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# Inside the Black Box of the Islamic Financial Decision: Designing a Paying for Performance Contracts[1] with Agency Problems, Incentives and Asymmetry of Information

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*Keywords: islamic banking finance, asymmetry of information, optimal contract, mudarabah, mucharakah, profits or losses sharing ratio, incentives.*

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# Inside the Black Box of the Islamic Financial Decision: Designing a Paying for Performance Contracts[1] with Agency Problems, Incentives and Asymmetry of Information

Dr. Elmelki Anas [α] & Dr. Ben Salah Saidi Hejra [σ]

*Abstract-* [1]From a theoretical point of view in the Islamic financial framework, trust is supposed to provide the economic glue that enables social financial cohesion and be the cornerstone of all transactions that need to be fair and equitable. The two parties involved in the contractual agreement must act with good intention in order to avoid exploitation in the exchange transaction and improve their mutual welfare. In fact, the contractor loves to his partner that which he loves for himself[2]. Unfortunately, in practice this situation is not always true, because Islamic finance isn't merely reserved to muslims and also among muslims there could be who isn't behaving in accordance with the Islamic teaching all the time, and have different interests. This situation can get worse, especially in PLS contracting with risk sharing, when there's a presence of asymmetry of information and non observability, which makes pareto-optimal risk sharing prevented, due to the lack of proper incentives and high monitoring costs not allowing suitable decisions taking. Instead what can be realized is only a second best solution (with enough incentives and reasonable monitoring costs that permit trading some of the risk sharing advantages).

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The main functions of the Islamic banking intermediation, as its conventional peers, are especially assets transformation, offering liquidity and payment services, risk management and processing information and monitoring engagements with different stakeholders.

In order to perform these functions, acquiring information about the different stakeholders involved in the financial contacting process is very crucial for packaging a set of contracts that provide an efficient and transparent execution of financing economic activities. This set of contracts allows the Islamic bank to meet the different financial needs.

In the practice of Islamic banks, we can easily notice the lack, and sometimes the absence of use of participatory financial tool in funding the clients and allocating the Islamic banks resources in its intermediation process[3].

In this work, we propose to study the impact of asymmetry of information on the practice of the Islamic bank in the design of Paying for Performance contracts (Profits or losses sharing (PLS)). Most of the time, the Islamic bank in its process of funding and during its relations with the clients is invited to take financial decisions under asymmetric of information (incomplete or imperfect information). Also the Islamic bank cannot observe the level of effort and /or the outcome of the investment (revenue streams) checked with precision the level of respect of the contractual terms.

This paper aims to fill in the gap; its purpose is to analyze incomplete long-term participatory financing contracts between an entrepreneur (The Agent) with no initial wealth (Mudharabah) or partial wealth ( Musharakah) and a wealthy investor: the Principal (the Islamic bank). Both parties involved in the contacting process may have potentially conflicting interests. We address the questions of (i) whether and how the initial contract can be structured in such a way as to bring about a perfect coincidence of objectives between both agents and meet the welfare maximization (ii) when the initial contract cannot achieve this coincidence of objectives how should control rights be allocated to achieve efficiency? One of the main results of our analysis concerns the optimality properties of the (contingent) control allocation induced by financial contracting in a Paying for performance context that

[1] Profits or losses sharing (PLS): the idea of this work has grown in the academic year 2017/2018 when I was charged to teach a course intitled "Islamic financial contracts". And my greatest debt is the work of Hart and Oliver the Economic Nobel Prize winner 2016 for their work on the theory of contract to which I referred to prepare my course curriculum. With the paradigm shift, which is one of the rare cataclysmic events in science when researchers make substantial break with the field has been progressing and then try to pursue a new direction. This is how I tried to look to the Islamic financial contracts with slight modifications that required an anomaly awareness and reality confrontation with theory to get something different and new. Falling in love with the initial idea is the very enjoyable part of the research. But when it comes to writing, I worry most about having perfect parts, and this slow down the paper production and makes it too long. But when it comes to publish it: it's another story.

[2] On the authority of Abu Hamzah Anas bin Malik (may Allah be pleased with him) - the servant of the Messenger of Allah (peace and blessings of Allah be upon him) - that the Prophet (peace and blessings of Allah be upon him) said:" None of you will believe until you love for your brother what you love for yourself."Related by Bukhari & Muslim

[3] www.ibisonline.net: in Europe, Asia and Middle East for 2015 moudharaba and Musharaka are less than 2% of the total portfolio Islamic Modes of Financing In The Tunisian context according to the 2017 annual report of The Zitouna bank: Mudharaba and Musharaka represent about 4.2% in the total portfolio financing products and about 3.2% in 2016.



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requires both the ability to write sufficiently detailed contracts ex ante, as well as the ability to measure and verify performance ex post

Then we present the design of profits or losses sharing contracts and the optimal contract conditions. After that, we introduce an illustrative model of Mudarabah contract and we analyze the levels of the Sharing rates of the profits or the losses to be fixed by the Islamic banking firm in order it becomes competitive in a dual banking system and gain at least what gains a conventional bank taking into consideration the presence of the asymmetry of information. We finally present the Musharakah financing contract with a focus on the diminishing Musharakah and the level of effort.

*Keywords: islamic banking finance, asymmetry of information, optimal contract, mudarabah, mucharakah, profits or losses sharing ratio, incentives.*

## I. Introduction

Contracts and for long decades, has been an important concept in economic and financial studies, research as well as practice, and gave rise to major fields: incentives structures studies, complete and incomplete contracts, agency costs and property rights. The study of contractual approaches can give us various details on how decision making is structured and the behavior of agents is framed. As Oliver Hart Concluded in his paper *Financial contracting 2001*: that has been an evolution in dealing with the firm profitability from it's treated as given standard to acknowledging that the managerial action (behavior) affect the profitability level. and the value of the firm depends on the allocation of control rights decision. This can be superposed by analogy to Islamic financial context.

The main functions of the Islamic banking intermediation, as its conventional peers, are especially assets transformation, offering liquidity and payment services, risk management and processing information and monitoring engagements with different stakeholders.

In order to perform these functions, acquiring information about the different stakeholders involved in the financial contacting process is very crucial for packaging a set of contracts that provide an efficient and transparent execution of financing economic activities. This set of contracts allows the Islamic bank to meet the different financial needs.

In this work, we propose to study the impact of asymmetry of information on the practice of the Islamic bank in the design of PLS contracts. The study of risk inherent to signing a contract. Most of the time, the Islamic bank in its process of funding and during its relations with the clients is invited to take financial decision under asymmetric of information (incomplete or imperfect information).

When a financial relationship is being tied between the Islamic bank and its client (corporate or individual entrepreneur), an informational problem is possible to take place in fact the Islamic bank may not know perfectly (exactly) the entrepreneur characteristics (its capacity to identify and implement good investment project). Also the Islamic bank cannot observe the level of effort and /or the outcome of the investment (revenue streams) checked with precision the level of respect of the contractual terms.

Finance and banking have been rethought by integrating the Islamic religious dimension which rejects the interest rate from the banking operations. This innovation in the banking sector has given birth to a new model of banking intermediation known as interest free banking or simply Islamic banking which enhances, risk sharing, value creating, ethics and socially responsible transactions.

Islamic finance is an interesting area of contemporary academic and policy interests. The Islamic financing process is based on 5 pillars which have to be respected together in order to guarantee the Shari' a compliance of the financial intermediation process. These five pillars which will be explained each in turn later are:

- The prohibition of interest (*Riba*)
- The prohibition of uncertainty (*Gharar*) and speculation (*Maysir*)
- The prohibition of unlawful haram assets which contradict the value pattern of Islam.
- The profits and losses sharing obligation PLS.
- The assets backing obligation.

*Section1:* Inside the Black Box of the Islamic financial decision and behavior: Heart, Mind, Faith and Money Do all the Stars shine?

We can easily notice, when reviewing the Islamic financial literature, that an abundant part of it has been widely dedicated to describing financial instruments and institutions. A little focus has been put on analyzing its foundational microeconomics aspects of decision making with broader principals of behavior[4] from a range of epistemological, social and economic (financial) dimensions, focusing on different approaches from motivations, incentives, risks, cognitive, emotion to socio-psychological as well as religion (conviction; sociality and identity) with rational Vs irrational assumptions that drives choices and business decisions and economics behavior in the Islamic financial framework. The idea of morally balanced decision has been mentioned in Adam Smith "Theory of Moral Sentiments" "… The great source of both the misery and disorders of human life seems to arise from overrating the difference between one permeant situation and another…"

[4] With reference to 2017 Nobel prize in Economics Richard Thaler: The behavioral economist one of the pioneer in this field.



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Finance is usually presented as the study of optimal decisions of capital allocation to generate added value with risk elimination or at least minimization (to avoid losses). As such decisions are made by human, it's useful to understand people's individual behavior and interactions and how emotions (also convictions) affect decisions.

The human nature is essentially characterized by self-discipline and self-control designed by the society through rules or divine guidance. The human behavior seeks to reach the individual well-being (individual interest: need fulfillment: material needs as well as spiritual moral intellectual and social) with respect of the mankind welfare that can be perceived as a multidimensional concept covering different aspects of human life and that leads to: the Mankind Happiness. This is only can be done with avoiding exploitation, behavior of excess and prevailing balance, fairness, justice in all the dealings through cooperation participation and help.

Islam is a religion of fairness, justice, equality and balancing in decision making: "Thus we have made you a justly balanced community" (Surat 2; 143). The balance in pursuing individual interest and society interest, in spending, in time allocation: Human life here in and hereafter…

Islam isn't a totally new religion; it is considered to be the last chain of Ibrahimic religions. Therefore many values are shared between Islam and Christianity and Judaism. The lack or absence of such values, principals and believes could turn the Adam Smith Invisible Hand to a Stealing Hand. The human behavior in the Islamic financial field consider agent as seeking optimization rather than rationality to reach the balancing situation with a learning process to avoid mistakes that makes rationality bounded and human are not identical although for long time in the economic theories are considered rational and thus identical when making decision and choice.

*a) Faith Mind and Money or the Business Ethics*

Institutions with its offer (goods and services), in the market logic, were created by Human to serve Human in an Economic framework in which people should be placed above economy. Islamic economy isn't a zero-sum game. There should be no exploitation, what is good for one stakeholder shouldn't be bad for the other. The gain on the expense of someone's welfare in transactions shouldn't be encouraged. Economy isn't an end in itself but is at the service of life, of society and is to be measured with reference to its social functional rationality (Ulrich Peter 200 p 11; 1997 p 117; 1989 p 182). Humans when seeking to achieve happiness, they shouldn't do it only by the pursuit of money gains but also with following the values and its conformity.

Kant doesn't demand self-sacrifice since man is explicitly pursuing his own happiness (Kant Immanual 1788 p 25). The Human duty is to shape the world with different decisions in such a way that people can also be happy in this. Part of our own happiness should then be found in the helping others to be happy (do not harm: pose no problem (environmental or other), what you don't want to be done to you, Do not do it to anyone else (others).

Immanual Kant "Act in such way that your behavior could be the basic of universal law".

The prophet Med P.B.U.H: "do unto others, as you would have them do unto to you": *The Moral behavior.*

To avoid the conflict of interest (individual Vs society) a relevant behavior guidance orientation can be applied to individuals, companies or the whole economy: Business ethics that have an important goal: prevailing the common good of economic individual benefit maximization and to improve the performance (productivity) in order to reach the economic efficiency (Marcus Donald)

*b) The intentions (the purpose) and the actions*

The good will (according to Immanual Kant) "intention", is decisive to achieve good actions (purpose) or at least not to have anyone including the decision to act or not to act. What if everyone did that? Become a Maxims.

The intention is crucial for ethical level evaluation. From an ethical point of view duties are what should be done with reference to a set of values (ethical principles of behavior that man in community has voluntarily accepted derived from religion, ideologies, believes and convictions…). This in community duties are law that regulate human coexistence.

*c) Ethics freedom and decision making*

The contractual freedom means the ability to choose from a among a sufficient range of contract types (or at least to have a bargaining power) or being able to make adjustments within the deal. A free individual has the deliberate choice between different decisions making, which lead to the self-bearing responsibility of the decision's consequences (Max Weber 1919 p 441-442). As all the people aren't the same in nature (convictions, actions) and they are not all well informed, their decision consequences will not be easily predictable and can even be immoral due to the limited rationality.

David Hume posed the bases of civilized society: security of the person, stability of propriety and the obligation of contracts (a treaties of human nature). The Islamic foundation of law and justice aim to the same premises also.

The promise is the moral basis of commitment (contract, obligation) from which emerged the contract in the modern time. Not all promises are legal, its



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obligations and standards can be driven from believes, faith or community rules. Whether written or not, the commitment "fidelity to one's word" to the contract agreements (contractual obligation) represent a promise that the parties have themselves assumed and trust each other in a way doing things cooperatively with respect of the mutual interest.

*d) Incomplete contract, incentives and morality*

In designing contracts, ethics can be integrated as incentives to direct the behavior of stakeholders. If some aspects are missing in the contract (agreements terms) or even in the legal system, this gap can be filled by morality (Homam, Karl 1999). Thus, decision makers (companies, individuals, politicians….) are asked to behave morally beyond the incomplete legal framework in respect to the requirements of good faith in carrying out of the contractual obligations. Therefore an economic action is moral or ethical if it does not harm other even if the conditions for competition allow the unethically behavior.

*e) The classical view of men "Homo Economicus" Vs Ethical view of man "Homo Ethiconomicus"*

An homoeconomicus (Max Weber 1992 p16) is considered as a machine that acts rationally such it's setup in its basic parameters, assuming a given level of information, he would always choose the option that maximizes its gain and his own advantages including even committing amoral action such as lying, betraying and other immoral acts (Milgrom, Roberts 1992) especially when the context allows in situations of lack of laws rules and regulations (sanctions and monitoring). With the Homo Ethiconomicus, the same is true with the difference in redefining "Gain" and widening the concept to integrate the doing good for other people. Even it seems to reduce one's own objective benefits, it increases, then his happiness instead.

*Section 2:* Return to fundamentals: Trust in Muslim communities:

From a theoretical point of view in the Islamic financial framework, trust is supposed to be the cornerstone of all transactions that need to be fair and equitable. The two parties involved in the contractual agreement must act with good intention in order to avoid exploitation in the exchange transaction and improve their mutual welfare. Explicit trust provides the economic glue that enables social financial cohesion. In fact, the contractor loves to his partner that which he loves for himself[5].

Unfortunately, in practice this situation is not always true, because Islamic finance isn't merely reserved to Muslims and also among Muslims there could be who isn't behaving in accordance with the Islamic teaching all the time, and selfish or boundedly rational entrepreneur, or with intrinsic material motivations may get in PLS contractual relationship with the Islamic bank.

This situation can get worse, especially in PLS contracting with risk sharing, when there's a presence of asymmetry of information and non-observability, which makes pareto-optimal risk sharing prevented, due to the lack of proper incentives allowing taking suitable decisions. Instead what can be realized is only a second-best solution (with enough incentives that permit trading some of the risk sharing advantages). The PLS contractual mechanism can entail conflict of interest, that's why this type of contract must be properly designed to ensure that the parties take mutually beneficial decisions and actions.

The Islamic bank when it funds a client (customer) through a PLS contract cannot observe the action of its partner, and also cannot make sure that it has chosen the good agent even when gathering the required level of information before signing the contract.

Monitoring the agent's actions, if it's possible to implement (with reasonable costs), can offer additional information to use in elaboration the contractual terms. In this case, a first-best solution (implying optimal risk sharing) is possible by using a forcing contract that takes actions against opportunistic behavior.

It is difficult for the Islamic bank to identify "Good Agent" Client in the mudhraraba arrangement and to do so it requires using a variety of screening devices, as for example designing a menu of contracts that aims to self-revelation of agent's private information, may represent a solution to the adverse selection problems.

## II. The Design of Profits or Losses Sharing (PLS) Financing Contracts in the Islamic Banking Firm

*a) Complete contracts*

We can refer to complete contracts as contracts in which the contractual terms describe exactly everything that can ever happen. There may be some incentive constraints arising from asymmetric information: moral hazard or adverse selection but there are no unanticipated contingencies. Actual contracts are not like this, they are weakly worded, confusing sometimes, and leave out essential aspects that's what make them incomplete. At some stage, Grossman and Hart realized that a critical question that arises with an incomplete contract is, who has the right to decide about the missing things? This can be called: right of the

[5] Refer to reference number 2: On the authority of Abu Hamzah Anas bin Malik (may Allah be pleased with him) - the servant of the Messenger of Allah (peace and blessings of Allah be upon him) - that the Prophet (peace and blessings of Allah be upon him) said:" None of you will believe until you love for your brother what you love for yourself."Related by Bukhari & Muslim



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residual control or decision right: Property rights theory (PRT). The question is, who has it?

Why should it matter who has residual control rights? Residual control rights are like any other asset: there is an optimal allocation of them. Sometimes it is more efficient for one owner to hold all the residual control rights, and sometimes it is more efficient for these control rights to be split between several owners.

*b) Rationality Vs Religiosity and agent behavior*

Islamic bank costumers (depositors investors or entrepreneurs) might make a strong pledge by treating with the logic of risk sharing and may see their wealth decreasing, but the gratification of following their moral deeds which can be enough to cover the cost of any loss incurred by their religious preferences and their quest to religious compliance. Accordingly, a pious Muslim behaves in ways contrary to the patterns that neoclassical economics attributes to homo economicus. As further formulated by the theoreticians of Islamic economics, a Muslim is primarily motivated to live an Islamic life and his actions tends as possible to be in compliance with his believes and to contribute to an equal society6.The characterization of the Muslim actor, namely homo Islamic us, substantially differs from homo economicus by preferring a moral economy over pragmatic benefits (Kuran, 1986, 1995, 2004). However, the pattern that Islamic bank deposits portray during interest rate changes indicates that Islamic bank depositors blend Islamic beliefs with so called rationality (Demiralp, 2015).

*c) Incomplete contracts*

Contractual incompleteness is mainly due to the difficulty of describing all possible future contingencies (market conditions, states of nature etc.) in advance; there are too many possible contingencies to describe, or even to predict. However, Maskin and Tirole (1999) show that as long as the parties can predict the possible payoffs, the first-best can be implemented by a message game which does not require describing all possible contingencies in advance. They argue that parties that are sufficiently rational to calculate the expected payoffs from an incomplete contract should also be able to use the effectively complete contracts they propose. In a rejoinder, Hart and Moore (1999) show that Maskin and Tirole is first-best investment result can be overturned in a sufficiently complex contracting environment (borrowed from Segal, 1999), when parties cannot commit not to renegotiate the initial contract. Furthermore, Aghion et al. (2012) demonstrate that some of the objections to the incomplete contract's framework are fragile, in the sense that the more complete contracts proposed in the critique only perform well under very strong common-knowledge assumptions.

## III. PLS Financing Contracts and Similarities with Venture Capital Financing

Kaplan and Stromberg (2003, 2004) report evidence from a large number of venture capital (VC) contracts. This is a real-world setting that quite closely corresponds to the environment of the financial contracting theories, where entrepreneurs who raise money for start-ups are the agents, and VC investors who invest in start-up firms are the principals. They find that VC financial contracts separately allocate cash-flow rights as well as different control rights including board rights, voting rights, and liquidation rights-between investors and entrepreneurs. The allocation of these rights is frequently state-dependent, being contingent on financial as well as non-financial measures of performance. Both cash-flow and control rights are allocated such that investors obtain full control of poorly performing firms. But entrepreneurs retain more control rights in better performing firms, and their cash-flow rights increase with firm performance, often in a non-linear fashion. Moreover, the allocation of rights responds to the perceived risk investors see in the venture, as well as the likelihood that investors will have to intervene in the future, for example by replacing management. Kaplan and Stromberg argue that these contracts can best be understood through a combination of incomplete-contracts theory and classic contract theory. Importantly, the separate allocation of cash-flow and control rights cannot be fully understood outside an incomplete-contracting framework.

*a) Incompleteness of the PLS contracts*

In the Profits or Losses contracts (Paying for Performance contracts: Mudaraba or Musharaka) where the Agent "entrepreneur" who needs to raise funds to finance an investment project. Future decisions concerning this project have to be taken, which due to its inherent incompleteness, cannot be perfectly determined in the initial contract. Moreover, the Agent "entrepreneur" and the Islamic Bank "investor" (fund provider) may have conflicting objectives regarding the future developments of the project which as a result of

[6] Islam is regarded not only as a set of moral preaching, but a framework spanning the whole life. In this interpretation, daily economic affairs should be inspired by the rules set by Islam. Since Islam forbids selfishness for the welfare and order of the whole community, the representative agent in Islamic economics is totally different from homo economicus. We refer interested readers to Kuran (1983) for a review on Islamic economics with an extensive critique about the applicability of its rules. Ebrahim and Safadi (1995), in their comment to Kuran (1983), try to nullify its arguments by presenting good practices in ancient Islam civilizations, but Kuran (1995) argues that Islamic economics without any modern standards would fail to meet the demands of modern societies.



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contractual incompleteness and wealth constraints, cannot be perfectly realigned by the initial contract.

We start with one period static model of bilateral contracting between an entrepreneur the agent, and an investor the principal (the Islamic bank); it discusses the nature of contractual incompleteness and describes the origin of the conflict of interest between the two contracting parties. In the case of Paying for Performance contracts (PLS contracts) a bilateral contracting relationship is being set up where the Agent "entrepreneur" seeks funding from a Principal the "Islamic bank" fund provider called also investor to finance the set-up costs, $I_0$, of his new project. We suppose in a dual banking system that there are many fund providers investors (other Islamic banks or conventional banks) looking for good investment opportunities and fewer entrepreneurs with good projects, so that our entrepreneur has all the bargaining power and can make a take-it-or-leave-it offer to the investor If the contract promises an expected return to the investor of at least $I_0$, the fund provider is willing to take the offer.' This defines the investor's individual rationality constraint.

The Islamic banking firm will finance the entrepreneur (Agent) who hasn't enough funds to undertake an investment project which requires a certain investment $I_0$ and will generate in the end of the first period an Output Level (OL) depending on the effort $e \in EL$ with *EL* a complete description of how the entrepreneur will manage the project) and the realization of the future state of the world $Sw \in \Omega$ . *OL (e,Sw)*

In the case of the Mudarabah contract, the initial wealth of the entrepreneur is: $W_0 = 0$ (1.1)

In the case of the Musharakah contract the initial wealth of the entrepreneur is: $W_0 > 0$ / $W_0 + C_{IB} = I_0$ (1.2)

The contractual arrangement specifies the percentage of sharing futures returns, the amount of capital contributions by the Islamic banking firm and the investors and the possible restrictions to control the entrepreneur behavior and to limit his undesired opportunistic decisions during the period spanned by the contractual agreement. The design of the financial contracts in presence of asymmetry of information must be done in a way to guarantee the interest of the Islamic banking firm and thus the client (the investment account holders) from the opportunistic behavior of the entrepreneur the Agent.

Before the contract is finalized the entrepreneur (Agent) may have access to pre-contractual private information which place the Islamic banking firm (Principal) at an information disadvantage and expose it to an adverse selection. After signing the financing contract, the entrepreneur (Agent) may provide certain level of effort which can be publicly observed or carried out privately by the entrepreneur (Agent) and exposing the Islamic banking firm (Principal) to a moral hazard. At the final stage, the realization of the Output, the result may be publicly observed and easily checked (supervised) by the Islamic banking firm or it may be observed privately only by the entrepreneur who realize it. All of these situations can be characterized as costly verification situations (*CVS*).

In the case of informational asymmetries, pre-contractual information (adverse selection), private actions and different level of effort (moral hazard) or the final result may be exactly known by outsiders only at a cost, the design of contracts must allow the Islamic banking firm to reduce the effects of informational asymmetries and thus protect its interests.

*b) PLS financing contracts and the Costly Verification Situations (CVS)*

With reference to Townsend (1979), in an informational asymmetries framework, the result (Output level) *OL* of the project may be observed without cost only by the entrepreneur (Agent), while the Islamic banking (Principal investor) can observe the *OL* only after paying a state dependent verification cost $C_1(OL)$

Verification policy $Vp(OL) = 1$ if the verification occurs (1.3)

And $Vp(OL) = 0$ if the no verification occurs (1.4)

The verification occurs in bad situation: low share of the Islamic bank if $OL < OLOL$ *the minimum accepted OL and in this case* $Vp(OL) = 1$ (1.5)

1) No verification occurs in the case of $Vp(OL) = 0$ in this case the entrepreneur (Agent Mudarib) pays to the Islamic banking firm (Principal investor) an amount depending on *OL* and the predetermined fixed sharing rate $S_R$

- Revenue of the Islamic banking firm $R_{IB} = S_R * OL$ (1.6) is accepted by the bank and is at least equal to the expected level of revenue.
- Revenue of the entrepreneur $R_E = (1 - S_R) * OL$ (1.7)
- As the mudarabah contract is a PLS contract, it's also a risk sharing contract.

The Islamic banking firm (I) (Investor) acts as a neutral risk agent (the Islamic bank uses the investment accounts funds). The entrepreneur (E) (Agent) is risk averse (in case of losses, no reward is granted to him for his effort "labor" and time).

Under the PLS arrangement, the terms of financial transactions reflect a symmetrical riskreturn distribution between counterparties (El-Hawary et al.,

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2007; Askari et al., 2010). Both the entrepreneur and the investor are risk neutral in income. Their Von-Neumann-Morgenstern utility functions over income and action pairs are denoted by UE(r,a) and UI(r,a) respectively. We suppose that they take the following simple form:

$$UE(r, a) = r + I(a,O) \quad (1.8)$$

$$U1(r, a) = r. \quad (1.9)$$

The investor the non management parties (silent partner) are only interested in the level of profitability monetary returns of the project. The entrepreneur, who thought about the project and took the initiative of setting it up, cares not only about the monetary returns but also about the opportunity cost and how much he values his effort level and other less tangible things such as reputation, specific human capital, etc. These non-monetary elements in his payoff depend on the choice of action and on the state of nature; they are represented by the functionl (a, 0). (Note that I(a, 0)can be positive or negative). $D_{U.H.e}$ disutility for the high effort level and $D_{U.L.e}$ disutility for the low effort level

We shall refer to them as the private benefits of the entrepreneur since they are not observable or verifiable by third parties. It is clear, given our specification of preferences, that potential conflicts of interest may arise between the entrepreneur and the investor concerning the choice of action.

The payment done by the entrepreneur (Agent) to the investor (Islamic banking firm) varies from small to big depending on the *OL.* Thus the optimal contract calls for risk sharing and all the problem is to determine the Sharing Rate $S_R$ which an agent is willing to accept and that may act as one such screening device: those who are willing to accept low PLSR may, on average may be considered as worse risks, they are willing to accept low PLSR because they perceive their probability of low profitability. As the PLSR decrease the average riskiness of those agent increase and thus possibility lowering the bank's profits. As the terms of the contract may change, the behavior of the agent client, is likely to change. For instance, rising (decreasing) the PLSR, decrease the time of ownership of the shares of the business company (the profitability of the business).

We will show that lower PLSR induce agent to undertake (they will perform) projects with lower profitability (lower probability of success) and lower level of efforts.

In a world with perfect and costless information, the bank would stipulate precisely all the actions which the agent should undertake (level of effort which might affect the project revenue and thus the level of profitability).

However the bank is not able to directly control all the actions of the Agent ; therefore , it will formulate the terms of the PLS contract in a manner to induce the agent to take actions and perform level of effort which are in the interest of the Islamic bank as as to attract low or reasonable risk agent profile.

For these reasons, the expected return of the project and thus the part of the Islamic bank from the project revenue may increase less rapidly than the PLSR and beyond a point may actually decrease. The PLSR at which the expected return to the Islamic bank is maximized, we refer to as the optimal PLSR*

Both the demand and supply of funds are function of the PLSR and interest rate (in a dual banking system)

## IV. Profit Maximization, Production of the Islamic Banking Firm

There is an abundant literature that explains bank production. The banking firm sets to itself the objective of profit maximizing as it's a rational economic agent[7]. The specification of the inputs and outputs of the production process of the banking firm has been the subject of continuous debate with the dominance of two currents, namely the production approach and the intermediation approach.

*a) Theory of the Islamic banking firm[8]*

The functioning of Islamic banks is essentially based on the idea of Profit or Loss Sharing " PLS " between on the one hand the bank and the client (depositor / investor agent with financing capacity) and on the other hand the bank and the entrepreneur client (agent in need of financing). The PLS principle assumes the existence of a financial partnership frame work with the existence of a minimum level of trust agency relationship (principal and agent). The operating model of Islamic banks suggests that they accept deposits on the basis of the PLS principle and allocate them to entrepreneurs again on the same basis as " PLS ".

On the asset side, Islamic banks have a variety of financing methods which are classified as follows :

- Investment-based financing mode PLS agency relationship (Mudaraba and Mucharaka).
- Sales-based financing method (Murabaha, Salam, Istisnaa).
- Lease-based financing method (Ijara).

[7]Jacob A. Bikker and Jaap WB Bos [2008] "Bank Performance A theoretical and empirical framework for the analysis of profitability, competition and efficiency" Part I Chapter 2 Production of the banking firm pp 6-16 First published 2008 by Routledge 2 Park Square, Milton Park, Abingdon, Oxon OX14 4RN Simultaneously published in the USA and Canada by Routledge 270 Madison Ave, New York, NY 10016 .

[8] Humayon A. Dar and John R. Presley Islamic banking Part II Chapter 8 pp191-206 [2003] "Handbook of International Banking" Edited by Andrew W. Mullineux Professor of Global Finance, University of Birmingh am, UK and Victor Murinde Professor of Finance, University of Birmingham, UK Published by Edward Elgar Cheltenham, UK • Northampton, MA, USA ISBN 1 84064 093 6.



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*b) Deposits and Investments*

Let D ($D_v$ ; $D_0$) be the set of possible deposits available to depositing clients,

$D_v$: represents deposits with variable income which are based on the PLS principle.

$D_0$: non-interest-bearing deposits, current accounts or savings accounts.

Islamic banks also offer a range of fixed and variable income financing methods to entrepreneurs (agent in need of financing) I ($I_f$ ; $I_v$ ; $I_0$)

Where $I_f$ : fixed income investment example Murabaha

$I_v$: Variable investment based on the principle of " 3P " example Mudaraba and Musharaka

$I_0$: investment without income for the example bank Quard Hassan

Be

$$\alpha = I_f / TI \ ; \ \beta = I_v / TI \ ; \gamma = I_0 / TI \qquad (2.1)$$

Are the respective proportions of investments in the various types of financing methods compared to the total investment TI = $I_f$ + $I_v$ + $I_0$

The income that the bank receives on all of its investments :

$$Y = \alpha r_f + \beta r_v + \gamma r_0 \qquad (2.2)$$

$r_f$ , $r_v$ , $r_0$ Are the rates respectively returned back fixed investment, and without variable income (returned as zero Quard Hassan) $r_0$ = 0.

The net profit of the bank can then be written:

$$\pi = Y - C \qquad (2.3)$$

With C represents all of the charges that the bank incurs in order to generate income Y.

If we decompose the total profit into two components according to the fixed income and variable income investment we get:

$$\pi = \pi_f + \pi_v \qquad (2.4)$$

Avec $\pi_f = \alpha r_f - C_f$ et $\pi_v = \beta r_v - C_v$

$\Pi_f$ : is independent of the profit level of the projects in which the entrepreneur is engaged, and therefore it can be treated as fixed income.

$\Pi_v$ : is the aggregate income rate of all income from individual business investments on the basis of the " PLS " principle.

Islamic banks invest in various PLS-based projects and the rates of income that the projects generate and that will be shared with its clients are not necessarily the same, if there are " n " projects in which the Islamic bank invests then:

$$r_v = \sum_{i=1}^{n} \frac{\beta_i}{\beta} (r_{viBI} * \pi_{vi}) \qquad (2.5)$$

With $\pi_{vi}$ = the total profit generated by the investment project " i "

Et $r_{vi_{BI}}$ = the proportion of the income from the investment project " i " accruing to the Islamic bank.

$\beta_i$ = The proportion invested in the project in relation to the overall investment performance and variable as:

$$\sum_{i=1}^{n} \beta_i = \beta .$$

$$\beta * r_v = \beta * \sum_{i=1}^{n} \frac{\beta_i}{\beta} (r_{viBI} * \pi_{vi})$$

$$\pi_v = \beta r_v - C_v$$

$$\pi_v = \sum_{i=1}^{n} \beta_i (r_{vi_{BI}} * \pi_{vi}) - C_v \qquad (2.6)$$

The total profit becomes

$$\pi = A + \sum_{i=1}^{n} \beta_i (r_{vi_{BI}} * \pi_{vi}) \qquad (2.7)$$

with $A = \alpha r_f - C_f - C_v$



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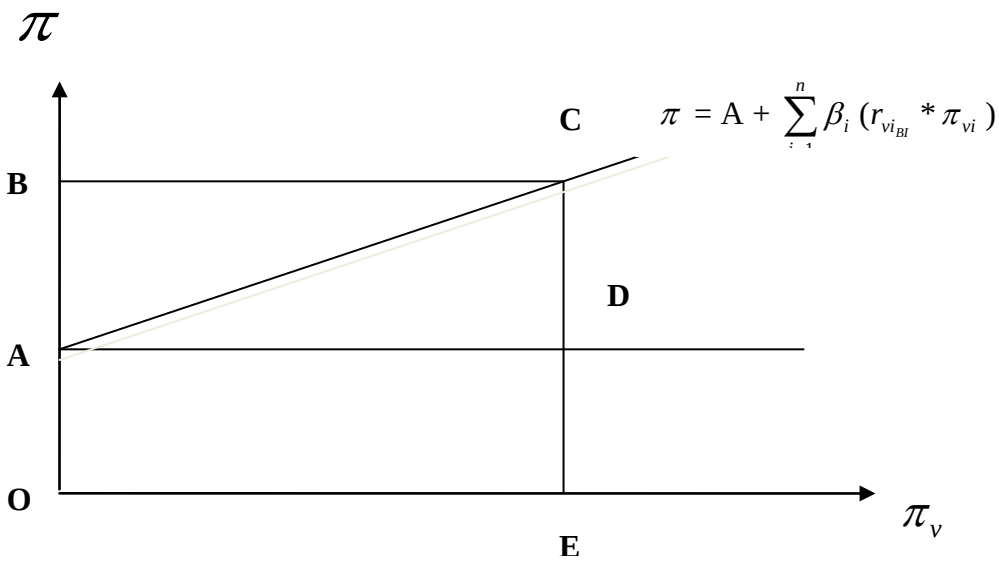


*Figure 1:* Profits of Islamic banking and the composition of investments

The presence in the total profit equation (6) of a component which corresponds to the fixed income has interesting implications with regard to the agency problems which are inherent in participatory contracts. This also explains why the majority of Islamic banks opt to allocate their funds on a fixed income funding basis because it's less risky and with high gain not like the PLS products that are more riskier and with less gain. On the other hand the profit equation has similarities with the CAPM equation, If we assume that the bank invests the same volumes of funds in variable return investments and fixed return investments then CAPM implies that:

$$\sum_{i=1}^{n} \beta_i (r_{vi_{BI}} * \pi_{vi}) > A \qquad (2.8)$$

Schematically, this implies that funds must be invested on the basis of variable returns to scale such as: ACD> OADE and assuming that only these investments generate profits beyond point C of the profit line. In this case, the proportion of investments with variable returns is higher than that of investments with fixed returns in the whole portfolio.

c) *PLS terms can be renegotiated in the light of each period result*

The PLS contract should specify indicate the distribution ratio of profit between both parties (which cannot be a lump sum or a percentage of capital). The distribution ratio could be revised at future dates by agreement of both parties.

Does the PLS contract allow, in imperfection information framework (hidden actions) reviewing the contractual terms to improve the welfare of the two parties? And how can such revision, be optimally implemented?

In the context of principal agent relationship in which the agent provides a productive input (effort) that cannot be observed by the principal (the Islamic Bank) directly[9].

Implementing monitors can provide information that is independent of the state of nature and allows the principal to detect any shirking by the agent with positive probability.

These monitors[10] seem to be of limited interest; however a first-best solution can be almost arbitrarily approximated in this case since observing the agent's action directly is made possible through these monitoring devises that needs to be valued in order to compare their cost to their benefits in agency relationships (Stiglits 1975, Willamson 1975) which serves to explain the extensive use of imperfect information in contracting. Furthermore, we characterize optimal contract based on such imperfect information in a way which yields considerable insight into the complex structure of actual contracts.

d) *Relation between Islamic bank and entrepreneur (Agent)*

We aim to present through this model[11], which is doesn't take into account the existence of taxes on

[9] Harris and Raviv 1976 and 1978; earlier works on principal and agent models: Wilson 1969, Ross 1973, and Mirrlees1976.

[10] The monitoring should be as perfect as possible in order to insure that any additional information about agent's action, however imperfect , can be used to improve the welfare of both the principal and agent as the PLS contract offer a framework of reviewing the contractual terms in going.

[11] We started from the idea of Hassoune Anouar which proposes a simple model of comparison of profitability between the Islamic banks and conventional banks, but we developed another analysis logic for the participative contract framework (Moudaraba). Hassoune Anouar (2003), « La Solvabilité Des Banques Islamiques: Forces et Faiblesses », Revue d'Economie Financière n° 72



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incomes, the levels of the Sharing rates of the profits or the losses to be fixed by the Islamic banking firm in order it becomes competitive and gain at least what gains a conventional bank. Under which conditions the Islamic banking firm can attract entrepreneurs who are not solely motivated by religious reasons and how to incite them to choose an Islamic financing?

*e) Illustrative one period model of Moudaraba contract*

The entrepreneur, who is supposed to be rational beside his seek of compliance of his believes to his business practices, will not choose the method of participative financing unless the profit released, after deduction of the Islamic banking firm's share will be higher than the profit obtainedif he will have to treat with a conventional bank and thus payback the main amount of the loan increased of his financial expenses (interests).

1) For the entrepreneur

$$(1-PLS_R)\tilde{P}_{OL} \geq \tilde{P}_{OL} - rD - \alpha D \qquad (3.1)$$

$PLS_R$ : Profits or Losses Sharing ratio

$\tilde{P}_{OL}$ : Expected Output level (Profit) in the period

D : Main amount of loan

$r$ : Interest rate

$\alpha D$ : Fraction of principal of the debt to be paid back;

For the one period model $\alpha = 1$.

$$PLS_R \leq \frac{D}{\tilde{P}_{OL}}(r+\alpha) \qquad (3.2)$$

2) For the Islamic banking firm

Let's suppose that the profit to be realized $\tilde{P}_{OL}$ can be exactly anticipated or calculated, the negotiations between the Islamic banking firm and the entrepreneur will focus on the level of $PLS_R$ and consequently the Islamic banking firm will not be free to fix any level of $PLS_R$ which will not take into account the interests of the entrepreneur who is likely to prefer the conventional financing otherwise;

$$PLS_R\tilde{P}_{OL} \geq rD + \alpha D \qquad (3.3)$$

$$PLS_R \geq \frac{D}{\tilde{P}_{OL}}(r+\alpha)$$

In the equilibrium $PLS_R = \frac{D}{\tilde{P}_{OL}}(r+\alpha)$

For the one period $\alpha = 1$.

$$PLS_R\tilde{P}_{OL} \geq rD + D$$

$$PLS_R \geq \frac{D}{\tilde{P}_{OL}}(r+1)$$

In the equilibrium $PLS_R = \frac{D}{\tilde{P}_{OL}}(r+1)$ (3.4)

- Strategies of the Islamic banks with respect to the achievements of profits

The Islamic bank will attach more importance to the credibility of the profits anticipations. Optimistic profits anticipations will be in the favor of the entrepreneur and the bank will have a less Sharing rate. Statistically speaking, the Islamic bank must decrease the differences in variability between the profit really carried out and that anticipated one, and thus obtain a standard deviation $\sigma(\tilde{P}_{OL}) = 0$.

The more the anticipations of the Islamic banks are optimistic the more it will have a negative impact on their levels of profitability. Consequently, we can say that the strategy of the Islamic bank is based on the decline of the estimated value of the profits, and contrary to this logic, the entrepreneur will formulate his strategy.

We distinguish three possible scenarios depending on the level of how being close the estimated values to the values really realized of profit.

- First scenario: the estimated value of profit matches with the value really realized of the profit:

This is the case of certainty $\tilde{P}_{OL} = \pi$ In this case:

$$PLS_R = \frac{D}{\pi}(r+1)$$

The entrepreneur is indifferent to the funding source(Islamic or conventional).

- Second scenario: the estimated value of the profit is greater than the one actually realized by the entrepreneur:

In this case: $\tilde{P}_{OL} > \pi$

The ratio: $PLS_R = \frac{D}{\tilde{P}_{OL}}(r+1)$ depend on the level of expected profit, but if the Islamic bank knew that the profit level will be limited to $\pi < \tilde{P}_{OL}$ it should have been fixed aProfits or Losses Sharing rate:

$$PLS_R = \frac{D}{\pi}(r+1) > PLS_R = \frac{D}{\tilde{P}_{OL}}(r+1) \qquad (3.5)$$

In this case, the participatory financing is more convenient to the contractor. But the bank may not be able to seize the opportunity to realize additional profits if it overestimates the level of profits to be performed by the contractor.

- Third scenario: the estimated value of profit is less than the one actually realized by the entrepreneur:

In this case: $\tilde{P}_{OL} < \pi$



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The ratio $PLS_R = \frac{D}{\tilde{\tilde{P}}_{OL}}(r+1)$ is set on the basis of predetermined level of expected profit $\tilde{\tilde{P}}_{OL}$ but if the Islamic bank knew that the profit levels will exceed $\tilde{\tilde{P}}_{OL}$ ; $\pi > \tilde{\tilde{P}}_{OL}$

$$PLS_R = \frac{D}{\pi}(r+1) < PLS_R = \frac{D}{\tilde{\tilde{P}}_{OL}}(r+1)$$

In this case, the contractor will see the amount of its income decrease, which may incentive him/her to use the financing interest rate based offered by the conventional banks from the moment he/she realizes that the participatory financing will reduce its profit level.

We outline from the three scenarios described above, in a framework of dual banking systemit is not in the interest of the Islamic bank to set conditions that are flexible and competitive with those set by conventional banks.

- Negotiating position of the contractor and Islamic banking

We have understood from the foregoing that it is in the interest of the entrepreneur to foster the most optimistic expectations, even knowing that the profit he will realize will be less than the level initially reported to the Islamic bank when the funds were requested.

Once the level of profit made is less than the expected, the contractor will transfer a portion of profits to the Islamic bank, which will surely be less than the amount of financial expenses (sum of interest) and principal of the loan to be paid to the conventional bank.

Therefore, the Islamic bank must be vigilant and rigorous in dealing with the expectations of the contractor because the objective of the latter is to minimize as possible the part of the Islamic bank in the profit by fixing a minimum level of the profit or losses sharing ratio of participation.

The Islamic banks have to consider, in studying the business plans of the contractors, the least optimistic expectations, based on the position of the contractor.

In other words the Islamic bank should base its strategy in fixing the profit or losses sharing ratio on the assumption that profit really achieved will be much lower than anticipated one by the contractor because if this latter was sure of high levels of profits to be realized he would have chosen the conventional financing and pay less than the part of the profits to be transferred to the Islamic bank.

We cannot consider that the participatory financing is the refuge of the least efficient contractors because in the case of project failure and the realization of losses, the contractor will bear a portion of these losses that is reflected in its provided effort and time spent which won't be remunerated.

*f) Multi periodic Model with" $\tilde{\tilde{P}}_{OL}$ " constant to infinity:*

$PLS_R$: Profits or Losses Sharing ratio supposed to be constant

$\alpha$: Fraction of principal of the debt to be paid backaccording to the constant amortization; $\alpha$ is constant thus the amortization is constant and $\alpha$ = 1/n

$r$: Constant interest rate

$D_i$ Remaining due capital to the I[th] period with i = 1,2, ...., n

$$D_1 = D$$

$$D_2 = D - \frac{1}{n}D \; ; D_3 = D - \frac{2}{n}D ; D_4 = D - \frac{3}{n}D \text{ et}$$

$$D_n = D - \frac{(n-1)}{n}D$$

Period 1:

$$(1 - PLS_R)\tilde{\tilde{P}}_1 \geq \tilde{\tilde{P}}_1 - rD_1 - \frac{1}{n}D \qquad (4.1)$$

Period 2:

$$(1 - PLS_R)\tilde{\tilde{P}}_2 \geq \tilde{\tilde{P}}_2 - rD_2 - \frac{1}{n}D \qquad (4.2)$$

Period 3:

$$(1 - PLS_R)\tilde{\tilde{P}}_3 \geq \tilde{\tilde{P}}_3 - rD_3 - \frac{1}{n}D \qquad (4.3)$$

And
Period n:

$$(1 - PLS_R)\tilde{\tilde{P}}_n \geq \tilde{\tilde{P}}_n - rD_n - \frac{1}{n}D$$

By summing the terms on both sides of the inequality we obtain:

$$(1 - PLS_R)\sum_{i=1}^{n}\tilde{\tilde{P}}_i \geq \sum_{i=1}^{n}\tilde{\tilde{P}}_i - r\sum_{i=1}^{n}D_i - \sum_{i=1}^{n}\frac{1}{n}D_i \qquad (4.4)$$

The level of interest rates affects the yield of participatory financing contracts as well as participatory remunerated accounts [(Chong & Liu (2009); Rachmawati & Syamsulhakim (2004); Kaleem & Mansoor (2003); Sudin & Norafifah (2000); Haron & Schanmugan (1995)][12].

[12] Sudin, H., Norafifah, A (2000), "The effet of conventional interest rates and rate of profit on funds deposited with islamic banking system in Malaysia", International Journal for Islamic Financial Sercvices, 1 (4).
Haron, S., Shanmugam, B. (1995), The Effects of Rates of Profit on Islamic Bank's Deposits: A Note, Journal of Islamic Banking and Finance, 12 (2), pp. 18-28.
Kaleem. A., Mansor. Md Isa (2003), Causality relationship between Islamic and conventional banking instruments in Malaysia, International Journal of Islamic Financial Services, 4(4).



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Several studies show a significant correlation between changes in the levels of interest rate and the variability of the Profits or Losses Sharing ratio of Islamic banks. Islamic banks do not rely exclusively on the model of mudaraba, although it is the realization of the logic of participative financing on which is based the Islamic bank.

But in practice, the financing mudaraba contract represents a small part in all activities of the Islamic banks this is due mainly to the high degree of risk related to the problems of asymmetric information and the higher cost of managing engaged in the participatory financing mode when compared to the conventional banks.

## V. Islamic Banks and the Mudaraba Finance Contracts

Islamic banking practice reveals the non-popularity of financing contracts such as Mudaraba and the methods of non-equity financing (Murabaha, Ijara, Salam, Ist'isnaa) are more used at the expense of participatory methods. This is due mainly to problems of moral hazard that affect this type of contract. Therefore, the success of participatory mode of financing will depend largely on solving the asymmetric information problems associated to it, which requires incentives consideration in the contractual terms.

There is abig difference betweena financing contract offered by an Islamic bank (a participatory contract) and a convention aldebt financing. Islamic banks beyond pure financial intermediation in the traditional sense, take direct stakes in investment projects through the sharing ratio of profits or losses. The question is how the Islamic banks manage and overcome incentive problems?

*a) Mudaraba contract and Principal Agent Relationship*

The theory of agency and incentives has beenl argely developed during the seventies, with the work of Ross (1973) and Jensen & Meckling (1976). This body of literature is interested in agency relationship that is developed between a principal and the agent. This the ory encompasses any contractual relationship, even implicitly between two parties and in which the situation of one party depend of the other action. By its nature, Mudaraba contract calls for the separation between ownership and decision. This type of contract regulates situations where the actions and the efforts made bythe contractoraffectthe welfareof the bankandin asecond roundinthe welfare of the Islamic bank client (investment account holder). Therefore,the context of Principal Officerisap propriate to analyze the peculiarities of this type of contract.

The initiative party is the one whoseeks to reduce this asymme try by considering some measures in our case it's the Islamic bank. Indeed, in the Mudaraba contract, the is lamic bank acts as the principal as long as it provides funds to the contract or who acts as an agent possessing no part in the project, and he provides only the effort and know-how necessary for the success of the project.

The income from the investment project will be shared between the two parties according $PLS_R$ : Profits or Losses Sharing ratio. It is not always possible for the Islamic bank to monitor and verify perfectly (without incurring additional costs) the actions of the contract or once the contract is being signed. This enhances the conflict of interest between both parties.

Specifically, under the Mudaraba contract a dishonest contractor can be induced through bad behavior to distort reality and declare a lower level of profit in order to obtain higher gains.

Also what can aggravate the problem of asymmetric information in participatory Mudaraba contracts type we can mention:

- The non-requirement of collateral is likely to magnify the problems of agencies.
- The inability of the Islamic banks to control or require the Contractor to comply with certain practices or to take certain actions on post-contract encourages him to not provide the optimal level of effort.
- The obligation of Islamic banks to support certain financial charges inherent in the failure of projects funded in participatory mode. Indeed, those participating contracts (Mudaraba, Musharaka) are relatively risky with the practical difficulty faced by the bank to monitor and supervise a significant number of projects funded under the participatory mode. For example, under the Mudaraba contract, the agent (client contractor) may increase charges, beyond the needed level to reach the profit maximization, from the momen the has to share profits or losses with the bank. In case of losses, it is the Islamic bank that shall bear all costs which may enhance the agency problem. For the client (contractor), the participative financing as Mudaraba is less risky than conventional bank financing (bank loan) which requires, in case of losses paying back afixed amount. The fact that most of the Islamic banks operate in a conventional financial system and as a result of competition, the agency problems may lead to the concentration of bad risks on the side of Islamic banks. To avoid such situations, the Islamic banks are invited to perform rigorous evaluations and to gather additional volume of information which leads inevitably to increase the

Erna Rachmawati, Ekki Syamsulhakim, [2004], "Factors Affecting Mudaraba Deposits in Indonesia", Working Papers in Economics and Development Studies (WoPEDS), 2004-04, Department of Economics, Padjadjaran University, revised Aug 2004.
Chong B. S., Liu M.H., (2009), Islamic Banking: interest free or interest based, Pacific Basin Finance Journal, N°17, pp 125-144.

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costs (monitoring costs) of intermediation higher than those of conventional banks. Thus, the viability and profitability of each project should be assessed separatelybe for enegotiating the profits or losses sharing ratio.

By assuming that the parties have symmetric information at the time of contracting, we abstract from the problem of adverse selection (which does not describe the reality). Adverse selection inherent to the asymmetric of information is important to integrate in the analyze of the PLS contractual relationship. However, research related to this area has been recognized by the 1996 Prize to James Mirrlees and William Vickrey for contributions to the economic theory of incentives under asymmetric information, by the 2001 Prize to George Akerl of, Michael Spence, and Joseph Stiglitz for analyses of markets with asymmetric information, and by the 2007 Prize to Leonid Hurwicz, Eric Maskin, and Roger Myerson for the foundations of mechanism-design theory. Both moral hazard and adverse selection were important building blocks for the 2014 Prize to Jean Tirole for the analysis of market power and regulation.

*b) The Adverse selection*

In case where the information is hidden, the type or characteristic of the entre preneur is not perfectly recognizable by the creditor, namely the Islamic bank, then it mustim plement prevention technique sag ainst negative effects adverse selection. In fact, the Islamic bank (the principal) may offer a menu of contracts that separate the different types of contractors (agents). The purpose is to form amenu of different contracts, where each of the contractors (agents) voluntarily chooses the most suitable contract designated by the Islamic bank. Thus, and according to the chosen contract, the Islamic bank (the principal) will be able to identify the characteristics of the agent. By doing this the Islamic bank sets up a model called screening. Islamic banks have variable profits or losses sharing ratios for investors to distinguish good (low risk) from bad investors (high risk). Thus, the bank can offer high profits or losses sharing ratio to investors with low risk and a good level of income.

*c) Moral Hazard*

In the framework where the action is hidden, the Islamic bank seeks to minimize the consequences of moral hazard. In fact, the Islamic bank (the principal) designs contracts that encourage the contractor (agent) to provide an optimal level of effort and perform acts more advantageous with respect to his incentives. The existence of moral hazard problems in participatory methods of financing is one of the most important factors that explain the non-popularity of these modes. In fact, the problem of moral hazard characterizes two situations, firstly if two agents agree on a contract but after that one of them began an action that is not observed by the other agent, we are dealing with a problem of hidden action moral hazard.

In this case, this agent can take advantage of his position and make actions that increase his welfare at the expense of the welfare of the other. On the other hand, if two agents agree on a contract but, thereafter, there is a state of nature observed by one of the agents but not the other, this is the problem of hazard morale with hidden knowledge. The agent cannot in fact reveal the true realization of the state of nature and take advantage of the situation at the expense of another. So the behavior and attitude of the borrower after the beginning of the contract can totally unbalance the terms of the contract in the presence of moral hazard. How the Islamic banks have to proceed in order to reduce and even eliminate the negative consequences arising from information problems?

The Mudaraba contract attracts a large number of entrepreneurs with limited resources given the non-requirement of collateral. Several projects with low returns and high risks will be offered to Islamic banking in order to be financed. Suppose an entrepreneur who has two projects with the same level of expected return but with different degrees of risk. The project "A" hasan accept able level of risk while the project "B" is having the same future a rate of return but characterized by a higher degree of risk. In a dual banking system where Islamic banks coexist and conventional banks and if it is not obvious to the Islamic bank to accurately characterize the two propositions "A" and "B" in terms of risk and return relationship, the entrepreneur chooses to finance the project "A" by debt contract with a conventional bank and thus realizes a high gain share. While for the project "B", he will prefer to be financed with an Islamic bank via a Mudaraba contract so that in case of bankruptcy the Islamic bank bears all the losses. Therefore, the non-requirement of collateral in connection with financing Mudaraba favors the concentration of high-risk entrepreneurs. In this context what mechanism the Islamic banking will use to overcome the problem of adverse selection?

In other words, how the Islamic banking firm comes to discriminate between high-risk projects and projects with lower risk?

In the absence of guarantee the Islamic bank can proceed to ration the supply of funds (By analogy to the concept of credit rationing Stiglitz, J. et A. Weiss [1981]: Credit Rationing in Markets with Imperfect Information American Economic Review 71, 393-410. Jaffee, D. and T. Russell (1976), 'Imperfect Information and Credit Rationing'. Quarterly Journal of Economics, vol. 90) to solve the problem of adverse selection.

In the process of rationing, the Islamic bank must employ a variety of technical discrimination (screening) to identify credibility and experiences of entrepreneurs.



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The first step taken by the Islamic bank, which aims to reduce adverse selection problems is to select contractors by classifying them into two categories:

- Those who have had successful experiences and relationships with banks.
- And the new ones.

Comparing the two groups, one can be considered the least risky because information about their abilities, their credibility and reputations can be obtained at an acceptable level of costs from their history. Funding projects proposed by new entrepreneurs can supply the adverse selection problems as long as the information about them are scarce and more expensive or unavailable. Having already experienced entrepreneurs distinguished from those who are not and have estimated their credibility, the Islamic bank will prioritize projects according to their expected levels of profitability and their degrees of risk. In order that the Islamic banks protect their selves against dishonest contractors, they shall make the over estimation of the degree of risk associated with each project financing and as compensation for this, they will choose the projects with the rate of return higher. However, the high rate of return required by the Islamic bank means that projects with future rates of return relatively low associated with low levels of risk will be deemed non-profitable and therefore will not be accepted by the Islamic bank.

Whenever the bank accepts a project to high rates of return another risky project will be attracted and thus a safer project removed.

To minimize the possibility of financing high risky projects and to achieve cost savings associated with information identifying the characteristics of each project, the bank will provide financing initially for projects that are similar to those already funded and successful.

In this sense the scope of intervention of the Islamic bank will be limited and it will find it self focusing on a single business.

Therefore the bank cannot necessarily reach the optimum allocation of funds and fails to promote new entrepreneurs and thus may lose opportunities for gains.

Even if the Islamic bank can identify the risk return relationship of projects and it wants to finance it, the participatory nature of the Mudaraba contract may give rise to problems of moral hazard such as incentives to effort (level of effort required)and agency problems.

*d) Illustrative model of the level of effort and incentive problems in the Mudaraba contract*

As part of the allocation of funds, the Mudaraba contract is closely related to agency problems. In fact the Islamic bank cannot force the contractor to perform actions that it considers appropriate (the optimum level of effort required).

Under this contract, the remuneration of the entrepreneur takes the form of a predetermined percentage of total income of the project.

This remuneration scheme offers no incentive for the contractor to provide the level of effort required to maximize profit.

Thus, the effort provided by the contractor is equal to his share of marginal revenue instead of the total marginal revenue of effort.

By constructing a simple model, the incentive problems associated with Mudaraba contract will be discussed in the following:

Under the financing participatory "Mudaraba", the Contractor receives $(1-PLS_R)$ net profit $\tilde{P}_{OL}$ whereas the bank receives $PLS_R$ the net profit $\tilde{P}_{OL}$.

The entrepreneur can choose the level of effort (e) that he'll provide and the Islamic bank cannot control this level of effort. The Islamic bank observes only the outcome of this effort which is reflected in net profit.

- The net profit depends exclusively on the level of effort provided by the contractor $PLS_R = f(e)$ $PLS_R(e)$ is an increasing function of the effort with decreasing marginal rate. The more the effort is provided by the contractor, the higher the level of profit will increase. The function $PLS_R(e)$ is continuously differentiable and strictly increasing concave.
- The entrepreneur is risk neutral, if not if he wasrisk-averse he will choose a fixed wage(a workstation). This assumption implies that the utility function of the entrepreneur depends on what he will receive as income and what it will provide such effort.
- The production analysis is the certain universe thus there is a positive relationship between effort and out put.
- Ouran alysis focuses on the level of effort and not on the risk sharing. $\pi'(e) \geq 0 \ \pi''(e) \leq 0$ $\pi(e=0) = 0$ (5.1)
- From the time that the contractor signs the contract and agrees with the bank on the rate of sharing, his concerns will be to maximize its utility function by keeping the level of effort provided(e):

$$\underset{(e)}{Max}\ (1-PLS_R)\ \pi(e) - a\,e \qquad (5.2)$$

With $(1-PLS_R)\ \pi(e)$ the part of the contractor in the net gain $\pi(e)$

a = the marginal disutility of effort is assumed to be constant.

The utility maximization of the entrepreneur is provided by the first order conditions:



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$$(1-PLS_R)\pi'(e)-a=0 \Leftrightarrow \pi'(e)=\frac{a}{(1-PLS_R)} \quad (5.3)$$

The Islamic bank is also interested in its share of income; its problem is the following:

$$\underset{(e)}{Max}\ (PLS_R)\ \pi(e) \quad (4)$$

This gives the first order condition:

$$(PLS_R)\ \pi'(e)=0 \Leftrightarrow \pi'(e)=0 \quad (5.4)$$

However, the socially optimal level is maximized when the rate of marginal revenue equalizes the marginal cost (disutility costs):

$$\underset{(e)}{Max}\ \pi(e)-a\,e \quad (5.5)$$

this gives

$$\pi'(e)-a=0 \Leftrightarrow \pi'(e)=a \quad (5.6)$$

This implies that the entrepreneur maximizes his utility by equalizing the marginal cost of disutility to its marginal revenue and marginal revenue not social. This means that the contract or will not provide the optimum level of effort to achieve the socially optimal level of income. This can be illustrated in the following figure:

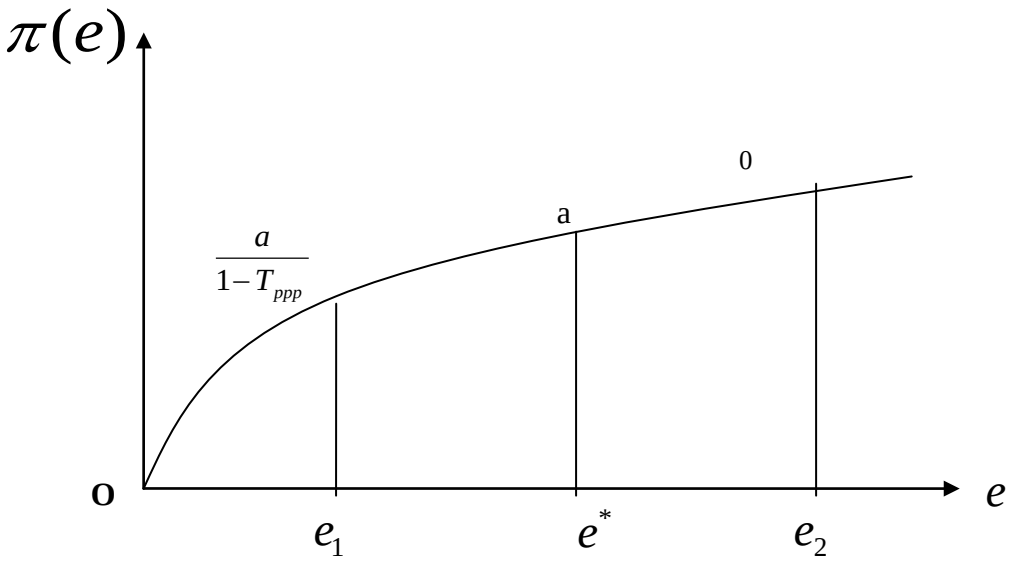


*Figure 2:* Level of Effort, incentive and profit

Agency problems and information asymmetry are not supposed to be occur in a context of Islamic finance which is based on moral and religious beliefs of different stakeholders[13], each of them treats others with sincerity and loyalty, love for them what he/she likes for her/his self. The realization of these moral and religious convictions will minimize transaction costs. But the problem is that the ethical and religious values are not always present, even their applications and understandings are not homogeneous.

*e) Musharaka (equity: participation in a joint venture or joint ownership)*

Musharaka (active partnership) is a contract between two parties (or more) to finance a project whose losses or profits are distributed in proportion to respective capital contributions. This contract is based on the morality of the client, the relationship of trust and profitability of the project or activity funded. The key to sharing profits or losses is determined at the time of signing the contract. Thus, the $PLS_R$ can beset either on the basis of negotiation and mutual consent (thesis Hanafi and Hanbali School[14]), or based on the setting of

[13] Stakeholders should notnecessarilybe Muslims. The fact that non-Muslim do not share the same faith as the Muslim, this does not mean that a Muslim mustbedespic able with them, on the contrary, it mustbe have fairly to wards them both by the word and by the Act. Equity isthe basis of various reports with non-Muslims.

[14] There are four main Islamic schools of lawma kingau thority to determine what is or what is not Sharia compliant. The Hana fiand



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each contracting party (Maliki school thesis and Shafi'ie[15]). Ina Musharaka montage, the Islamic bank and the contractor both contribute in different degrees in the capital needed to start a business. The capital contribution maybe made either by cash contribution and / or in kind. This contract gives each partner the right to administer the affairs of society, and the right to participate in the profits or losses in proportion to their contributions. The Contracting Parties shall jointly assume the risks. Musharaka can be performed by the Islamic banks in the sense client/depositors -Islamic bank or in the sense Islamic bank-customer (contractor).First, as part of customer relationship depositor-Islamic bank which is governed by a contract musharaka, the customer participates in the out come of the Islamic bank and receives a portion based on the amount it has advanced. Moreover, the relationship between Islamic bank and customer Contractor, and is governed by a contract type musharaka, focuses on financial investment projects considered cost-effective and compatible with the principles of Islamic finance.

The funds require dare subject to a contribution of the two contracting parties will be integral incase of loss and share profits if the outcome of this investment is a gain.

*f) Diminishing participation in the capital of Firm*

According to AAOIFI[16] standards, Diminishing Musharakah has been defined as "the partnership in which one of the partners undertakes that it will purchase the shares of the other party/parties in installments/is periods to ensure that the project that is the subject matter of the partnership is transferred to the party that demands the financing"

In a diminishing Musharakah, the bank's interest share decreases by the payments received from the client, and the bank's share of the profit is calculated on the basis of the outstanding interest share. The client enters into an agreement with the bank for joint ownership of property in a known investment share of each partner. Afterward, the client pays the rent to the bank for using its share. The bank can only rent this property according to the level of its investment share. The bank cannot obligate the client to purchase its share. The bank's shares will be divided into a certain number of units, and the client will purchase these units from time to time at an agreed period. The customer purchases these units and the client increases his investment shares and reduces the amount of rent gradually until the client becomes the sole owner of the property.

1) Modeling of diminishing participation and acquisition of capital by the entrepreneur at the end of the period

*Let C be the capital needed to undertake the project*

$C_E$ = B: Contribution of the entrepreneur to Capital

$C_{BI}$ = K = N * B Contribution of the Islamic bank to Capital.

With N: Coefficient of proportionality of K with respect to B, N> 1.

$$C = C_E + C_{BI} \qquad C = (N + 1)\,B \qquad (6.1)$$

We consider the profit reinvestment hypothesis with two cases:

2) The project reports a steady income periodically annual.
3) The project reports a variable income from one year to another.

*First case*[17] Let $P_1 = P_2 = P_3 = \ldots\ldots = P_n = P_{..}$ The profit of the period: year.

And let us assume that the portion of the profit going to the entrepreneur is proportional to his share in the capital.

*First year:* The part of the capital held by the entrepreneur is : $C_{E1} = B$ (6.2)

Part of the profit available to the contractor: $R_1 = \frac{P}{N+1}$

*Second year:* the part of the capital held by the entrepreneur is:

$$C_{E2} = B + \frac{P}{N+1} = B(1 + \frac{P}{(N+1)B}) \qquad (6.3)$$

Part of the profit available to the contractor: $R_2 = \frac{P}{N+1}(1 + \frac{P}{(N+1)B})$

*Third year:* The part of the capital held by the entrepreneur is:

$$C_{E3} = B(1 + \frac{P}{(N+1)B}) + \frac{P}{N+1}(1 + \frac{P}{(N+1)B})$$

$$= (B + \frac{P}{N+1})\,(1 + \frac{P}{(N+1)B})$$

Hanbali school sarer a ther conservative they prevailin the Middle East countries mainlygolf.

[15] The school Shafi'ie prevails in Southeast Asian countries and the Maliki school prevails in North Africa. These two schools are quite liberal.

[16] Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI) :http://aaoifi.com/

[17] Boualem Bendjilali & Tariqullah Khan Economics Of Diminishing Musharakah [Research Paper No: 31] First edition 1995 1416H *Islamic Research and Training Institute*, Islamic Development Bank. Jeddah - Saudi Arabia.



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$$= B\,(1+\frac{P}{(N+1)B})^2 \quad (6.4)$$

Part of the profit available to the contractor: $R_3 = \frac{P}{N+1}(1+\frac{P}{(N+1)B})^2$

Generally speaking we can write: the part of the profit available to the contractor at the period j is written in the following form: $R_j = \frac{P}{N+1}\left[1+\frac{P}{(N+1)B}\right]^{j-1}$ (6.5)

We assume that the entrepreneur's share of the total profit is fully reinvested in the project in the form of acquisition of part of the capital that materializes in the shares of its partner namely the bank.

We note $C_{Ej-1}$ the contribution of the entrepreneur to the capital at period d-1 and $R_{j-1}$ the contractor's share of the profit that will be reinvested in period j.

The total contribution of the entrepreneur to the capital C in the period j :

$$C_{Ej} = C_{Ej-1} + R_{j-1}$$
$$C_{Ej-1} = C_{Ej-2} + R_{j-2}$$

Making $: C_{En} = C_{E1} + \sum_{j=1}^{n-1} R_j$ (6.6)

with $C_{E1} = B$

As the entrepreneur's share of total profit increases and the bank's share decreases each year, this indicates a change in the ownership structure.

When the project is wholly owned by the contractor at the time of the project, its share of the profit will equal the entire profit generated by the project. In other words we will have to have the following equality:

$$\frac{R_j}{P} = \frac{\frac{P}{N+1}\left[1+\frac{P}{(N+1)B}\right]^{j-1}}{P} = 1$$

$$\Leftrightarrow \left[1+\frac{P}{(N+1)B}\right]^{j-1} = N+1$$

$$\Leftrightarrow (j-1)\log\left[1+\frac{P}{(N+1)B}\right] = \log(N+1)$$

$$(j-1) = \frac{\log(N+1)}{\log\left[1+\frac{P}{(N+1)B}\right]} \quad (6.7)$$

Equation (3) provides information on the time required for the contractor to be the owner of the entire project. In other words, when P increases the time required for the project to belong entirely to the contractor decreases. Deriving (3) on P:

$$\frac{\partial(j-1)}{\partial P_1} = -\frac{\log(N+1)}{\left(\log\left[1+\frac{P}{(N+1)B}\right]\right)^2} * \frac{1}{P+B(N+1)} \quad (6.8)$$

The negative sign of equation (6.8) illustrates the inverse relationship between period j and profit level P.

*Second case*[18]*:* The project yields a variable income from one year to another.

Is $P1 \neq P2 \neq P3 \neq \ldots Pj \ldots. \neq Pn$ the profit of the year period.

And let us assume that the part of the profit going to the entrepreneur is proportional to his share in the capital.

*First year:* The part of the capital held by the entrepreneur is: $C_{E1} = B$

[18] Extension of the first case



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Part of the profit available to the contractor:

$$R_1 = \frac{P_1}{N+1} \quad (6.9)$$

*Second year:* The part of the capital held by the entrepreneur is : $C_{E2} = B + \frac{P_1}{N+1} = B(1 + \frac{P_1}{(N+1)B})$

Part of the profit available to the contractor: $R_2 = \frac{P_2}{N+1}(1 + \frac{P_1}{(N+1)B})$ (6.10)

*Third year:* The part of the capital held by the entrepreneur is:

$$C_{E3} = B(1 + \frac{P_1}{(N+1)B}) + \frac{P_2}{N+1}(1 + \frac{P_1}{(N+1)B})$$

$$= B\left[(1 + \frac{P_1}{(N+1)B}) + \frac{P_2}{B(N+1)}(1 + \frac{P_1}{(N+1)B})\right]$$

$$= B\left[(1 + \frac{P_1}{(N+1)B})\,(1 + \frac{P_2}{B(N+1)})\right] \quad (6.11)$$

Part of the profit available to the contractor: $R_3 = \frac{P_3}{N+1}\left[(1 + \frac{P_1}{(N+1)B})\,(1 + \frac{P_2}{B(N+1)})\right]$

*Fourth year:* The part of the capital held by the entrepreneur is :

$$C_{E4} = B\left[(1 + \frac{P_1}{(N+1)B})\,(1 + \frac{P_2}{B(N+1)})\right] + \frac{P_3}{N+1}\left[(1 + \frac{P_1}{(N+1)B})\,(1 + \frac{P_2}{B(N+1)})\right]$$

$$R_4 = \frac{P_4}{N+1}\left[(1 + \frac{P_1}{(N+1)B})\,(1 + \frac{P_2}{B(N+1)})(1 + \frac{P_3}{(N+1)B})\right] \quad (6.12)$$

Generally speaking we can write : the part of the profit available to the contractor (entrepreneur) at the period j is written in the following form: $R_j = \frac{P_j}{N+1}\prod_{i=1}^{j-1}(1 + \frac{P_i}{(N+1)B})$ (6.13)

We assume that the entrepreneur's share of the total profit is fully reinvested in acquiring new parts of the capital by holding additional the shares from the Islamic bank.

We note $C_{Ej-1}$ the contribution of the entrepreneur to the capital at period j-1 and $R_{j-1}$ the contractor's share of the profit that will be reinvested in period j.

The total contribution of the entrepreneur to the capital C in the period j :

$$C_{Ej} = C_{Ej-1} + R_{j-1}$$

$$C_{Ej-1} = C_{Ej-2} + R_{j-2}$$

Making: $C_{En} = C_{E1} + \sum_{j=1}^{n-1} R_j$ (2) with $C_{E1} = B$

When the project is wholly owned by the contractor at the time of the project, its share of the profit will equal the entire profit generated by the project. In other words we will have the following equality:

$$\frac{R_j}{P_j} = \frac{\frac{P_j}{N+1}\prod_{i=1}^{j-1}(1 + \frac{P_i}{(N+1)B})}{P_j} = 1$$

$$\Leftrightarrow \prod_{i=1}^{j-1}(1 + \frac{P_i}{(N+1)B}) = N+1 \quad (6.14)$$

From the foregoing, the level of profit generated by the investment project settles on the entrepreneur's contribution to the capital. This encourages him to increase his level of effort and therefore his level of productivity and profit in order to have the full capital under the diminishing musharakah contract and which is an incentive to solve the agency problems encountered during participatory contracts musharakah by involving the entrepreneur in the project via the share of capital.

## VI. Bargaining Power and Renegotiation Effects in Contractual Design

In the case of pay for performance contracts (venture capital financing and PLS in the Islamic



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financing context), the bargaining power is a crucial variable in the process of designing the contracts. The bargaining power can essentially be useful when determining the PLS ratio in the Mudaraba and Musharaka contracts and the period covering these agreements. The payoff related to the entrepreneur's actions and effort (complete vs incomplete and symmetric vs asymmetric)

With the cooperation coalition game (theoric method developed by Nash 1953) between the fund provider with the entrepreneur, they can discuss their situation and agree on a joint plan when the outcome of the financed project is uncertain. It's also relevant to think about contracting and bargaining in a situation of informational asymmetry (adverse selection, Hazard Moral) and the conflict of interest : all these problems have been developed in the contractual approach of the firm: Coase 1973; Jenson and Meckling 1976; Fama and Jenson 1983.All these analyses still valid for the Islamic financial context.

*Bargaining Tools:*
Leverage: parts in the Capital: Musharaka or Mudaraba
Previous successful experiences
Managerial Power and teams
Rival fund providers for the brilliant project ideas
Corporate control and property rights
Renegotiation in the loss cases
Size of the firm and its capital structure
Competition in banking and Venture Capital markets
Transaction costs
Symmetrically or not parties are informed

These several tools can have effect on the contract type, placement and investment modes, the right to set contracts conditions taking into account the agency coast consideration and the strategic aspects.

Smaller firms (growth cycle: when the firm is new) hardly have any access to funds from traditional financial institutions as they have few assets and being riskier would prefer the PLS mode of financing to spread their risk. The Islamic banks can use the PLS ratio to distinguish good (bad) investment and high (low) risk.

The question to be asked is: the level of information (expected return yield estimated by the entrepreneur and how the Islamic bank assesses this) gathered by the Islamic banks is enough and relevant?

The Islamic bank can mention the fact that it has the right to undertake auditing process in case its share is less than expected, and in order to incentive the agent to perform effort needed to succeed the project and to behave in a manner to increase their mutual welfare. When the auditing process is implanted its costs are supported by the agent to dissuade the agent to behave dishonestly.

The renegotiation in the PLS contracts can help to influence the way agent acts and behaves. The principal can induce the agent take set of desirable actions and thus improve the common welfare and risk sharing.

In the property rights approach as developed by Grossman and Hart 1986; Hart and Moore 1990; Hart 1995, the ownership structure leads to the residual control rights. In the PLS contracts allocation of the right to tale decision in case not mentioned prior in the contract to the principal (Islamic Bank) or the agent (entrepreneur) can play the role of incentives Hart et al 1997; Laffont and Martimort 2002.

## VII. Conclusion

Mudaraba contract financing represents a minimal part of the overall activities of Islamic banks. This is mainly due to the high degree of risk that emanates from the problems of information asymmetry and which generates a higher management cost than that supported by the conventional banks. The problems of agency and asymmetric information are not meant to arise in a context of Islamic financing that is based on the moral and religious beliefs of the various stakeholders[19], each of whom treat the other parties sincerely and loyalty, loves for them what he loves for himself. The realization of these moral and religious beliefs will minimize transaction costs. But the problem is that ethical and religious values are not always present and even their applications and their understandings are not homogeneous.

The conditions under which Islamic banks can attract entrepreneurs who are not driven solely by religious motives and encourage them to opt for Islamic financing are especially the levels of profit-sharing or loss ratios to be set by the Islamic bank to be competitive and at least earn what a conventional bank earns depends on the level of interest rates practiced by the latter in a dual banking system. The entrepreneur will not choose the PLS financing contract unless the profit generated, after deduction of the Islamic bank's share, will be higher than the profit generated if it will have to deal with a conventional bank and thus repay the principal of the bank borrowed increased by its financial charges (interest).

As part of the allocation of funds, the contract of Moudaraba is intimately linked to the problems of agency. Indeed the Islamic bank can not force the entrepreneur to perform actions that it considers appropriate (the optimum level of effort to provide). According to this contract, the contractor's remuneration takes the form of a predetermined percentage of the total income of the project. This payment scheme does not provide incentives for the contractor to provide the

[19] Stakeholders must not be Muslims. The fact that the non-Muslim does not share the same faith as the Muslim does not mean that the Muslim must be despicable toward him, on the contrary, he must behave towards him fairly both by word and by the act. Equity is the basis of various relationships with non-Muslims.



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level of effort needed to maximize profit. Thus, the effort provided by the entrepreneur equals his share of the marginal income instead of the total marginal income of the effort.

Islamic banks have the variable profit or loss sharing rate to distinguish good low-risk entrepreneurs from bad high-risk ones. Thus the bank can offer entrepreneurs with low risk and good income a high sharing ratio. Finally, the level of profit generated by the investment project funded by musharakah mode of financing can attract the entrepreneur to own the whole capital. This encourages him to increase his level of effort and therefore his level of productivity and profit in order to have the full capital under the diminishing musharakah contract and which can be considered as an incentive to solve the agency problems encountered during participatory contracts mucharaka by involving the entrepreneur in the project via the share of capital.

The optimal financial instrument for Islamic banks operating in environments characterized by agency problems and incomplete contracts is the Profits or losses contracts. The optimality and use of equity contracts will decrease as the level of agency problems increases in dual banking system, and debt contracts will become the dominant form of finance. Although Islamic banks should be based on the profit-and-loss sharing principle, given the economic environments in which they operate, a continuous quest for optimal PLS contract must be done to take advantage of this powerful tool in a dual banking system.

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