Enhancing the Structure of Islamic Banking by Lessening the Asymmetric Information Pertaining to Profit and Loss Sharing Instruments

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The structure of Islamic banking is built upon two basic pillars; the abolition of interest and the use of profit and loss sharing mechanism. Today, Islamic banks put effort to keep the first pillar strong whereas the second pillar is abandoned to its fate. Our hypothesis is that one of the basic reasons of the poor performance regarding to profit and loss sharing mechanism is asymmetric information problem. In that regard, the aim of this paper is to develop problem solving approaches lessening the asymmetric information pertaining to profit and loss sharing instruments. Out of the two problem solving approaches developed in the paper, the first one is based on a negative incentive scheme and the second one is to check the validity of dividend signalling hypothesis for Islamic banking. A detailed literature review and quantitative analysis accompanied to the aim of this paper.

Key Words: Islamic banking, profit and loss sharing mechanism and instruments, asymmetric information

I. Introduction

Islamic banks have been one of the financial actors since 1960s. Initially, their unique structure was built upon profit and loss sharing (PLS) mechanism rather than interest-based financing. Today, there is a visible clash between this ideal structure and current practices. Different opinions are mentioned as the possible reasons for such a clash e.g. risks inherent in PLS instruments, lack of technology and sophistication to deal with long-term projects etc. In this paper, the existence of asymmetric information is accepted as one of the basic reasons of the weakness of the PLS pillar of Islamic banking. As a specific approach, what type of asymmetric information problem arises in what circumstances and how they arise will be shown in detail. Moreover, when it comes to the problem solving stage for the lack of PLS mechanism, the literature is almost mute. This paper is also an attempt to fill in this gap in Islamic finance literature. While doing that we benefit from classic economic literature and quantitative methods. The paper is structured as the following; the next section will give background information about Islamic banking in general and PLS instruments in particular. The third section will be about problem indication and the following section will discuss the problem solving approaches. The last section will conclude the paper.

II. Background information

There will be two sub-sections belonging to background information. The first sub-section will give general information about Islamic banking. The second sub-section will be specifically about profit and loss sharing instruments.

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II.I Islamic banking

The necessity of modern financial institutions run by Islamic sensitivity is especially felt by the independence of Muslim communities. The first concrete attempts combining modern finance and Islam were in Egypt via Mit Ghamr savings project in 1963. Even though they did not call themselves as Islamic, the idea was to provide financial intermediation according to Islamic teachings. The first modern commercial Islamic bank, Dubai Islamic Bank, was established in 1975. The number of Islamic banks has increased all around the world since then. According to the figures revealed by Imam and Kpodar (2010), out of the 176 Islamic banks registered in Bankscope as of 2006, 70 percent of them are in the Middle East, 14 percent are in Southeast Asia and 15 percent are in Sub-Saharan Africa. Moreover, according to the report published by Financial Times (2010), "Assets in Islamic finance rose to $822bn by the end of 2009, an increase of 29 percent compared with the end of 2008." In time, the sophistication of organizational structures (such as the existence of Islamic commercial banks, Islamic investment banks, intergovernmental Development Bank) and financial instruments (such as sukuk, diminishing musharakah, takaful) have also developed.

The basic idea behind the establishment of Islamic banks is to have banking operations filtered from Islamic point of view. Such an idea is the extension of the acceptance of God as the sole and ultimate owner of everything in this world and hereafter. For human being, to be owner of something is temporary since the owned things are trusted by God. Then, if God is the sole and ultimate owner, it has also the right to determine how these things should and should not be used. This right is not only because of owning the things but also because of knowing them perfectly. Hence, economic activities should be compatible with the rules and regulations of the religion which can be learned and inferred from the basic sources of the religion.[2] The collection of all the religious rules and regulations is known as shariah (Islamic law). Accordingly, Islamic banking can be described as a banking system which follows shariah by the guidance of shariah supervisory boards[3]. Hence, shariah-based structure is the main difference of Islamic banks. The other theoretical differences between Islamic and modern conventional banks can be seen in more detail from table 1:

Table 1: Theoretical differences between Islamic and conventional banking

Islamic Banking	**Conventional Banking**
Compatible with Islamic economic system	Compatible with capitalist, liberal economic system
Follows the criteria of shariah	No religion based rules and regulations
Avoidance from interest and usury (riba)	It is based on interest and usury
Trust-based partnership relations	Debtor-creditor relations
Risk is shared	Risk is on the debtor`s side
Avoidance from excessive risk and uncertainty (gharar)	No avoidance from excessive risk and uncertainty
The importance of social responsibility	Profit maximization based system[4]

2 Hierarchically, the sources of shariah are Quran, sunnah (practices of the Prophet), ijma (consensus of opinion), and qiyas (analogical deduction).

3 By saying that we do not mean a homogeneous understanding and application of shariah among all Islamic banks. Hence, what is meant by shariah is actually Islamic jurisprudence here.

4 It should be indicated that cooperative banks, which are also called as ethical banks, follow a secular type of

These theoretical differences manifest themselves in operational differences. The operational differences of Islamic banks can easily be seen from their balance sheets shown in table 2:

Table 2: Balance sheet of an Islamic bank versus a conventional bank

Islamic Bank	**Conventional Bank**
Assets	***Assets***
Cash balances	Cash and balances
Financing assets (murabahah, ijarah, istisna, salam)	Investments
Investment assets (mudarabah, musharakah)	Loans
Fee-based services	Advances
Non-banking assets	Other assets
Liabilities	***Liabilities***
Demand deposits	Deposits
Investment accounts (mudarabah, musharakah)	Borrowings
Equity capital	Shareholders` equity/capital

It can be seen from table 2 that on the asset side, Islamic banks use their funds by non-interest based sales or investments. On the liability side, Islamic banks have investment accounts based on profit and loss sharing mechanism as one of the sources of funds. The idiosyncratic financing methods of Islamic banks mentioned on the balance sheet can be explained briefly as the following; murabahah is a sale contract based on mark-up profit, ijarah is leasing where not the subject matter but the right of its use given to lessee, istisna is a sale contract in which the commodity is transacted before it actually comes into existence and salam is also a sale contract where advance payment is done for the goods which will be delivered at a specific future date. Below, we will focus on the other remaining financing instruments which are mudarabah and musharakah.

II.II Profit and loss sharing (PLS) mechanism

The two pillars of the modern Islamic banking structure are being interest-free and profit and loss sharing (PLS) mechanism (See: M. Uzair (1955), Siddiqi (1969)). As one of the pioneers of the non-interest and PLS based Islamic banking model, Qureshi (1945) argues that the legal business in Islam is "... co-partnership in which one of the capital supplying partners becomes entitled to the income in view of the capital he supplies without taking any active part in the concern." Hence, the conventional banking system can not be accepted from Islamic point of view since it entirely depends on interest. As an answer to the question of how banks can survive without paying and taking interest, he says that "This can be achieved only if the banks instead of becoming creditors of industry, trade, business and commerce, become their partners." In the end, to sublimate Islamic partnerships and to build an entire Islamic banking model on PLS is not a total fallacy since it has been evidenced via different works that PLS has some advantages over other financing methods. In one of the early works, Chishti (1985) constructs a model and concludes that "PLS financing makes payment

social responsibility concept. However, we only focus on the modern conventional commercial banks which are the majority of the current financial system.

commitments a function of cash flows and strongly discourages the financing of speculative borrowers -this, eliminating the main sources of volatility in capitalist economies." In his unique work, Al-Suwailem (2008) uses a simulation-based system and shows that interest-free lending yields better results than interest-based system in terms of wealth distribution and accumulation of less gross debt. As a recent work, Sugema et al. (2010) show by a theoretical modelling that PLS based banking system is welfare improving.

Today, what is meant by partnership in Islamic banks is the financing methods of mudarabah and musharakah (and sometimes wakalah). However, these two PLS methods are not totally new concepts since mudarabah and musharakah were commonly practised in pre-Islamic Arab peninsula. After the appearance of Islam, the prophet kept the practice of them but with a great emphasis of riba[5] non-existence. Hence, the sensitivities about riba, excessive uncertainty (gharar) and social justice gave an Islamic character to these ancient partnership applications and turned them into Islamic partnerships. The terms mudarabah, muqaradah and qirad are used interchangeable. According to Hasan (1989), the existence of these three different words which have the same meaning was probably due to geographical differences. For instance; the terms muqaradah and qirad were originated in the Arab peninsula, especially in Hijaz, while the term mudarabah was originated from Iraqi provinces. The term mudarabah is derived from the expression 'making a journey' while muqaradah and qirad are derived from the word qard which means 'cutting'. Since today the most commonly used term is mudarabah, we will continue to use this word instead of muqaradah and qirad. On the other hand, the term musharakah comes from the word shirkah which means 'sharing'. The legitimacy of mudarabah in Quran is mostly supported by the following verses:

1. "Recite, then, as much of the Quran as you may do with ease. He knows that in time there will be among you sick people, and others who will *go about the land in search of God`s bounty*..." (73:20).
2. "And when the prayer has been concluded, *disperse within the land and seek from the bounty of Allah*, and remember Allah often that you may succeed." (62:10)

The italics on above verses are related to mudarabah i.e. making a journey for a business in sake of God`s bounty. On the other hand, the legitimacy of musharakah in Quran is supported by the following verses:

1. "…but if more than two, they *share* in a third..." (4:12).
2. "Verily many are the *partners (in business)* who wrong each other except those who believe and work deeds of righteousness..." (35: 24).
3. "And they say, 'What is in the bellies of these animals is exclusively for our males and forbidden to our females. But if it is [born] dead, then all of them have *shares* therein.'" (6:139).

It can be seen from above verses that neither mudarabah nor musharakah is explained in detail. This is done in hadith literature instead. The legitimacy of mudarabah and musharakah in sunnah are exemplified by the following hadith. The first five hadith examples are about mudarabah and the rest is about musharakah:

1. Malik said, "When a man owes money to another man and he asks him to let it stay with him as a qirad, that is disapproved of until the creditor receives his property. Then he can make it a qirad loan or keep it. That is because the debtor may be in a

5 For the sake of the paper, we do not go into detail about the discussions of what riba is. As a small note, throughout the paper, riba and interest are used as the one and same thing.

tight situation, and want to delay it to increase it for him." (Malik, Muwatta, Book 31, Number 32.3.4).

2. Yahya said that Malik spoke about an investor who made a qirad loan and stipulated to the agent that only certain goods should be bought with his money or he forbade certain goods which he named to be bought. He said, "There is no harm in an investor making a condition on an agent in qirad not to buy a certain kind of animal or goods which he specifies." (Malik, Muwatta, Book 32, Number 32.3.5).
3. Malik said, "The recognized and permitted form of qirad is that a man takes capital from an associate to use. He does not guarantee it and in traveling pays out of the capital for food and clothes and what he makes good use of, according to the amount of capital. That is, when he travels to do the work and the capital can support it. If he remains with his people, he does not have expenses or clothing from the capital." (Malik, Muwatta, Book 032, Number 32.2.3).
4. Yahya said that Malik said, "... If the principal does not increase or there is a loss, the agent does not have to make up for what he spent on himself or for the loss. That falls to the investor from the principal. Qirad is permitted upon whatever terms the investor and the agent make a mutual agreement, of half the profit, or a third or a fourth or whatever." Malik (also) said, "It is not permitted for the agent to stipulate that he uses the qirad money for a certain number of years and that it not be taken from him during that time... If it seems proper to either of them to abandon the project and the money is coin, and nothing has been bought with it, it can be abandoned, and the investor takes his money back. If it seems proper to the investor to take the qirad loan back after goods have been purchased with it, he cannot do so until the buyer has sold the goods and they have become money." (Malik, Muwatta, Book 32, Number 32.4.6).[6]
5. Malik said, "The way of doing things among us is that there is no harm in partnership, transferring responsibility to an agent, and revocation when dealing with food and other things, whether or not possession was taken, when the transaction is with cash, and there is no profit, loss, or deferment of price in it. If profit or loss or deferment of price from one of the two enters any of these transactions, it becomes sale which is made halal by what makes sale halal, and made haram by what makes sale haram, and it is not partnership, transferring responsibility to an agent, or revocation." (Malik, Muwatta, Book 31, Number 31.40.87).
6. Jabir bin Abdullah said that the Messenger of Allah decreed pre-emption in every joint ownership and not divided the one it may be a dwelling or a garden. It is not lawful for him (for the partner) to sell that until his partner gives his consent. (Sahih al-Bukhari, Bk. 10, Chapter 49, Number 3916).
7. Zuhra bin Mabad stated that he used to go with his grandfather, Abdullah bin Hisham, to the market to buy foodstuff. Ibn Umar and Ibn Zubair would meet him and say to him, "Be our partner, as the Prophet invoked Allah to bless you." So, he would be their partner, and very often he would win a camel`s load and send it home. (Sahih al-Bukhari, Bk. 44, Volume 3, Number 680).
8. Sayyidina Ibn Abbas reported that Allah`s Messenger said, "Every partner is a shafi

6 Malik`s Muwatta has a specific part called qirad and in this part there are 9 more hadith examples besides the ones that we referred here. It is not possible for us to refer all the hadith examples but we can make a small note about what these additional hadith examples deal with; qirad in wares, hire in qirad, overstepping in qirad, expenses permitted in qirad, expenses not-permitted in qirad, debts in qirad, goods in qirad, loans in qirad, accounting in qirad.

(meaning, he has a right and option) and shufah covers everything. (Tirmidhi, Sunan, Book 15, Chapter 34, Number 1376).

9. Abu Hurayrah narrated that, Allah, Most High, says: "I make a third with two partners as long as one of them does not cheat the other, but when he cheats him, I depart from them." (Abu Dawud, Sunan, Book 22, Number 3377).

10. Aisha, Ummul Mu'minin narrated that Makhlad ibn Khufaf al-Ghifari said: I and some people were partners in a slave. I employed him on some work in the absence of one of the partners. He got earnings for me. He disputed me and the case of his claim to his share in the earnings to a judge, who ordered me to return the earnings (i.e. his share) to him. I then came to Urwah ibn Zubayr, and related the matter to him. Urwah then came to him and narrated to him a tradition from the Apostle of Allah on the authority of Aisha: Profit follows responsibility. (Abu Dawud, Sunan, Book 23, Number 3502).

From above hadith examples, the following properties of mudarabah and musharakah can be revealed; a qirad relationship between a debtor and lender can be started after the lender gets his capital back. Qirad is accepted in gold and silver. Limited qirad is also acceptable. Whatever is gained from qirad should be shared according to the percentage decided. The agent does not guarantee the capital and he can use from this capital for the expenses. The investor has the responsibility of loss, not the agent. The profit sharing ratio can be half half or any other agreed proportions. Time limit and guarantee on qirad are not acceptable. Pre-emption is decreed.

The use of Islamic partnerships continued after the Prophet and has spread through different parts of the world by conquests and even inspired Western economic practices such as commenda (See: Udovitch, 62). But, the transformation of the partnerships into modern Islamic financial practices could only appear during the second half of the 20th century. We do not go into detail about the reasons of this delay. Today, according to the modern definitions of Islamic partnerships, "Musharakah is a form of partnership between the Islamic bank and its clients whereby each party contributes to the capital of partnership in equal or varying degrees to establish a new project or share in an existing one, and whereby each of the parties becomes an owner of the capital on a permanent or declining basis and shall have his due share of profits (whereas) mudarabah is a partnership in profit between capital and work." (Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI)). In sum, the model of modern Islamic banking took the classic mudarabah and musharakah methods as starting point, then modifications have been done such as contracts with multiple agents, double-tier model etc. The modifications especially benefited from ijtihad.

III. Problem indication

Despite the sublimation of PLS mechanism, the numbers and figures are not as equally promising. It has been a widely pronounced fact that Islamic banks` financing depends more and more heavily on debt-based, short term instruments rather than Islamic partnerships. According to Samad et al. (2005), 2002 reports of two Islamic banks reveal the following results; for the Bank Islam Malaysia Berhad, mudarabah accounts only 0.66% and musharakah does 3.53% of total financing whereas for the Bahrain Islamic Bank, mudarabah constitutes 9.33% and musharakah does 2.16% of total financing. As the first modern commercial Islamic bank, it can be expected that Dubai Islamic Bank is a prototype for Islamic banking activities. Table 3 shows the percentage of mudarabah income inside total

income for the period of 2000-2009. The numbers are calculated through the financial reports:

Table 3: The ratio of mudarabah income inside total income, Dubai Islamic Bank, 2000-2009

Year	Mudarabah income/Total income
2001	3.6
2002	3.9
2003	2.9
2004	3.3
2005	4.1
2006	6.9
2007	7.4
2008	13.7
2009	11.4

It can be seen from the table that even though there has been an upward trend towards mudarabah as income earning activities, the numbers show that mudarabah is still far from being dominant financing method. Instead of PLS, Islamic banks are using short-term debt-based financing instruments and especially murabahah. In its original form, murabahah is a sale contract but not a financing method. However, because of the difficulties arising due to the application of mudarabah and musharakah, its use as a financing method is accepted by the scholars. Having said that, murabahah applications of Islamic banks cause a wide range of discussions e.g. the validity of the contract with a subject matter different than commodities, to shorten the commodity owning period, to purchase the commodity directly from the client. These are only few of the discussion issues about murabahah and we will not go into detail about them. The important question is why there is lack of PLS in Islamic banks. Different answers have been pronounced by different scholars. For instance; Dar and Presley (2000) list the reasons of the lack of PLS in general. Some of these reasons are; PLS contracts are vulnerable to agency problems, they are riskier, they need well-defined property rights and they are not feasible for short-term funding. Febianto and Kasri (2007) have their own reasons to explain why Islamic banks tend to avoid PLS instruments. Some of these reasons are the lack of transparency, high monitoring costs and asymmetric information. Lastly, due to the facts and figures from Malaysia and Bahrain, Samad et al. (2005) assert the following reasons for the low level use of PLS instruments; agency problem, ambiguity in assets` ownership and investment constraints. In that regard, our own hypothesis is:

> H_1: The lack of PLS in Islamic banks depends especially on the existence of moral hazard for the asset side and the existence of adverse selection for the liability side relations.

The effect of asymmetric information problem on the lack of PLS is already mentioned by some scholars. However, our hypothesis has some differences since we indicate what specific asymmetric information problem is valid for what specific relations. Moreover, we will show in detail how these asymmetric information problems affect the choice between PLS and

murabahah. Lastly, even though asymmetric information is mentioned as one of the reasons for the lack of PLS, there is not yet any attempt on how to solve it. Hence, our work will differentiate itself also in that regard since two different problem solving approaches will be proposed.

III.I Literature of asymmetric information and debt-equity choice

Asymmetric information, as it can be understood form its name, refers to unequal distribution of information among actors e.g. debtor-creditor, principal-agent, employer-employee etc. The most common asymmetric information forms are adverse selection and moral hazard. The first one appears when a lender "... is not capable of distinguishing between projects with different credit risk when allocating credit (whereas, moral hazard occurs due to) the borrower`s ability to apply the funds to different uses than those agreed upon with the lender, who is hindered by his lack of information and control over the borrower." (Bebczuk, 2003). Briefly, the first form appears before the contract is signed or a deal is sealed and the second form occurs after the agreement is done. In the classic economic literature, to explain the choice between debt and equity due to asymmetric information goes back to the capital structure theories. Modigliani-Miller (M-M) model is referred as the earliest capital structure theory. According to the third proposition of Modigliani and Miller (1958), "... regardless of financing used, the marginal cost of capital to a firm is equal to the average cost of capital, which is in turn equal to the capitalization rate for an un-levered stream in the class to which the firm belongs." In simple terms, the value of a firm is irrelevant of how it is financed. However, their conclusion depends on the assumptions of no taxes, no uncertainty, no bankruptcy cost. The relaxation of the assumption of bankruptcy cost was done by Stiglitz (1969) and Stiglitz (1974) who shows how bankruptcy cost can create serious problems for the M-M model. Then, the relaxation of the uncertainty assumption came, especially by the intuition of Akerlof (1970) who firstly identified the problem of asymmetric information. Ross (1977) argues that under informational asymmetry, firms signal their private information by rising their debt level i.e. leverage. In their famous work, Myers and Majluf (1984) conclude that "It is generally better to issue safe securities than risky ones. Firms should go to bond markets for external capital, but raise equity by retention if possible. That is, external financing using debt is better than financing by equity." Their results became known as the pecking order hypothesis where the order of financing decision goes through first internal riskless debt, then risky debt and lastly equity. The pecking order theory assumes that information asymmetry is an important determinant of firms` capital structure. Since then, there have been many works dealing with the effects of asymmetric information on corporate finance decisions. For instance; to illuminate the cases which do not fit into the hypothesis of Myers and Majluf, Kale and Noe (1991) construct their own model and conclude that "... whenever there`s a tax induced advantage to debt finance, there exists a separating equilibrium in which higher quality firms issue equity." The logic behind such a conclusion is that when debt financing is eased by tax reduction, low quality firms can more easily mimic high quality ones. Hence, to signal their quality, high quality ones turn into equity instead. On the other hand, as a partial support for the hypothesis of Majluf and Myers, Narayanan (1988) argues that "... in a world of asymmetric information, the use of debt by profitable firms keeps the inferior firms out." So, according to him, the choice of debt over equity helps to the market being clean from 'lemons'.

In terms of the analysis of debt-equity choice and asymmetric information, Islamic finance literature is rather limited but not totally silent. For instance; Aggarwal and Yousef (2000) compare murabahah and mudarabah contracts under the existence of moral hazard and

adverse selection. The authors have the following conclusions; debt contracts expand the set of projects funded and improve the social welfare, debt contracts are more preferable for the bank while the entrepreneurs would prefer equity contracts, especially if there is not much competition in the market. In another work related to the effect of asymmetric information on debt-equity choice, Masood Khan (1989) compares the fixed and variable return schemes for Islamic banking. According to his main argument, the dominance of the fixed return schemes in the real world can be explained by the existence of informational asymmetry. According to his conclusion, the choice between variable and fixed return scheme depends on the monitoring cost and these costs are higher for the first one. In another work where the existence of asymmetric information is an initial assumption, Haque and Mirakhor (1986) show optimal PLS contracts under uncertainty and information asymmetry. As a result, they show that the effect of asymmetric information together with uncertainty on PLS is over-investment. In a similar kind of work, the model of Baldwin et al. (2002) aims at finding the behaviour of an Islamic firm in the presence of moral hazard and adverse selection. According to the results of linear optimisation problem, the authors find that the optimal pure adverse selection contract menu creates over-investment and over-employment. The reason of such a result is explained by the authors that "... the investor finds that the most efficient way to reduce the cost of the information asymmetry is to award information rents that just overcome the temptation of the agent to lie." Lastly, as qualitative works, Bacha (1995) argues that even though it is labelled as equity, mudarabah is actually a hybrid instrument which makes it facing with agency problems of both equity and debt whereas Sarker (2000) explains the severity of asymmetric information for PLS contracts by the existence of ex-ante information limitations related to project quality and the incentive of under-reporting. So far, six different works about the relationship between debt-equity choice and asymmetric information in Islamic institutions have been mentioned. The first two of them was comparing the effects of asymmetric information problem pertaining to PLS and murabahah instruments. According to Aggarwal and Yousef, fixed debt-like contracts expand the set of projects funded, so they improve the social welfare. According to Masood Khan, the fixed contracts are preferable since they have less monitoring cost under the existence of asymmetric information. However, as an alternative view, El-Din (1991) argues that the arguments, which support the idea that debt-like contracts improve welfare, depend on the limited mean-variance model of Tobin. He also argues that the model of Masood Khan is only valid for non-corporated small-scale firms. The third and fourth works show how Islamic institutions make optimal decisions when asymmetric information is given. The last two works are based on qualitative analyses about the subject. In sum, according to the literature in modern economic theory and Islamic finance, it can be concluded that asymmetric information *does* affect the choice of financing. Even tough the side of this effect is not totally clear, in most of the cases it is in favour of debt over equity. The important question here is why and under what conditions the existence of asymmetric information is more negative for equity. By below analysis, we aim to show the disadvantages of PLS under asymmetric information. Then, we will concentrate on how to tackle with these disadvantages.

III.II Analysis of asymmetric information pertaining to equity and debt-based instruments

Adverse selection and moral hazard pertaining to equity in Islamic banks can be followed by the modelling of mudarabah and musharakah. Assume that there are two customers, A and B. They would like to finance their projects which are both expected to yield V_n. For their

projects, each one of them asks V_0 investment from an Islamic bank. The bank accepts and they become partners. In case of success, the bank gets the following expected revenue:

$$ER_{bank} = \alpha(V_n - V_0)pr_{bank} \quad (1)$$

where, pr_{bank} is the profit sharing ratio for the bank and α is the probability of success. Since V_n and V_0 are the same for both of the customers, what is decisive for the revenue of the bank is the probability of success of each project i.e. the type of customers. If the probability of success of A is higher than B, then she should get a higher profit sharing ratio:

$$pr_A \geq pr_B \quad (2)$$

But, under adverse selection, what is unknown by the bank is the type of the customers. So, the bank sets the profit sharing ratio for its customers as the following[7]:

$$pr_A \geq pr \geq pr_B \quad (3)$$

This also explains why Islamic banks set standard contracts with fixed profit and loss sharing ratios for everyone. In that case, the deadweight loss arises due to the gain of B at the expense of A:

$$DL_{PLS} = \alpha(pr_A - pr)(V_n - V_0) \quad (4)$$

This equation shows the cost of adverse selection problem arising due to PLS on the asset side relations of Islamic banks. We do not take into account the risk appetite of the actors since this element is trivial at this stage. The adverse selection problem arises due to the same reason for murabahah i.e. the type of the customers are unknown. Assume there are again A and B who ask from the bank an asset which values V_0. Since murabahah is a debt-based instrument, the good type A would get less mark-up than B if there was no adverse selection. Because of the existence of adverse selection, the bank decides a mark-up rate according to the following rule:

$$mr_B \geq mr \geq mr_A \quad (5)$$

The deadweight loss in the case of murabahah is simply as the following:

$$DL_{mur} = \alpha(mr - mr_A)V_0 \quad (6)$$

where *mr* is the mark-up rate set by the bank. When we compare the cost of adverse selection on PLS and murabahah, the left-hand side of the equations 4 and 6 can easily be set for the same values. What is decisive here is the other side of the equations. It can be seen that for the cases of $V_n > 2V_0$ (if the investment yields more than hundred percent), the adverse selection has higher negative effects for PLS. However, such cases are very rare. Hence, it can be concluded that, the adverse selection is less problematic for PLS than murabahah when the bank is principal. The basic reason for that is the deadweight loss depends on the value of the asset for murabahah while it depends on the profit yielded for PLS. In any case, the actor which becomes disadvantageous is the good-type customer.

Moral hazard can arise due to different reasons for PLS. As far as we are concerned, these reasons are; to use the borrowed money in other means than originally indicated, to announce

7 It should be reminded that $pr+pr_{bank}=1$.

the profit less than its original value by inflating costs, to find ways to escape from responsibility in the case of loss and intense risk taking. This last reason would not be a problem if the agent is risk averse. For the sake of the comparison with murabahah, we will concentrate on the first, third and the fourth reasons since in those cases doubts about moral hazard arise when there is loss at the end of the business i.e. when there is default. However, for the second case, it is enough for the principal to become suspicious about moral hazard when the announced profit is much more less than the expected one. After the announcement of loss in the first, third and fourth reasons, an investigation starts. Each investigation can have two outcomes; fail or not-fail. Our concern is the outcome of not-fail which means that moral hazard is detected. If moral hazard is detected, the agent is responsible for the whole loss and investigation cost (*IC*) due to negligence. Thus, the net income of the customer through PLS contract under moral hazard is:

$$N.I^{c}_{PLS} = -loss - IC \tag{7}$$

Meanwhile, the bank gets its initial endowment back, which is:

$$N.I^{b}_{PLS} = V_0 \tag{8}$$

For murabahah, the investigation process is also started when the debtor announces default. If this investigation does not fail then the debtor pays the cost. The customer generally announces default after he makes some payments to the bank and gets some part of the asset. Here, we neglect the down-payment which is a common application in murabahah. The net income of the bank through murabahah contract when moral hazard is detected is:

$$N.I^{b}_{mur} = (1-s)*V_0(1+r_m) \tag{9}$$

where *s* is the portion of the asset value taken by the debtor until default time. Meanwhile, the bank is still keeping the (1-*s*) portion of whole asset. The value of the asset is $V_0(1+r_m)$ since the bank adds a profit margin to the original asset value. The corresponding net income of the customer when moral hazard is detected is:

$$N.I^{c}_{nf} = s*V_0(1+r_m) - IC \tag{10}$$

If we compare equations 7 and 10, it can be seen that the customer is definitely ending in a better situation under murabahah than PLS when moral hazard is detected. If equations 8 and 9 are compared, the situation of the bank becomes better under murabahah than PLS when moral hazard is detected, if:

$$\frac{r_m}{1+r_m} < s \tag{11}$$

Under moral hazard, the customer ends with a higher net income in murabahah contract than PLS one. It means that, the customer has less incentive to sign a PLS contract with the bank if moral hazard is mostly probable. The bank has also possibility of being effected more negatively from moral hazard in PLS contract than murabahah. For adverse selection, the cases where negative effects are higher in PLS contract are rather rare. Hence adverse selection is not a big problem for PLS for most of the cases, at least for the asset side relations. In sum, the choice of murabahah over PLS is related to the existence of moral

hazard rather than adverse selection on the asset side. It can be noticed that we did not show the effects of adverse selection and moral hazard on the liability side relations since our aim here was to compare PLS with murabahah and murabahah is not a liability side element. But this does not mean that there is no moral hazard and adverse selection on the liability side. We expect that the effect of adverse selection is more problematic on that side since the customer has less power to arrange the profit sharing ratio as banks do when they are principal. Moreover, customers have also less possibility to learn about the type of banks than banks can do. On the other hand, the effect of moral hazard is expected to be less on the liability side since banks` cheating possibilities are limited by regulations. We will mention the existence of adverse selection and moral hazard on the liability side relations when we are suggesting problem solving approaches. After the comparison of asymmetric information for murabahah and PLS instruments in Islamic banks, we can now turn our attention to the question of how to deal with asymmetric information problem pertaining to PLS instruments.

IV. Problem solving approaches

In this part, two problem solving approaches will be discussed in terms of solving the asymmetric information problem pertaining to PLS instruments.

IV. I Using incentives

It was mentioned above that the customer has definitely and the bank has probably less incentives to sign a PLS contract than murabahah under moral hazard when the bank is principal. Here, we suggest a two-period incentive approach to lessen the moral hazard problem. Before anything else, we will briefly touch upon incentive theory.

In classic economic literature, different suggestions have been discussed about how to solve moral hazard problem e.g. monitoring, aligning interests, bonding, dynamic relationship etc. To use incentives is one of the commonly discussed problem solving approaches against moral hazard problem. The theory of incentives has been developed since 1970s, but as Laffont and Martimort (2002) indicate, it is possible to find the roots of incentives even in early works of modern economic theory such as Adam Smith and incentive contracts in agriculture. The theory of incentives deals with the problems arising due to principal-agent relations and a solution is called incentive compatible when "... each individual has a personal incentive to act in accordance with some overall interest." (Bannock et al., 2003). One of the outstanding names in the literature of incentives is Barnard (1968) with his suggestions of specific and general incentives. Some of the specific incentives mentioned by him are; material incentives, personal or non-material incentives, desirable physical conditions, ideal benefactions. On the other hand, literature of incentives is quite limited in Islamic finance field. There are very few works discussing the use of incentives. One of these works belongs to Dar (2007). He shows how to increase incentive compatibility of Islamic hedge funds. In another work, Farook and Farooq (2011) argue that "Banks and financial institutions are incentivised by modern prudential regulations to minimize their exposure to equity based instruments such as mudarabahah and musharakah." As a solution to this, they suggest an incentive based approach "... through the imposition of a variable bank-specific α-factor."

Our incentive model to prevent moral hazard in PLS contracts has the following initial property; each PLS contract, no matter for how long period it is agreed upon, is evaluated in two equal periods. At the end of the first half period, there are three possible outcomes for the ongoing business; profit, loss, no change. Assume that the bank is principal and the customer is agent i.e. asset side relation. For the case of profit, the only moral hazard cause can be

under-reporting the profit value, especially by inflating costs. Hence, an investigation is started after the first half-period to see whether there is any under-reporting or not.[8] If any under-reporting, moral hazard, is detected then the numbers will be corrected before second period starts and the customer pays the investigation cost. The incentive point here is that the customer`s profit sharing ratio will be decreased for the entire period. The question is, how much should it be decreased? The punishment for under-reporting should have the following property; it should be high enough to prevent the customer to under-report during the first period. This property can be shown by the following condition:

$$OP(m-k)+IC \geq RP*m+(OP-RP)*m \tag{12}$$

where *OP* is original profit, *RP* is reported profit, *IC* is investigation cost, *m* is initially agreed profit sharing ratio for the customer and *k* is the profit sharing ratio after decrement. The customer`s extra earning by cheating is shown by the right-hand side of the above relation. If moral hazard is detected, the customer`s profit sharing ratio will be decreased for the entire business. The amount that the customer would loose from this deduction and investigation cost is shown on the left-hand side of the relation. This amount should be at least equal to the extra earning by under-reporting to prevent the customer from cheating. Let`s show this condition by an example. Assume that the bank and customer agreed on fifty-fifty sharing ratio and the original profit at the end of the first period was $100 but the customer reported it as $80. Hence, in total, he was expecting to earn 80*50%+(100-80)=60$ by under-reporting. If the customer did not under-report the profit, he would get 100*50%=50$. By under-reporting, the customer gets 10$ more than the situation if he did not under report. If IC is 5$, then the decreased profit sharing ratio should be *at most* 45%. The reason for that is, the profit is corrected to its original value, 100$, and by 5% of decrease from the original profit sharing ratio plus investigation cost, the customer would loose exactly 100*(50%-45%)+5=10$. Hence, the amount that the customer would loose after the punishment should be at least equal to the amount he would gain by under-reporting. If the investigation which is done at the end of the first period does not detect any moral hazard, then the bank should pay *IC* and there will not be any changes in terms of profit sharing ratios. Additionally, the investigation cost should be low enough to make the principal be willing to investigate. The condition is:

$$OP(m-k) \geq IC \tag{13}$$

Here, *OP(m-k)* becomes the gain of the bank if moral hazard is detected and the customer`s sharing ratio is decreased. As a matter of fact, this gain should be at least equal or higher than the investigation cost to give incentive to the bank for the investigation. Using negative incentive is also possible for the case when there is zero profit at the end of the first period. In such a case, the bank can still be suspicious of under-reporting since it is possible for the customer to inflate the costs as much as the profit. For a negative incentive to work, below condition should be met:

$$OP(m-k)+IC \geq OP-RP*m \tag{14}$$

It can be appreciated that to under-report zero profit is not a common practice since it should not be easy for the customer to inflate the costs as much as the profit without being noticed. On the other hand, there is no need for incentive strategy if there is loss at the end of the first

8 At this point, the investigation can either be done by the bank itself or by a third party.

period since the customer would be directly responsible from the loss if negligence as a source of moral hazard is detected. In sum, our incentive approach is applicable for any cases of under-reporting at the end of the first-period and moral hazard is detected after the investigation process. The incentive type is negative and material one. The use of a negative incentive can be an important tool for Islamic banks on the asset side since they are the more vulnerable side of the relationship when moral hazard is concerned, especially due to under-reporting. At this point, three questions can be asked: 1) By knowing that an investigation is done at the end of the first period, the customer can wait the second period to under-report. How can this be prevented? The answer is simple, there will be another investigation process at the end of the period and the profit sharing ratio of the customer will be decreases for the whole business period if there was an under-reporting for the second period. The above conditions will still be valid. 2) Connected to the answer of the first question, would not it be costly for the bank to make two investigations for every PLS contract signed with different customers? First of all, if equation 12 is provided, then the bank has enough incentive to make investigation. But the investigation can be done by a third party which lessens the burden of the bank. Second, if moral hazard is detected than the customer would pay the cost anyway i.e. no cost for the bank. 3) How can a bank continue its relationship with a customer after the moral hazard is detected at the end of the first period? It is the whole point with a negative incentive i.e. to deter the customer before he/she cheats.

For the liability side relations, when the bank is agent and the customer is principal, the above incentive model can also be used. Again, an investigation is done at the end of the first-period to see whether the bank under-reports the profit. If there is moral hazard, the bank pays the investigation cost and its share will be decreased. The amount of the decrement is:
If there is not any moral hazard, the customer would pay the investigation cost.

$$m - \frac{(OP - RP)IC}{OP} \geq k \qquad (15)$$

IV. II Signalling

It was mentioned before that the bank as a principal can protect itself from adverse selection problem by setting a standard sharing ratio which is in between the sharing ratio of a good customer and a bad one. However, when the customers are principal inside the liability side relation, they have not a similar power to arrange the profit sharing ratios among different Islamic banks. Hence, adverse selection is especially a problem for liability side relations. In literature, there have been suggestions about how to solve this problem e.g. information disclosure, reputation etc. In his well-known work, Akerlof (1970) mentions the following institutions counteracting adverse selection problem; guarantees, brand-name good, chains and licensing practices. As it can be seen from all these suggestions, the key point here is to use a tool revealing the type of the seller or the agent to the principal. Another commonly mentioned problem solving approach is signalling. The person who firstly used the term signalling was Spence (1973). In his work, he defines signals as observable and alterable attributes. He explains the use of signals in a job market where “Individuals are assumed to select signals so as to maximize the difference between offered wages and signalling costs.” Other pioneering works of signalling are incentive-signalling approach of Ross (1977) and signalling model of Leland and Pyle (1977). Works about signalling paved the way for a more specific research area called signalling games. Briefly, “A (finite) signalling game starts with a chance move that picks the type of player 1. Player 1 is informed about his type but player 2 is not. Player 1 moves first, player 2 observes player 1`s action and moves next, and

then the games ends." (Peters, 2008). To see how a signalling game between Islamic banks would look like, we have created a simple game. The basic elements of this game can be seen below:

b_G: good bank

b_B: bank bank

m : rate of return, $m=(m_1, m_2)$, $0 < m_1 < m_2$

p_H: high risk-high yield project

p_L: low risk-low yield project

There is a simple rule here; when both of the banks invest in low risk-low yield project they both expect to earn k. But when both of them invests in high risk-high yield project, the good bank expects to earn k+2 while the bad one expects to earn k+1. This difference occurs from the more developed management character of the former one. Banks are using their rate of return as a signal to possible depositors. With a high signal, they attract n amount of depositors whereas with a low signal they attract n-1 amount of depositors. Lastly, each bank has four strategies to follow; send a high signal, invest in high risk-high yield project; send a high signal, invest in low risk-low yield project; send a low signal, invest in high risk-high yield project; send a low signal, invest in low risk-low yield project. According to all these elements and assumptions, in a simple game, below results occur:

Table 4: Expected returns due to signalling game between a good and a bad Islamic Bank

b_G, b_B	$m_2 p_H$	$m_2 p_L$	$m_1 p_H$	$m_1 p_L$
$m_2 p_H$	n(k+2)*, n(k+1)*	n(k+2), nk	n(k+2), (n-1)(k+1)	n(k+2), (n-1)k
$m_2 p_L$	nk, n(k+1)	nk, nk	nk, (n-1)(k+1)	nk, (n-1)k
$m_1 p_H$	(n-1)(k+2), n(k+1)	(n-1)(k+2), nk	(n-1)(k+2), (n-1)(k+1)	(n-1)(k+2), (n-1)k
$m_1 p_L$	(n-1)k, n(k+1)	(n-1)k, nk	(n-1)k, (n-1)(k+1)	(n-1)k, (n-1)k

where vertical player is the good one and horizontal player is the bad one. The table is organized due to expected returns which are calculated by the number of depositors gained by the signal multiplied with the expected yield of the project type. For instance; by sending a high signal through high rate of return, a good bank expects to attract n amount of depositors and by investing in a high risk-high yield project, it expects to yield k+2 which in total makes n(k+2) expected return. It can be seen from the table that the first row-first column is marked by stars since this is the Nash equilibrium of this game i.e. both good and bad banks signal high and invests in high risk-high yield project. The problem for depositors is, they can not understand that bad bank is just imitating the good one and when they deposit their money in this bad bank, they end up with a lower yield of k+1 instead of the higher yield of the good one, k+2. This simple illustrative game is a good example to show why adverse selection creates problem for a customer during the process of choosing an Islamic bank.

Now, the question is to find the best signal which reveals the good quality of the bank and which can not be imitated by the bad one. In literature, there are attempts to find out a good signal revealing the quality of a bank. One of these signals is dividend share. In his work,

Bhattacharya (1979) develops "... a model in which cash dividends function as a signal of expected cash flows of firms in an imperfect-information setting." The major signalling cost of his model is dividend tax. In the end, he shows how the change in interest rate and tax would affect the signalling equilibrium. In another well-known work, John and Williams (1985) identify a signalling equilibrium with taxable dividends. Last but not the least, Miller and Rock (1985) show that "... an informationally consistent signalling equilibrium exists under asymmetric information..." In sum, all these initial works try to find a dividend-signalling equilibrium by theoretical models. The next step is to check their validity by empirical research. In that regard, one of the earliest and unique works belongs to Eades (1982). In his work, he uses the signalling model of Ross and Bhattacharya and he performs two hypothesis testing for the hypotheses of dividend yield-own variance and the relative signalling strength (RSS). As a result of the first testing which covers the period of 1960-1979, he finds that, there is a negative relationship between dividend yield and own stock variance. This is compatible with the theory. However, for the second testing, he finds no supportive evidence for the signalling hypothesis. In another empirical work which is directly related to the role of dividend as a signalling for bank quality, Boldin and Leggett (1995) gather data from 207 institutions and find that high dividends per share signal that the bank is healthy. Additionally, as dividend payout ratio increases, the quality of the bank diminishes. In sum, it is possible to find both supportive (See: Kalay (1980), Ryan et al. (2000)) and opposing (See: Amihud and Murgia (1997), Vieira (2005)) empirical works in literature. Hence, it can be said that, the empirical conclusion of dividend signalling hypothesis is far from being clear.

When one searches the literature about signalling hypothesis for Islamic financial institutions, almost no work can be found. One of these rare works belongs to Hassan et al. (2003). In their work, they use dividend signalling hypothesis to explain the existence of short-term asset concentration. They find that Islamic banks are having stable dividends and to keep them stable, the banks prefer to use short-term financing methods such as murabahah. However, their work does not check the validity of the hypothesis arguing that dividends are signals for future cash-flows but rather it proves the stability of dividend payments. As a matter of fact, there is need for works investigating the signalling approach as a problem solver in Islamic banks. Below, we will make our empirical analysis to check the validity of dividend signalling hypothesis for Islamic banks. The logic behind the dividend signalling theory is that banks can signal their quality through their dividend choices and if there is increase in dividend payments, it reflects positive expectations about future. In that regard our hypothesis is:

H_2: Islamic banks with increasing trend of dividend payments are signalling for a better future position

Our data covers 25 Islamic banks from different countries and the period of 2007-2010. The necessary data is gathered from annual and financial reports of these 25 banks. During this data gathering process, the following points are taken into account; the variables of assets and dividends are calculated according to the parity of 31 december 2007 and 2008 US dollar-home currency unless the numbers are originally in US dollar, return on equity (*ROE*) is calculated as the ratio of net income divided by total equity, for some banks the end of the annual year is not december but march or june. The empirical research is built upon the following multiple linear regression model:

$$ROE_t = \beta_1 + \beta_2 D*RDIV_0 + \beta_3 ROE_{t-1} + \beta_4 (ROE_0 - ROE_{-1}) + \beta_5 LogAsset_{-1} + \varepsilon \quad (16)$$

where *t* is time either year 1 (2009) or 2 (2010), *ROE* is return on equity, *D*RDIV* is the dummy variable multiplied with the annual dividend change between year 0 (2008) and -1 (2007). Dummy variable takes 1 if dividend payment has increased or decreased, 0 otherwise. The model is constructed due to the model of Grullon et al. (2005) with some changes.[9] According to the model, the future earning is proxied by the return on equity and the effect of the change of dividend payment is chosen as one of the independent variables. The existence of the other independent variables is necessary to control their effects. The model was run two times, one with *ROE* 2010 as dependent variable and one with *ROE* 2009 as dependent variable. The results obtained from SPSS can be seen from table 5 and 6:

Table 5: Linear regression results of the model with *ROE*10 as dependent variable

Descriptive Statistics

	Mean	Std. Deviation	N
ROE10	6.6820	15.26332	25
dummyRDIV	46.8992	52.92427	25
ROE08minusROE07	-3.2292	5.44518	25
logAsset08	21.7580	1.27934	25
ROE09	5.3300	16.83418	25

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.823[a]	.677	.612	9.50658

a. Predictors: (Constant), ROE09, ROE08minusROE07, dummyRDIV, logAsset08

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3783.756	4	945.939	10.467	.000[a]
	Residual	1807.502	20	90.375		
	Total	5591.257	24			

a. Predictors: (Constant), ROE09, ROE08minusROE07, dummyRDIV, logAsset08

b. Dependent Variable: ROE10

9 For instance; the original model includes the market value as one of the independent variables which does not take part in our model, the dummy multiplied dividend change variable is simplified in our model. We choice their model as a base model since it is difficult to find a good proxy for Islamic bank quality.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-12.092	36.987		-.327	.747
	dummyRDIV	.017	.038	.057	.438	.666
	ROE08minusROE07	-.080	.361	-.029	-.223	.826
	logAsset08	.642	1.716	.054	.374	.712
	ROE09	.707	.131	.780	5.410	.000

a. Dependent Variable: ROE10

Table 6: Linear regression model with *ROE*09 as dependent variable

Descriptive Statistics

	Mean	Std. Deviation	N
ROE09	5.3300	16.83418	25
ROE08minusROE07	-3.2292	5.44518	25
logAsset08	21.7580	1.27934	25
dummyRDIV	46.8992	52.92427	25
ROE08	11.9072	11.82234	25

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.903[a]	.816	.779	7.90909

a. Predictors: (Constant), ROE08, ROE08minusROE07, dummyRDIV, logAsset08

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5550.280	4	1387.570	22.182	.000[a]
	Residual	1251.075	20	62.554		
	Total	6801.355	24			

a. Predictors: (Constant), ROE08, ROE08minusROE07, dummyRDIV, logAsset08
b. Dependent Variable: ROE09

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1.000	(Constant)	-5.030	31.336		-0.161	0.874
	ROE08minusROE07	-0.725	0.304	-0.235	-2.387	0.027
	logAsset08	-0.361	1.490	-0.027	-0.242	0.811
	dummyRDIV	0.006	0.031	0.018	0.185	0.855
	ROE08	1.309	0.163	0.920	8.031	0.000

a. Dependent Variable: ROE09

It can be seen from above results that both of the models are having high adjusted R-square where the model which has *ROE*09 as dependent variable has slightly better adjusted R-square. What we are interested in here is the effect of dividend changes on future earnings. In both of the models, the independent variable *D*RDIV* has a small, positive effect on future earnings. But, the variable is not statistically significant in none of the models. Instead, among our independent variables, only *ROE*09 is statistically significant for the first model and *ROE*08, (*ROE*08-*ROE*07) are statistically significant for the second model at 95 percent confidence level. These significant variables are also the reason for adjusted R-squares being high. Hence, the validity of dividend signalling hypothesis for Islamic banks is inconclusive. But these results can be re-evaluated through the analysis of different time period for different Islamic banks.

If another possible signalling element is searched for Islamic banks, the basic condition for that element is to depend on free and rational choice of the bank. For instance; to distribute or not to distribute dividends and how much distribution should be done are decided by the bank according to its future predictions. This is why dividend is seen as a potential, proper signalling device. Rate of returns could be another signalling device for Islamic banks, however, today they are kept stable because of the competition. Our second alternative signalling device for Islamic banks is the use of extra reserve. Islamic banks are already following reserve requirements of their central banks. Rather than that, to keep extra reserve is their own choice which is depending on future expectations i.e. if the expectations are bad, then the amount of extra reserve will be higher. As an extra reserve kept by Islamic banks, profit equalization reserve (PER) can be a good proxy. Our second signalling hypothesis for Islamic banks is:

H_3: Islamic banks which have better asset quality would hold less PER.

The basic reason behind this argument is that cost of holding extra reserve is greater for better banks. The mathematical proof of this reasoning can be followed from the work of Greenbaum and Thakor (1989). We will explain this argument with an example here. Assume that you put 100 euro in an Islamic bank PLS account. You agreed on half-half profit sharing ratio. After one year period, the business(es) became successful and your account became 150 euro. That makes 50 euro profit in total and 25 euro profit for the bank. You decided to continue with that bank for one more year and kept your money there. The bank has two options now; either they can put all the money into business again or keep some part of it as an extra reserve in PER. Assume that the bank decided to follow the first option and your

money became 180 euro with 20 percent profit during the second period. That makes 30 euro profit in total and 15 euro profit for the bank. On the other hand, if the bank decides to put 2 percent of the profit earned during the first period (50*0.02=10 euro) in PER, they start their business with 140 euro instead of 150 euro at the beginning of the second period. It was said that the profit rate during the second period was 20 percent, hence, your 140 euro would become 168 euro at the end. That makes 28 euro profit in total and 14 euro profit for the bank. In sum, with 2 percent extra reserve, your account would become 168 euro instead of 180 euro and the bank`s profit would become 14 euro instead of 15 euro. This 1 euro difference between the profits of the bank is the cost of holding extra reserve. This cost would be larger if the profit ratio was higher for the second period e.g. 14 euro cost for 40 percent profit rate. It is obvious that better quality banks are having more chance of yielding higher profits. Hence, for better quality banks, the cost of holding extra reserves would also be higher since they could earn more if they had not have these reserves. To check the validity of above hypothesis, an empirical research is needed. However, it is not an easy task to get information about PER from Islamic banks. Hence, this hypothesis stays as an open question for now. Another open question is whether reserve requirements are preventing these extra reserves being signals for Islamic bank quality and if they do, at what point, under what conditions they prevent it.[10]

V. Conclusion

Islamic banking model developed at the second half of the 20th century was structured on two basic pillars; the existence of profit and loss sharing (PLS) mechanism, the non-existence of interest. Between these two interconnected pillars, interest evasion is still followed with great effort whereas the use of PLS is not followed as strongly as the former one. In this paper, we first showed the fact of the lack of PLS by numbers and figures followed by the indication of different opinions about this fact. Then we hypothesised that the lack of PLS depends on moral hazard problem on the asset side and adverse selection problem on the liability side relations of Islamic banks. The next step was to prove this hypothesis mathematically. Lastly, we have suggested the use of negative, material incentive as a solution to the moral hazard problem and the use of dividend and extra reserve signals as solutions to the adverse selection problem.

Competing interests

The author of this paper has not any conflicting interests with any organization, institution, group of people or a person in regard of writing this paper.

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10 According to Greenbaum and Thakor (1989), reserve requirements prevent the signalling power of extra reserves if they are so high or low. On the other hand, it does not prevent so much if the banks are more similar to each other. If this is the case also for Islamic banks, then, any future reserve requirements set for PER by AAOIFI should be strategic. Otherwise the signalling property of extra reserves can disappear.

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