Agency problems in venture financial contracts: profit-sharing ratio as a screening device

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Abstract

Both Islamic and conventional venture contracts suffer from information asymmetry and incentive problems. The venture capitalist and the manager have an agency relationship because of the insufficient information about the financed investment and/or the manager type. This paper presents a literature review of agency problems in venture contracts and proposes a theory of Profit Sharing Ratio (PSR) with information asymmetry about the manager type. In order to avoid the adverse selection, in this theoretical framework the negotiated profit sharing ratio acts as a screening device. We show that adverse selection is signaled when the manager accepts a PSR set beyond a given critical value. This threshold of the PSR corresponds to the maximum payoff to the venture capitalist. Likewise, the negotiation of the PSR offers a new tool for screening managers’ type. We suggest that the PSR level may complete the carried interest in conventional venture contracts.

Key words: Venture capital contracts, Agency problems, Profit sharing Ratio, carried interest.

JEL classification: D82, G21, G23, G24
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Abstract

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1. Introduction

The primary financial products proposed by Islamic banking industry are respectively the profit-sharing contract known as ‘Mudaraba’ and the profit and loss-sharing contract known as ‘Musharaka’. These contracts constitute a form of partnership, where the investment decision-making process is based on Islamic Law principles\(^1\). Their main characteristic is that the net profit must be shared between the Islamic bank (IB) and the manager with respect to a pre-negotiated profit-sharing ratio (PSR). In the profit-sharing contract, the Islamic bank acts as a venture capitalist that provides the initial invested capital while the manager has the sole responsibility of managing the financed investment (Mudaraba). However, in the profit and loss-sharing contract, all partners (Islamic bank and manager) provide the required invested capital and are entitled to contribute to the investment decision-making process as desired. For the two Islamic contracts, the investment decisions must be supervised by an Islamic law board to check their compliance with Islamic law principles.

Referring to literature, although these contracts constitute the basis of Islamic banking industry, no profit and loss-sharing contracts continue currently to constitute the overwhelming majority of Islamic banks’ portfolios (Khan, 2010). For instance, the ‘Musharaka’ contract presents only 2.21 percent of the portfolio of Dubai Islamic Bank\(^2\) in 2012. Similarly, Al Rajhi Bank (the world’s largest Islamic bank) does not use ‘Musharaka’ and ‘Mudaraba’ contracts. Therefore, these Islamic contracts are known today as Islamic venture capital (for ‘Mudaraba’) and Islamic joint venture (for ‘Musharaka’) which are offered by asset management companies or some Islamic banks. Several researches argue that agency problems such as moral hazard and adverse selection faced by Islamic banks that deal with those contracts might account for its disappearance (Balkhail and Presley, 2002). Similarly, Bashir (2001) explains that Islamic banks prefer Islamic fixed return contracts

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\(^1\) Islamic law prohibits the sale of intangible products and excludes transactions and activities in certain sectors deemed illegal (such as sales of alcohol or pork). Islamic law prohibits also uncertainty, speculation, and risky economic activity with interest that is considered as a surplus on the capital without any effort.

(Murabaha\textsuperscript{3}, Ijara\textsuperscript{4}, etc.) to ‘Musharaka’ and ‘Mudaraba’ contracts in order to avoid agency problems. Thus, following these serious agency problems, a theory of optimal contracts for profit and loss-sharing contracts is developed (Ahmed, 2002). Nevertheless, the multiple optimal Islamic contracts defined in the literature are determined with information symmetry. The researches neglect the relevant effect of agency problems on their theoretical models. Therefore, the literature on Islamic contracts remains, to our knowledge, limited with regard to the propositions of alternative solutions to such agency problems.

This paper examines critically the literature about Islamic and conventional venture financial contracts with agency problems. The main objective of this paper is to propose a theory of profit-sharing ratio by examining the desirability and implications of venture financing within a principal-agent (venture capitalist-manager) framework. To achieve our aim, agency problems faced in the selection of the deal stage and in the investment stage by Islamic and conventional venture financial contracts are firstly addressed. We also give a critical systemized overview of ways proposed in the literature to reduce those agency problems. Typically, we argue that in such contracts the skills and abilities of the manager are essential for the success of the financed investment. Then, we particularly focus on the relevant role of the profit-sharing ratio in the settlement of venture financial contracts and suggest an original theory where this ratio acts as a screening device. To our knowledge, this paper provides the first theoretical framework in this way.

The paper is organized as follows. The next section compares Islamic and conventional venture financial contracts in order to assess whether there are relevant differences or similarities. In the third section, agency problems faced in the selection stage are analyzed. The fourth section exposes agency problems confronted in the investment stage. The fifth section explains and criticizes the optimal profit-sharing ratio which is reported from theoretical and empirical researches about Islamic venture financial contracts. The sixth section presents a theory of profit-sharing ratio as a screening device for venture financial contracts. The last section concludes the paper.

\textsuperscript{3} It is an agreement between an Islamic bank and its client according to which the Islamic bank is engaged to buy for the account of its client a tangible asset from a third party in exchange of a mark-up profit. The client will purchase the asset against a deferred payment.

\textsuperscript{4} The principle of this contract is the same of a conventional leasing contract with respect to Islamic law principles described above.
2. Comparison between Islamic and Conventional venture finance

Generally, a manager who expects that his/her investment provides no-monetary benefits (the responsibility of investment decision making) and high payoffs (profit sharing principle) has a spontaneous incentive to choose venture financial contracts. These contracts insure high total payoff to the manager’s effort with a low cost of capital (Pryor, 1985) because his/her contribution is often limited. In this context, the Islamic venture capital and Islamic joint venture are the alternative contracts to conventional venture financial contracts with specific features that are described below.

2.1. Features of Islamic venture capital

Islamic venture capital is a partnership in which the ‘mudarib’ acts as a manager who has the sole responsibility of management and the 'rabb al-Mal' who acts as the provider of funds for the investment. At a basic level, this contract is proposed by Islamic banking industry which is built on a two-tier ‘Mudaraba’ model.

Figure 1. Forms of Islamic venture capital

![Diagram showing forms of Islamic venture capital](image-url)
Figure (1) depicts two forms of Islamic venture capital contract in the banking industry. In form 1, the Islamic bank acts as a manager of funds (‘mudarib’) and the depositor acts as a provider of funds (‘rabb al-Mal’). Indeed, the Islamic bank is required to invest the collected funds in investments in compliance with Islamic law principles. If the investment succeeds, the Islamic bank shares its payoff $\Omega P$ with the depositors in a pre-determined ratio $\lambda$. If the investment fails, the Islamic bank smooths out its results in order to not affect negatively and immediately the payoff $[(1 - \lambda)\Omega P]$ to the depositors. In such a case, the payoff 2 to the depositors will be distributed from either the profit equalization reserves (PER$^5$) or the investment risk reserves (IRR$^6$) of the Islamic bank. However, in form 2, the partnership is between the manager of the financed investment and the Islamic bank which acts as a venture capitalist. This form is based on profit-sharing principle with respect to a pre-negotiated ratio $\Omega$. Otherwise, if the investment fails, the Islamic bank bears all losses whereas the manager loses only his/her effort of management. Before concluding the agreement, the Islamic bank can require collateral to prevent it from fraud and breach of terms of the contract on the part of the manager. Consistent with the determination of the profit-sharing ratio, for the two forms there is no specific profit-sharing ratio which has been prescribed by Islamic law. Its value must be negotiated between partners and depends on the mutual consent of partners in the bargaining stage. They can share the profits in equal or different proportions. However, they cannot determine the profit share as a fixed amount whatever the performance of the investment or as a specific rate related to the capital.

In this study, we focus on the form 2 of Islamic venture capital. Indeed, the Islamic venture capital cannot contribute to the investment decision making process. According to Islamic law, the management is the sole responsibility of the manager because it constitutes his/her no-monetary contribution to the capital of the investment. This constraint causes agency problems where the external partner does not control the investment decisions (Jensen

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$^5$ The Islamic bank uses the PER as a mechanism that acts to mitigate the fluctuation of the return rate arising from the flows of its payoffs, its provisions and its total deposits. PER allocation is the amount appropriated out of the gross income of IVC or IJV before allocating the manager’s share. The objective of this allocation is to smooth the return paid to the involved depositors and the shareholders, and to ensure that the return rate of the Profit-Sharing Investment Account (PSIA) is remained competitive and stable during the period of losses or low returns. Currently, PER can be allocated up to a maximum 15% of the total gross income every month. The PER is allocated as follows: \[\text{PER (maximum monthly provision)} = (15\% \times \text{gross income}) + \text{net trading income} + \text{other income} + \text{irregular income such as recovery of non-performing financing (NPF) and write back of provisions.}\] In Malaysia, as per BNM Guidelines, Islamic bank must maintain a maximum accumulated PER of 30% of Islamic Banking Shareholders’ Fund.

$^6$ The Islamic bank uses also the IRR as an amount appropriated out of Investment account’s income after deduction of the manager’s profit share in order to cover any future losses on investments financed by PSIA.
and Meckling, 1976). In this context, Islamic law proposes two types of Islamic venture capital contract to protect the venture capitalist from such problems. The first type is known as ‘Mudarabah muqayyadah’ where the venture capitalist may impose some conditions to control and restrict the investment decisions of the manager. The second type is known as ‘Mudaraba mutlaqah’ which implies that the venture capitalist should not impose any restrictions. However, the venture capitalist can require collateral against negligence or abuse in the use of funds on the part of the manager. The collateral may take different forms that depend on the risk level of the investment and the importance of the contribution of the venture capitalist.

Therefore, there is no standard Islamic venture capital contract. Each contract differs with respect to the bargaining powers of partners.

2.2. Features of Islamic joint venture

Islamic joint venture known as ‘Musharaka’ contract is an equity participation that is based on a profit and loss-sharing principle. All partners contribute to the invested capital and to the management of the financed investment. It is possible to conclude the contract between more than two partners. In this context, we distinguish two types of Islamic joint venture contracts. The first type is known as a definitive ‘Musharaka’ in which the partnership is definitive. However, in the second type known as a digressive ‘Musharaka’, over a determined period, the manager purchases the equity participation of the financier which is divided into equal value units.

Similarly, at a basic level, this contract is proposed by Islamic banking industry which is built on a two-tier ‘Musharaka’ model.
Figure 2. Forms of Islamic joint venture

Figure (2) illustrates two forms of Islamic joint venture contract in the banking industry. Form 1 is as defined above for Islamic venture capital contracts. However, in form 2, the Islamic bank contributes in percentage to the invested capital by $(\alpha)$ and the manager contributes by $(1 - \alpha)$. The profit-sharing principle is the same as for Islamic venture capital. However, the losses are shared with respect to their respective contribution to the invested capital. In this analysis, we focus on form 2.

Consistent with Islamic law principles, there are two approaches to specify the profit-sharing ratio. The ‘ratio identity’ approach implies that partners may agree with a profit sharing with respect to their respective contributions. Nevertheless, almost all Islamic economists and jurists find that the ‘ratio divergence’ approach allows a more fair profit sharing. In this approach, the profit-sharing ratio is different from their contributions to take into account the contribution to the human capital (skills and expertise), especially when there is a sleeping partner who does not participate in the management.
2.3. Comparison

We develop the main differences and similarities between conventional and Islamic venture financial contracts regarding to their principle, structure of capital, management, compensation of partners, etc. Tables (1) and (2) summarize the comparative analysis.

Table 1. Comparison between IVC and CVC

<table>
<thead>
<tr>
<th></th>
<th>CVC</th>
<th>IVC</th>
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<tbody>
<tr>
<td><strong>Principle</strong></td>
<td>It is a private equity in which the venture capitalist raises funds from outside investors to give a financial support to the development and growth stages of startup firms on behalf of these investors.</td>
<td>The initial invested capital is provided in totality by the Islamic venture capitalist. The manager participates to the investment only with his/her skills and abilities (human capital). The capital must be in the form of cash or tangible assets.</td>
</tr>
<tr>
<td><strong>Capital</strong></td>
<td>The initial invested capital can be commonly provided by all partners or totally provided by the venture capitalist. The venture capitalist may subscribe for common shares, preferred shares, bonds with share warrants (ABSA) or make advances on current account associate.</td>
<td>The initial invested capital is provided in totality by the Islamic venture capitalist. The manager participates to the investment only with his/her skills and abilities (human capital). The capital must be in the form of cash or tangible assets.</td>
</tr>
<tr>
<td><strong>Management</strong></td>
<td>The venture capitalist can participate by his/her expertise to the investment decision making process to support the manager by giving additional human resources and a professional networking aid.</td>
<td>The manager is the sole responsible of the management of the financed investment or firm. An Islamic Law Board controls his/her investment decision making process.</td>
</tr>
<tr>
<td><strong>Compensation</strong></td>
<td>The venture capitalist receives a distribution of dividend from the financed firms (profit share on the basis of an agreed percentage of the profit(Ω)). The manager receives fixed management fees and a profit share. Likewise, venture capitalist often receive from their investors a periodic fixed management fees which is equal to up to 2% of the total net asset value. Some of them receive performance fees known as carried interest (more typically for hedge funds) which is their net profit share in percentage, typically around 20% (It may be changed at any time). The main gain of venture capitalists is realized on the resale of their equity participation to exit.</td>
<td>If the investment fails, the venture capitalist bears the whole of losses to the extent of his/her contribution to the invested capital whereas the manager losses only his/her human capital. They record their capital at liquidation time.</td>
</tr>
<tr>
<td><strong>Losses</strong></td>
<td>If the investment fails, the venture capitalist bears the whole of losses to the extent of his/her contribution to the invested capital whereas the manager losses only his/her human capital. They record their capital at liquidation time.</td>
<td>The manager guarantees neither the capital nor the return on capital. But in case of negligence or breach of any term of the contract on the part of the manager, the venture capitalist can use the collateral that he requires since the conclusion of the contract, and thus the manager bears the losses.</td>
</tr>
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<td>The manager guarantees neither the capital nor the return on capital. But in case of negligence or breach of any term of the contract on the part of the manager, the venture capitalist can use the collateral that he requires since the conclusion of the contract, and thus the manager bears the losses.</td>
<td></td>
</tr>
</tbody>
</table>
Investment

Early-stage, high-potential, high risk and growth startup firms. Early-stage, high-potential, high risk and growth startup firms. The activities of financed investments must be lawful (respect Islamic law principles; financial and qualitative screening

Principal-agent Relationship

The venture capitalist is considered as agent and the investors as principal. On the other side, the venture capitalist acts as principal and the manager of the financed investment acts as agent. For instance, on the liability side, the Islamic bank acts as agent and the depositors as principal. On the asset side, the Islamic bank is the principal (equity financier) and the manager is the agent.

Risks

Inability to resell the subscribed shares, financial risk, Uncertainty, high risk, information asymmetry, adverse selection, management risk, agency cost, liquidity risk. Inability to resell the subscribed shares, financial risk, information asymmetry, adverse selection, management risk, agency cost, withdraw funds from depositors’ investment accounts (for Islamic banks).

Table 2. Comparison between IJV and CJV

<table>
<thead>
<tr>
<th></th>
<th>CJV</th>
<th>IJV</th>
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<tbody>
<tr>
<td><strong>Principle</strong></td>
<td>It is a partnership between two or more parties whereby each one contributes to the invested capital to become a shareholder.</td>
<td></td>
</tr>
<tr>
<td><strong>Capital</strong></td>
<td>The initial invested capital is commonly provided by all partners. The capital can be in different forms.</td>
<td>The initial invested capital is commonly provided by all partners. The capital must be provided in the form of monetary assets or tangible assets.</td>
</tr>
<tr>
<td><strong>Management</strong></td>
<td>All partners may be involved in the management of the financed firm or investment (asking for payment of debts, admission of liabilities, taking up legal actions, etc) and are entitled to act in the interest of the partnership. Partners may appoint an external manager.</td>
<td></td>
</tr>
<tr>
<td><strong>Compensation</strong></td>
<td>Partners receive fixed management fees and an incentive compensation (profit share) determined on the basis of an agreed percentage of the profit (( \Omega )) (It may be changed at any time).</td>
<td></td>
</tr>
<tr>
<td><strong>Losses</strong></td>
<td>If the investment fails, the losses will be borne by all partners with respect to the proportions of their contributions to the capital.</td>
<td></td>
</tr>
<tr>
<td><strong>Collateral</strong></td>
<td>Partners guarantee neither the capital nor the return on capital, except in case of negligence or breach of any term of the contract on the part of one of them.</td>
<td></td>
</tr>
<tr>
<td><strong>Investment</strong></td>
<td>There are no restrictions.</td>
<td>The activities of the financed firm or</td>
</tr>
</tbody>
</table>

7 The activities of the financed project or firm must be done in lawful sectors that do not sell alcohol, pork, etc. Consistent with financial screening, the financial ratio must not exceed certain critical values fixed by Islamic law. For instance, the debt ratio has not to exceed 33.3% or 40%.
investment must respect the Islamic law principles (financial and qualitative screening). An Islamic Law Board controls his/her investment decision making process.

Principal-agent Relationship

There is no principal-agent relationship when all partners are involved in the management. However, if there are some partners who do not participate to the investment decision making process or who engage an external manager, it will be a relationship between the partners as principal and the manager as agent. For instance, on the liability side, the Islamic bank acts as agent and the depositors as principal. On the asset side, the Islamic bank (if it does not contribute to the management) is the principal (equity financier) and the manager is the agent.

Risks

Uncertainty, high risk, information asymmetry, adverse selection of partners, management risk, agency cost, liquidity risk.

Information asymmetry, adverse selection of partners, management risk, agency cost, withdraws funds from depositors’ investment accounts (for Islamic banks).

Tables (1) and (2) illustrate the features of Islamic venture financial contracts as defined by the standards of AAOIFI. Indeed, we note that Islamic and conventional venture financial contracts seem to have the same principle. Consistent with conventional and Islamic joint venture contracts, we note that there are no relevant differences that might affect their common principle. The sole differences are such that the partners have to invest in lawful activities and the capital must be in the form of tangible assets (qualitative differences). However, consistent with venture capital contract, the respect of Islamic law principles is the source of three main differences. The first difference lies in the determination of the profit-sharing ratio. According to the standard of Islamic venture capital contract as specified by AAOIFI, the negotiation\(^8\) of the profit-sharing ratio that determinates the profit share of the venture capitalist is mandatory. Nevertheless, this difference remains theoretic. In practice, Islamic private equity uses a carried interest (usually around 20%) similar to conventional private equity (for form 1: investors and venture capitalist). For instance\(^9\), Al Rajhi GCC Equity and GulfInvest Al Huda Islamic Fund propose a carried interest of 20%, and NBAD UAE Islamic Fund AL Naeem uses 10%. In this context, Metrick and Yasuda (2010) find that among the 98 conventional venture capital funds there is only one fund with a 17.5% carry level, three with a 25% rate and one fund with 30% rate, while the remaining funds use 20%.

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\(^8\) The bargaining stage is imposed by the Islamic law. Following to the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI-Sharia Standards): “it is a requirement that the mechanism for distributing profit must be clearly known in a manner that eliminates uncertainty and any possibility of dispute. The distribution of profit must be on the basis of an agreed ratio.”

\(^9\) Source: fund factsheets from their management companies’ websites.
Similarly, Litvak (2009) finds that conventional venture capitalists receive a carried interest between 20 and 25% of the periodic performance. The exact origin of this 20% rate remains unknown. Likewise, the second difference is like that the conventional venture capitalist is involved in the management of the financed investment, whereas the management is the sole responsibility of the manager in Islamic venture capital contract. Finally, the third difference remains in the application of financial and qualitative screening to select investments in Islamic venture contracts. Therefore, these qualitative differences have no effect on the similar principle of Islamic and conventional venture capital contracts.

3. The Selection stage

This section provides a review of the literature on adverse selection problems and the proposed solutions for Islamic and conventional venture finance contracts.

3.1. The adverse selection problem

Universally, adverse selection problem arises when the provider of funds is unable to discriminate against risky borrowers because of a lack of information about the type of potential borrowers (Armendariz and Morduch, 2005). Prior to financing and investment stage, the venture capitalist performs a due diligence (Tyková, 2007). Typically, in this selection stage the venture capitalist attempts to detect the type of the manager, the feasibility of the investment and the structure of the relevant business line. Selection of the good investment that promises high expected profits is a relevant and difficult task for the Islamic and conventional venture capitalist. The manager may report ex-ante a high expected profit to induce the provider of funds to choose a lower remuneration (Neinhaus, 1983) or/and to induce him to finance his/her investment/firm. Likewise, the manager may overestimate the probability of success that will be ex-ante reported to the provider of funds (Manove et al., 2001). However, we argue that venture capitalist have enough skills, expertise and networking to be able to screen the quality and the probability of success of the financed investment/firm. They are typically specialized in a particular set of industry and investments, and therefore their skills and practical experiences facilitate the screening of highly complex investment/firm.

Similarly, failure to screen managers who are likely to successfully perform the financed firm or investment exposes the Islamic (Al-Jarhi, 2002) and conventional venture capitalist to adverse selection (Tyková, 2007). Defining the type of the manager remains a
difficult task because each prospective manager-candidate claims to be of higher type with higher skills to manage the financed investment/firm. This difficulty explains the origin of adverse selection problem.

3.2. Review of solutions

As part of solving the agency problem between Islamic venture financial contracts’ counterparts, some researchers argue that the profit share in a predetermined ratio leads the manager to behave honestly because his/her payoff depends on his/her operations (Khan, 1985). In the same context other researchers show that agency problems can be solved within the framework of an Islamic economy (Sarker, 1999). The author argues that Muslims believe in the concept of eternal life, in which if the work is done with honesty it will be paid, whereas if there is dishonesty it will be unpaid. This would be an intangible incentive to be honest. Similarly, if all financial operations are financed on the principle of profit and loss-sharing, honest managers would dominate the dishonest ones in the market and they could benefit from a stake in the ownership (for example). This would induce managers to be honest (Sarker, 1999) and tell the truth about their skills and abilities. These arguments are quite credulous since investors are not necessarily Muslims and honesty is not necessarily related to Islam religion. The virtue of honesty is also recognized by other traditional spiritual paths. Therefore, we note that the literature on Islamic venture capital contracts with adverse selection remains restricted.

Likewise, Tykovà (2007) argues that the interactions between conventional venture capitalists and their portfolio firms are characterized by high information asymmetry, high risk and uncertainty. Indeed, the literature about conventional venture capital stipulates that such contracts suffer from adverse selection problems and proposes some resolutions (Hellmann, 1998, 2002; Amit et al., 1990; Chan et al., 1990). We then analyze the most known models.

Amit et al. (1990) analyze the ex-ante uncertainty of the venture capitalist regarding the type of the manager and the quality of the investment (consequences of adverse selection problems). They show that during the selection stage, the high-type manager has to signal his/her true type (e.g. a diploma, a business plan of high quality) or his/her own confidence on

the success of the investment (e.g. acceptance of support penalties in bad performance period) to reduce adverse selection problems and find a separating equilibrium. Their argument is that by signaling his/her true type and the true quality of the investment the venture capitalist will propose attractive conditions to the best manager. Nevertheless, this analysis may be arguable for three main reasons. First, after a due diligence (e.g. preparing a business plan) the venture capitalist will be naturally able to distinguish between good and bad investments without any signal from the manager. Second, the manager might send a wrong signal of his/her type. Third, it is assumed that the manager can finance his/her investment on his/her own, while often the venture capitalist remains the sole possible financing mode for start-up firms.

Chan et al. (1990) argues that managers’ skills have a relevant role in explaining the performance of the financed investment in venture capital. Their skills permit to decide whether the manager or the venture capitalist must have the control to avoid agency problems. The proposed model assumes that in the first period the manager has the control and cash flows will reveal his/her true type. If he proves that he is sufficiently skilled, he will continue to control and will receive a payoff that depends on his/her efforts. The objective is to induce him to perform better. Otherwise, he will receive only fixed management fees and will transfer the control to the venture capitalist whose skills are publicly known. These assumptions might be criticized. Indeed, we argue that the judgment of the abilities and skills of the manager requires an observation for a long period. Therefore, if in the beginning the manager has not told the truth on his/her skills, the financed investment will fail over a long period and it would be not possible to pass to a second investment period. Similarly, Tykovová (2007) stipulates that usually the manager has a large equity share in order to induce him to put stronger effort and the venture capitalist has control over certain fields in order to avoid future agency conflict.

Therefore, we note that the literature on conventional venture financial contracts with adverse selection about the type of the manager remains also limited. The selection stage is complex because it requires a deep screening of the type of the manager along with specific features of the investment (potential markets, products, sector, etc.). Specific features of Islamic venture financial contracts could put forward new approaches to screen his/her true type. In our theoretical framework in the fifth section, we prove that the negotiation of the profit-sharing ratio allow the venture capitalist to screen the type of the manager. We suggest that this analysis can be extended to the conventional venture contracts with adverse selection.
4. The Investment Stage

In this section, we provide a review of the literature on the reasons for particular arrangements and prospective moral hazard problems in the investment stage.

4.1. The moral hazard problem

Moral hazard problem specifically emerges when funds are provided by external investors without participation in the management of the investment, more typically in Islamic venture capital. This agency problem is due to the inability of the venture capitalist ex post to accurately detect the expected return rate while the manager has privileged information (Al-Jarhi and Iqbal, 2001). The manager as the leader of the investment has an incentive to ex post report spontaneously an artificial low income (Sarker, 1999). This ex post information asymmetry causes moral hazard problem for Islamic venture financial contracts (Bacha, 1997) and conventional financial contracts (Tykovà, 2007). Nevertheless, we argue that the venture capitalists have enough skills and practical experience which make them able to screen the quality of the investment, develop a successful business line and avoid such problems.

To prevent them from moral hazard, it is sustainable that the venture capitalists have to continuously monitor the financed investment/firm by sitting on the board of directors. In this context, Islamic venture financial contracts require also an Islamic law board composed of experts on Islamic law principles who check the conformity with Islamic law rules of all actions and investment decisions.

Cornelli and Yosha (2003) develop a model in which the entire invested capital is provided by the venture capitalist and the manager always proceeds with the investment. Therefore, in financing stage, the manager has an incentive to manipulate short-term signals by reducing the likelihood of the liquidity of the investment in order to induce the venture capitalist to stay. This theoretical framework proposes that the provided capital should be in the form of convertible debt to avoid such moral hazard problem. Consistent with the finding of Marx (1998), when the venture capitalist is not involved in the management of the financed investment the probability to fail will be higher. In Marx’s model, the venture capitalist intervenes only if the development of the portfolio firms is bad in order to avoid a costly intervention for him and an opportunity cost (private benefits) for the manager. The excessively high cost of collecting information about the credibility of the investment and the skills of the manager reduces the incentive to work and increases production costs. However,
the assumption that stipulates that the venture capitalist does not intervene when there is high profit should be discussed. Indeed, we argue that having a high income does not deny that the manager can keep private benefits. On the contrary, it increases the likelihood of agency problems. Jensen (1986) shows those self-interested managers’ incentives to waste free cash flow on empire-building, value-reducing, investments.

Likewise, more recently, Casamatta (2003) develops a theory for the dual role of venture capitalist (financing and advising) and assumes that there is a double moral hazard problem between the venture capitalist and the manager (because their efforts are not observable). This theory proposes that both of the manager and the venture capitalist have to give proper incentives through the cash-flow rights they receive over the profit of the investment. Similarly, the model shows that the effort of the manager is more efficient than the effort of the venture capitalist, whereas other models have shown that the joint efforts of the manager and the venture capitalist are more efficient (Schmidt, 2003; Houben, 2002; Lulfesmann, 2000). Indeed, Repullo and Suarez (2004) develop a theoretical model in which there are three parties: the initial provider of funds, the manager and the venture capitalist who contribute to the management of the financed investment. This paper shows that if the initial provider contributes to the success of the investment, the incentive of the venture capitalist and the manager will be decreased. Otherwise, they will receive incentive to exert higher effort. Likewise, several researches show that the distribution of control rights between the venture capitalist and the manager might reduce moral hazard problems (Kirilenko, 2001; Hellmann, 1998).

Some researchers have discussed the moral hazard problem in the case of Islamic venture capital and Islamic joint venture contracts offered by Islamic banks such as Al-Jarhi (1998) and Khalil et al. (2002). They refer to the agency theory where the Islamic bank is the principal and the manager is the agent in the sense of Jensen and Mickling (1976). Nevertheless, there are no models with moral hazard that propose alternative solutions. As our knowledge, there is one paper that analyzes how and when Profit Loss Sharing (PLS) financing methods can solve asymmetric information problems (Hassan and Yousfi, 2013; Yousfi, 2013). This paper shows that Mudaraba contract provides powerful incentive schemes to the manager. As the Islamic venture capitalist is not actively involved in the project and the project success depends on the entrepreneur's effort, it solves the moral hazard problem. This result can be criticized. According to agency theory, when the principal is not involved in the management, it typically leads to agency relationship between the agent and the principal.
Moreover, Hassan and Yousfi (2013) argue that Mudaraba contract constitutes a powerful incentive scheme in the way that is the threat to get null profit share in case of failure. This leads the manager to exert the first best level of effort. Nevertheless, the authors forget that in case of failure the manager loose only his management effort whereas all financial losses will be supported by the venture capitalist. This is not an incentive to make the best level of effort. Therefore, the contractual relationship in Mudaraba financing faces moral hazard problem. It cannot be a solution.

Masud (1990) explains the dominance of debt finance in practical life and suggests that moral hazard is an objective constraint in the way of a “financial Islamization policy”. This model uses the Capital Market Line to prove that, by referring to the standard mean-variance portfolio theory and by using risk neutral utilities, the Islamization is costly because of the moral hazard cost. Tag El-Din (1990) criticizes the ‘moral hazard thesis’ proposed by Masud (1990) that considers only the case of risk-neutrality of the partners. His paper shows that when the partners are risk averse in the absence of moral hazard the principle of profit sharing is an optimal Pareto compared to conventional debt financing in the economy.

4.2. Monitoring

The imbalance in the governance of the financed firm seems to be one of the main reasons for the lack of venture financial contracts. To control the income of their equity participations, venture capitalists should bear the cost of monitoring to ensure that the manager tell the truth about the reported profit. Gompers (1995) demonstrates empirically that the monitoring mechanisms depend on the specific features of the firm and the monitoring intensity is positively related to the expected agency costs. He proves that the lower the asset tangibility the higher the growth options the greater the asset specificity of a firm and the higher the monitoring frequency. Similarly, some researches show that after IPO of the financed firm, conventional venture capitalists take more active role of monitoring than external investors (outsides directors and blockholders) (Frye, 2003) and have a positive empirical effect on the board independence (Boone et al., 2007). Therefore, this mechanism of monitoring is too expensive for the venture capitalist. For instance, Bergemann and Hege (1998) develop a time-varying share contracts which provides intertemporal risk-sharing between venture capitalist and manager. This theoretical framework shows that the moral hazard costs might be high and lead to an inefficient early stopping of the financed investment.
Despite the effort of monitoring, several characteristics still remain uncontrollable by the venture capitalist because the venture financial contracts provide him limited control rights. For instance, with respect to Islamic law, in a world with perfect and costless information, the Islamic venture capitalist is not able to directly control all the actions of the manager. Therefore, we argue that the venture capitalist will formulate the terms of the venture financial contract in a manner designed to induce the manager to align his/her interests with those of the venture capitalist, as well as to attract high-type managers.

According to Dar and Presley (2000), a complementary and consistent management system is necessary for the stability of Islamic financial institutions. The authors develop a model that details with the key issues of the relationship between the Islamic bank (as a venture capitalist) and the investor. They suggest that an Islamic financial Institution establishes venture capital funds and operates such as an organizational structure based on venture capital. The authors propose some monitoring mechanisms. First, all the interest free financial institutions should find a monitoring organism which will collect data and other relevant information about the firms. Second, each interest free financial institution can set up separate monitoring sections in their credit services. Therefore, monitoring seems to be the classical solution to reduce the moral hazard problem.

Islamic venture capitalist seems to have a limited use of monitoring since he is not allowed by Islamic law to interfere in the investment decisions. However, we argue that the structure of venture capital contract dramatically reduces prospective conflicts of interest which are associated with moral hazard problems (Milgrom and Roberts, 1992). Indeed, the agency theory assumes that the partners seek to maximize their respective utilities, and therefore we argue that they are susceptible to behave in their own interest since their wealth depends on the generated profit (profit-sharing). All terms of Islamic venture financial contracts should be clear for both of venture capitalist and manager and if one of them does not respect the terms, the other may terminate the contract at any time (Standards of AAOIFI). Likewise, conventional and Islamic venture capitalist may require collateral of breach and fraud which protects them from moral hazard problems.

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11 According to Islamic law, the manager must give to the Islamic venture capitalist a guarantee that will be used when the manager commits fraud, misuse of capital in risky activities or does not respect the terms of the venture financial contract. However, the losses are the result of a breach of the contract conditions on the part of the manager who will bear the whole of losses.
The next section emphasizes the relevant role of the profit-sharing ratio as described in the literature on Islamic venture capitalist. The aim is to propose afterward a theory of profit-sharing ratio as screening device.

5. Review of Profit-sharing ratio Propositions

Agency problems are important determinants of reward sharing in a production process. These problems may be solved through the efficiency of allocation of resources by including a package of incentives in reward sharing structure (Sarker, 1999). Several researches have tried to develop an optimal profit-sharing ratio in the case of Islamic venture financial contracts, but without taking into account agency problems in their models.

Hassan (1985) finds analytically that over a long term period Islamic venture financial contracts offered by Islamic banks are more profitable than debts with interest rate offered by conventional banks. The model shows that in a perfect market where conventional and Islamic banks coexist, the optimal profit-sharing ratio is \( \Omega = (r_i + \alpha)K/P \). In this model, the profit share of the Islamic bank as a venture capitalist is a function of the prevailing rate of interest received by conventional bank \( r_i \), the financial leverage \( K/P \) and the estimated risk premium received by conventional bank \( \alpha \). It is also assumed that the partners of Islamic venture financial contract attempt to maximize their respective utilities for a given invested capital \( K \) and a given risk premium \( \alpha \). However, the finding of this model is questionable. Indeed, if we present the equilibrium proposition of Hassan (1985) as follows, \( \Omega P = (r_i + \alpha)K \), this equality implies that Islamic and conventional banks receive the same risky profit. This equilibrium seems to be no realistic because it implies the equality of respective specific risks of Islamic and conventional banks. This implicit strong assumption of Hassan’s model is refuted with reference to the documented differential riskiness of Islamic and conventional banks’ contracts. For instance, Hayati et al. (2004) run an empirical study to examine factors that affect the credit risk of Islamic banks in Malaysia. Their data shows that factors explaining the respective specific risks of Islamic and conventional banks are different. Hayati et al. (2004) conclude that the specific risk taken respectively by these banks is not the same.

Bashir et al. (1993) develop a two-period equilibrium model for Islamic venture financial contracts offered by Islamic banking industry. It is assumed that the invested capital and the profit-sharing ratio are the basic features of venture financial contracts and could have a relevant role in enhancing the business reputation of financed firms. Bashir et al. (1993) find
an optimal equity capital \([K^* = F(Y, \Omega, \gamma, \pi)]\) and an optimal profit-sharing ratio \([\Omega^* = F(Y, K, \gamma, \pi)]\), with information symmetry, as function of the bank’s total equity capital \(K\), the depreciation of capital \(\gamma\) and the expected inflation rate \(\lambda\). Then, this paper tests empirically the theoretical findings by using data from Kuwaiti Finance House over the 1987-1988 period. However, this study is restricted because the empirical evidence is checked only for one Islamic bank.

Tag El-Din (2008) defines an optimal risk-return Islamic venture capital contract using a model partnership contract. This paper shows a negative relationship between the expected income in percentage \(\alpha\) and the risk-sharing structure \(\beta\) by using optimal contracts’ curves (OCC). The optimal breakeven profit-sharing ratio with information symmetry is \(\omega = 1/2 + k(RAD/\theta)\) where \(k\) is a positive constant, \(RAD\) is the differential risk attitude and \(\theta\) is the total expected return. This paper finds that when the Islamic bank as a venture capitalist (the manager) has a strong financial bargaining position, his/her profit share will be higher and his/her risk share will be lower than the manager (Islamic bank). Similarly, risk and profit will be fairly shared between the two partners when they have the same opposite bargaining positions. Nevertheless, this optimal design is a particular case because it is based on the maximization of respective quadratic utility functions of the manager and the Islamic bank. Likewise, the analysis is based on only information symmetry and does not take into account the other main terms of the venture capital contract such as the invested capital and the expected profit.

Sugema et al. (2010) develop a theoretical model to show that Islamic banking system can improve the welfare of the economy through its profit and loss sharing principle. Using the production function \(y = F(L, K)\), the model shows that with certainty and in a competitive market the optimal profit-sharing ratio is defined as a relationship between the marginal productivity of capital \((MPK)\) and the average productivity of capital \((APK)\). This theoretical finding may be criticized. Indeed, the optimal profit-sharing ratio is determined at a global economy level without taking into account the micro level. We argue that the fixation of this ratio depends strongly and in priority on the mutual consent of partners (according to the AAOIFI standards).

The several researches to find the optimal profit-sharing ratio confirm its relevant role in the settlement of venture financial contracts. In the next section, we develop a theoretical framework where the profit-sharing ratio is proposed to act as screening devices. We focus on
the conflict of interest that may exist between the venture capitalist and the manager in the selection stage.

6. A theory of Profit-sharing ratio as a Screening Device

As shown in the sections above, several researches have tried to estimate the incentive compensation of partners of venture finance contracts (profit-sharing ratio of Islamic venture capitalist) with information symmetry. In this section, we attempt to show that the negotiation of the profit-sharing ratio \( \Omega = (1 - \text{carried interest}) \) might moderate the riskiness of the venture financial contract by screening the manager type (preventing from adverse selection problem). This effect depends directly on the imperfect market information about the manager type in the selection stage.

In this analysis, we focus on the adverse selection problem with information asymmetry about the manager type. Our choice is due to the relevant role of his/her skills and abilities in determining his/her performance and his/her risk-taking. In Islamic and conventional venture contracts the respective payoffs to the manager and the venture capitalist depends strongly on the value of the profit-sharing ratio. Indeed, this theory proposes that, in the bargaining and selection stage, the negotiation of the profit-sharing ratio allows the venture capitalist to screen the manager type. In order to simplify our analysis, we assume that the expertise and high experience of venture capitalist makes him able to screen the quality of the investment (expected return and risk) (Tykovà, 2007). Therefore, information asymmetry is only on the manager type. In this context, we assume that the manager is likely to be either a high-type manager with high skills to perform the financed investment or a low-type manager with low (not enough) skills to perform the investment. In this case, the expected payoff to the venture capitalist and the expected payoff to the manager depend obviously on the probability to choose the high-type manager. Consequently, the venture capitalist has to be able to identify the high-type manager to perform the investment. Therefore, we establish the following proposition.

PROPOSITION 1: In a venture financial contract with imperfect information on the skills and abilities of the manager, the expected payoff to the venture capitalist depends on the manager type.

For simplicity, consider that there is only one manager endowed with innovative investment that requires an initial investment amount \( I \). The contribution of the venture
capitalist to the invested capital is $\alpha I$. Assume that the venture capitalist and the manager are risk averse and the profit-sharing ratio is negotiated and definitely determined in the bargaining and selection stage. There is a profit sharing\textsuperscript{12} when the investment succeeds and generates an expected profit $\bar{P}_{i,t_1}$ at the liquidation time $t_1$. However, if the investment fails, the venture capitalist bears losses and the manager loses only his/her effort of management.

**Figure 1. Expected payoff to the venture capitalist**

**Without adverse selection**

![Figure 1](image-url)

Figure (3) illustrates the payoff to the venture capitalist without adverse selection $\tilde{\Pi}_{i,t_1} = \Omega \bar{P}_{i,t_1} + I$ as function of the net profit of the investment $\bar{P}_{i,t_1}$. In this figure, we assume that the invested capital is not flexible and is equal to $I = 100$. The proposed profit-sharing ratio is fixed at $\Omega = 30\%$.

With imperfect information on the type of the manager, assume that the expected profit of the investment depends on the $i$-type manager with $i = H$ for a high-type and $i = L$ for a low-type manager. Thus, at the liquidation time $t_0+1$, the net expected payoff to the venture capitalist is,

$$\tilde{\Pi}_{i,t_1} = \text{Max}[I, \sum_i [p_i \Omega \bar{P}_{i,t_1} + I]]$$

(1)

And the net expected payoff to the manager is:

$$\Phi_{i,t_1} = \text{Max}[0; \sum_i p_i (1 - \Omega) \bar{P}_{i,t_1}]$$

(2)

\textsuperscript{12}It is not permitted to start the allocation of profit between the partners unless the operating costs, expenses and taxes are deducted in calculating the profit and the capital of the Islamic venture financial contracts is maintained (AAOIFI standards).
The two equations above give respectively the expected payoff to the venture capitalist and the expected payoff to the manager depending on $p_i$ the probability that the good investment managed by the $i$-type manager generates an expected profit $\tilde{p}_{i,t_1}$. Indeed, assume that the venture capitalist fixes a probability distribution $p_H$ that the good investment managed by the high-type manager generates a high net profit $\tilde{p}_{H,t_1}$ and a probability distribution $p_L$ that the good investment managed by the low-type manager generates a low net profit $\tilde{p}_{L,t_1}$. We assume that the distribution of probabilities is not known by the manager with $p_H + p_L = 1$ and $\tilde{p}_{H,t_1} > \tilde{p}_{L,t_1}$.

**PROPOSITION 2:** In the bargaining and selection stage, the profit-sharing ratio acts as a screening device such as there exists a threshold profit-sharing ratio $\Omega$ beyond which the expected payoff to the venture capitalist will be a decreasing function of the profit-sharing ratio.

We assume that there is a profit-sharing ratio equal to $\Omega$ for which the expected payoff to the venture capitalist is maximized. Similarly, assume that in the bargaining and selection stage the venture capitalist proposes a profit-sharing ratio equal to $\Omega'$ which is higher than the threshold $\Omega$. This assumption allows him to keep a margin of negotiation of the profit-sharing ratio equal to $(\Omega' - \Omega)$. We expect that in this stage the high-type manager will try to negotiate a profit-sharing ratio as low as possible in order to maximize his/her own profit share. Our argument is that the high-type manager knows that his/her skills and abilities will permit him to perform better the financed investment, and thus he/she wants to be better compensated. In such a case, the final negotiated profit-sharing ratio will be equal or near to $\Omega$. Otherwise, the low-type manager is more likely to accept a high profit-sharing ratio such that $\Omega < \Omega' \leq \Omega$ and will consequently receive a profit share equal to $p_L(1 - \Omega)\tilde{p}_{L,t_1}$. Our argument is that he/she knows his/her own type (low-type without enough skills to manage the investment), and therefore he/she tends to accept the high proposed profit-sharing ratio to induce the venture capital to accept his/her application. Thus, the negotiation of the profit-sharing ratio that represents the profit share of the venture capitalist in percentage may act as a screening device. Indeed, when the profit-sharing ratio decreases from $\Omega'$ to $\Omega$ in the bargaining and selection stage, the adverse selection problem decreases and the expected payoff to the venture capitalist increases. Likewise, with adverse selection problem in the
bargaining stage a decrease of the profit-sharing ratio towards $\bar{\Omega}$ increases the expected profit of the investment, and consequently the expected payoff to the venture capitalist.

$$\bar{\Pi}_{i,t_1}(\Omega) = \int_0^1 \max[I, \sum_i p_i \Omega \bar{\Pi}_{i,t_1} + I] d\Omega$$  \hspace{1cm} (3)

The equation (3) is the expected payoff to the venture capitalist as function of the profit-sharing ratio $\Omega$. As shown in Appendix A, from equation (1.3), we find:

$$\frac{d\bar{\Pi}(\Omega)}{d\bar{\Omega}} = -[p_L \bar{\Omega} P_L + I] < 0$$  \hspace{1cm} (4)

Therefore, the equation (4) implies that an increase of the profit-sharing ratio beyond the threshold $\bar{\Omega}$ decreases the expected payoff to the venture capitalist. This decreasing function might be as explained above the result of an adverse selection problem. This result confirms our predictions about the relevant role of the negotiation of the profit-sharing ratio in screening the manager type (over the bargaining and selection stage).

PROPOSITION 3: Beyond the critical value of the profit-sharing ratio $\bar{\Omega}$, the venture capitalist has no interest to accept the application of the manager for a probability that the investment would be managed by the low-type manager.

Consistent with the assumption defined above $\bar{P}_{H,t_1} > \bar{P}_{L,t_1}$, the payoff to the venture capitalist as a profit share will be lower when the good investment is managed by the low-type manager such as,

$$\frac{d\Pi_{i,t_1}(\Omega)}{dp_L} < 0$$  \hspace{1cm} (5)

Therefore, from the ratio between (4) and (5), we have $\frac{dp_L}{d\bar{\Omega}} > 0$. This finding implies that when the profit-sharing ratio is beyond the critical value $\bar{\Omega}$ in the bargaining stage, the good investment will be more likely to be managed by the low-type and to fail.
Figure 2. Expected payoff to venture capitalist as function of profit-sharing ratio

Figure (4) illustrates the payoff to the venture capitalist with and without adverse selection. It shows the implicit adverse selection cost supported by the venture capitalist in a market with imperfect information on the manager type. Without adverse selection, the payoff is a linear and increasing function of $\Omega$. However, with adverse selection problem, the payoff is a decreasing function of $\Omega$ beyond the threshold $\Omega$. Consistent with propositions 2 and 3, we argue that behind the optimal profit-sharing ratio $\Omega$ the profit-sharing ratio has a double effect on the payoff to the venture capitalist. The first effect is a direct positive effect on the payoff to the venture capitalist with information symmetry. The second effect is a negative effect on the payoff to the venture capitalist with information asymmetry because of the adverse selection cost. This adverse selection cost is equal to the difference between the payoff to the venture capitalist with information symmetry and his/her payoff with information asymmetry beyond the critical value $\Omega$.

When $\Omega \in [0; \Omega]$, there are only high-type managers (no adverse selection problem) and the payoff to the venture capitalist will be $\bar{\Pi}_{H,t_1}(\Omega) = \int_{0}^{\Omega} [\Omega \bar{P}_{H,t_1} + I] d\Omega$. Otherwise, when $\Omega \notin [0; 1]$, there are high and low-type managers (adverse selection problem). Therefore, the adverse selection cost is equal to

$$\bar{\Pi}_{L,t_1}(\Omega) - \bar{\Pi}_{H,t_1}(\Omega) = \left[ \frac{1}{2} [p_L \bar{p}_{H,t_1} - p_L \bar{p}_{L,t_1}] - \Omega^2 \left[ \frac{1}{2} \bar{p}_{H,t_1} - p_L \bar{p}_{L,t_1} \right] \right] - I$$

(6)
Equation (6) implies that if \( \hat{\Omega}^2 = 1/2(\hat{\Omega} = \sqrt{1/2}) \) and \( p_L = p_H = 1/2 \), the adverse selection cost will be equal to the initial invested capital \( \lambda \).

7. Conclusion

Islamic and conventional venture financial contracts are characterized by incentive problems and information asymmetry between the venture capitalist and the external manager. Researches about the venture financial contracts that deal with the adverse selection and moral hazard problems are multiplied. In this paper, we structure the literature on conventional and Islamic venture financial contracts with agency problems. Indeed, we explain agency problems confronted by the venture capitalist in separately the selection stage and the investment stage. Each stage of the venture financing contract is considered as an integral part of the financing process of the finance investment/firm. The literature about modeling adverse selection problem for venture financial contracts remains limited. We argue that developing theoretical models is crucial for both of venture capitalists and managers to find the optimal profit-sharing ratio with information asymmetry about the skills and abilities of the manager.

Islamic and conventional contracts seem to have the same principle of profit and loss sharing and suffer from similar agency problems. Screening the type of the manager and specifying/observing actions for all states of the world ex ante are complex tasks. Partners enter in an agency relationship into the venture financial contracts (usually between venture capitalist and manager) because their respective payoffs depend on the return of the investment as well as the effort of the management that could be the sole responsibility of the manager. In such contracts, partners define the incentive compensation (the pre-negotiated profit-sharing ratio which is the profit share of the venture capitalist in percentage), the structure of financing and their respective rights.

The present paper contributes to design the profit-sharing ratio as a screening device to avoid selecting a low-type manager (adverse selection problem about the skills and abilities of the manager) in venture financial contracts. Our proposal is that the negotiation of the profit-sharing ratio might be a relevant tool to prevent venture capitalists from such problem. To achieve our aim, we start by a critical analysis of the profit-sharing ratio as defined by the literature on Islamic venture financial contracts with information symmetry. Then, we develop
a theory of profit-sharing ratio with information asymmetry about the type of the manager. In this context, we establish that there is a critical value of profit-sharing ratio $\hat{\Omega}$ beyond which there is a serious adverse selection problem. This threshold corresponds to the maximum payoff to the venture capitalist. We expect that, in the bargaining phase, the low-type manager will accept a high profit-sharing ratio near to that proposed by the venture capitalist to induce him to accept his/her application. Our argument is that he knows his/her own low type, and therefore he knows that the expected profit will be low. Otherwise, since he knows his/her own type and his/her ability to rich high future investment returns, the high-type manager will attempt to negotiate a profit-sharing ratio as low as possible in order to maximize his/her own profit share. Similarly, we show that if $\hat{\Omega}^2 = 1/2(\hat{\Omega} = \sqrt{1/2})$ and $p_L = p_H = 1/2$ (with $p_L (p_H)$ the probability that the good investment will be managed by the low-type (high-type) manager and will generate a low (high) expected profit, the adverse selection cost will be equal to the initial invested capital $I$.

This framework could be extended in two manners. A next research would attempt to specify the optimal profit-sharing ratio with adverse selection problem. Second, prospective researches could assess empirically whether specific features of the venture financial contracts and specific characteristics of managers affect the compensation (incentive and fixed fees), the performance and the risk-taking of managers.
APPENDIX A. Proof of Equation (4)

From the Equation (3) of the expected payoff to the venture capitalist at the liquidation time $t_0 + 1$

$$\delta_{\text{dummy}}$$

We find that

$$\delta_{\text{dummy}}$$

$$\delta_{\text{dummy}}$$

Then, we have

$$\hat{\Omega}_{i_{L_0+1}}(\Omega) = -\left[ p_t \hat{\Omega}_{L_{i_{L_0+1}} + 1} + I \right] < 0$$

(4)
References


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