




# “Demand trade-off between PLSs and markups in the presence of a conventional banking relationship: The case of Moroccan companies”

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# DEMAND TRADE-OFF BETWEEN PLSS AND MARKUPS IN THE PRESENCE OF A CONVENTIONAL BANKING RELATIONSHIP: THE CASE OF MOROCCAN COMPANIES

## Abstract

Theoretical explanations based on information asymmetry constitute the dominant paradigm of the near disappearance of PLSs (profit and loss sharing). This assumption implicitly implies a hypothesis on the power of contractual choice exclusively monopolized by Islamic banks. The theoretical positioning in this study to explain the arbitrage between PLSs and markups is based on a lack of demand. In this sense, this paper attempts to verify the demand trade-off of Moroccan companies between PLSs and markups. A logistic regression was used to establish several findings. The evidence suggests that past banking relationships with conventional banks and debt maturity both favor the commercialization of markups. On the other hand, financial quality of firms has no direct impact on the choice between PLSs and markups. This assertion implies that it is incorrect to assume that sole entrepreneurs undertaking high-risk projects choose to be funded by PLSs. Combining that with the fact that companies that agree to be funded by PLSs agree to share profits, private information and decision-making power, it can be said that PLSs can have a good chance of thriving in Morocco if Islamic banks provide a favorable climate for their marketing.

## Keywords

profit and losses sharing, markups, Islamic banking,  
conventional banking

## JEL Classification

G21, G23, E58

## INTRODUCTION

Most authors argue that Islamic banks should focus mainly on activities of the PLS typology. Thus, Islamic banks should avoid double-Mudharaba intermediation (pure intermediation) as opposed to the non-pure intermediation represented by mark-up financing. The intermediation best suited to the philosophy of Islamic finance should include liabilities mainly dedicated to PLSs such as Mudharaba and Wakala. However, many economists do not support the development of PLS intermediation. In this sense, Islamic intermediation is effective when fundraising is based on Mudharaba and project funding is based on markups. This position can be defended in order to optimize the preservation of the interests of fund depositors. Some authors go so far as to say that the PLS principle is incompatible with modern financing requirements. To justify this, it is argued that PLS, for example, cannot cover the financing of the acquisition of goods for clients. Sharia-compliant semi-PLS intermediation, characterized by funds managed by Mudharaba and used to finance projects by markup, is advantageous for Islamic banking in terms of risk reduction. In this way, Islamic banks can compete on an equal footing – in terms of optimal risk management – with conventional banks.



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The migration of Islamic banks to this mixed activity compromises their engagement in the real economy and only covers consumption at the expense of investment. Overall, almost all the studies on the disappearance of PLS contracts from the balance sheets of Islamic banks point to a problem of supply. To address the issue of the lack of PLSs on the market, the hypothesis of a demand shortage is a very plausible argument. Borrowers reject PLS financing for a given quality of their projects because it is more expensive if profitability exceeds a certain level. As a result, borrowers discriminate against PLSs and opt for markup financing or interest financing. In addition, entrepreneurs reject PLSs because they are against the disclosure of private information to financiers. To summarize, there are many factors unique to PLS contracts that make them less attractive to profitable businesses. Given the complete absence of PLS products and the fact that most of the research is focused on the banks' perspective, it is justified to study firms' preferences for markups or PLSs, as there is little research in this area.

## 1. LITERATURE REVIEW

The fundamental idea on which Ross's (1977) model is based is the ability to deduce information from the level of indebtedness of a company. In this context, high indebtedness reflects a strong capacity to honor its commitments and reveals its financial quality. Specifically, a bank uses non-tariff terms, such as contractual clauses and maturity to reduce information asymmetry and credit risk (Stice, 2018; Beneish & Press, 1995). If the borrower does not respect the terms of the contract, the bank can force him to repay the loan before maturity. Flannery (1986) argues that external investors can acquire private information by observing the maturity of a company's debt. There is a balance where low-risk companies choose to issue short-term debt and high-risk companies choose long-term debt. Short-term debt therefore makes it possible to adjust the terms of the contract when renewing the loan. Credit terms may be revised for renewal depending on the financial health and profitability of the business. A borrower of good financial quality may benefit from a lower interest rate than a high risk borrower. Debt maturity is therefore a signal that reflects the financial quality of the firm to the market (Hasan et al., 2022; Zhen et al., 2020; Ross, 1977; Leland & Pyle, 1977).

Roosa (1951) studies the effect of the bank relationship in an environment characterized by credit rationing. He finds that the availability of credit increases when the company establishes a long-term relationship with its bank. Banking relationships are seen as a way to ensure the availability of finance. Kane and Malkiel (1965) argue that a strong banking relationship can increase the supply of credit. They explain that a bank on-

ly offers favorable financing conditions to its former customers with whom it has a relationship. In this way, the longitude of the duration testifies to the confidence of the bank in the capacity of the company to meet its deadlines. Likewise, Fried and Howitt (1980) teach us that old clients, already evaluated by the bank, are less rationed than the new ones proving their financial health of the firm. The common point of all these studies is that the bank obtains an informational advantage over its competitors by identifying and controlling the behavior of its clients (Schwert, 2018). Overall, a strong and long-term banking relationship with a conventional bank is a sign of the company's good health. In this regard, a client's history with conventional banks may be relevant to the Islamic bank's decision making in the event that he decides to switch to Sharia-compliant financing.

According to the Leland and Pyle (1977) model, the existence of asymmetric information motivates the entrepreneur to demonstrate their high financial quality by getting involved financially in the project. By providing funds for the project, the risk-averse entrepreneur diversifies his portfolio in a suboptimal manner. It thus sends a good signal to prove the good financial quality of the project. If the entrepreneur doubts the success of his project, he will not participate in the financing of the latter. He knows that if he fails, he will bear part of the losses (Brick & Palia, 2007). Theoretically, the signal by the participation in the capital of the company facilitates the obtaining of a bank loan. This acts as a guarantee of financing by the entrepreneur making it possible to reduce the asymmetry of ex-ante information for the bank (Bond & Rai, 2008). Financial involvement also reduces the problems associated with ex-post information

asymmetry once the credit has been granted (Song & Thakor, 2007; Boot et al., 1991). For a borrower, participation in the project is costly because the likelihood of mismanagement may result in a loss, some of which the borrower will suffer (Mansour et al., 2015; Othman & Masih, 2015; Nouman & Ullah, 2014).

The preponderance of markups financing is a trend that appeared late in the literature to reflect the real development of facts and practices in Islamic banks. The complications related to moral hazard and agency problems are at the center of this reasoning (Abdul-Rahman & Nor, 2016; Marizah & Nazam, 2016; Mansour et al., 2015). Khan (1995) presents a different explanation, arguing that demand factors may be behind the decline of PLS financing. However, Khan (1995) shows the importance of demand factors. The central position of his article addresses the evolution of risk aversion of entrepreneurs according to their experience. Khan (1995) believes that the degree of risk aversion is a decreasing function of business life and therefore of the experience of the entrepreneur and the age of the firm. In this way, entrepreneurs will tend to be more risk averse when starting their businesses. They will be risk lovers years later, given the maturity and experience they gain over time. Therefore, novice entrepreneurs prefer PLSs, while more experienced entrepreneurs prefer markups. For experienced entrepreneurs, the expectations are different since confidence increases over time, they will be more willing to master more risk and prefer markups.

Several works have examined the asymmetric information issue for SMEs, highlighting the influence of firm size on the access to financing. Petersen and Rajan (2002) conclude that information on the credit record of SMEs increases their access to credit. To the extent lenders are more informed, they can take rapid financing decisions. Liu et al. (2011) find that bank financing costs are directly influenced by the asymmetric information element and firm size. Banks perceive the approach to collecting information on SMEs as not being financially profitable and instead require collaterals that only large companies can provide (Liu et al., 2011). This attitude of banks results in a credit rationing and high cost of borrowing for SMEs. The literature shows that firm size has a pri-

mary effect on a firm's financing and investment decisions as well as a bank's lending and borrowing function. Islamic finance literature has focused only on the portfolio of Islamic banks in terms of the relationship between PLS and markup financing. However, it can be thought that large companies choose to be financed by markups. Small businesses opt for PLSs because they have no other alternatives, since their requests are systematically rejected in the absence of sufficient guarantees.

The arbitrage between PLSs and markups depends on the comparison between the markups margin and the profit loss sharing ratio (Othman & Masih, 2015; Pryor, 2007). PLSs and markups can coexist, under the clause that the risk inherent in each project is remunerated at a fair price. The arbitrage between PLSs and markups is therefore mainly linked to the profitability of the project. However, Dar and Presley (2001) put forward arguments linked to the economic situation and to fiscal and legal problems that are manageable and are not specific to financial products of the PLS type. The determination of profit margins for markups of Islamic banks is not favorable to the marketing of PLS financing. The entrepreneur will arbitrate between the PLS and the markup according to the profit sharing rate. For a given sharing rate, the profit margin of a markup contract will crowd out the PLS for high profitability projects (Iqbal et al., 1998). This has the effect of dividing the customers of Islamic banks into two categories:

- The first concerns entrepreneurs whose projects to be financed have a high expectation of gain and a low risk. These entrepreneurs refuse to share the potential gains with the bank. Thus, they will opt for a markup financing;
- The second concerns entrepreneurs with projects with an expectation of low profits, or projects with high profits but where the risk is high. These entrepreneurs favor PLS financing methods.

Islamic banks that refuse to grant PLS financing for serious risks do so only for the second category of customers. So the supply does not take effect because there is no demand, since the first category is not interested in PLSs (Khan & Ahmed, 2002). According to this reasoning, it is the predetermi-

nation of markups that creates an anti-selection (Mansour et al., 2015; Mansoori, 2011). However, other researchers are of the opinion that borrowers refuse PLS financing mechanisms for quality projects (Sadique, 2010a). Therefore, they prefer non-PLS financing so as not to share the benefits with Islamic banks (Dusuki, 2007; Farooq, 2007).

Iqbal and Llewellyn (2002) believe that PLS contracts generate a great information need that can be concealed from investors, resulting in high transaction costs. Within conventional theory, sharing contracts have come under some criticism. Stiglitz and Weiss (1981) see that equity financing in the category of which PLSs can be included are less efficient compared to borrowing. Similarly, agency problems between managers and shareholders are more serious in PLS-type contracts, since the latter show a desire not to disclose private information (Ahmed, 2008; Khan & Bhatti, 2008). A firm may refuse to communicate information on its financial statements or on other private information to the Islamic bank, which finances it through a PLS (Khan, 1995; Nouman & Ullah, 2014; Shaikh, 2011). This refusal can be an important source of the informational asymmetry making it impossible to obtain PLS funding for companies applying for this type of contract.

The lack of PLSs compared to markups is essentially related to the respective costs. The determination of profit margins and the overweighting of PLS risks are not in favor of the latter (Ahmed, 2008; Abdalla, 1999). The entrepreneur will arbitrate between the PLS and the markup according to these profits after deduction of the financial charges of each financing modality. For a profit and loss sharing rate, establishing the profit margin of a markup contract will rule out PLS for the entrepreneur for a high profit expectation (Shaikh, 2011; Sadique, 2010a; Khan & Bhatti, 2008). Entrepreneurs with a high expectation of profit and low risk refuse to share the gains with the Islamic bank, in this way they will opt for markup financing. In this sense, many researchers are of the opinion that borrowers refuse PLS financing mechanisms for quality projects, because they are more expensive for them (Farooq & Ahmed, 2013).

PLS monitoring takes place at all stages of the contract to hold the contractor to terms and monitor

his behavior (Marizah & Nazam, 2016; Nouman & Ullah, 2014; Nagaoka, 2010). The bank in a PLS contract has the right to influence corporate governance and monitor its performance and decision making (Othman & Masih, 2015; Sadique, 2010a; Sadique, 2010b; Sadr, 1999). From this perspective, a PLS contract faces several problems, including agency conflicts between Islamic banks and entrepreneurs (Dar & Presley, 2001). In addition, property rights are poorly defined and constitute an obstacle to the principle of profit and loss sharing (Alomar, 2006). The entrepreneur loses the exclusivity of decision and information of his company in a PLS contract. However, some entrepreneurs refuse PLS financing to keep the confidentiality of private information and protect the activity against interference from the Islamic bank (Shaikh, 2011; Ahmed, 2008).

The arbitrage between PLSs and markups depends above all on the arbitrage between the profit margin of markup contracts and the profit and loss sharing ratios of PLS contracts (Jan & Asutay, 2019; Nouman et al., 2019; Abedifar et al., 2015). The preference also depends on the risk specific to each of the two families of financing methods (Khan & Ahmed, 2002). The methods of determining the markups by Islamic banks are not favorable to the marketing of PLSs. For a given profit sharing rate, the exogenous fixing of the profit margin of a markup contract will crowd out the PLS for an expectation of high profits. Entrepreneurs with projects with a low expectation of profit or projects with a high expectation of profit, but whose risk is high, are more inclined to favor PLS financing methods (Alkhan, 2020; Iqbal et al., 1998). In this sense, the offer therefore does not take effect because there is no demand at the base since the good investor is not interested in the PLSs. Two working hypotheses will be formulated, which will not undergo direct empirical testing but will serve as the foundation of the empirical analysis. The working hypotheses are formulated as follows:

*WH1: Entrepreneurs of poor financial quality with projects with low or high risk of profit expectation prefer PLS financing methods.*

*WH2: The choice of corporate financing is exclusively between PLSs and markups.*

Combining the points discussed earlier in the literature review with the working hypotheses, the following research hypotheses are formulated:

*H1: The level of bank indebtedness with a conventional bank has a direct impact on the arbitrage between PLSs and markups:*

*H1a: The greater the short-term debt, the better the financial quality of the firm and, it will tend to avoid PLSs.*

*H1b: A significant long-term debt is a signal of poor financial quality from the firm, so it will opt for PLSs.*

*H2: A long-term banking relationship with a conventional bank is a signal of the company's good financial quality, pushing it to avoid PLSs.*

*H3: If the manager is a shareholder in the company, he/she will tend to avoid PLS financing.*

*H4: If decision-making maturity in the company is high, there will be a preference for markups:*

*H4a: The more experienced the business owner, the more likely he/she will avoid PLS financing.*

*H4b: The older the business, the less preference will be given to PLS financing.*

*H5: The larger the size of the company, the more it will tend to avoid PLS financing.*

*H6: The better the company's financial situation, the more likely it is to choose markup financing methods.*

*H6a: The higher the profitability of the company, the less it will prefer PLS financing methods.*

*H6b: The greater the risk of bankruptcy of the company, the more it will have a preference for PLSs.*

*H7: If company executives have a preference for PLS, they will agree to disclose the information to the Islamic bank.*

*H8: If the company is unwilling to share the profits with the bank, it will avoid PLS financing.*

*H9: If the company is unwilling to share decision-making power with the bank, it will avoid PLS financing.*

## 2. EMPIRICAL METHODOLOGY

Below, an empirical study is carried out to analyze the arbitrage between PLSs and mark-ups. In the following sections, a description of the field work will be presented, which includes the development of the survey questionnaire, data collection, and processing. Subsequently, an empirical study will be conducted using a logistic regression.

### 2.1. Data collection

In order to meet the research objectives, a field study was undertaken. The objective is to collect the data on the arbitration of demand of SMEs between PLS and mark-ups. Despite the efforts that have been made to retrieve all copies distributed, only 160 questionnaires out of 500 were returned, of which 106 were satisfactorily completed and 54 were excluded. Questions relating to accounting data, which are very sensitive, adversely affected the response rate. In this way, even if the respondents were assured that the data would be processed anonymously, the questionnaire only obtained a response rate of 21.2% (see Table 1).

**Table 1.** Questionnaire response rate

Distributed	Not returned	Returned	Valid	Invalid	Response rate
500	340	160	106	54	21.2%

The database is made up of 106 client companies from several conventional banks and different business sectors. The basic sample includes 63 companies that have opted for PLSs and 43 companies that have opted for markups.

### 2.2. The model

To test hypothesis *H1* relating to the level of bank indebtedness with conventional banks and its impact on the arbitrage between PLSs and markups,

two variables are designed, namely, STDET and LTDET. The STDET variable will be used to verify *H1a* relating to short-term debt with conventional banks, which represents the level of short-term debt of a company. The LTDET variable used to verify *H1b* represents the company's total long-term debt with conventional banks. To test hypothesis *H2* relating to the previous banking relationship with a conventional bank, the variable used is BANREL, which measures the banking relationship in years with the company's current main bank. To capture the impact of the manager's participation in the firm's capital on the arbitrage between PLSs and markups, hypothesis *H3* was put forward. This will be quantified by the variable PARTI, which measures the manager's participation in the capital of the firm as a percentage. The signal by the decision-making maturity of the manager and the company is represented by hypothesis *H4*. Thus, to test *H4a*, the variable used is AGEMAG, which measures the age of the manager in years. While for *H4b* the variable AGEFIRM is used to measure the age of the firm. The signal by the size of the company is captured by *H5* and represented by the variable SIZE, which measures the total turnover of the company surveyed.

Regarding the signal by the financial health of the company, it is the subject of hypothesis *H6*, which is subdivided into two sub-hypotheses. The first is *H6a* represented by the variable RENT, which measures financial profitability calculated by dividing net income by total assets. The second sub-hypothesis *H6b* will be represented by the variable FINQUAL measured by the Z-score of Altman (1968), which reflects the quality of the company's financial situation. This score is based on a linear combination function of five financial ratios considered to be most significant in distinguishing companies in good financial condition from companies in bankruptcy. A Z-score > 2.99 indicates that the firm is in good financial condition. Conversely, if the Z-score < 2.99, there is doubt about the financial quality of the company, or it is poor. Since companies are not listed, the market equity value is estimated using the net book asset method. It is based on the latest available balance sheet, using the formula:

$$V = \text{Total assets} - \text{Total debt}. \quad (1)$$

Hypothesis *H7* representing the willingness of managers to disclose information is captured by the variable INFO. It is a binary variable, which takes 1 if the manager agrees to disclose private information to the bank, and takes 0 otherwise. Regarding the willingness to share the profits with the Islamic bank by managers, it is represented by the *H8* hypothesis. The variable used for this is PROF, which is a binary variable that takes 1 if the manager agrees to share profits with the Islamic bank, and takes 0 otherwise. The willingness to share decision-making power with the bank is captured by hypothesis *H9*, which is measured by DEC. It is a binary variable, which takes 1 if the leader agrees to share decision-making power with the Islamic bank, and takes 0 otherwise.

The literature review gave us the possibility to present some hypotheses in terms of demand arbitrage between PLSs and markups. The next step is to model these hypotheses through a logistic regression. The model is given by:

$$\begin{aligned} PLS_i = & \beta_0 + \beta_1 STDET_i + \beta_2 LTDET_i + \\ & + \beta_3 BANREL_i + \beta_4 PARTI_i + \\ & + \beta_5 AGEMAG_i + \beta_6 AGEFIRM_i + \\ & + \beta_7 SIZE_i + \beta_8 RENT_i + \beta_9 FINQUAL_i + \\ & + \beta_{10} INFO_i + \beta_{11} PROF_i + \beta_{12} DEC_i + \varepsilon_i. \end{aligned} \quad (2)$$

For the model to be considered valid, it is necessary for it to fulfill the requirements of logistic regression. Therefore, before using the model for any statistical inferences, it is needed to evaluate the model's fit and identify any problems.

### 3. RESULTS

The logic regression result provides the chi-squared and pseudo R-squared logarithmic likelihood of the model. These and other measures, which will be discussed below, provide a broad picture of the goodness of fit of the model to the data.

#### 3.1. Model diagnosis

The Chi-square log likelihood is a test to see if the model as a whole is statistically significant. This is the difference in the log likelihood of the running

**Table 2.** Test of the whole model

Model	-Log-likelihood	Degrees of freedom	Chi-square	Prob. > Chi-square
2*Difference	49.796370	12	99.59274	< .0001*
Complete	21.779081	–	–	–
Reduced	71.575451	–	–	–
R square (U)				0.6957
AICc				73.5147
BIC				104.183
Observations (or weighted sums)				106

model compared to the log likelihood of the intercept model (Table 2).

The difference between the reduced and full models measures the importance of the variables as a whole for the fit. The difference is 49.79 between the -Log-likelihood for the intercept model is 71.57 and 21.78 for the full model, which includes the 12 explanatory variables. For the regression, there are 12 parameters which represent the explanatory variables of the arbitrage between PLSs and markups, so a degree of freedom of 12.

When using the chi-squared likelihood ratio to check the assumption that each parameter of the regression is zero, the difference in ( $-2\log$  likelihood) of the fitted model and the intercept model gives a value of 99.60. Taking this statistic into account, the probability of obtaining a higher chi-square value if the model is not better suited than the intercept model is significantly less than 1%. Thus, the chi-square test of the total uncertainty of the fit of the complete model informs that the model provides relevant information to the explained variable. Also, the  $R^2$  of McFadden, which in the model is 0.6957, testifies to a satisfactory predictive capacity.

### 3.2. Goodness of fit

The second step is to determine whether the current model variables provide enough information or whether more complex terms need to be added. The goodness of fit test provides this information (Table 3).

**Table 3.** Goodness of fit

Source	Degrees of freedom	-Log-likelihood	Chi-square
Misadjustment	93	21,779081	43,55816
Saturated	105	0,000000	Prob. > Chi-square
Adjusted	12	21,779081	1,0000

The saturated degree of freedom is  $m - 1$ , where  $m$  represents the population of the sample. Adjusted degrees of freedom correspond to the number of parameters excluding the intercept, in this case 105 and 12, respectively. The error of adjustment is equal to the deviation of the saturated model from the adjusted model, in this case  $105 - 12 = 93$ . In Table 3, the negative logarithmic probability of error from non-adjustment is given, as is the error in a saturated model and the overall error in the fitted model. In this instance, the lack of chi-square goodness of fit is insignificant (Prob. > chi-square = 1). This finding confirms the assumption that introducing additional variables does not improve the results.

### 3.3. The ROC curve

The ROC curve (Receiver Operating Characteristic) plays a key role in determining the predictive power of the model. Because a network is relatively better according to two criteria: a high sensitivity and specificity complement, which is  $(1 - \text{specificity})$ . Thus, a model is considered better when the ROC curve is at the top near the left corner, as is the case with our model. The area under the ROC curve reflects the level of performance of the selected model; it should be between 0 and 1. For the curve to represent a better performance it should be between 0.5 and 1 and the closer it is to “1” the better it is. We have a 96.2% chance of placing a positive ahead of a negative when scoring with our classifier (logistic regression). Compared to the 50% of the reference situation, the result of the logistic regression is rather encouraging.



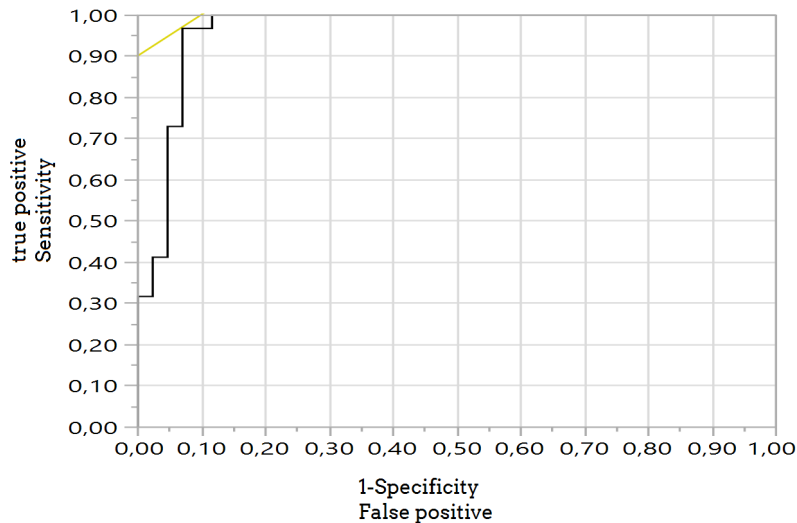


Figure 1. ROC curve

### 3.4. Likelihood ratio tests

Chi-square likelihood ratio tests are computed as the -2 log likelihood difference between the full model and the intercept model. It is reported in Table 4.

Table 4. Likelihood ratio test of effects

Source	Chi-square likelihood ratio	Prob. > chi-square
AGEFIRM	4.69219049	0.0303**
AGEMAG	0.30903304	0.7578
PARTI	3.0051562	0.0830*
DEC	0.05402613	0.8162
INFO	2.29652877	0.4605
PROF	0.00030352	0.9861
BANREL	3.14843149	0.0760**
STDET	5.09208639	0.0464**
LTDET	0.05638843	0.4494
FINQUAL	6.1287618	0.0133**
RENT	6.82282693	0.0090***
SIZE	9.29324804	0.0023***

Note: \*\*\* Significant at 1%; \*\* significant at 5%; \* significant at 10%.

The likelihood ratio test examines how much each variable contributes to the model. When the significance of the test is small (less than 0.1), the variable is contributing significantly to the model. Table 4 shows that the variables AGEFIRM, PARTI, BANREL, STDET, FINQUAL, RENT and SIZE contribute significantly to the model.

### 3.5. Multicollinearity test

When the variables are orthogonal to one another, i.e. not correlated at all, the tolerance and the VIF are both equal to 1. When one variable is very tightly correlated with one or several other variables, then the tolerance drops to 0 and the inflation of the variance will be large. A tolerance of 0.1 or lower (equivalent to a VIF of 10 or more) is in general a matter of major concern.

Table 5. Variance inflation factor

Term	VIF
Constant	—
AGEFIRM	7.7481422
AGEMAG	1.4462914
PARTI	1.2113038
DEC	1.3213095
INFO	1.3474661
PROF	1.3547128
BANREL	7.7949161
STDET	1.3274933
LTDET	1.2751911
FINQUAL	1.3767631
RENT	1.1449005
SIZE	1.8293185

By analyzing the VIF values within the logistic regression, it is possible to observe the absence of significant collinearity. This confirms the results obtained by the correlation matrix, since the equivalent VIFs are less than 10. In this way, it is possible to keep all the predictors in the model, making it easier to interpret the effects of each of the variables predicted by the literature review. In

this way, it is not needed to perform any of the usual transformations, such as the logarithmic transformation, the square transformation or even the elimination of certain variables.

### 3.6. Parameter estimation

Having presented the basic model, the variables used and the hypothesis to be tested, the regression results are presented below (see Table 6).

The STDET variable is significant with a negative correlation, which allows us to accept hypothesis *H1a* regarding short-term debt with conventional banks. In other words, the higher the level of a company's short-term debt, the more likely she is to opt for a markup. Regarding the company's long-term debt, the variable LTDET used to test *H1b* is rejected. On the other hand, the variable BANREL, which measures the banking relationship with the conventional bank in years, is significant with a negative correlation in line with the hypothesis, therefore hypothesis *H2* is accepted.

The variable PARTI, which measures the manager's participation in the company's capital as a percentage, has the same direction of correlation as the hypothesis *H3* but not significant. The variable AGEMAG, which measures the age of the manager of the company in years, has a direction of correlation contrary to hypothesis *H4a*. On the other hand, AGEFIRM, which measures the age of the company, has a direction of correlation consistent with hypothesis *H4b*, but the two variables are not

significant. Also, the variable SIZE, which measures the total turnover of the surveyed company, is significant with a sense of correlation in line with hypothesis *H5*.

Regarding the variable RENT, which measures the financial profitability of the company, is significant, but the direction of the correlation is not in line with *H6a*, which is therefore rejected. The second sub-hypothesis *H6b*, represented by the variable FINQUAL, measured by the Z-score, which reflects the quality of the company's financial situation, has a sense of correlation in accordance with the hypothesis, but it is not significant. The INFO variable, which indicates the manager's willingness to disclose private information, the PROF variable, which represents the manager's agreement to share profits, and the DEC variable, which describes the firm's willingness to share decision making, are all significant. It can be concluded that firms that agree to be financed by PLS agree to share profits, private information and decision-making power.

## 4. DISCUSSION

Conventional debt is an accessible signal to the market that reflects the financial quality of the company's activity as reported by Hasan et al. (2022). A company's debt history can provide valuable information for Islamic banks recently established in Morocco. Under these conditions, the purpose of this paper is to investigate the demand

**Table 6.** Estimates of logistic regression coefficients

Term	Estimation	Standard error	Chi-square likelihood ratio	Prob. > chi-square	Lower control limit	Upper control limit
Constant	-0.55953	0.2904789	3.7167275	0.0539*	-1.145702	0.0094356
STDET	-2.278e-8	1.0224e-8	5.3842308	0.0203**	-4.429e-8	-3.471e-9
LTDET	-1.322e-8	4.4072e-8	0.0950528	0.7578	-1.098e-7	5.6145e-8
BANREL	-0.031639	0.0193594	2.7877822	0.0950*	-0.071644	0.0054441
PARTI	-0.012422	0.1227014	0.0102474	0.9194	-0.256132	0.2316141
AGEMAG	0.0036745	0.0050607	0.5446754	0.4605	-0.005922	0.0142857
AGEFIRM	-0.006574	0.0210914	0.0964686	0.7561	-0.047785	0.0362795
SIZE	-8.326e-9	4.4953e-9	3.8578835	0.0495**	-1.825e-8	-1.71e-11
RENT	0.7312435	0.3604851	3.9678165	0.0464**	0.0121208	1.4454725
FINQUAL	-0.024907	0.0330882	0.5722657	0.4494	-0.092008	0.0397064
INFO	0.2051173	0.1019389	4.0840177	0.0433**	0.006248	0.4116057
PROF	0.4335148	0.1224248	13.955782	0.0002***	0.2037388	0.694426
DEC	0.3382417	0.1072304	9.7893541	0.0018***	0.128846	0.5554662

Note: \*\*\* Significant at 1%; \*\* significant at 5%; \* significant at 10%.

trade-off between PLSs and markups in the presence of a conventional banking relationship. The study results show that short-term debt has an impact on the choice of companies in such a way that firms with high short-term debt opt for markups. It can be argued that this is because it is a more or less similar alternative to borrowing which is in line with Minhat and Dzolkarnaini (2016). This can be seen as a signal for Islamic banks to take advantage of this preference and target firms on this basis. The results of this study show also that the signal from the decision-making maturity of the manager and the firm is not significant. Consequently, Islamic banks can offer PLSs to inexperienced entrepreneurs in view of their strong risk aversion under the clause of adequate monitoring as stated by Khan (1995).

In addition, empirical evidence shows that large companies opt for markup financing and small companies for PLS financing, which is corroborated by Mansour et al. (2015). In this sense, it

can be assumed that small businesses find in PLSs a possible outlet to face the marginalization of which they are victims in conventional financing. Entrepreneurs whose projects to be financed have high profit expectations agree to share the profits with the Islamic bank under a PLS contract. In this way, the bank can take advantage of the predetermined markups to favor PLSs and attract profitable projects as stated by Khan (1995). The fact that financial quality does not affect the choice between PLSs and markups also leads us to argue that it is not true that only high-risk entrepreneurs choose PLS financing, which is contrary to Ahmed (2008) and Abdalla (1999), among others. Nevertheless, the sample shows that firms that agree to be financed by PLSs agree to share profits, private information and decision-making power. Thus, if the sample can be extrapolated to Moroccan firms, it can be stated that PLSs has a good chance of flourishing in Morocco if Islamic banks and the state create a favorable climate for their commercialization.

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## CONCLUSION

Theoretical and empirical research in Islamic finance is mainly devoted to the study of supply. By contrast, this paper focuses on the demand for Islamic finance and leads to results that contradict these studies. Due to the size of the sample, the results should be treated with caution. However, the line of research that focuses on the demand for Islamic financial products deserves more attention from researchers. This study shows that the more short-term debt a firm has, the more likely it is to opt for a mark-up financing. This result can be interpreted as a signal to Islamic banks to play on this preference. However, long-term debt, when considering the results of this study, has no impact on the preference of demand between the two families of Islamic financing modalities. In addition, this study also highlights that the stronger the previous banking relationship with conventional banks, the more likely the company is to opt for markups. It could be said that the signal from previous banking relationships with conventional banks and the maturity of the debt both favor mark-ups.

The results also show that the manager's participation in the capital has no direct impact on the arbitrage between PLSs and markups. In this sense, the Islamic bank cannot count on participation, which is a reducing signal of the borrower's information asymmetry to facilitate decision-making. But this does not prevent the bank from targeting owner managers to market PLSs because the latter have no particular preferences in this regard. Entrepreneurs in the sample whose projects are profitable commit to share the profits with Islamic banks in a PLS contract. In this way, the bank can avoid artificial adverse selection and favor PLSs to attract profitable projects. In addition, the fact that financial quality has no direct impact on the choice between PLSs and markups, leads to rejecting the postulate that only high-risk entrepreneurs opt for PLSs. Finally, this study shows that companies that agree to be funded by PLSs agree to share profits, private information and decision-making power. If these findings can be applied to the broader context of Morocco, the successful promotion of PLSs in the country would likely rely on the active support and promotion of Islamic banks and the government.

## AUTHOR CONTRIBUTIONS

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## REFERENCES

- Abdalla, M. G. E. (1999). Partnership (Musharakah): A new option for financing small enterprises. *Arab Law Quarterly*, 14(3), 257. Retrieved from <https://www.jstor.org/stable/3382083>
- Abdul-Rahman, A., & Nor, S. M. (2016). Challenges of profit-and-loss sharing financing in Malaysian Islamic banking. *Geografia*, 12(2). Retrieved from <http://journalarticle.ukm.my/9811/1/4x.geografia-si-feb16-aisyah-edam.pdf>
- Abedifar, P., M. Ebrahim, S., Molyneux, P., & Tarazi, A. (2016). Islamic banking and finance: Recent empirical literature and directions for future research. In *A Collection of Reviews on Savings and Wealth Accumulation* (pp. 59-91). <https://doi.org/10.1002/9781119158424.ch4>
- Ahmed, A. G. (2008). The implication of using profit and loss sharing modes of finance in the banking system, with a particular reference to equity participation (partnership) method in Sudan. *Humanomics*, 24(3), 182-206. <https://doi.org/10.1108/08288660810899359>
- Alkhan, A. M. (2020). Analyzing the Practice of Mushāraka Mutanāqisa in the Islamic Banking Industry: The Kingdom of Bahrain as a Case Study. *Asian Economic and Financial Review*, 10(3), 275-288. <https://doi.org/10.18488/journal.aefr.2020.103.275.288>
- Alomar, I. (2006). *Financial Intermediation in Muslim Community: Issues and Problems* (MPRA Paper No. 8298). Retrieved from <https://mpra.ub.uni-muenchen.de/8298>
- Altman, E. I. (1968). Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. *The Journal of Finance*, 23(4), 589-609. <https://doi.org/10.2307/2978933>
- Beneish, M. D., & Press, E. (1995). The resolution of technical default. *Accounting Review*, 70(2), 337-353. Retrieved from <https://www.jstor.org/stable/248309>
- Bond, P., & Rai, A. S. (2008). Co-signed vs. group loans. *Journal of Development Economics*, 85(1-2), 58-80. <https://doi.org/10.1016/j.jdeveco.2006.05.006>
- Boot, A. W., Thakor, A. V., & Udell, G. F. (1991). Credible commitments, contract enforcement problems and banks: Intermediation as credibility assurance. *Journal of Banking & Finance*, 15(3), 605-632. [https://doi.org/10.1016/0378-4266\(91\)90088-4](https://doi.org/10.1016/0378-4266(91)90088-4)
- Brick, I. E., & Palia, D. (2007). Evidence of jointness in the terms of relationship lending. *Journal of Financial Intermediation*, 16(3), 452-476. <https://doi.org/10.1016/j.jfi.2007.01.001>
- Dar, H. A., & Presley, J. R. (2000). Lack of profit loss sharing in Islamic banking: management and control imbalances. *International Journal of Islamic Financial Services*, 2(2), 3-18. Retrieved from [https://www.academia.edu/6345958/Lack\\_of\\_Profit\\_Loss\\_Sharing\\_in\\_Islamic\\_Banking\\_Management\\_and\\_Control\\_Imbalances](https://www.academia.edu/6345958/Lack_of_Profit_Loss_Sharing_in_Islamic_Banking_Management_and_Control_Imbalances)
- Dusuki, A. W. (2007). The Ideal of Islamic Banking: A Survey of Stakeholders's Perception. *Review of Islamic Economics*, 11, 29-52. Retrieved from [https://www.isfin.net/sites/isfin.com/files/the\\_ideal\\_of\\_islamic\\_banking-\\_a\\_survey\\_of\\_stakeholders\\_perceptions.pdf](https://www.isfin.net/sites/isfin.com/files/the_ideal_of_islamic_banking-_a_survey_of_stakeholders_perceptions.pdf)
- Farooq, M. O. (2007). Partnership, equity-financing and Islamic finance: whither profit-loss sharing? *Review of Islamic Economics*, 11, 67-88. Retrieved from [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1415239](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1415239)
- Farooq, M., & Ahmed, M. M. M. (2013). Musharakah financing: Experience of Pakistani banks. *World Applied Sciences Journal*, 21(2), 181-189. Retrieved from <https://citeseerx.ist.psu.edu/document>

- ment?repid=rep1&type=pdf&doi=a2011f0cb4be7c446de290a16872b-557703de2b8
16. Flannery, M. J. (1986). Asymmetric information and risky debt maturity choice. *The Journal of Finance*, 41(1), 19-37. <https://doi.org/10.1111/j.1540-6261.1986.tb04489.x>
  17. Fried, J., & Howitt, P. (1980). Credit rationing and implicit contract theory. *Journal of Money, Credit and Banking*, 12(3), 471-487. <https://doi.org/10.2307/1991722>
  18. Hasan, I., Lee, H., Qiu, B., & Saunders, A. (2022). *Climate-related Disclosure Commitment of the Lenders, Credit Rationing, and Borrower Environmental Performance*. SSRN. <https://dx.doi.org/10.2139/ssrn.4150069>
  19. Iqbal, M., & Llewellyn, D. T. (Eds.). (2002). *Islamic banking and finance: new perspectives on profit sharing and risk*. Edward Elgar Publishing. Retrieved from <https://www.elgaronline.com/display/1840647876.xml>
  20. Iqbal, M., Ahmad, A., & Khan, T. (1998). *Challenges facing Islamic banking* (Vol. 1). Jeddah: Islamic Research and Training Institute. Retrieved from <http://www.sifitn/images/articles/Challenges-Facing-Islamic-Banking.pdf>
  21. Jan, S., & Asutay, M. (2019). *A model for Islamic development: An approach in Islamic moral economy*. Edward Elgar Publishing. Retrieved from <https://www.e-elgar.com/shop/gbp/a-model-for-islamic-development-9781788116725.html>
  22. Kane, E. J., & Malkiel, B. G. (1965). Bank portfolio allocation, deposit variability, and the availability doctrine. *The Quarterly Journal of Economics*, 79(1), 113-134. <https://doi.org/10.2307/1880516>
  23. Khan, M. M., & Bhatti, M. I. (2008). Development in Islamic banking: a financial risk-allocation approach. *The Journal of Risk Finance*, 9(1), 40-51. <https://doi.org/10.1108/15265940810842401>
  24. Khan, T. (1995). Demand for and supply of markup and PLS funds in Islamic banking: some alternative explanations. *Islamic Economic Studies*, 3(1). Retrieved from <https://ssrn.com/abstract=3166790>
  25. Khan, T., & Ahmed, H. (2002). Credit Risk Management in Islamic Banking. In M. K. Hassan & M. K. Lewis (Eds.), *Handbook of Islamic Banking* (pp. 148-158). Edward Elgar Publishing, Inc. Retrieved from [https://www.isfin.net/sites/isfin.com/files/risk\\_management\\_in\\_islamic\\_banking.pdf](https://www.isfin.net/sites/isfin.com/files/risk_management_in_islamic_banking.pdf)
  26. Leland, H. E., & Pyle, D. H. (1977). Informational asymmetries, financial structure, and financial intermediation. *The Journal of Finance*, 32(2), 371-387. <https://doi.org/10.2307/2326770>
  27. Liu, M. H., Margaritis, D., & Tourani-Rad, A. (2011). Asymmetric information and price competition in small business lending. *Journal of Banking & Finance*, 35(9), 2189-2196. <https://doi.org/10.1016/j.jbankfin.2011.01.022>
  28. Lobe F., & Vilanova, L. (2006). *Microéconomie bancaire*. Paris: Presse universitaire de France. Retrieved from <https://www.eyrolles.com/Entreprise/Livre/microeconomie-bancaire-9782130552307>
  29. Mansoori, M. T. (2011). Is "Islamic Banking" Islamic? Analysis of current debate on Shari'ah legitimacy of Islamic banking and finance. *Islamic Studies*, 50(3-4), 383-411. Retrieved from <https://www.jstor.org/stable/41932603>
  30. Mansour, W., Ben Abdelhamid, M., & Heshmati, A. (2015). Recursive profit-and-loss sharing. *Journal of Risk*, 17(6), 21-50. Retrieved from <https://ssrn.com/abstract=2799686>
  31. Minhat, M., & Dzolkarnaini, N. (2016). Islamic corporate financing: does it promote profit and loss sharing? *Business Ethics: A European Review*, 25(4), 482-497. <https://doi.org/10.1111/beer.12120>
  32. Nagaoka, S. (2010). Reconsidering mudarabah contracts in Islamic finance: What is the economic wisdom (hikmah) of partnership-based instruments? *Review of Islamic Economics*, 13(2), 65-79. Retrieved from <http://hdl.handle.net/2433/155773>
  33. Nouman, M., & Ullah, K. (2014). Constraints in the application of partnerships in Islamic banks: The present contributions and future directions. *Business & Economic Review*, 6(2), 47-62. Retrieved from <https://ssrn.com/abstract=2772563>
  34. Nouman, M., Ullah, K., & Jan, S. (2022). Domains and motives of Musharakah spur in the Islamic banking industry of Pakistan. *The Singapore Economic Review*, 67(01), 381-409. <https://doi.org/10.1142/S0217590819500620>
  35. Othman, A. N., & Masih, M. (2015). *Do profit and loss sharing (PLS) deposits also affect PLS financing? Evidence from Malaysia based on DOLS, FMOLS and system GMM techniques* (MPRA Paper No. 65224). Munich Personal RePEc Archive. Retrieved from <https://mpra.ub.uni-muenchen.de/65224/>
  36. Petersen, M. A., & Rajan, R. G. (2002). Does distance still matter? The information revolution in small business lending. *The Journal of Finance*, 57(6), 2533-2570. <https://doi.org/10.1111/1540-6261.00505>
  37. Pryor, F. L. (2007). The economic impact of Islam on developing countries. *World Development*, 35(11), 1815-1835. <https://doi.org/10.1016/j.worlddev.2006.12.004>
  38. Roosa, R. V. (1951). Interest rates and the central bank. In *Money, trade, and economic growth: in honor of John Henry Williams* (pp. 270-295). New York: The Macmillan Company.
  39. Ross, S. A. (1977). The determination of financial structure: the incentive signaling approach. *The Bell Journal of Economics*, 8(1), 23-40. <https://doi.org/10.2307/3003485>
  40. Sadique, M. A. (2010a). Islamic Banks' Dilemma Between Ideals and Practice: Debt or Equity. *Global Journal of Management and Business Research*, 10(2), 147-150.

- Retrieved from <http://irep.iium.edu.my/4051/>
41. Sadique, M. A. (2010b). Transition of Islamic banks from debt-based modes to equity-based financing: issues and prospects. In *International Conference on Islamic Banking & Finance: Cross Border Practices & Litigations*, International Islamic University Malaysia. Retrieved from <http://irep.iium.edu.my/7257/1/17Sadique.pdf>
  42. Sadr, K. (1999). The Role of Musharakah Financing in the Agricultural Bank of Iran. *Arab Law Quarterly*, 14(3), 245-256. Retrieved from <https://www.jstor.org/stable/3382082>
  43. Schwert, M. (2018). Bank capital and lending relationships. *The Journal of Finance*, 73(2), 787-830. <https://doi.org/10.1111/jofi.12604>
  44. Shaikh, M. A. (2011). Contemporary Islamic Banking: The Issue of Murābahah. *Islamic Studies*, 50(3-4), 435-448. Retrieved from <https://www.jstor.org/stable/41932606>
  45. Song, F., & Thakor, A. V. (2007). Relationship banking, fragility, and the asset-liability matching problem. *The Review of Financial Studies*, 20(6), 2129-2177. <https://doi.org/10.1093/rfs/hhm015>
  46. Stice, D. (2018). The market response to implied debt covenant violations. *Journal of Business Finance & Accounting*, 45(9-10), 1195-1223. <https://doi.org/10.1111/jbfa.12321>
  47. Stiglitz, J. E., & Weiss, A. (1981). Credit rationing in markets with imperfect information. *The American Economic Review*, 71(3), 393-410. Retrieved from <https://www.jstor.org/stable/1802787>
  48. Zhen, X., Shi, D., Li, Y., & Zhang, C. (2020). Manufacturer's financing strategy in a dual-channel supply chain: Third-party platform, bank, and retailer credit financing. *Transportation Research Part E: Logistics and Transportation Review*, 133, 101820. <https://doi.org/10.1016/j.tre.2019.101820>