# Incentive Structure of Financing a Project: An Islamic Finance Approach

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## ABSTRACT

Financing is an important component in any project. Without finance, it is impossible to run any project as it is considered the lifeblood of the business. But due to the presence of predetermined rate of interest, economists have provided alternative approach for financing the project. In this paper a model using profit and loss sharing (PLS) system and comparison of it with the conventional financing model is developed. Thrust in this paper is towards establishing a new theoretical reasoning why PLS system is less frequently used in Islamic banking in terms of net worth of the borrower. It has been argued that agency problem like moral hazard is still acute in PLS system. An idea has been discuss to solve this problem using game theoretic tool.

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## 1. INTRODUCTION

Consider that an entrepreneur has a project but he does not have adequate resources (financial and non-financial) to execute it. In this case if there is no system to provide him with sufficient funds to carry out his project, a potential opportunity for the development of a society will be wasted. Financial intermediaries like banks play a significant role to solve this problem. They attract the surplus money from those who do not need it immediately and provide it to those who need it immediately. Many systems and mechanisms have been developed to get the surplus money and provide it to the needy.

This situation poses two challenges. First how to perpetuate the saving habit of the people and get it deposited to the financial intermediaries. Second whose project to finance and how because of the limited information available regarding the entrepreneurs.

The modern financial theories have developed numerous tools to jack up savings. But all of them revolve around the concept of interest which is not allowed in Islam. Islamic finance also attempts to solve this sort of problem without involving in interest dealings.

There are broadly two types of financing in Islamic economics i.e., shariah based financing like Musharkah and Mudarbaha and Shariah compliant financing like Murabaha, Ijara, etc.

There is a basic difference between Mushrakah and Mudarbaha. In both the cases profits will be shared according to an agreed ratio. As far as the loss is concerned, it will be borne according to the ratio of capital invested into the project. As in Mudarbaha, the entire capital is provided by the investor; hence the entire loss is borne by him. The entrepreneur will not bear any loss Kassim (2016). But in Musharkah, the loss will be shared according to the capital ratios invested in the project. These both of them as profit and loss sharing (PLS) system. Although they are the ideal tools in Islamic finance but they are rarely seen in practice.

Shariah compliant products like Murabaha, Ijara, etc. are widely used for financing. Murabaha is a cost plus financing. Authors like Naser (2006), Alfakhre (2009), Almsafir and Alsmadib (2014) and Lone (2015) consider Murabaha as a sale contract between the Islamic bank and the customer. This can be thought as interest based financing because both charge a fixed amount

above the debts. But both are fundamentally different in their processes. In fact, it is a fallacy that generally critics consider Murabaha equivalent to interest based system. It seems that they are similar but are not exact. It has been explained later in this section.

## 2. REVIEW OF LITERATURE

In the literature it has been established empirically that PLS system is less common for financing. In the case of Pakistan where Islamic banks exist from its very beginning, Farooq and Ahmad (2013) shows empirically that Musharakah and Mudarbaha financing are almost negligible. They show that their shares are 0.8% in 2006 and 1.55% in 2007. Although it rose to 2.9% in 2010 but it declined to 2.40% in 2011. In this case PLS financing increased a little but it is not very encouraging. It was also established for Indonesia in Ernawati (January, 2016) that PLS plays insignificant role in financing for productive purposes.

A detail examination is presented why PLS system is less frequently observed in Islamic financing. The data is presented from Middle East, Asia, Africa and Europe; which is shown in the Table 1 (Muhammad, 2014).

Table 1 shows that PLS form of financing is not very encouraging across the world. Many reasons have been given in Muhammad (2014) for its elusive nature.

Many well-known and reputed scholars of Islamic finance like Nejatullah Siqqiqui expressed their dismay over the current practices of Islamic finance. In a recent paper, El-Gamal (2014) examined the current practices of Islamic finance in the light of Ibn Rushd theories and concluded that Islamic finance is a mirage.

Islamic bank uses a Murabaha contract that creates a "collateral by-contract" and is therefore considered not common (Shaban et al., 2016).

However, the objective of this research is to examine theoretically why this is not very common method of financing in Islamic banking. Different reasoning is established for this purpose in terms of net worth of the borrower and links it with credit rationing.

The concentration in this paper is on Mudarbaha (PLS system) and Murabaha (cost plus sale) and then compare between them. These two systems were analyzed theoretically and their properties are established.

### Table 1: PLS form of financing in the world

| Region | Percentage of PLS to other Shariah compliant financing |
|--------|---------------------------------------------------------|
| Middle-east | 8.32 |
| Asia | 5.01 |
| Africa | 4.19 |
| Europe | 0.73 |

PLS: Profit and loss sharing

## 3. A FALLACY

Let us first comment on a fallacy that is being always posed in front of the Islamic economists. The fallacy is illustrated with the following example:

Example: Consider a person who works in a factory situated 50 km from his residence. He commutes daily from his home to the factory by public transport that costs him time, money and he also bears exhaustion because of the hassle of travel in public transport. He earns only 500 US dollar per month. He does not afford to buy a car immediately. However, he can buy a car by saving money over a span of 5 years. Modern and Islamic banking systems both provide a way out from this situation.

### 3.1. Modern Bank Case
He approaches a modern bank for financing his car purchase voluntarily. He does this, although he knows that he can survive without a car. However, buying a car will reduce some of his travel time. He will utilize this time in some other tasks like devoting more time in the upbringing of his children, etc. He will also enjoy some ease and comfort.

We know that every system in the world is to provide ease and increase the welfare of the inhabitants of this great planet irrespective of Islamic or modern. Since he has a reliable and good job, the banks sanction loans to him on some fixed interest that he will pay as monthly installments over a fixed period of time. Note that everything here is happening without any compulsion. Unlike the case where a person is dying of hunger, then he approaches a bank for a loan. The outcome is that he has got a car and he has to pay more than the price of a car in monthly installments to the bank.

Note that this transaction is prohibited in Islam because it involves interest.

### 3.2. Islamic Bank Case
Consider the case where this person approaches an Islamic bank for a loan so that he can buy a car. Instead of providing loan to this person, the bank asks him to give his specifications of the car that he wants to buy. The bank purchases the car and sells it to him on some mark-up price. He has to pay the price of the car in monthly installments to the bank. The outcome is that the person has got a car and has to pay more than the price of the car to the bank in monthly installments. This transaction is allowed in Islam, known as deferred sales or Murabaha in the parlance of Islamic economics.

Note that the outcome is same in both the cases and there is no iota of compulsion in both the cases. In both the cases, the customer might end up paying the same amount of money. Many people raised the question that both the systems appear same then why we should have two systems.

While examining both the systems, it is clear that outcomes are same in both the cases but the process are different. In Islamic economics, not only outcome matters but also the process through

which it has been achieved. This distinction in outcome and process is very important. For example, if someone performs pilgrimage to Makkah (Haj) but he has not earned the resources to support his pilgrimage by legal sources, his pilgrimage will not be accepted.

The strength of Islamic finance system comes because its transactions are based on real assets. The very axiom or assumption that every economic transaction in Islamic economics is backed by real assets makes it unique and shields it from economic distress, financial turmoil and bubble.

Second salient feature of this system is that it does not only consider profit maximization as its objective. It encourages to develop a system that induces people to adopt bounded rationality aspects unlike the neo-classical theories that have been developed considering only the rationality (always maximizing one' own payoff) assumption. Although many economists like Rubinstien, Spiegler, Simon, etc. have started developing bounded rational models where economic agents not only cares about their payoff but also cares about honesty, sympathy, altruism and helping others, etc., but their approach is not in the light of Islamic teachings and laws.

We consider an adapted theoretical model of corporate finance where instead of interest, PLS system is brought. A model is presented that has been described in the book, "Theory of corporate finance" by Jean Tirole, in particular the model that have been proposed in a paper by Holmstrom and Tirole (1997). Although the model is very primary and simple but it establishes many points. For instance why Murabaha is more in practice than PLS system. We try to build a new model incorporating the Islamic tools like Musharka or Mudarbaha, i.e., PLS system.

## 4. THE MODEL

In modern corporate finance theory, the net worth that is simply the worthiness of entrepreneur for attracting investment plays a very significant role for mobilizing financing. This implies not every project will get financed in capital market.

The other salient feature of the modern corporate finance is credit rationing where the borrowers are willing to pay higher interest rate but the lenders are not willing to lend because it is predicted that this will attract bad borrowers. Bad borrowers means those who are interested in amassing private benefits rather than indulging themselves more seriously in making the project to succeed. This will aggravate the moral hazard problem.

These two issues have been first discussed in Holmstrom and Tirole (1997). We develop a model removing interest rate and embed PLS instead.

There is an entrepreneur having a project that requires a fixed investment which is denoted by $I$. He does not have sufficient credit to finance his project. Let us say he has $A < I$, where $A$ is the amount of asset that he has. We will later consider the case

when the entrepreneur does not have any asset for financing his project. He only does have the knowhow or expertise to execute the project (Musharka).

But now we consider that he has some asset $A$ and has to procure the remaining fund ($I−A$) from the investor for executing his project. We will call the investors lenders in my model now on.

### 4.1. Project
If the project is undertaken and succeeded, then it yields return $R > 0$ and if it fails, then it yields zero income. The total income if the project succeeds is divided according to pre-agreed ratio. The borrower gets $R_b$, the lender gets $R_l$ and $R = R_b + R_l$. The probability of project success is $p$. The entrepreneur enjoys some private benefits $B$ if he does not engage himself in the project seriously (he shirks). Thus,

$$P = \begin{cases} p_h & \text{if he works} \\ p_l & \text{if he shirks} \end{cases}$$

Where, $p_h > p_l$. This means probability of success is higher if he works. The difference between these probabilities is denoted by $\Delta = p_h − p_l$.

### 4.2. Preference and PLS Contract
Both the borrower and lender are risk neutral. The lenders are competing with each other in the capital market. I assume that the capital market is perfectly competitive. This means they are getting zero profit. The timing of the contract is as follows: First the decision of financing the project is made. Then, how to raise ($I−A$) amount of the capital from the market. In case of conventional financing system, there is no provision of loss sharing in case the project fails. I consider PLS system where loss $L$ is shared with $\sigma$ and ($1−\sigma$) by the borrower and the lender respectively. The project has positive net present value (NPV) if entrepreneur works:

$$p_h R − I > 0 \tag{1}$$

and if he shirks:

$$p_l R − I + B < 0 \tag{2}$$

Equation 2 implies that NPV is negative if the entrepreneur does not work even if he enjoys some private benefit. This implies bad project will not get financed. Now we would like to analyze when the project will get financed and how much profit should be given to the borrower to induce him for working.

## 5. LENDER'S CREDIT ANALYSIS

We consider an incentive structure for borrower such that he works if we embed PLS into the standard credit analysis model. Thus, borrower will work only if:

$$p_h R_b − \sigma(1 − p_h)L \geq p_l R_b + B − \sigma(1 − p_l)L \text{ or } R_b \geq \frac{B}{\Delta p(1 + \sigma L)} \tag{3}$$

The right hand side is net expected profit that the borrower receives when he works and the left hand side is the net expected profit when he does not work. Now we can infer from the above incentive inequality that the borrower will work only if he must get at least $\dfrac{B}{\Delta p(1+\sigma L)}$. Thus, the lender will get at most:

$$\bar{P} = R - \frac{B}{\Delta p(1+\sigma L)} \tag{4}$$

Without jeopardizing the incentive constraint of borrower. This is the expected pledgable gross income for the lender.

Remark 1: In standard model without PLS, condition 3 is

$$R_b \geq \frac{B}{\Delta p(1+\sigma L)}.$$

Comparing this with PLS condition, we see that the lender is guaranteed to receive more gross income under PLS regime than the interest based regime of financing a project. The interest based regime can easily be modeled as Murabaha regime. The total sum of money raised by the interest rate over the stipulated period of time can be easily adjusted as cost plus sale. Thus, we consider Murabaha and interest regime equivalent. From the above analysis, we see that the entrepreneur has to give up more share of expected profit to the lender.

This discourages him to finance his project through PLS system. That is why banks are forced to adopt Murabaha way financing. This might be one of the reason why Murabaha way of financing is more in fashion in Islamic banking industries.

It also bears an economic intuition. As you bear more risk, you deserve to have more share of income.

Remark 2: The borrower also shares the loss. If he does not work, then one explanation is that his incentive constraint is not satisfied. We can also see that if $\sigma(1-p_l)L > B$, then the borrower will not shirk. He will work. We will try to endogenize the risk sharing parameter $\sigma$ in the model by eliciting the private benefit the borrower enjoys:

$$p_h\left(R - \frac{B}{\Delta p(1+\sigma L)}\right) \geq (I-A) + (1-\sigma)(1-p_l)L \tag{5}$$

This inequality pins down the necessary condition for financing. Manipulating the above inequality, we have:

$$A \geq p_h\frac{B}{\Delta p(1+\sigma L)} - (p_hR-I) + (1-\sigma)(1-p_l)L = \bar{A} \tag{6}$$

We conclude from the above inequality, the borrower must have some wealth to attract financing. It is denoted here by $\bar{A}$. Even in PLS system, very poor from the society cannot get the financing.

Let us denote the wealth of the borrower in conventional financial theory by $A^C$ and it has the following form:

$$p_h\frac{B}{\Delta p(1+\sigma L)} - (p_hR-I) = A^C \tag{7}$$

Which regime requires more wealth in the hand of borrower to initiate financing; we cannot say anything just looking at Equations 6 and 7. To establish the fact that conventional financial system requires more wealth in the hand of borrower, the difference between equations $A^C$ and must be positive. Thus, we have,

$$A^C - \bar{A} \Rightarrow p_h\frac{B}{\Delta p} - p_h\frac{B}{\Delta p(1+\sigma L)} - (1-\sigma)(1-p_l)L \geq 0 \tag{8}$$

This implies that $A^C \geq \bar{A}$ if and only if,

$$p_h\frac{\sigma BL}{\Delta p(1+\sigma L)} \geq (1-\sigma)(1-p_l) \tag{9}$$

This implies that if the lender bears very small share of the loss when the project failed and the failure probability of the project is very small when the borrower shirks, then the borrower is required to have more wealth in his hand in modern banking system than Islamic financial system.

The term $(1-p_l)$ will be very small only when $p_l$ is very large. This means that if the probability of project success is very high even though the borrower shirks. This further means that only very secured types of project will be financed in Islamic financial system.

This is another explanation why we see PLS system less in practice. This adds a new explanation of less frequently seen PLS system in practice in Islamic banking literature. We can also add here that since mostly more secured projects get financed under PLS system; moral hazard will not be as a serious problem as it appears to be in modern financial system. Although we will explain another strategy to solve moral hazard problem in PLS system in the last section of this paper.

## 6. CREDIT RATIONING

Credit rationing means that borrowers are willing to give a high fraction of return to the lenders but the lenders do not want to grant such financing. We know that if $A < \bar{A}$, the project will not be funded although it has positive NPV. Credit rationing will occur in this situation.

The following inequality explains the credit rationing phenomenon in the conventional model:

$$A \geq p_h\frac{B}{\Delta p} - (p_hR-I) \tag{10}$$

This equation means that a potential borrower with no wealth will not find financing for his project although his project has positive net value.

We know that the counterpart of the above equation in Islamic financial system is,

$$p_h\frac{B}{\Delta p(1+\sigma L)} - (p_hR-I) + (1-\sigma)(1-p_l)L \tag{11}$$

It is also required for the borrower to have some wealth in his hand even in Islamic financial system. Thus, credit rationing also occurs in PLS system.

## 7. PLS AND MORAL HAZARD

The biggest challenge in financial theory is that of moral hazard problem. Moral hazard problem arises when the borrower does not work seriously to make the project successful because he can enjoy some private benefit by saving his effort. In reality the action of the borrower will not be directly observable by the lender or investor. In our case, the effort that the entrepreneur puts in the project is not observable. Which makes this more difficult to solve and therefore the problem needs to be examined more carefully both in the PLS system and interest based system.

In modern financial system, this has been tried to be solved by providing appropriate financial incentive to the entrepreneur. But financial incentive works to an extent. It does not eradicate this problem completely.

Thus, a new approach has been adopted in modern financial theory to look at this problem. This is known as behavioral financial theory.

Similarly PLS system has been also criticized that it aggravates the moral hazard problems. Moreover, in PLS system this problem becomes more serious because part of the loss in case of project failure is borne by the lender too unlike the convectional model where the entire loss of the project is borne by the borrower.

This might be another reason why financing in Islamic finance based on PLS system is less frequently observed than Murabaha based financing.

There might be a solution for this problem using the tools from the formal game theory. In this paper it has been observed that lending and borrowing is not one time interaction between the borrower and the lender. This continues generally over a period of time. If we think that it is one time thing for a borrower, we can make it to spread over a period of time by not releasing the borrowed amount in one go. In fact, if some technique will be innovated here to do that, it will be great help to operationalize the PLS system in practice.

If borrower and lender transact repeatedly over a period of time, then one can have more information about the borrower. This will make the relationship between the borrower and the lender more trustworthy. In this way, he can cultivate a reputation for himself among the lenders. This reputational aspect of the borrower can be exploited to curb the moral hazard problem. Thus, reputation is an example of non-monetary tool to solve this problem.

Right now there is not a crystal method to incorporate the "reputation" which is model developed by George and Samuelson (2006). But one can think and then it is possible to develop a model in this line to tackle the moral hazard problem. Repeated interactions can be modeled strategically and can be built in a reputation model.

The idea is to have a repeated game where the borrowers and the lenders are the players, their payoffs are return from the project and private benefits for the borrowers, strategies for the entrepreneur are to work or shirk and for the lenders are to lend or not to a particular borrower. Through this game one can cultivate some reputation for the borrower that can be used as a signal to get financing.

## 8. CONCLUSION

In this paper elementary model of financing for a project using PLS system is developed and PLS system is compared with the interest based system. A new theoretical explanation was found and that is why PLS less frequently used in Islamic finance. Some commonalities between PLS system and interest based system are also seen. One is the net wealth of the entrepreneur and another is the credit rationing phenomenon.

Different interpretation is also provided of net wealth of the borrower and credit rationing by bringing PLS system in the mainstream economics. The big challenge is to tackle the moral hazard problem that PLS system brings. We provide a very crude idea to solve this problem using game theoretic approach by exploiting the reputation aspect of the borrower.

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