

THE EFFECT OF EQUITY ON PROFITABILITY AND RISK: A COMPARATIVE STUDY BETWEEN ISLAMIC AND CONVENTIONAL BANKS



Arafet Hamida ^(a) Amira Lanouar ^(b)

^(a) Associate Professor, Higher Institute of Management of Gabes, University of Gabes, Tunisia; E-mail: arafet.hamida@isggb.mu.tn

^(b) PhD Student, Higher Institute of Management of Gabes, University of Gabes, Tunisia; E-mail: amira.lanouar@gmail.com

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ABSTRACT

The nature of the relationship between equity and risk as well as equity and profitability has been the subject of two basic hypotheses in the literature: the structure-behavior-performance (SCP) approach for the capital-profitability relationship and the moral hazard approach for the capital-risk relationship. The objective of this article is to study the relationship between equity and risk and equity and profitability for 215 banks from 18 emerging countries. This study focuses on Islamic banks and conventional banks. We use a GMM estimator. The results obtained for Islamic banks regarding the relationship between equity and risk did not confirm the moral hazard hypothesis. Indeed, equity has a positive effect on risk with the three measures used (the variance of average economic profitability, the variance of average financial profitability, and the logarithm of Z-Score). The same goes for conventional banks. An increase (decrease) in capital leads to an increase in risk (decrease). As for the relationship between equity and profitability, we found a difference in results for the two types of banks studied (Islamic and conventional). Indeed, for Islamic banks, the SCP (structure-behavior-performance) theory is not verified. An increase (or decrease) in capital leads to a decrease (or increase) in profitability. This was found for the three profitability specifications used (average economic profitability, average financial profitability, and net interest margin). For conventional banks, equity positively affects profitability with its different measures, which is consistent with the structure-behavior-performance paradigm.

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INTRODUCTION

The banking industry is threatened by the unstable and shifting economic climate, which began with the subprime mortgage crisis and weakened financial institutions before intensifying into the global health crisis that impacted all economic sectors. However, the viability of a bank is proportional to the importance of its equity capital more than its size. A very large bank with too little equity capital can disappear very quickly. Indeed, the importance of the amount of equity capital reflects the level of risk that shareholders are willing to take. It represents a safety cushion created to guarantee solvency in the event of an undesirable structural transformation.

Although the norm that governs the decisions of an economic agent in conventional finance is the optimization of the risk-return trade-off, several studies have created a great controversy regarding the possible negative or positive relationships between equity capital and profitability on the one hand (Naceur and Kandil, 2009; Gul et al., 2011), and equity capital and risk on the other hand (Shrieves & Dahl, 1992; Rime, 2001; Godlewski, 2004; 2009; Jokipii and Milne, 2011). The moral hazard theory, which states that an increase (decrease) in equity capital is associated with a decrease (increase) in risk. Whereas the capital-profitability relationship has been assimilated into the SCP (structure-behavior-performance) hypothesis, which states that an increase or decrease in equity capital generates an increase or decrease in profitability. However, the basic principles that drive an Islamic financial system diverge from those of traditional finance. The prohibition of interest rates and the requirement for certain ethics in Islamic financial transactions (the prohibition of

¹ Corresponding author: ORCID ID: 0009-0003-6365-7632

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speculation and excessive risk-taking, the incorporation of the principle of equitable profit-sharing, etc.) represent the fundamental principles of Islamic finance.

The divergence of interests between Islamic banks and their conventional counterparts has led us to wonder about the effect of equity capital on profitability and risk for each. We propose to highlight the nature of these relationships, which have sparked a great debate.

LITERATURE REVIEW

The relationship between risk and bank capital has been of cardinal importance to economists from various countries and has generated a preponderant mass of literature over the past decade. In fact, pioneering research was carried out by economists (Shrieves & Dahl, 1992) on banks in the United States, who found that risk exposure and capital levels are simultaneously related; a simultaneous increase (decrease) in equity capital levels would generate a synchronous increase (decrease) in the incurred risk, and vice versa. In addition, Shrieves and Dahl showed that this relationship was present even in well-capitalized banks. This relationship was not strictly the consequence of regulatory influence but rather reflected the behavior of bank owners towards risk. Recently, Jokipii and Milne (2011) have confirmed this positive link in a study that examined a sample of US banks over the period from 1986 to 2008. In the context of Swiss banks, Rime (2001) supported the existence of a positive relationship between changes in risk and capital (equity-to-total assets ratio), but no significant relationship was found between risk and CAR. In addition, other studies on European banks and emerging markets have yielded the same results (Porter, 2009; Godlewski, 2004). Even in Tunisia, the relationship between capital and risk appeared to be dynamic and positive. This reflected the awareness of managers regarding the application of regulations for better determination of the risks that threatened the continuity of banking intermediation. Other studies have shown a relationship that conforms to the moral hazard hypothesis, which states that an increase in capital is associated with a decrease in risk. We can cite a study of Indian commercial banks, Indonesian commercial banks, and also inefficient Japanese cooperative banks in the article by (Deelchand & Padgett, 2009). The study of the relationship between equity capital and risk has attracted a great deal of attention in the literature. This relationship raises a controversial aspect. Based on the literature, we have seen a fluctuating positive and negative correlation between risk and equity capital, which aligns with the moral hazard theory.

The fundamental origin of the structure-behavior-performance paradigm emerged with the pioneering work, which states that the structure of an industry determines behavior and influences performance in that industry. In other words, it considers that the observable characteristics of a market or industry, more explicitly, the number, size, and concentration of suppliers, on the one hand, and entry conditions and regulation, on the other hand, can affect the behavior of participants in that market and therefore determine the results of firms. Gradually, this concept has stimulated a significant volume of work in the banking industry (Lloyd-Williams et al., 1994), which was a privileged area of analysis of the SCP mechanism due to its specific regulatory stake.

Lloyd-Williams et al. (1994) conducted a study on a sample of 92 Spanish banks over a three-year period from 1986 to 1988. They concluded that the Spanish banking market, governed by government and regulatory pressures, increasingly concentrated and reduced the cost of collusion, leading to higher profits for all these banks. Furthermore, a year later, used this structure-conduct-performance relationship on a sample of banks from 18 different countries over a period spanning from 1986 to 1989. They discovered that, in the face of a specific regulatory situation, the traditional SCP paradigm led to the following outcome: the degree of concentration has an effect on the level of competition in the industry. In the same theoretical framework, considered a sample of banks from major industrialized countries and concluded that there is a positive correlation between bank concentration and overcapacity in this industry: higher concentration should be associated with greater overcapacity. Additionally, he emphasized that the profit of a small bank increases more rapidly than that of a large bank. Staying within the banking context, the SCP paradigm was used in a study by Fu and Heffernan (2009) on a panel of Chinese banks that sought to understand the effects of reforms on the structure and performance of the Chinese banking sector. A bank that holds a relatively high proportion of capital is unlikely to earn high profits and is even less exposed to risk.

The ambiguous nature of this paradigm makes its use very diverse and useful in various studies to explain a significant relationship between structure, behavior, and efficiency. In this context, the SCP relationship was the basis of the work, the foundational article of this study. The objective was to confirm or challenge the notion that bank capital increases (or decreases) with an increase (or decrease) in profitability.

Generating profit has always been a primary objective for investors and entrepreneurs in order to ensure the success of their projects. While the capital-risk relationship has gained significant momentum compared to the capital-profitability relationship, a literature review on the concept of profitability demonstrates its increased importance for insurance companies, businesses, and even banks.

Indeed, the structure-behavior-performance paradigm has drawn attention to the positive relationship between equity capital and profitability. This theory was proven on a sample of US commercial banks in the 1980s. He emphasized that an unexpected increase in capital tends to enhance profitability.

In the same context, a variety of studies have confirmed the same result but with a different analytical framework. In fact, the effect of equity capital on profitability is measured within a group of specific characteristics rather than as a standalone explanatory variable. Examples of such studies include research conducted by Naceur and Kandil (2009) on a sample of Egyptian banks, a study on Tunisian banks by Naceur (2003), as well as two studies conducted on a panel of

banks in the MENA region. The first study used an unbalanced panel regression (Omran & Naceur, 2011), while the second employed a dynamic panel approach (Omran & Naceur, 2011) while considering credit risk.

From another perspective, Islamic banks, like their conventional counterparts, are also influenced by the capital effect. There is indeed a positive relationship between equity capital and profitability (Bashir, 1999), examined the impact of bank capital on profitability and risk using a sample of banks from 42 Asian countries. This fruitful research revealed that investment banks had the lowest and positive capital effect on profitability, while banks in Middle Eastern countries exhibited the highest and positive capital effect on profitability. However, Gul et al. (2011) revealed a negative relationship between capital and economic profitability (ROA - return on assets) in a sample comprising the 15 largest banks in Pakistan.

Furthermore, Pessarossi and Weill (2015) analyzed the impact of regulatory changes in equity capital on the efficiency of Chinese commercial banks from 2004 to 2008. They concluded that equity capital strengthens financial stability, meaning that an increase in the equity capital ratio promotes cost efficiency in banks. Thus, equity capital requirements can contribute to financial stability by directly increasing the cushion of capital to absorb losses

Based on a comprehensive literature review regarding the relationship between equity capital and profitability, two types of results were observed. A positive relationship between equity capital and profitability supports the SCP theoretical approach, while a negative relationship between the two also exists. Moreover, it was noted that no study has addressed this relationship in terms of a comparison between conventional banks and Islamic banks over the same period and region.

MATERIALS AND METHODS

Modeling, presentation and processing of variables

Regarding the previous literature review, a major controversy has arisen regarding the relationships between equity, profitability, and risk. These relationships differ depending on whether they are sometimes positive or negative. Furthermore, we have noted the absence of a comparative study addressing the two types of relationships among a sample of Islamic and conventional banks for the same period and region.

We are trying to provide answers to the following hypotheses:

Hypothesis 1: The relationship between equity and risk is negative.

Hypothesis 2: The relationship between equity and profitability is positive.

Empirically, we use a dynamic panel data model, as well as the generalized method of moments (GMM) as an estimation technique.

The econometric model

In order to underline the impact of bank capital on profitability and risk, we will focus on the research of Lee and Hsieh (2013). We preserved the dynamic panel data models from as a result, we kept the generalized method of moments (GMM) as an estimate technique. After that, the model appears as follows:

$$\pi_{it} = \alpha_0 + \alpha_1\pi_{it-1} + \alpha_2EA_{it} + \alpha'X_{it} + \lambda_i + \varepsilon_{it} \quad \forall i, t \quad (1)$$

$$V_{it} = \beta_0 + \beta_1V_{it-1} + \beta_2EA_{it} + \beta'X_{it} + \mu_i + \vartheta_{it} \quad \forall i, t \quad (2)$$

With i and t are respectively the bank and the time. ε_{it} and ϑ_{it} represent the two error terms.

$\alpha_i = \alpha_0 + \lambda_i$ and $\beta_i = \beta_0 + \mu_i$ denote the unobserved bank-specific effect. These variables are included in the explanatory model of bank profitability and risk to explicitly address the heterogeneity bias across banks. π_{it} and π_{it-1} respectively measure the bank's profitability at date t and $t - 1$. V_{it} and V_{it-1} respectively measure the bank's risk on the date t and $t - 1$.

Model (1) is designed to determine the impact of equity on profitability. This profitability is measured by three approaches, namely; the average economic profitability. The average financial profitability, the average of financial profitability, and finally, the net interest margin.

Model (2) shows the impact of equity on risk. The latter is also measured by three proxies that we site; the variance of the average economic return the variance of the average financial return and the logarithm of the Z-score. Equity is measured by the ratio of equity to total assets, the presents the vector of coefficients of the microeconomic or macroeconomic explanatory variables.

Presentation and descriptive analysis of variables

The variables to explain

The variables to be explained are profitability and risk, as we have already mentioned. We will be using three measures for profitability and three measures for risk.

Average economic profitability: This ratio is defined as net income divided by the average of assets (this average is calculated by dividing the sum of assets for year's t and $t-1$ by two). This approximation of profitability has been used in various studies to indicate the income generated by assets financed by the bank (Abduh & Idrees, 2013; Gul et al., 2011; Naceur and Omran, 2011).

Average financial profitability: This ratio is defined as a net income divided by the average of equity (this average is calculated by dividing the sum of equity for year's t and $t-1$ by two). It is also referred to as "shareholder profitability, which evaluates the return on funds invested by them in the bank (Lee & Hsieh, 2013).

Net interest margin: It is the difference between interest income and interest expenses divided by total assets. The role of financial intermediation played by banks, in terms of deposit collection and loan provision, leads to considering their intermediation margin as an indicator of their performance and profitability (Gul et al., 2011).

Variance of average economic profitability: It is a volatility indicator calculated based on the past three years (Sun & Chang, 2011).

Variance of average financial profitability: It is a volatility indicator calculated based on the past three years (Lee and Hsieh, 2013).

Logarithm of the Z-score: It is defined as $Z_{-}(t)$, where $Z_{-}(t) = \ln((ROAA_t + EA) / \sigma ROAA)$. This measure is often used as an indicator of bank stability and soundness (Michalak and Uhde, 2012). The higher the value, the more stable the bank is considered to be. Its frequent use in studies is due to its simplicity in calculation, as it only requires accounting information (Lepetit & Strobel, 2013).

Explanatory variables

Equity: These funds are measured by the ratio of equity to total assets (EA_{it}), based on the works of Shrieves and Dahl, 1992; Naceur, 2003; Deelchand and Padgett, 2009. This ratio identifies bank capitalization and measures capital adequacy. It also indicates the bank's ability to absorb losses from its shareholders (Bashir, 1999).

Size: It is measured by the logarithm of total assets. The subprime crisis highlighted the importance of this variable in explaining risk and profitability. According to the "too big to fail" doctrine, size has a negative effect on profitability volatility (De Haan & Poghosyan, 2012) and on the degree of risk aversion. This was evident during the recent crisis with the bankruptcy of the largest bank in the United States, Lehman Brothers. Larger banks can diversify their portfolios to benefit from economies of scale and scope. A diversified portfolio implies lower risk. However, even though banks benefit from diversification effects, the average return on their portfolio does not significantly distinguish them from smaller banks. In the context of this study, size is expected to play an important role since the sample includes oil-rich countries (Saudi Arabia, the United Arab Emirates, etc.).

Logarithm of gross loans: This ratio measures the volume of gross loans and is often strongly related to the notion of risk. (Foos et al., 2010) suggested that loan growth represents an important driver of bank risks.

Interbank ratio: The interbank ratio is the sum of money lent to banks divided by the sum of money borrowed from banks. The higher this ratio (greater than 100), the more funds and liquidity the bank has, indicating higher solvency (Li et al., 2012).

Net loan to total assets: This ratio is classified as a liquidity ratio and measures the percentage of assets occupied by loans. However, loans are the largest component of interest, which implies a positive relationship with profitability. The higher this ratio, the more liquidity problems it may pose

Loan loss provisions to net interest income: This ratio reflects the quality of the loan portfolio or asset quality. It relates to provisions for interest income.

Real interest rate: The real interest rate is the nominal interest rate adjusted for inflation.

Inflation rate: The inflation rate is based on the consumer price index, which measures the change in prices of a representative basket of goods and services compared to a base period. This indicator is often used as a control variable. The relationship between the inflation rate and profitability differs depending on whether the rate is expected or unexpected. If the inflation rate is expected, conventional banks can adjust interest rates opportunistically. As a result, revenues increased faster than costs, having a positive impact on profitability. However, if the inflation rate is unexpected, banks cannot immediately adjust interest rates, and costs will be higher than income, negatively affecting profitability (San & Heng, 2013). For an Islamic bank, states that it can benefit from an increase in this ratio when most of its profit comes from direct investments and Murabahah operations.

GDP growth: Gross Domestic Product reflects the domestic economic activity of a country. GDP growth, defined as the annual change in GDP, reflects the state of the economic cycle and the health of a country (San & Heng, 2013). It is expected that GDP growth is positively related to economic growth. Furthermore, Ghenimi and Omri (2018) have shown that bank

size, net interest margin, credit risk (NPL), liquidity gaps, capital adequacy, and economic growth (GDP) are significant determinants of liquidity risk for Islamic banks in the Middle East and North Africa region.

In this study, we use a sample composed of 215 banks from 18 emerging countries (Malaysia, Saudi Arabia, Bahrain, the United Arab Emirates, Kuwait, Qatar, Oman, Egypt, Iran, Iraq, Jordan, Lebanon, Mauritania, Palestine, Sudan, Syria, Tunisia, and Yemen). The sample is divided between 113 Islamic banks and 72 conventional banks. The latter are from Malaysia and the Gulf Cooperation Council (GCC) countries. The study covers the period from 2010 to 2018. Table 1 provides a presentation of the countries studied as well as the number of banks and observations.

Table 1. Presentation of the countries studied as well as the number of banks and observations

Countries	Islamic Banks		Commercial Banks		Malysian Commercial Banks	
	Banks	Observations	Banks	Observations	Banks	Observations
Malaysia	17	61	***	***	37	152
Saudi Arabia	4	8	9	55	***	***
Bahrain	20	48	15	60	***	***
United Arab Emirates	10	34	19	99	***	***
Kuwait	9	26	6	34	***	***
Qatar	5	14	8	38	***	***
Oman	***	***	8	32	***	***
Egypt	2	12	***	***	***	***
Iran	16	56	***	***	***	***
Iraq	4	8	***	***	***	***
Jordan	3	18	***	***	***	***
Lebanon	3	2	***	***	***	***
Mauritania	1	1	***	***	***	***
Palestine	1	5	***	***	***	***
Sudan	11	15	***	***	***	***
Syria	2	1	***	***	***	***
Tunisia	1	6	***	***	***	***
Yemen	4	1		***	***	***
TOTAL	113	316	65	318	37	152

However, it should be noted that the sample obtained represents unbalanced panel data, as it contains unbalanced data corresponding to observations that are not available for all variables for all banks in the panel for one or more periods of the time interval studied.

Table 2 and 3 provide an overview of the nature of the correlation between the variables for Islamic banks and conventional banks, respectively. The correlation between the variable of interest (capital) and average economic profitability, as well as the variance of average economic profitability, is weak and positive for both types of banks. Additionally, equity capital and average financial profitability are weakly and negatively correlated for both Islamic and conventional banks. The same applies to the relationship between capital and the variance of average financial profitability. Net interest margin is positively and weakly correlated with capital for all banks. As for the correlation between equity capital and LnZ-score, it is weak and positive for both types of banks.

Table 2. Correlation matrix for islamic banks

	<i>ea</i>	<i>roaa</i>	<i>roae</i>	<i>nim</i>	<i>vroaa</i>	<i>vroae</i>	<i>lnzscore</i>	<i>lngl</i>	<i>lnta</i>	<i>inter</i>	<i>la</i>	<i>llpnir</i>	<i>tir</i>	<i>inf</i>	<i>pib</i>
<i>ea</i>	1														
<i>roaa</i>	0.236	1													
<i>roae</i>	-0.105	0.223	1												
<i>nim</i>	0.295	0.470	0.101	1											
<i>vroaa</i>	0.215	-0.339	-0.149	0.005	1										
<i>vroae</i>	-0.054	-0.120	0.511	0.025	0.128	1									
<i>lnzscore</i>	0.126	0.265	-0.125	0.161	-0.395	-0.303	1								
<i>lngl</i>	-0.391	-0.148	0.079	-0.264	-0.093	0.026	-0.018	1							
<i>lnta</i>	-0.377	-0.158	0.085	-0.254	-0.013	0.046	-0.059	0.891	1						
<i>inter</i>	-0.048	0.058	0.092	0.017	-0.094	0.049	0.227	-0.055	-0.093	1					
<i>la</i>	-0.327	0.028	0.059	-0.135	-0.272	-0.054	0.063	0.581	0.337	-0.098	1				
<i>llpnir</i>	-0.138	-0.121	-0.108	-0.073	-0.129	-0.041	0.066	0.013	-0.027	0.025	0.043	1			
<i>tir</i>	-0.071	-0.274	-0.117	-0.086	0.149	0.021	-0.109	0.014	-0.024	0.004	-0.040	0.107	1		
<i>inf</i>	-0.033	0.080	0.080	0.022	-0.084	-0.059	-0.018	-0.012	0.095	0.048	0.113	-0.027	-0.319	1	
<i>pib</i>	0.211	0.298	0.113	0.141	-0.047	0.005	0.052	-0.120	-0.155	-0.001	-0.043	-0.032	-0.352	0.016	1

Table 3. Correlation matrix for conventional banks

	<i>ea</i>	<i>roaa</i>	<i>roae</i>	<i>nim</i>
<i>ea</i>	1			
<i>roaa</i>	0.425	1		
<i>roae</i>	-0.104	0.758	1	
<i>nim</i>	0.363	0.285	0.148	1

vroaa	0.350	0.304	-0.009	0.010	1										
vroae	-0.046	-0.066	-0.103	-0.066	0.423	1									
lnzscore	0.042	0.034	0.120	0.198	-0.423	-0.342	1								
lngl	-0.437	-0.009	0.211	-0.176	-0.097	0.038	0.017	1							
lnta	-0.481	-0.049	0.195	-0.210	-0.124	0.033	0.025	0.947	1						
inter	0.395	0.394	0.118	0.185	0.211	0.010	-0.075	-0.104	-0.194	1					
la	-0.127	0.091	0.139	0.080	-0.009	0.032	-0.0050	0.577	0.323	0.165	1				
llpnir	-0.096	-0.288	-0.337	-0.180	0.054	0.149	-0.191	-0.002	-0.030	0.033	0.041	1			
tir	-0.013	-0.111	-0.116	-0.062	0.027	0.060	-0.044	-0.048	-0.046	-0.077	-0.030	0.125	1		
inf	0.120	0.214	0.122	0.020	0.021	0.003	-0.128	0.088	0.041	0.216	0.214	-0.104	-0.370	1	
pib	0.112	0.157	0.130	-0.055	-0.009	-0.080	0.066	-0.092	-0.105	0.050	-0.054	-0.171	-0.278	0.217	1

Table 3 presents descriptive statistics, including the number of observations, mean, standard deviation, minimum value, and maximum value for the different variables used in the model during the sampling period. These descriptive statistics are calculated for both Islamic banks and conventional banks.

We have observed that the average profitability coefficient is higher for conventional banks than for Islamic banks. Additionally, the average risk coefficient is higher for Islamic banks than for their conventional counterparts for all three risk measures.

Table 4. Descriptive statistics

Variables	Islamic banks					Conventional banks				
	Obs	Moy	E- type	Min	Max	Obs	Moy	E- type	Min	Max
<i>Equity Ratio</i>										
EA	627	28,138	26,874	-1,67	100	619	13,971	8,204	0,786	99,775
<i>profitability</i>										
ROAA	651	1,874	6,48	-45,31	53,086	619	1,95	3,39	-55,48	30,18
ROAE	651	11,242	28,445	-127,1	508,23	619	15,01	13,34	-135,9	63,183
NIM	646	4,393	5,757	-26,267	63,996	619	3,13	1,410	-3,15	13,87
<i>mesures of risque</i>										
VROAA	624	24,8	106,04	0,0003	1845,8	616	5,16	42,68	0,00002	660,51
VROAE	624	468,8	4513,4	0,006	78879,3	616	109,70	611,91	0,011	9154,9
LnZscore	615	3,151	1,265	-0,916	7,65	614	3,58	1,085	-0,305	7,24
<i>Microeconomic variables</i>										
LnGL	593	13,033	2,83	-1,11	17,39	617	14,94	1,68	9,08	18,27
LnTA	627	12,9	2,28	3,76	17,9	619	15,59	1,43	10,703	18,73
INTER	414	206,33	214,97	0	945,32	586	140,83	168,9	0	965,50
LA	601	45,26	23,78	0	98,917	617	54,52	17,16	0,502	89,58
LLPnir	503	31,07	96,66	-715,68	865	602	18,15	40,89	-122,6	677,8
<i>Macroeconomic</i>										
TIR	1008	1,35	9,051	-16,78	66,27	918	0,36	8,69	-16,78	41,31
INF	1008	7,083	7,124	-10,06	53,23	918	3,59	3,41	-4,86	15,05
PIB	1008	5,72	5,513	-41,3	46,5	918	5,93	4,23	-5,15	20,84

obs designates the number of observations, Moy designates The average of the variable coefficient, the standard deviation of each variable is represented by E-type, Min designates minimum and Max designates maximum.

RESULTS AND DISCUSSIONS

The relationship between equity and risk

Table 4 provides the estimation results for two subsamples: Islamic banks and conventional banks, using equation (1). We employed the Generalized Method of Moments (GMM) to estimate the dynamic panel data model proposed.

Table 5. GMM results

	Risque					
	Islamic Banks			Conventional banks		
	(1)	(2)	(3)	(1)	(2)	(3)
VROAA _{it-1}	0.347*** (0.000)			0.114*** (0.000)		
VROAE _{it-1}		0.244*** (0.000)			0.796*** (0.000)	
In Zscore _{it-1}			0.681*** (0.000)			0.677*** (0.000)
EA _{it}	0.568*** (0.000)	8.974*** (0.002)	0.017*** (0.000)	0.717*** (0.000)	14.402*** (0.000)	0.039*** (0.002)
ln GL _{it}	-51.00*** (0.000)	151.657 (0.357)	-0.269*** (0.001)	-0.621 (0.239)	69.745*** (0.002)	-0.287** (0.024)
ln TA _{it}	54.33*** (0.000)	-600.23*** (0.000)	0.239*** (0.001)	0.004 (0.993)	-26.173 (0.221)	0.270** (0.023)
INTER _{it}	-0.005*** (0.342)	10.714*** (0.000)	0.001*** (0.000)	-0.002*** (0.000)	-0.0798*** (0.001)	0.001*** (0.002)
LA _{it}	0.041 (0.083)	38.845***	0.009***	0.059***	-1.705***	0.014**

		(0.000)	(0.010)	(0.000)	(0.004)	(0.014)
LLPnir_{it}	-0.171*** (0.000)	-7.816*** (0.000)	0.002*** (0.000)	-0.011*** (0.000)	-3.629*** (0.000)	0.0004 (0.328)
TIR_{it}	0.09*** (0.010)	50.178*** (0.000)	-0.004 (0.112)	0.035*** (0.000)	2.063*** (0.000)	0.0005 (0.793)
INF_{it}	-1.544*** (0.000)	-12.443*** (0.000)	-0.023*** (0.000)	0.116*** (0.000)	1.217** (0.045)	-0.032*** (0.000)
PIB_{it}	0.247*** (0.003)	137.945*** (0.000)	-0.034*** (0.000)	0.143*** (0.000)	3.165*** (0.000)	-0.024*** (0.001)
Test de Sargan (p-value)	0.222	0.2924	0.4302	0.01	0.02	0.2497
Test d'AR(2) (p-value)	0.3752	0.406	0.2668	0.6682	0.2959	0.023
Test de Wald (p-value)	0.000	0.000	0.000	0.000	0.000	0.000
Nombre de banques	65	65	65	83	83	83
Nombre d'observations	279	279	277	493	493	491

The dependent variable is profitability measured by: VROAA (first specification), VROAE (second specification), LnZ-score (third specification) respectively. *, ** and *** indicate the degree of significance at the 1%, 5% and 10% thresholds. The p-values are in parentheses. AR(2) means the test for second-order autocorrelation of errors.

The coefficients for the lagged dependent variables, 0.347 for variance of average economic profitability (VROAA), 0.244 for variance of average financial profitability (VROAE), and 0.681 for the logarithm of Z-score (LnZscore), are consistently positive and statistically significant at the 1% level.

These results deviate from the principle of moral hazard, which suggests that an increase (decrease) in capital should be followed by a decrease (increase) in risk. They are consistent with previous studies by Shrieves and Dahl (1992), Rime (2001), Godlewski (2004), Porter (2009), and Jokipii and Milne (2011)

The Wald test indicates the overall significance of the model and all three specifications at the 1% level. The second-order autocorrelation test rejects the H1 hypothesis, suggesting the absence of second-order autocorrelation in the residuals. The Sargan test validates the instruments used, as evidenced by the p-values, which reject the H1 hypothesis and support the validity of the instruments. The p-value for the variance of average economic profitability is 0.222.

The logarithm of gross loans (LnGL) has a negative and significant coefficient only for the first and third specifications of Islamic banks' risk. It is not significant for the second specification (variance of average financial profitability). An increasing trend in loans increases the potential for borrower defaults, leading to higher risk for banks

Bank size has a significant positive effect on risk for VROAA and LnZscore. This suggests that larger banks have more investment opportunities, which increases their level of risk (Deelchand & Padgett, 2009). However, the estimated coefficient for size is statistically significant and negative for the second specification.

The coefficient for the interbank ratio has a positive and significant impact (at the 1% level) on risk, as approximated by VROAE and LnZscore. It is not statistically significant for the first specification, where risk is approximated by VROAA. This liquidity ratio highlights the interbank relationships, including those with foreign banks that are highly dependent on the international market. Foreign banks exhibit a higher level of risk. Similarly, the second liquidity ratio (net loans to total assets) positively affects Islamic banks' risk, suggesting that a higher level of liquidity can increase bank risk.

The coefficient for the asset quality ratio (LLPnir) has a significant negative effect (at the 1% level) on approaches to risk, namely, the variance of average economic profitability and the variance of average financial profitability. However, this coefficient is positive and significant (at the 1% level) for the third specification.

Most of the estimated coefficients for macroeconomic variables are statistically significant at the 1% level. An increase in the real interest rate positively affects the risk of Islamic banks. Several previous studies have shown that a decrease in the interest rate increases the willingness to take risks. The relationship between the real interest rate and risk is positive for all three approaches.

The GDP growth rate has a significant negative impact on the risk of Islamic banks for VROAA and LnZscore. An increase in the GDP growth rate is generally associated with a decrease in bank risk.

The inflation rate has a positive and significant effect on risk, as approximated by VROAA and LnZscore. This implies that an increase in inflation raises bank risk.

The exchange rate has a significant positive effect on risk as measured by VROAA and LnZscore. The depreciation of the exchange rate increases risk.

Finally, the coefficient for the liquidity ratio (Intla) has a significant positive impact on risk, as approximated by VROAA and VROAE, but is not significant for the LnZscore specification. A higher level of liquidity increases the risk for banks.

Overall, the results indicate that equity capital, lagged dependent variables, bank size, interbank ratio, liquidity ratios, asset quality ratio, and macroeconomic variables have significant effects on Islamic banks' risk. The direction and significance of these effects vary across different specifications of risk measurement.

The relation between equity and profitability

Table 6 provides the estimated results for two subsamples of Islamic banks and conventional banks using equation (2). We used the Generalized Method of Moments (GMM) to estimate the dynamic panel data model proposed.

For Islamic banks, the coefficients related to our variable of interest, equity capital, are statistically significant at the 1% and 5% levels. This holds true for all three profitability measurement approaches. These coefficients have a negative sign, implying that an increase in capital is accompanied by a decrease in profitability. The coefficients for the capital variable range from -0.139 to -0.038 across the three profitability approximations. A 1% increase in capital leads to a decrease in profitability ranging from -0.1% to -0.03%. The coefficients for the lagged dependent variables, 0.364 for Return on Average Assets (ROAA), 0.157 for Return on Average Equity (ROAE), and 0.066 for Net Interest Margin (NIM), are positively and statistically significant at the 1% level.

These results deviate from the structure-conduct-performance paradigm, which suggests that an increase (or decrease) in capital should be followed by an increase (or decrease) in profitability. They are similar to the findings of studies by Naceur and Kandil (2009), and Gul et al. (2011).

Table 6. GMM results

	Profitability					
	Islamic Banks			Conventional Banks		
	(1)	(2)	(3)	(1)	(2)	(3)
ROAA_{it-1}	0.364 *** (0.000)			0.086 *** (0.004)		
ROAE_{it-1}		0.157 *** (0.000)			0.136 *** (0.000)	
NIM_{it-1}			0.066 *** (0.001)			0.754 *** (0.000)
EA_{it}	-0.038 *** (0.000)	-0.139* (0.051)	-0.052 *** (0.000)	0.269 *** (0.000)	1.188 *** (0.000)	0.065 *** (0.000)
ln GL_{it}	-1.743 *** (0.000)	-1.365 (0.592)	-1.591 *** (0.000)	-0.756 *** (0.001)	-0.505 (0.772)	0.356 *** (0.000)
ln TA_{it}	1.152 *** (0.002)	-0.011 (0.996)	1.777 *** (0.000)	0.793 *** (0.000)	1.541 (0.345)	-0.301 *** (0.000)
INTER_{it}	0.003 *** (0.000)	0.047 *** (0.000)	0.003 *** (0.000)	-0.0003 (0.308)	-0.009 *** (0.002)	-0.0002 (0.256)
LA_{it}	0.045 *** (0.000)	0.102 (0.146)	0.036 *** (0.000)	-0.045 *** (0.000)	-0.273 *** (0.000)	-0.005 (0.045)
LLPnir_{it}	-0.003 (0.241)	-0.030* (0.082)	-0.019 *** (0.000)	-0.011 *** (0.000)	-0.156 *** (0.000)	0.00014 (0.790)
TIR_{it}	-0.073 *** (0.000)	0.059 (0.118)	0.026 *** (0.000)	0.002 (0.390)	0.051 *** (0.002)	-0.004 *** (0.008)
INF_{it}	-0.098 ** (0.000)	0.07 (0.367)	0.037 ** (0.000)	0.052 *** (0.000)	0.243 *** (0.000)	0.0003 (0.940)
PIB_{it}	0.301 *** (0.000)	1.889 *** (0.000)	0.167 *** (0.000)	0.010 (0.220)	0.088 (0.217)	-0.009 ** (0.013)
Test de Sargan (p-value)	0.0952	0.1064	0.1150	0.1269	0.1083	0.0979
Test d'AR(2) (p-value)	0.9212	0.1355	0.4302	0.9614	0.7914	0.1240
Test de Wald (p-value)	0.000	0.000	0.000	0.000	0.000	0.000
Nombre de banques	66	66	66	83	83	83
Nombre d'observations	287	287	287	493	493	493

The dependent variable is profitability measured by: ROAA (first specification), ROAE (second specification), NIM (third specification) respectively. *, **, and *** indicate the degree of significance at the 1%, 5%, and 10% levels, respectively. The p-values are in parentheses. AR(2) means the test for autocorrelation of errors of order 2.

The Wald test indicates overall model significance for all three specifications at the 1% level. The test for second-order error autocorrelation rejects the H1 hypothesis, indicating the absence of second-order autocorrelation in the residuals. The Sargan test verifies the validity of the instruments used, and the calculated p-values reject the H₁ hypothesis, providing evidence for the validity of the instruments.

For Islamic banks, the coefficient of the logarithm of gross loans (lnGL) is negatively and significantly associated with average economic profitability (ROAA) and positively significant at the 1% level for net interest margin (NIM). However, it is no longer significant for average financial profitability. Bank size has a significant and positive effect on average economic profitability and net interest margin but is not significant for the other approximation of profitability (ROAE). Larger Islamic banks are believed to offer a wider range of financial products and services at lower costs. The interbank ratio has a positive and significant impact (at the 1% level) on all three measures of profitability. Islamic banks are classified as lenders rather than borrowers of funds, which provides them with liquidity. The liquidity ratio (net loans to total assets) has a positive effect on average economic profitability and net interest margin but is not significant for average

financial profitability. A higher provision for loan loss ratio (LLPnir) has a negative impact on the second specification of profitability at the 10% significance level and the third specification at the 1% significance level but has no significant impact on the other measure of bank profitability.

Most estimated coefficients for macroeconomic variables are significant at the 1% level. Economic growth positively affects all three profitability measures, as it stimulates the demand for bank loans. The inflation rate has a positive and significant effect on net interest margin, as higher inflation is associated with increased interest rates, which favor higher profitability. However, inflation negatively affects average economic profitability and has no effect on average financial profitability. The impact of the real interest rate on Islamic bank profitability remains ambiguous, with a negative effect on ROAA and a positive effect on net interest margin.

For conventional banks, the coefficients related to equity capital are statistically significant at the 1% level for all three profitability specifications. These coefficients have a positive sign, indicating that an increase (decrease) in capital is accompanied by an increase (decrease) in profitability. The coefficients for the capital variable range from 0.065 to 1.118 across the three profitability measures. A 1% increase in capital contributes to a profitability increase ranging from 0.06% to 1.11%. The lagged dependent variables have positive coefficients and remain significant at the 1% level, indicating persistent profitability.

These results confirm the structure-conduct-performance (SCP) paradigm, which states that an increase (decrease) in capital is followed by an increase (decrease) in profitability. They are similar to the findings of studies by Naceur (2003), Naceur and Omran (2011).

The Wald test indicates overall model significance for all three specifications at the 1% level. The test for second-order error autocorrelation rejects the H1 hypothesis, indicating the absence of second-order autocorrelation in the residuals. The Sargan test verifies the validity of the instruments used, and the calculated p-values reject the H1 hypothesis, providing evidence for the validity of the instruments.

For conventional banks, the coefficient of the logarithm of gross loans (lnGL) is negatively and significantly associated with average economic profitability (ROAA) and positively significant at the 1% level for net interest margin (NIM). However, it is no longer significant for the average financial profitability. Bank size has a significant and positive effect on average economic profitability. An increase in size allows for portfolio diversification and the realization of economies of scale and scope. However, size has a negative effect on net interest margin at the 1% significance level, which can be attributed to the "too big to fail" doctrine. The effect of size is no longer significant for average financial profitability (ROAE). The interbank ratio has a negative and significant impact (at the 1% level) on average financial profitability. If a bank excessively focuses on interest income through excessive lending, it may compromise its liquidity and solvency. The liquidity ratio (net loans to total assets) has a negative and significant effect on profitability across all three specifications. When loans are substantial, liquidity is affected, increasing the probability of default for marginal borrowers. The provision for loan loss ratio (LLPnir) has a negative impact on average economic profitability and average financial profitability at the 1% significance level but has no significant effect on net interest margin. If the LLPnir ratio is high, the bank is concerned about the solvency of its clients and is exposed to liquidity risk.

Half of the estimated coefficients for macroeconomic variables are significant at the 1% level. The impact of economic growth on bank profitability remains ambiguous, with a negative effect on net interest margin and no effect on the other profitability specifications. However, higher inflation rates are associated with increased interest rates, favoring higher profitability for net interest margin and economic profitability. These findings are consistent with the studies of Naceur (2003) and San and Heng (2013). The real interest rate has a negative effect on profitability, as approximated by the net interest margin, while it has a positive effect on average financial profitability.

In conclusion, the relationship between equity capital and profitability differs between Islamic and conventional banks. For Islamic banks, the SCP hypothesis is not supported. An increase (or decrease) in equity capital leads to a decrease (or increase) in profitability across all three specifications. For conventional banks, the structure-conduct-performance paradigm is confirmed. An increase (decrease) in equity capital leads to an increase (decrease) in profitability across all three specifications.

CONCLUSIONS

The results of this empirical study suggest that the hypothesis of moral hazard is not supported for both Islamic and conventional banks. This means that an increase (decrease) in equity capital is not associated with a decrease (increase) in risk, according to the three measures of risk used. However, the results confirm the SCP hypothesis for conventional banks, indicating that an increase (decrease) in equity capital is associated with an increase (decrease) in profitability, as measured by the three indicators of profitability. On the other hand, this relationship between capital and profitability is not observed for Islamic banks, where an increase (decrease) in equity capital is associated with a decrease (increase) in profitability, according to the three approaches of profitability measurement. These findings highlight the differences in the relationship between equity capital, profitability, and risk between Islamic and conventional banks.

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