU(S_*)
\]

**Proof**: Let \( \Lambda = \{S(R) : ES(R) = aE(R); 0 \leq S(R) \leq 1\} \)
Thus \( \Lambda \) defines the class of a-sharing rules. Suppose also that \( R \leq M \) where \( M \) is a sufficiently large constant.

The proof requires two things:
\begin{enumerate}
  \item \( EU(S^*(R)) \geq EU(S(R)) \) for all \( S(R) \in \Lambda \) and \( U \) concave.
  \item \( EU(S_*(R)) \leq EU(S(R)) \) for all \( S(R) \in \Lambda \) and \( U \) concave.
\end{enumerate}
i.e. \( S^*(R) \) is the upper bound and \( S_*(R) \) is a the lower bound for the class \( \Lambda \) under all concave functions.

Thus we will prove the above two statements separately. We will make use of the following two lemmas by Rothschild and Stiglitz (1970) (see reference (6) to Chapter 3).

**Lemma a**: Suppose \( X \) and \( Y \) are two random variables with the same expected value. \( Y \) is riskier (or more variable) than \( X \) if any of three conditions are true:
\begin{enumerate}
  \item \( Y = X + Z \) with \( E(Z|X) = 0 \) and \( X \) and \( Y \) are identically distributed.
  \item \( EU(X) \geq EU(Y) \) for all bounded and concave utility functions.
  \item If \( f \) is the density of \( X \) and \( g \) is that of \( Y \) then \( g = f + s \)
\end{enumerate}
where \( \int s(x)dx = \int xs(x)dx = 0 \)
i.e. the density of \( Y \) can be obtained from that of \( X \) by a single mean-preserving spread.
**Lemma b:** Let G be the distribution function of Y and F be the distribution function of X. Define
\[ S(x) = G(x) - F(x) \]
then G is riskier than F if S satisfies the following two conditions (called the integral conditions):

(i) \[ T(1) = \int_0^1 S(x)dx = 0 \]

(ii) \[ T(y) = \int_0^1 S(x)dx \geq 0 \quad \text{for all } 0 \leq y \leq 1 \]

**Proof of (i):** Suppose S*(R) is not the most preferred payoff, rather S(R) has this property (such a payoff exists since \( \Lambda \) is a member of the bounded class of function). We will establish a contradiction.

Since S(R) \( \in \Lambda \)
\[ ES(R) = aE(R) \]
and \( 0 \leq S(R) \leq R \)

Second, since S(R) is most preferred
\[ EU(S(R)) \geq EU(S'(R)) \quad \text{for all } S'(R) \in \Lambda \]
and in particular we have
\[ EU(S(R)) \geq EU(S^*(R)) \quad (1) \]

Given that U is concave (1) implies that S(R) is less risky than S*(R) (by lemma a above). Again by lemma a (iii), this means that the distribution of S*(R) can be obtained from that of S(R) through a single mean-preserving spread. Thus for (1) to be true the difference of the distribution functions of S(R) and S*(R) should satisfy the integral conditions of lemma b.

Thus we need to find the distribution functions of S(R) and S*(R).

Let F(r) be the distribution function of R and H(r) be the distribution function of S*(R), then
\[ H(r) = \begin{cases} 
0 & r \leq 0 \\
F(r) & 0 \leq r \leq D' \\
1 - F(D') & D' \leq r \leq M \\
1 & M \leq r 
\end{cases} \quad (2) \]

Define S(R) as follows:
\[ S(R) = \begin{cases} 
t_1(r) & r \leq D' \\
t_2(r) & r \geq D' 
\end{cases} \quad (3) \]
where, given \( D' \), \( t_1(r) \) and \( t_2(r) \) are chosen so that:
\[ ES(R) = aE(R) \text{ and } 0 \leq S(R) \leq R \]
Thus S(R) is an arbitrary payoff function that belongs to \( \Lambda \). Let G(r) be the distribution function of S(R), then:
\[ G(r) = \begin{cases} 
0 & r \leq 0 \\
F(t_1^{-1}(r)) & 0 \leq r \leq D' \\
F(t_2^{-1}(r)) & D' \leq r \leq M \\
1 & M \leq r 
\end{cases} \quad (4) \]

Finally, let:
\[ K(r) = H(r) - G(r) \quad (5) \]

Thus we need to check if K(r) satisfies the integral conditions of lemma b.

The first condition is trivially true since both of the payoffs belong to the class \( \Lambda \).

For the second condition let:
\[ T(r') = \int_0^{r'} K(r)dr \]
\[ = \int_0^{r'} [H(r) - G(r)]dr \]
Thus it should be true that:
\[ T(r') \geq 0 \quad \text{for all } r' \in (0,M) \]

Let \( r' = D' \), then
\[ T(D') = \int_0^D [H(r) - G(r)]dr \\
= \int_0^D [F(r) - F(t_1^{-1}(r))]dr \]
Since F is monotonic and \( r \leq t_1^{-1}(r) \) we have
\[ F(r) \leq F(t_1^{-1}(r)) \]
\[ T(r) = \int_0^D [F(r) - F(t_1^{-1}(r))]dr \leq 0 \]
contradicting that S(R) is the most preferred a-sharing payoff.
**Proof of (**)**: Though a rigorous proof along the same lines of (*) can be given, here we argue by a simple method that is fairly intuitive.

Since $S^*(R)$ is the most preferred payoff, the residual payoff should be the least preferred payoff. The residual payoff is given as:

$$
S^*(R) = \begin{cases} 
0 & R \leq D \\
R - D & R > D
\end{cases}
$$

where $D$ is determined by the constraint that $S^*(R)$ must belong to $\Lambda$. But $S^*(R) = S_\alpha(R)$ and as such

$$EU(S^*(R)) \leq EU(S(R))$$

for all $\alpha \in \Lambda$.

**Corollary 2**: A risk averse investor strictly prefers the VRS over the FRS.

**Proof**: We need to show that:

$$EU(Y') \succ EU(Y')$$

at the point where:

$$E(Y') = E(Y')$$

Note that both $Y^r$ and $Y^f$ are a-sharing rules since:

$$E(Y') = aE(R)$$

and both of these payoffs are bounded by $M$. Therefore the corollary follows by letting:

$$S_\alpha(R) = Y^f = \max(R_i - D, 0)$$

in proposition 2.

**Theorem 1**: Corresponding to each FRS there is a VRS which improves everyone’s welfare.

**Proof**: From Corollary 2 each investor prefers VRS. We show that the lender can be made better off through the VRS arrangement.

Since $U$ is continuous there is an $e$ positive such that:

$$EU((a^* - e))R = EU(max(R_i - D, 0))$$

Therefore it is possible to give, say, $\frac{1}{2}eR_i$ to the lender without changing the investor’s preference for the VRS.

From corollary 1, it follows that for $a = a^* - \frac{1}{2}e$ the lender strictly prefers the VRS. This shows that the VRS improves everyone’s welfare.
Appendix 2

Proposition 1: Let \((P', Y', g, h, C')\) be the game defined above for the VRS. The Nash Solution of the game is given by the pair:

\[(g^*, h^*) = [r-b/1-a, 1- \exp\{(1-a)(1-g(r))-b\}/b]\]

and minimizes the expected cost of monitoring.

Proof: The investor chooses \(g(r)\), for a given \(h(g(r))\), to maximize:

\[Y^* = r - (1-a)g(r) - h(g(r))(1-a)(r-g(r))\]

The first order condition is:

\[
\begin{align*}
\frac{dY^*}{dg(r)} &= -(1-a) - h'(g(r))(1-a)(r-g(r)) + (1-a)h(g(r)) = 0 \\
g(r) &= r + \{1 - h(g(r))\}/h'(g(r)) \quad (1)
\end{align*}
\]

On the other hand the lender maximizes, for a given \(g(r)\):

\[E(P^*) = \int_d^r \{(1-a)g(r) + h(g(r))(1-a)(r-g(r)-b)\}mdr \quad (2)\]

where \(m = 1/1-d\).

This is equivalent to maximizing integrand in (2). We will justify this procedure below. Since (2) is linear in \(h(g(r))\) for a given \(g(r)\), we have:

\[h(g(r)) = \begin{cases} 
0 & \text{if } (1-a)(r-g(r)) \leq b \\
1 & \text{if } (1-a)(r-g(r)) \geq b 
\end{cases} \quad (3)\]

A corner solution is clearly inefficient in terms of cost of monitoring. If the lender has access to randomized monitoring technology then he chooses \(h(g(r))\) such that:

\[h(g(r)) \epsilon (0,1) \text{ and } (r-g(r)) = b/1-a \quad (4)\]
This is the Nash Equilibrium condition for the lender. But the problem is how to find \( h(g(r)) \) from (4)?

From (1):

\[
r - g(r) = -[1 - h(g(r))]/h'(g(r))
\]

So the Nash Solution is given by the two equilibrium conditions:

\[
r - g(r) = -[1 - h(g(r))]/h'(g(r)) = b/1-a
\]

(5)

From the second equation in (5) we get:

\[
[1 - h(g(r))]/h'(g(r)) = -b/1-a
\]

or

\[
-(b/1-a)h'(g(r)) + h(g(r)) = 1
\]

(6)

(6) is a linear differential equation which has the solution:

\[
h^*(g(r)) = 1 - \exp[-(1-a)(1-g(r)-b)/b]
\]

where \( h(1 - b/1-a = 0) \) is the initial condition. Note that the lender’s optimal strategy does not have \( r \) as its argument since he does not observe \( r \). This justifies our procedure of maximizing the integrand in (2):

\[
h^*(g(r)) \text{ forces } g(r) \text{ to be:}
\]

\[
g^*(r) = r - b/1-a
\]

(7)

It can be seen that \( g^*(r) \) is invertible in \( r \), but the reporting space \((0,1-b/1-a)\) is different from \((d,1)\), the original space. We see that \( d = b/1-a \).

Thus we have shown that:

\[
(g^*, h^*) = [r-b/1-a, 1-\exp[-(1-a)(1-g(r)-b)/b]]
\]

is the Nash equilibrium solution of the game under the VRS.

It remains to be shown that this also minimizes the expected monitoring costs.

Given \((g^*, h^*)\):

\[
E(C') = \int_{0}^{1-b/1-a} b[1 - \exp[-(1-a)g(r)-b)]/b]mdg(r)
\]

\[
= b[1-(b/1-a-b)(1-exp[(1-a-b)/b])]
\]

(8)

Thus \( E(C') \leq b \). The only other equilibrium is \( h(g(r)) = 1 \). But then \( E(C') = b \). Thus \((g^*, h^*)\) minimizes the monitoring costs.

\[
\text{Proposition 2: Let } (P^r, Y^r, g, h, C^r) \text{ be the game defined above for the FRS. The Nash Solution of the game is given by:}
\]

\[
(g^*, h^*) = [\min(r,D)-b,1-\exp[-(D-g(r)-b)/b]]
\]

and minimizes the expected cost of monitoring.

\[
\text{Proof: In this case the investor chooses } g(r), \text{ for a given } h(g(r)), \text{ to maximize:}
\]

\[
Y^r = r - g(r) - h(g(r))[\min(r,D) - g(r)]
\]

(9)

Maximizing (9) over \( g(r) \) gives:

\[
dY^r = -1 - h'(g(r))[\min(r,D) - g(r)] + h(g(r)) = 0
dg(r)
\]

(10)

which gives:

\[
g(r) = \min(r,D) + [1 - h(g(r))]/h'(g(r))
\]

(11)

On the other hand the lender maximizes, for a given \( g(r) \):

\[
E(P^r) = \int_{g}^{1}[g(r) + h(g(r))[\min(r,D) - g(r) - b]]
\]

(12)

As we argued in Proposition 1, this is equivalent to maximizing the integrand in (11). Since (11) is linear in \( h(g(r)) \), we get:

\[
h(g(r)) = \begin{cases} 
0 & \text{if } \min(r,D) \leq b \\
1 & \text{if } \min(r,D) > 0 
\end{cases}
\]

(13)

Again a corner solution is inefficient in terms of cost of monitoring. If the lender has access to a randomized technology he will choose \( h(g(r)) \) so that:

\[
h(g(r)) \in (0,1) \text{ and } \min(r,D) - g(r) = b
\]

(14)

This is the Nash Equilibrium condition for the lender under the FRS. Now combining (10) and (13), we get:

\[
\min(r,D) - g(r) = -[1-h(g(r))]/h'(g(r)) = b
\]

From the second equation in (14) we get:

\[
bh'(g(r)) + h(g(r)) = 1
\]

(15)

(15) is a linear differential equation having the solution

\[
h^*(g(r)) = 1 - \exp[-(D - g(r) - b)/b]
\]

(16)
where we have imposed the initial condition:
\[ h(D-b) = 0 \]

On the other hand the optimal \( g(r) \) is given as:
\[ g^*(r) = \min(r, D) - b \]

It is easy to show in the same way as in Proposition 1 that this Nash equilibrium minimizes the cost of monitoring.

**Proposition 3:** Given a uniform distribution of return \( R \) and (1-a) and D, such that
\[ E(P^r) = E(P^o) \]

with no monitoring costs, then the expected monitoring costs under the VRS are greater than under the FRS.

**Proof:** The expected costs for the VRS are given by:
\[ E(C^r) = b[1 - (b/1-a-b)[1-\exp[-(1-a-b)/b]]] \]

while under the FRS the costs are given by:
\[ E(C^f) = (b/1-b)[D-b(2-\exp[-(D-b)/b])] \]

We need to show that:
\[ E(C^r) > E(C^f) \]
\[ b[1 - k = (1-a-b)/b [1-\exp[-(k = 1-a-b)/b]]] > (b/1-b)[D-b(2-\exp[-(D-b)/b])] \]
\[ 1 - k = (1-a-b)/b[1-\exp[-(k = 1-a-b)/b]] > D-b(2-\exp[-(D-b)/b]) \]
\[ (k = (1-a-b)/b[1-\exp[-(k = 1-a-b)/b]] > b(2-\exp[-(D-b)/b]) \]

since \( D < 1 \)
\[ 1-\exp[k = (1-a-b)/b] < 2 - \exp[-(D-b)/b] \]
\[ \exp[-(k = 1-a-b)/b] > \exp[-(D-b)/b] - 1 \] (17)

Since \( 0 < \exp(-k) < 1 \) for all non-negative \( k \), (17) is true for all \( a, D \), and \( b \). This means that in particular it is true for the pair \( (a, D) \) such that:
\[ E(P^o) = E(P^f) \] with no information costs.

**Lemma 1:** Let \( (1-a) \), \( (1-a') \), \( D \) and \( D' \) denote the share and fixed return of the lender without and with the information costs. Then if the lender equalizes his return across two schemes under both situations:
\[ a' < a \]

and
\[ D' > D \]

**Proof:** The payoff to the lender under the FRS with information costs is:
\[ E(P^r) = (1/1-b)(D(1-\frac{1}{2}D) - \frac{1}{2}b^2) - b \] (18)

while the payoff to the lender under the FRS with no information costs is:
\[ E(P^f) = (1/1-b)(D(1-\frac{1}{2}D) - \frac{1}{2}b^2) \] (19)

equalizing (18) and (19) we get:
\[ D'(1-\frac{1}{2}D') - b(1-b) = D(1-\frac{1}{2}D) \]

or
\[ D'(1-\frac{1}{2}D') = D(1-\frac{1}{2}D) + b(1-b) \]

Since \( b(1-b) > 0 \), we have:
\[ D' > D \]

On the other hand the lender’s payoff under the VRS with and without the information costs are:
\[ E(P^r) = \frac{1}{2}(1-a')[1 + b/(1-a')] - b \] (20)
\[ E(P^o) = \frac{1}{2}(1-a)[1 + b/(1-a)] \] (21)

respectively.

Equalizing (20) and (21) we get:
\[ (1-a') = (1-a) + 2b/1+b(1-b) \]

Since \( b/1+b(1-b) \geq 0 \), we have \( (1-a') > (1-a) \) or \( a' < a \) as required.

**Proposition 4:** The choice of the financial contract depends on the attitude towards risk of the investor. For a sufficiently low degree of risk aversion the FRS dominates the VRS.
Proof: It is clear that in order to determine the investor’s choice of the contract we have to look at his expected utility under the two contracts. Thus the choice of a contract depends on the degree of risk aversion. The proof of exact dependence is fairly tedious and as such we ignore it here. We show the dominance of the FRS under the linear case.

The proof follows from Proposition 3 and Lemma 1. From Proposition 3 we know that expected monitoring costs are higher for the VRS and Lemma 1 establishes the transfer of these costs to the investors. Since the payoff to the lender is equalized across both schemes and in both situations, the investors would ultimately bear these monitoring costs. But these costs are smaller in the case of the FRS since there is a smaller deadweight loss. Therefore the investor’s payoff is higher under the FRS and he would accordingly prefer the FRS over the VRS.
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