Islamic and conventional bank margin's determinants: an evidence from the GCC Region

Done by:

Wassim Aladin

University of Valencia, Faculty of Economics

Under supervision of:

Joaquin Maudos

University of Valencia, Faculty of Economics

Abstract

This study analyzes the determinants of net interest margin in conventional banks or net profit-and-loss sharing margin in Islamic banks in the Gulf Cooperation Council or GCC region (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and United Arab Emirates). This region has adopted dual banking system when conventional banks operate side by side with Islamic banks. Using data for a sample of 71 banks, 54 conventional and 17 Islamic banks, and employing a dynamic model, the results show that the most significant economic impact on the intermediation margin is determined by credit risk, average operating costs and degree of risk aversion, which can permit us to conclude that policies should be aimed in the first place at managing appropriately the default risk, controlling costs and at improving efficiency and competition conditions. For the specific case of Islamic banks, we conclude that the theoretical model used so far does not satisfy the specific characteristics of these banks, and therefore cannot be applied on Islamic banking.

1 Introduction

The analysis of the evolution and determinants of net interest margin (NIM) is extremely important, since a small change in the margin has a huge impact on the profitability and performance of the bank as well as on the economy. High Net Interest Margins can hinder the growth of savings and investment and imply that the cost of using the financial system may become unaffordable for certain borrowers. Its impact is likely to be more severe for developing countries where a larger percentage of firms and individuals tend to depend on banks to meet their external funding needs.

Since the banking sector is a fundamental element in the channeling of funds between lenders and borrowers, it is necessary that this task of intermediation is carried out with the lowest costs possible. That is because the lower is the bank's net interest margin (or profit-and-loss sharing margin in Islamic banks), and thus the lower is the social costs of financial intermediation, the greater will be the social welfare.

Islamic banks are also expected to encourage the growth in the banking sector as being a business partner. By emphasizing the investment paradigm, the main role of Islamic banks is to distribute funds to productive financing, based on profit-and-loss sharing (PLS) mode of finance.

Our starting point is the method used in the pioneering study of Ho and Saunders (1981), who consider the banking firms as mere intermediaries between lenders and borrowers, and find that the optimal pure spread depends on four factors: the market power as a proxy for competition, the degree of risk aversion, the average size of bank operations, and the volatility of market interest rates. This model has been extended in several studies: McShane and Sharpe (1985) change the source of interest rate risk, situating it in the uncertainty of the money markets instead of the interest rates on credits and deposits; Allen (1988) expands the model to permit the existence of various types of credits as well as deposits; Angbanzo (1997) makes an extension of the model considering credit risk and interest rate risk; Maudos and Fernández de Guevara (2004) extend the model even more including average operating costs as a determinant of the intermediation margin, in addition they use the Lerner index of market power as a direct measurement of the degree of competition; Carbó and Rodríguez (2007) also extend the model by incorporating non-traditional activities, using a multi-output model with the aim of analyzing the relationship between bank margin and specialization.

This study analyzes the bank margin in the principal Gulf banking sectors, identifying the fundamental elements affecting this margin. The starting point for analyzing the determinants of the interest margin is the original model of Ho and Saunders (1981) and later extensions by other authors, but widened to take banks' operating costs as well as the financial crisis effect into account. Also, unlike the usual practice in the literature, we will use direct measurements of the degree of competition in the different markets, as done by Maudos and Fernandez Guevara (2004), calculated by means of concentration indices or Lerner indices of market power.

In this context, the model of the determinants of the intermediation margin has not been estimated for the specific case of the dual banking system in the Gulf Cooperation Council (GCC) region taking into account the impact of financial crisis over the period 2008-2010.

Distribution of conventional loan and Islamic financing in real sector can be optimized, if the pricing set by the bank is in accordance to market price or market return. This normal pricing will provide reasonable profit for entrepreneurs who obtain loan from conventional banks or financing from Islamic banks for their businesses. Unreasonable pricing, too high for example, will distort the market, reduce business interest, and will also reduce the effectiveness of intermediation function carried out by banks. High loan/financing price will make the attempt to encourage the activities in real sector becomes counterproductive.

The results of this study may be useful in the design of specific measures of economic policy. For example, if market power turns out to be the factor that most explain the evolution of the margin, public initiatives must be designed in order to encourage competition among banks. On the other hand, if a significant part of the variability is determined by the interest rate risk and the credit risk instead of the market power, public policies should be designed at achieving a climate of financial stability.

This study tries to identify the determinants of the net interest margin (NIM) in conventional banks, as well as the net profit-and-loss sharing margin (NPM) in Islamic banks, and to identify the factors that most explain the evolution of these margins, in order to suggest possible solutions that can be achieved to provide a better banking climate.

The rest of this article is organized as follows; Section 2 contains a brief background for Islamic banks. Section 3 is about the literature review. Section 4 discusses the theoretical model. Section 5 talks about the

empirical model, variables used, description of the sample and empirical results. Finally, section 6 contains the conclusions of the paper.

2 Islamic banking: background

In recent years, Islamic finance has penetrated the financial systems of a growing number of Western countries, despite of a general lack of principles governing this form of finance. With the increasing accumulation of wealth by oil exporting Islamic nations and the sharp rise in Muslim population inside and outside the Islamic world, the future of Islamic finance shows promise. Industries such as oil in the Gulf and tourism in Maghreb have a great growth potential and therefore large investment requirements. In addition, a bank that operates under the Islamic precepts can obtain access to a pool of different types of savings to finance their clients or their own. However, Islamic finance also face challenges, as it is in an initial phase of development. The main challenges are the lack of a uniform legal framework and, in some cases, an inadequate regulation of this different way of finance. It is also necessary to increase the transparency of these markets, especially in a context like the present, in which many investors doubt the benefits of financial innovation. Finally, liquidity in Islamic capital markets remains very thin.

Generally, it is possible to distinguish three general phases that have characterized the process of Islamic finance;

The first phase began with the establishment of joint institutions that offer a selected number of products in those countries where people had a certain familiarity with Islamic principles (e.g., Malaysia and some Middle Eastern countries in the decades of the 1960 and 1970). At this stage, some conventional banks decided to open Islamic windows through which they could meet the needs of business customers who wish to operate under the principles of the Shariah[1].

After that, a growing number of commercial banks around the world showed interest in the possibility of offering Islamic financial products. This interest did not only reflect the desire of these banks to exploit the business opportunities offered by a growing Muslim population in many countries, such as in the United Kingdom, but also was motivated by the desire to attract a growing number of international investors wishing to make transactions within the scope of Islamic law.

The second phase was characterized by the establishment of banks with purely Islamic vocation. Unlike the case of Islamic windows, Islamic

[1] Shariah refers to the holy laws and rules of the Qur'an

banks are institutions that operate one hundred percent following the concepts of Islam. It is important to highlight that the use of Islamic windows as a platform to penetrate the Islamic financial industry has been a practice more common in Southeast Asia than in the Arab World and / or Western countries, where the recent trend points to the establishment of banks purely Islamic, as are the recent cases of Kuwait, Syria, United Kingdom and Switzerland.

Finally, the third phase, perhaps the most spectacular to date has been characterized by the expansion of Islamic finance globally, and the development of a true Islamic capital market. At this stage, financial institutions offer a growing menu of Islamic products. Thus, terms such as sukuk (Islamic bonds), which were completely unknown in major financial centers a decade ago, today are on the menu of financial assets available for international investors.

Islamic Banking is based on profit and loss sharing (PLS) between the borrower and the bank (Khan and Mirakhor, 1987). Islamic banks maintain profit by mixing investment and commercial banking operations to engage in acceptable rates of return for depositors but in accordance to Islamic rules and principles. Unlike conventional banks, where money is considered as a commodity that can be bought and sold, Islamic banks treat money as a mean to facilitate transactions for trading purposes (Al-Kassim, 2005). Islamic banking rules are according to the Islamic *Shariah (norms & rules)* derived from the *Quran* and prophet Mohamed's (peace be upon him) sayings. There are five main contracts in Islamic finance: *Mudarabah*, *Musharakah*, *Murabahah*, *Ijarah* and *Salam*.

a) ***Mudarabah***: is a contract between two parties; one provides the capital and the other provides the labor to form a partnership to share the profits by predetermined proportions.

b) ***Musharakah***: is a contract between two or many parties to establish a commercial enterprise based on capital and labor. The profit and loss is shared at an agreed proportion (Hassan and Zaher, 2001).

c) ***Murabahah*** refers to a sale of a good or property with an agreed profit against a deferred or a lump sum payment. There are two types: the first one is between the client and the bank, whereas the second is between the bank and the supplier. The client (purchaser) orders a certain commodity through the bank, the bank then buys the commodity from the supplier and sells it to the client with a specified profit whereby the client can make a lump sum or a deferred payment to the bank (Iqbal and Molyneux, 2005).

d) ***Ijarah (leasing)***: in which two parties are involved: the leaser and the lessee. The leaser (bank) is the real owner of the asset or property that is rented out to the lessee (client) until full payment is received. The lessee has the option to keep the asset at the contract maturity or give it back to the bank. If all payments are received, the lessee can keep the asset but at a higher price than the usual asset price (Iqbal and Molyneux, 2005).

e) ***Salam***: is another contract where full payment for a good is paid in advance but the delivery of the good is made at an agreed future date (Iqbal and Molyneux, 2005).

In very brief, there are three main prohibitions imposed by Islam in Islamic finance: (i) treating with interest rate (ribah), (ii) engagement in excessive risk (gharar), and (iii) betting (maysir). Also, all financial transactions must be backed by a real asset.

Recently, the Islamic banking sector in the GCC region has witnessed tremendous growth and an increased demand for Shariah-compliant products and services.

3 Literature review

The literature on banking has developed various models over the years in order to explain the evolution of the intermediation margin. In particular, the pioneering study by Ho and Saunders (1981) considers the bank as an intermediary between lenders and borrowers, and shows that the optimal pure spread depends on four factors: the market power as a proxy for competition, the degree of risk aversion, the average size of bank operations, and the volatility of market interest rates.

Subsequently, the theoretical model by Ho and Saunders (1981) has been extended by other authors: Allen (1988) considers more than one type of loans with interdependent demands; Zarruk and Madura (1992) developed a model of the banking firm integrating the regulation of capital and deposit-insurance premium. These authors show that when the deposits are insured, a tightening of regulatory capital is reflected by a decline in bank margin under the assumption of decreasing and constant absolute risk aversion, but when they consider the increasing absolute aversion to risk they conclude an ambiguous relationship between the deposit-insurance premium and the margin; Angbazo (1997) incorporates credit risk and interest rate risk, as well as the interaction between these two types of risk; Saunders and Schumacher (2000) studies the determinants of the margin in six European countries and the USA. They

decompose the bank margins into a regulatory component, a market structure component and a risk premium component, and find that the more restricted the banking system is the larger appears to be the monopoly power and therefore the margin.

Of a special interest is the extension made by Maudos and Fernández de Guevara (2004) who makes an interesting contribution to the theoretical model by taking into account the average operating costs as a determinant of net interest income, and estimate it empirically for the main European banking sectors. Furthermore, they use direct measurements of market power (Lerner index) instead of structural indicators of competition (market concentration indicators). The authors conclude that the increase in the Lerner index in European banks influences the net interest margin positively. This effect, however, was counteracted by the fall in average operating costs, credit risk and implicit interest of payments, as well as the lower volatility of market interest rates. The authors find therefore that a situation of lower intermediation margins is compatible with an increase in market power.

On the other hand, a study made by Carbó and Rodríguez (2007) extends the theoretical model by including traditional as well as non-traditional activities, with the aim of studying the effect of specialization on the margin using a multi-output model. In order to do this, they estimate a dynamic model, considering that banks need to match the random deposit supply and the random demand of lending and non-traditional activities over periods. They find that diversification in non-traditional activities causes an increase in market power, and a decline in spread as a result of cross-subsidization; Maudos and Solis (2009) examine the determinants of NIM in the Mexican banking system, and find that high operating costs, high market interest rates volatility and increased market power imply higher intermediation margins. Furthermore, the bank margin's study has been also applied by several authors, like Gelos (2006), Williams (2007) who works on a sample of Australian banks, Tatum Blaise Tan (2012), Angelini and Cetorelli (2003), Jude (2005), Ben Khediri and Ben Khedhiri (2011), Saad and El-Moussawi (2012) and others.

The literature on bank margins for Islamic banks is hardly available. Hutapea and Kasri (2010) examined the relationship between the Islamic bank margin and its determinants, and then compared it with the bank margin of conventional banks in Indonesia for a sample of five banks, three conventional and two Islamic banks. They show that as interest rate volatility increases, Islamic bank margin responds negatively, whereas the conventional banks margin responds positively; Ascarya and Yumanita

(2010) analyzed the determinants of the NIM in conventional banks as well as the NPM in Islamic banks in Indonesia using multivariate analysis with a dynamic panel data. They found surprisingly that risk aversion, liquidity risk, implicit cost and non-performing loans have an insignificant effect over the NIM (or NPM).

4 Theoretical model

Theoretical models built to understand the developments in the bank margin often consist of the derivation of an optimal bank margin, taking into account market power and degree of risk aversion of the bank leaders. The basic assumption underlying these models is to consider the banking firm as an indivisible entity trying to achieve an objective of maximizing its margin.

The nature of Islamic bank margin is determined by the nature of its components. Islamic banks never have a predetermined-commitment to pay to depositors, since this violates the Shariah norms regarding Ribah. Thus, deposit or financing rates of Islamic banks' debt-based products[2] are known ex ante, while those of the equity-based products[3] are known ex post. Taken together, as the deposit rate and financing rate of the equity-based products of Islamic banks will be known at the end of period, it follows that the Islamic bank margin is ex post in nature[4]. Conversely, the deposit rate of conventional banks is a predetermined-commitment by the name of interest rate. Since the deposit and lending rates are predetermined as interest rate commitment, the net interest margin of conventional banks is known ex ante (Hutapea and Kasri 2010)

As financial intermediaries, Islamic and conventional banks normally face the same problems in their operations. The dealership model proposed by Ho and Saunders (1981) is the basic model for determining the bank margin. In this model the objective of the bank is to maximize the expected utility of its final wealth with respect to interest rates on loans and deposits (or financing and deposit rates in Islamic banks) that are considered as the key components of bank assets and liabilities. The

[2] Products of Islamic banks can be classified into debt-based and equity-based products. The debt-based (fixed-return) products are commonly based on the sale (trading) and lease of tangible assets with delayed payment, among others Murabahah (mark-up sale), Ijarah (leasing), Istisna' (sale to manufacture transaction) and Salam (sale with future delivery).

[3] The based-equity (variable-return) products employ PLS contracts such as Mudarabah (trust financing) and Musharakah (joint financing).

[4] Although in the extreme case, where all financing products are fixed-return (debt-based) and thus the financing rate is known ex ante, notice that the Islamic BM remains ex post since the deposit rate is unknown ex ante.

interest rates therefore are the most important decision variable that the bank seeks in order to maximize its wealth taking into account the risk/return of the bank portfolio and the objective of growth of the value of the bank measured by its final wealth.

The problem of maximizing the expected utility of the bank's final wealth at the end of period given the interest rates paid *a* and the interest rate received *b*, can be written as follows:

$$E[U(W \mid a,b)] = \lambda_a E\left[U\left(\widetilde{W} \mid deposit\ transactions\right)\right] + \lambda_b E\left[U\left(\widetilde{W} \mid loan\ transactions\right)\right] \quad \textbf{(1)}$$

In this model, the probabilities of offering deposits (λ_a) and demanding loans (λ_b) depend on the interest rates *a* and *b* earned by the bank and are defined by the following equations:

$$\begin{cases} \lambda_a = \alpha - \beta . a \\ \lambda_b = \alpha - \beta . b \end{cases} \quad \textbf{(2)}$$

where α and β represent respectively the intercept and slope of the loan demand and deposit supply functions.

As in Maudos and Fernández de Guevara (2004), the intuition of the model is as follows. Let us suppose that a new deposit reaches the bank before any new demand for loans. In this event, the bank will temporarily invest the funds received in the money market at an interest rate *r*, assuming a risk of reinvestment at the end of the period if money market interest rates fall. Similarly, if a new demand for loans reaches the bank before any new deposit, the bank will obtain the funds in the money market, and will therefore face a risk of refinancing if interest rates rise. Furthermore, the return of loans is uncertain because of the probability that some of them will not be repaid (credit risk). Consequently the bank will apply a margin to loans *b* and deposits *a* that will compensate for both interest rate risk and credit risk.

In this context, the initial wealth of the bank can be determined by the difference between its assets (loans L and net money market assets M), and its liabilities (deposits D):

$$W_0 = L_0 - D_0 + M_0 = I_0 + M_0 \quad \textbf{(3)}$$

With $L_0 - D_0$ being the net credit inventory (I_0).

The criticism by Lerner (1981) of the original model of Ho and Saunders (1981) is taken up incorporating into the model the productive nature of the banking firm by including the production costs associated

with the process of intermediation between deposits and loans. Thus, the operating costs of a banking firm are assumed to be a function of the deposits captured C(D) and the loans made C(L), so that the costs of the net credit inventory can be expressed as C(I) = C(L) + C(D).
With all these assumptions, the final wealth of the bank will be

$$W_T = I_0 + I_0 r_I + I_0 Z_I + M_0 + M_0 r + M_0 Z_M - C(I_0)$$
$$= W_0(1 + r_W) + I_0 Z_I + M_0 Z_M - C(I_0) \quad \textbf{(4)}$$

where $r_I = \frac{L_0 r_L - D_0 r_D}{I_0}$ is the average profitability of the net credit inventory, $r_W = \frac{I_0 r_I - M_0 r}{W_0}$ is the average profitability of the bank's initial wealth and $Z_I = Z_L \frac{L_0}{I_0} + Z_D \frac{D_0}{I_0} = Z_L \frac{L_0}{I_0}$ is the average risk of the net credit inventory. Z_M and Z_L reflect the uncertainty faced by the banks, which is of two kinds: interest rate risk, distributed as a random variable $Z_M \sim N(0, \sigma_M^2)$, and credit risk, the profitability of the loan is uncertain and is distributed as a random variable $Z_L \sim N(0, \sigma_L^2)$. In order to take into account the interaction between credit risk and interest rate risk the joint distribution of the two disturbances is assumed to be bivariate normal with non-null covariance (σ_{LM}).

The first-order conditions with respect to *a* and *b* from equation (1) are,

$$a = {}^1/_2 \frac{\alpha_D}{\beta_D} + {}^1/_2 \frac{C(D)}{D} - {}^1/_4 \frac{U''(\bar{W})}{U'(\bar{W})} [(D + 2M_0)\sigma_M^2 + 2L_0 \sigma_{LM}]; \quad \textbf{(5)}$$
$$b = {}^1/_2 \frac{\alpha_L}{\beta_L} + {}^1/_2 \frac{C(L)}{L} - {}^1/_4 \frac{U''(\bar{W})}{U'(\bar{W})} [(L + 2L_0)\sigma_L^2 + (L - 2M_0)\sigma_M^2 + 2(M_0 - L_0 - L)\sigma_{LM}];$$

So the optimal bank margin *s=a+b* is,

$$S = {}^1/_2 \left(\frac{\alpha_D}{\beta_D} + \frac{\alpha_L}{\beta_L}\right) + {}^1/_2 \left(\frac{C(L)}{L} + \frac{C(D)}{D}\right) - {}^1/_4 \frac{U''(\bar{W})}{U'(\bar{W})} [(L + 2L_0)\sigma_L^2 + (L + D)\sigma_M^2 + 2(M_0 - L)\sigma_{LM}]; \quad \textbf{(6)}$$

Where the determinants that explain the pure margin, according to the theoretical model, are:

(a) The competitive structure of the markets which is proxied by (α/β), where β is the elasticity of the demand for loans or financing and the supply of deposits, such the less is the value of β, i.e. the less elastic are the demand for credit or the supply of deposits, a higher margin can be applied by the bank exercising therefore monopoly power.

(b) Average operating costs with a positive sign, indicating that a higher margin will be required to cover the operating costs.

(c) Degree of risk aversion, expressed by($\frac{U''(\bar{W})}{U'(\bar{W})}$), the coefficient of absolute risk aversion, being positive given the assumption that the bank is risk averse (U'' < 0). Therefore, a higher degree of risk aversion would require a higher margin.

(d) The volatility of money market interest rates (σ_M^2).

(e) Credit risk (σ_L^2), also with a positive sign indicating that for a higher level of default risk, a higher margin would be applied.

(f) The interaction between the two previous risks, interest rate risk and credit risk, captured by their covariance (σ_{LM}).

(g) The average size of credit and deposit operations expressed by (*L+D*), and the total volume of credits ($L+2L_0$). We can observe a positive relation between the variable and the margin, which can be justified that, for a given value of credit risk and market risk, an operation of greater size would mean a greater potential loss, so the bank will require a greater margin.

5. Empirical model: variable selection, description of the sample and empirical results

5.1 Variable selection

5.1.1 Dependent variable: Bank Margin

The first maximizing behavior that can give rise to the bank is maximizing its NIM, in conventional banks, (or NPM in Islamic banks) that can be measured by the difference between interest earned by banks on their assets in conventional banks (or earning on financing activities in Islamic banks) and interest paid on their liabilities (or payments on deposits in Islamic banks) reported at average productive assets.

5.1.2. Explanatory variables

The explanatory variables selected for the determination of bank margin are similar to those used by Ho and Saunders (1981), Angbazo (1997), Maudos and Solis (2009) and Brock and Suarez (2000), Maudos and Fernandez de Guevara (2004), and Tatum Blaise Tan (2012). We classify the explanatory variables in three groups; a) the margin determinants derived from the theoretical model; b) ad hoc variables (variables not explicitly included in the theoretical model); and c) control variables of the macroeconomic conditions.

So the first group contains the principal determinants of the pure spread:

a) Bank competition

Lerner indices are included to capture banks' ability to exercise market power from facing inelastic demand for loans and supply of deposits. Lerner index, widely used in the specific case of banks is defined as the difference between the price and the marginal cost divided by the price, measures the capacity to set prices above the marginal cost, being an inverse function of the elasticity of demand and of the number of banks. The values of the index range from 0 (perfect competition) to 1 (monopoly). The empirical approach to the Lerner index is based on the procedure used in Maudos and Perez (2003) and Fernandez de Guevara et al. (2001) where the prices are calculated by estimating the average price of bank production (proxied by total assets) as a quotient between total revenues and total assets. Algebraically, the Lerner index is

$$lERNER_I = \frac{p_i - MC_i}{p_i} \qquad \textbf{(7)}$$

Where the price p_i is proxied as the total revenue (interest income + other operating income)/total assets, and marginal costs MC_i are estimated following this translogarithmic cost function:

$$ln\ C_i = \alpha_0 + ln\ TA_i + {}^1\!/_2\ \alpha_k (ln\ TA_i)^2 + \sum_{j=1}^{3} \beta_j ln\ w_{ji} + {}^1\!/_2 \sum_{j=1}^{3}\sum_{k=1}^{3} \beta_{jk} ln\ w_{ji}\ ln\ w_{ki} + {}^1\!/_2 \sum_{j=1}^{3} \gamma_j ln\ TA_i ln\ w_{ji} + \mu_1 Trend + \mu_2\ {}^1\!/_2\ Trend^2 + \mu_3 Trend\ ln\ TA_i + \sum_{j=1}^{3} \delta_j Trend\ ln\ w_{ji} + ln\ u_i \qquad \textbf{(8)}$$

where C_i is the bank's total costs (financial and operating), TA_i total assets, Trend is included in order to capture the effect of the technical progress, and $w_i$the price of the factors of production as defined below:

- w_1 = price of labor: personnel costs/total assets.[5]
- w_2 = price of physical capital: operating costs (except personnel costs) / fixed assets.
- w_3 = price of deposits: financial costs/deposits.

Considering that a panel data set is available, the costs function is estimated introducing fixed individual effects in order to capture the

[5] Actually it would be better to use personnel costs to employees' ratio, but unfortunately *Bankscope* does not provide such information.

influence of variables specific to each bank. We also impose in our estimations the restrictions of symmetry and degree one homogeneity in the prices of inputs. The estimated coefficient in our model is expected to have a positive sign, as a higher market power is likely to contribute to higher margins.

b) Average operating costs

They are defined as the ratio of the bank's personnel, administrative and other operating expenses to total assets. Banks with higher average operating costs are expected to have higher margins.

c) Degree of risk aversion

As in Maudos and Fernádez de Guevara (2004), the ratio equity/total assets is used as a proxy. As in the theoretical model, we expect a positive relation between this variable and bank margin, as firms that are more risk averse will require a higher margin in order to cover the higher costs of equity financing compared to other types of financing.

d) Interest rate risk

Theories and empirical evidences show that conventional banks would ask for a higher margin as a compensation when interest rates volatility increases. In contrast, we argue that Islamic BM reacts negatively to interest rate volatility. That is, as market interest rates volatility increases, Islamic banks need to increase their deposit rate or to decrease their financing rate. That is because, in the deposit market, as market interest rate increases, it is possible that Islamic bank's customer withdrawn their deposits and transfer them to the conventional banks, this risk is known as displaced commercial risk (displaced commercial risk usually is defined as an exposure when the Islamic banks are under market pressure to pay a return that exceeds the rate that has been earned on assets financed or when the return on assets is under-performing as compared with competitors' rates). In the financing (credit market), however, demand for Islamic banks' financing will also increase when market interest rates increase, as their prices are still lower. Therefore, as the market interest rates swing, up or down, Islamic banks are exposed to a certain degree of risk, which probably comes from the movement of either their depositors or users of funds. Thus, the higher the volatility of market interest rate, the bigger the displaced commercial risks faced by Islamic banks leading them to increase their deposit rate or to decrease their financing rate or operate at a lower margin.

The empirical proxying of this variable is based on the annual standard deviation of daily interest rates of three-month interest rate in the interbank market .

On the basis of daily interest rate data we have calculated the corresponding annual deviations in each of the countries analyzed in our sample.

e) Credit risk

Both Islamic and conventional banks have to face the risk of non-repayment or default on a credit or financing in their operations. This risk requires the bank to apply a risk premium implicitly in the interest rates charged for the operation. Credit risk will be proxied by the loans/total assets ratio[6]. A positive sign is expected, since banks specialized in the granting of loans (financing) are more exposed to credit risk.

f) Interaction between credit risk and interest rate risk

To proxy this variable we calculate the product of the measurement of credit risk and the interest rate risk, i.e. credit Risk and each of the variables of interest rate risk (standard deviation of 3-month interbank rate, standard deviation of 1-year treasury bonds).

g) Average size of operations/volume of loans

Likewise, the potential loss will be greater for those banks in which the volume of credits granted is greater, we expect a positive sign for this variable. The volume of loans granted (in logarithms) is used as a proxy for this variable, as proposed by Maudos and Fernandez de Guevara (2004).

In addition to the variables posited by the theoretical model as determinants of the pure spread, the empirical evidence shows that other variables also can affect the margin and must be included in the empirical estimations. Taking previous studies as a reference, the following variables are used:

h) Implicit interest payments

Implicit return to depositor, that reflects extra payments to depositors through service charge remission or other types of transfers, is positively related to the Islamic BM as well as the conventional BM. As the implicit return to depositors is a component of the operation costs of the banks, a

[6] Actually, it would be better to use the default rate as a proxy of credit risk for conventional banks and loan loss reserves/gross loans for Islamic banks, but due to the unavailability of information it couldn't be possible.

higher financing rate will be asked to cover the higher costs, or a lower deposit rate will be paid to depositors as a compensation for the free services offered, leading the bank margin in both cases to increase. In order to proxy this variable we will use net operating expenses of non-interest revenues, expressed as a percentage of total assets .

i) Opportunity costs of bank reserves

As in the case of conventional banks, Islamic banks have to fulfill reserve requirement regulation which reduces the banks' opportunity to give financing. Previous literatures suggest that the banks will request a higher financing rate as the reserves increase in compensation for the forgone opportunity. So, we expect that the Islamic BM, like the conventional BM, will respond positively to the opportunity cost of bank reserves. This variable is proxied by the ratio of liquid reserves/total assets, using the cash variable (cash and due from banks) as a proxy for bank reserves.

j) Quality of management

High quality management can be translated into a profitable composition of assets and a low cost composition of liabilities. The quality or efficiency of management is proxied by the cost to gross income ratio. We expect a negative sign, since an increase in this ratio, means a decrease in the efficiency or quality of management, and therefore will imply a lower margin.

Additionally, and with the aim of controlling for the possible effect of macroeconomic conditions on the evolution of the intermediation margin, we use the following variables:

k) Real GDP Growth

Silva, Oreiro, de Paula and Sobreira's (2007) study on bank spreads in Brazil suggests an ex-ante ambiguous effect of growth on interest spreads. On one hand, there can be a negative effect of GDP on bank spreads due to the "default effect" (i.e. good economic performance lowers bank default), while on the other hand, there could be a positive effect which according to the results obtained by Bashir (2000) and Beckmann (2007) can be explained to the fact that the positive development of economic activity, accompanied by an improvement of corporate profitability, lower costs related to bad and doubtful debts, and an increase in activity of banks, should lead to an improvement in the intermediation margin. Khawaja and Din (2007) found a negative relationship between real output

growth and bank spreads in their study on interest spreads in Pakistan. Their explanation is based on Bernanke and Gertler's (1989) findings, that a borrowers' creditworthiness deteriorates along with its net worth during recession, and as such, the borrowers can only borrow at higher rates, thereby raising the spreads.

l) Inflation

The sign is not determined a priori. Thus, some authors show that high inflation rates have an adverse effect on loan interest rates and this increase is reflected in higher intermediation margins (*Demirgüç-Kunt and Huizinga, 1999; Brock and Rojas, 2000; Martínez and Mody, 2004*). However, there is the possibility that the interest rates on liabilities may adjust to an inflationary shock more quickly than those on assets, so there will be a negative relationship between inflation and the intermediation margin (*Claeys and Vander Vennet, 2008*).

m) Financial crisis in 2008–2010

As a dummy variable (1 for years > 2007; 0, otherwise). Ex-ante, the impact of the financial crisis on BMs can be either positive or negative. The effect may be positive as it would reduce deposit rates and increase lending rates. The former could be the result of monetary stimulus, reducing the monetary rate, which may be reflected in bank deposit rates. Moreover, banks would lend at higher rates as borrowers become riskier during the crisis. In contrast, according to Doliente (2005), BMs decline as the number and levels of NPL rise during the crisis driving realized interest gains down. Similarly, the increase in actual defaulted or restructured loans pulls down the actual interest income from loan activities.

5.2 Description of the sample

The information used to estimate the model is taken from the *BankScope* database, using unconsolidated financial statements, or consolidated ones if the former was not available. The sample contains a total of 568 observations corresponding to a 71 of banking firms. By countries, UAE represents 28.2% of the total number of observations, Kuwait 19.2%, Saudi Arabia 15.6%, Bahrain 14.2% and Qatar & Oman 11.4% each. Finally by banks' type, Islamic banks represent 24% of the sample, 17 banks, and the remaining 76%, 54 banks, were for the Conventional banks.

[Table 1 about here]

Table 1 shows the descriptive statistics both of the bank margin and its explanatory variables for the whole sample of the GCC region considered. In the case of the variable being studied, *BM*, there has been a reduction of 16.5% in the period analyzed, from 3.29% in 2003 to 2.75% in 2010. Likewise, the market power, proxied by the Lerner index, has followed the same route with a reduction of 1.8% since 2003 till 2010 reaching an average of 12.62% .

An increase shall be observed in the average operating costs in the period under study from 1.97% in 2003 to 2.14% in 2010, considered as a bad indicator of banking developing. Risk aversion decreased in the years analyzed, though it must be borne in mind that it is being proxied by the equity/assets ratio, so it seems that Gulf banks did not make an effort to increase the bank capitalization and therefore did not make an effort to face losses or risks.

Regarding the interest rate risk variable measured by their standard deviations, we can observe an increase which can be translated into an increase in the interest rate risk. Credit risk, proxied by loans/assets ratio, has suffered an increase which implies an increase in the default risk faced by Gulf banks. The opportunity cost of reserves (liquidity) experimented a notable increase since 2003 till 2010, likewise the implicit interest payments increased during the period considered. The cost to income ratio representing the quality of management has increased significantly since 2003 till 2010 which means that the efficiency of the management has deteriorated in the period analyzed. Finally, regarding the macroeconomic variables, we can see an increase in the inflation rate and a decrease in the real GDP growth in the GCC region which are considered as a mean of the same rates in all the countries forming the GCC region.

5.3 Empirical Results

Table 2 outlines the correlation matrix among the variables.

[Table 2 about here]

This matrix helps to account for some econometric problems especially multicollinearity among independent variables. In general, most variables have low pair-wise correlation coefficients, except for some variables, like interest rate risk variable which has a high correlation with its interaction with the credit risk variable , something expected given that the interaction variables are the product of both risks. In addition, we can observe a high correlation coefficient between implicit interest payments and average operating costs, which could be harmful to the result of one of these two variables as shown later in the results section. But generally this table indicates that multicollinearity problem might not appear among the variables.

Since the dependent variable, BM, presents inertia in time, given that banks would need to match the random supply of deposits with the random demand of loans or financing, we consider as in Carbó and Rodriguez (2007) that the actual values of the margin are determined by their previous values. So the estimations are done with the GMM estimator as a dynamic model[7].

As the explanatory variables as well as the dependent variable analyzed have a correlation with the unobserved time-invariant individual effect for each bank, we will need a transformation like first-differencing in order to eliminate the bank individual effects. So as done by Maudos and Solis (2009), we use the methodology of Arellano and Bover (1995) and Blundell and Bond (1998), under which we estimate a system of equations in first-differences as well as in levels, i.e. the system GMM estimator. This system combines the standard set of equations in first-differences with suitably lagged levels as instruments, and an additional set of equations in levels with suitably lagged first-differences as instruments. Two-step GMM estimators are used with asymptotic standard errors robust to heteroskedasticity as we can see in Table 3.

[7] Actually, we also did the estimates with a static model (Fixed effects), although we didn't report it due to the inertia that present s the bank margin. The results were significant and satisfied the predicted signs of almost all the variables, and it is available upon request.

[Table 3 about here]

Moreover, in order to avoid the endogeneity problem which considers the possibility that the explanatory variables are not strictly exogenous, as Lerner index for example. In this case, and given the endogeneity of the cost and prices, the variable therefore is not exogenous. So we use lagged levels and lagged differences of the explanatory variables as instruments.

In order to determine the consistency of the estimators, we first verify the validity of the instruments using the Hansen over-identifying test. Table 3 shows no evidence to reject the null hypothesis that the model is correctly specified and the instruments are valid. Secondly, we use the statistic proposed by Arellano and Bond (1991) to test the lack of serial correlation of the errors in levels. The evidence shows first-order serial correlation in differences (by construction), but no significant second-order serial correlation. Therefore, we accept the validity of the implementation of the dynamic model.

Table 3 shows the results of the estimation of the explanatory equation of the margin using the GMM estimators. It shows that in general all the variables are statistically significant and present the signs predicted, except for the case of implicit interest payments which is significant but with a negative sign instead of positive, which might be due to the uncertainty about the quality of the proxy used for this variable in the literature so far, in addition to the high correlation coefficient that presents with average operating costs as can be seen in table 2. The insignificance of some variables can be due to the inclusion of Islamic banking in these estimates which we will see later that our theoretical model is not appropriate for the Islamic banks case.

[Table 4 about here]

Table 4 is estimated to compare the results in two dimensions, Islamic banks on one hand and on the other conventional banks. Although the results are insignificant[8] for the case of Islamic banks, the sign was as expected for the variable interest rate risk. As we can see, as predicted the sign is negative, that is, in the deposit market, as market interest rate increases, it is possible that Islamic bank's customer withdrawn their deposits and transfer them to the conventional counterpart (displaced

[8] The insignificance of the results may be due to the very small sample available for the Islamic banks represented by only 17 banks in the entire region under study. Besides, we can attribute it to the possibility of that our theoretical model does not fit for the specific characteristics of Islamic banking.

commercial risk). In the financing (credit market), however, demand for Islamic banks' financing will also increase when market interest rates increase, as their prices are still lower compared to the credit interest rate of the conventional banks.

On the contrary, in the case of conventional banks, all the variables are significant and presents the predicted signs, except for the implicit interest payments variable which is significant but with a different sign than the predicted one. As we mentioned previously, this can be due to the uncertainty about the quality of the proxy used for this variable in the literature so far, in addition to the high correlation coefficient that presents this variable with average operating costs. For the rest of variables, we can observe that all variables present the expected signs.

Thus, market power, proxied by the Lerner index, affects the bank margin positively. Interest rate risk also presents the expected positive sign, that is, conventional banks would ask for a higher margin as a compensation when interest rate risk increases. Likewise, the bank that assume greater credit risk presents higher interest margins. Risk aversion also presents the expected positive sign.

Average operating costs also presents the expected sign, as the theoretical model predicts, the banks that bear higher average operating expenses need to operate with higher margins in order to enable them to offset their higher transformation costs. This result is consistent with that obtained by Brock and Rojas (2000), Martínez and Mody (2004), Fernández de Guevara (2004) and Maudos and Fernández de Guevara (2004) for European banks.

The interaction between interest rate risk and credit risk is negative, implying that the greater the volatility of interest rates and the greater the exposure to default risk are, the less is the effect on the margin. The negative sign may be explained by the result obtained by Brock and Rojas (2000) that non-performing loans are associated with smaller spreads in some countries of Latin America because of inadequate provisioning for loan losses. Another possible explanation given by the authors is that, on the assumption that banking authorities are reluctant to close banks in trouble and may encourage high risk, banks with a high proportion of bad loans may lower spreads as a way of trying to encourage the borrowers to pay the credit back as they have more flexibility regarding the credit prices, and by that trying to solve their problems.

Another determinant of the bank margin is the size of the transactions. The results show that banks with larger operations incur higher risk, and thus charge a higher margin. Also, as expected the sign

turned out to be positive in the case of opportunity cost of reserves. In addition, we can see that management quality sign was negative as expected (a higher value of the variable implies lower efficiency and therefore lower margins).

Regarding the macroeconomic variables, inflation demonstrated a negative sign indicating that the interest rates on liabilities may adjust to an inflationary shock more quickly than those on assets, which implies lower bank margins. Likewise, the financial crisis variable showed also a negative sign which according to Doliente (2005), BMs decline as the numbers and levels of NPL rise during the crisis, driving realized interest gains down. Similarly, the increase in actual defaulted or restructured loans pulls down the actual interest income from loan activities.

Unlike the inflation and financial crisis, the real GDP growth presented a positive sign which can be explained to the fact that the positive development of economic activity, accompanied by an improvement of corporate profitability, lower costs related to bad and doubtful debts, and an increase in activity of banks, should lead to an improvement in the intermediation margin.[9]

[Table 5 about here]

The elasticities shown in Table 5, that represent the economic significance of bank margin's determinants in the case of conventional banks, show that the evolution of the bank margin in the banking sectors of the GCC region responds more to variations in credit risk, variations in average operating costs, and variations in the degree of risk aversion respectively. In the particular case of credit risk, a 10% reduction in this variable would enable the bank margin to be reduced by 49.23%, its reduction in the period analyzed being one of the most important factors in explaining the fall of the bank margin in the GCC region. However, a 10% reduction in average operating costs would reduce the margin by 16.92% showing the importance of including this variable in out theoretical model as done by Maudos and Fernandez de Guevara (2004) and Maudos and Solis (2009). Likewise, a 10 % reduction in degree of risk aversion would produce a reduction of 16.82% in the bank margin.

[9] We also did the estimates for the periods before and after the crisis separated in order to see the effect of the crisis on the bank margin, but due to the small sample that we have in the period after the crisis we couldn't confirm the validation of the model. While in the period before the crisis, the model was confirmed and the results were significant and presented the predicted signs.

6 Conclusions

Starting from the model of Ho and Saunders (1981) and later extensions by other authors, this study analyses the determinants of the bank margin in the countries that form the GCC region on the basis of a broad sample of banks in UAE, Saudi Arabia, Oman, Kuwait, Qatar and Bahrain in the period 2003-2010. The model shows that the bank margin depends on the competitive conditions of the market, interest rate risk, credit risk, average operating expenses and the risk aversion of banking firms, as well as on other variables not explicitly introduced into the model (opportunity cost of reserves, implicit interest payments and quality of management), in addition to the macroeconomic variables (real GDP growth, inflation and financial crisis).

The contributions of this paper in relation to other studies on the banking system are as follows. First, we use a complete model that includes previous contributions by other authors, incorporating the original model of Ho and Saunders (1981), average operating costs and the effect of the financial crisis (Allen, 1988; Angbazo, 1997; Maudos and Fernández de Guevara, 2004) using the GMM estimator as a dynamic model for the estimations. Second, the model is estimated empirically for the GCC region's banking system for the first time. Finally, the study includes a comparison between Islamic banks and conventional banks.

In the theoretical setting, we argued that Islamic banks are not remote from the interest rate volatility in their presence under a dual banking system like the GCC region's. Unfortunately and as we observed in the results mentioned previously, we can conclude that our theoretical model is not applicable on Islamic banks as it is on conventional ones, since it does not fit the special characteristics of Islamic banking.

The results show that the most significant economic impact on the intermediation margin is determined by credit risk, average operating costs, and the degree of risk aversion. The results also show that, in general, we obtain the signs expected in the coefficients of the variables considered in the literature. Average operating costs is demonstrated to be from the most significant variables in the explanation of the bank margin as shown by our dynamic model. In this respect, the containment of average costs experienced in the GCC region in recent years has been a decisive factor in enabling bank margins to be reduced. This shows the importance of the inclusion of operating costs as an endogenous variable, as done by Maudos and Guevara (2004) and Maudos and Solis (2009).

In the light of the evidence obtained, and from an economic policy orientation, the results allow us to conclude that policies should be aimed in the first place at controlling the risk resulting from the credits given to the clients, trying in this respect to adopt more sophisticated risk management models. In addition, to controlling the average operating costs. Thus, banking firms with high operating costs should pass them on to their clients by setting higher margins. Finally, policies should be aimed at increasing competition in the banking sector, and at favoring more stable macroeconomic conditions.

Tables

Table 1: Descriptive statistics

	2003		2010	
	Mean	**σ**	**Mean**	**σ**
Bank Margin %	3.2900	2.2890	2.7470	1.8517
Market Power %	12.8481	0.0732	12.6222	0.0751
Operating Costs %	1.9683	1.2736	2.1411	2.4490
Degree of Risk Aversion %	20.0618	16.0355	19.5989	14.2833
Standard Deviations of Interest Rates	0.1630	0.1065	0.1752	0.0797
Credit Risk %	50.8330	19.9958	52.7599	20.4042
Interaction CR&IRR	0.0739	0.0465	0.0908	0.0542
Average Size of Operations	2.9637	0.7349	3.4643	0.8808
Opportunity Cost of Reserves %	3.2615	3.6863	7.5216	6.4911
Implicit Interest Payments %	0.9275	0.8024	1.0483	1.6057
Management Quality %	41.1216	12.2643	58.4221	113.8017
Inflation %	1.4127	1.3599	3.2915	1.3820
Real GDP Growth %	4.9648	1.7877	4.7563	4.2087

Source: BankScope and own elaboration.

Table 2: Correlation matrix

	Bank Margin	Market Power	Operating Costs	Degree of Risk Aversion	Interest Rate Risk	Credit Risk	Interaction CR&IRR	Average Size of Operations	Opportunity Cost of Reserves	Implicit Interest Payment	Management Quality	Inflation	Real GDP Growth	Financial Crisis
Bank Margin	1													
Market Power	0.1606	1												
Operating Costs	0.14	-0.096	1											
Degree of Risk Aversion	0.1052	0.049	0.2979	1										
Interest Rate Risk	-0.0198	0.034	-0.0264	0.0089	1									
Credit Risk	0.2456	0.073	-0.3056	-0.0515	0.0014	1								
Interaction CR&IRR	0.0599	0.059	-0.1416	-0.2147	0.8453	0.4	1							
Average Size of Operations	-0.0271	0.015	-0.3963	-0.6676	0.0784	0.59	0.3259	1						
Opportunity Cost of Reserves	-0.0505	-0.087	0.0708	-0.1425	-0.0076	0.09	0.0492	0.1614	1					
Implicit Interest Payments	0.027	-0.095	0.9463	0.1665	-0.0257	-0.27	-0.1177	-0.2906	0.0469	1				
Management Quality	-0.135	-0.14	0.3197	0.0139	-0.0083	-0.19	-0.1023	-0.1847	0.194	0.2528	1			
Inflation	0.0003	0.053	-0.0544	0.0051	0.5537	0.09	0.5414	0.088	0.0905	-0.0495	-0.0322	1		
Real GDP Growth	0.0478	0.095	-0.0826	0.1068	0.0923	-0.09	0.0712	-0.0729	-0.1226	-0.0521	-0.0783	0.3136	1	
Financial Crisis	-0.0796	-0.035	0.0698	-0.066	0.3791	0.09	0.3673	0.1906	0.2503	0.0654	0.1354	0.1759	-0.3077	1

Source: BankScope and own elaboration.

Table 3: Econometric estimates of the GMM model

Dependent Variable: Bank Margin				
Variable	**Coefficient**	**t-statistic**	**Corrected Standard Errors**	**p-value**
Dependent Variable (t-1)	0.828	27.10	0.03	0.000
Market Power	0.013	3.11	0.25	0.003
Operating Costs	0.757	2.99	0.01	0.004
Degree of Risk Aversion	0.024	3.32	0.00	0.001
Interest Rate Risk	0.005	1.36	0.01	0.179
Credit Risk	0.021	2.05	0.01	0.044
Interaction CR&IRR	-0.005	-0.73	0.01	0.468
Average Size of Operations	0.003	2.45	0.00	0.017
Opportunity Cost of Reserves	0.007	1.17	0.01	0.246
Implicit Interest Payments	-1.358	-5.37	0.25	0.000
Management Quality	0.005	2.06	0.00	0.043
Inflation	-0.020	-3.40	0.01	0.001
Real GDP Growth	0.031	3.55	0.01	0.001
Financial Crisis	-0.287	-3.89	0.07	0.000
Constant	-2.788	-4.85	0.57	0.000
Number of Observations	497			
Number of banks	71			
Arellano-Bond_1 [p-value]	0.041			
Arellano-Bond_2 [p-value]	0.574			
Sargan test [p-value]	0.126			
Hensen test [p-value]	0.390			

Note 1: The reported t-statistics are based on robust standard errors.
Note 2: Arellano-Bond_1 (2) are tests for first (second)-order serial correlation, asymptotically N(0, 1). These test the first-differenced residuals in the system GMM estimators.
Note 3: The Hansen test is a test of overidentification restrictions. Under the null hypothesis, the test statistic is distributed as a chi-squared in the number of overidentifyng restrictions.
Note 4: System GMM results are two-step estimates.
Source: BankScope and own elaboration.

Table 4: Econometric estimates (GMM) for Islamic and conventional banks separated

Dependent Variable: Bank Margin

	Islamic Banks		Conventional Banks	
Variable	**Coefficient**	**t-statistic**	**Coefficient**	**t-statistic**
Dependent Variable(t-1)	0.562	1.47	0.565	18.85
Market Power	0.033	0.31	0.015	4.76
Operating Costs	3.158	0.80	0.288	2.47
Degree of Risk Aversion	0.049	0.36	0.028	6.27
Interest Rate Risk	-0.020	-0.26	0.010	3.16
Credit Risk	0.122	1.62	0.032	5.15
Interaction CR&IRR	0.030	0.26	-0.012	-2.52
Average Size of Operations	-0.002	-0.27	0.005	2.58
Opportunity Cost of Reserves	0.236	1.03	0.017	2.03
Implicit Interest Payments	-3.233	-0.92	-0.276	-2.27
Management Quality	-0.056	-0.90	-0.002	-4.66
Inflation	-0.029	-0.58	-0.023	-3.52
Real GDP Growth	0.021	0.31	0.028	3.42
Financial Crisis	-0.517	-0.87	-0.357	-5.23
Constant	-7.166	-1.45	-3.181	-4.45
Number of Observations	119		378	
Number of banks	17		54	
Arellano-Bond_1 [p-value]	0.044		0.022	
Arellano-Bond_2 [p-value]	0.461		0.181	
Sargan test [p-value]	0.381		0.150	
Hensen test [p-value]	1.000		0.057	

Source: BankScope and own elaboration.

Table 5: Economic significance of BM determinants

Variable	Elasticity
Market Power	5.9
Operating Costs	16.92
Degree of Risk Aversion	16.82
Interest Rate Risk	0.17
Credit Risk	49.23
Interaction CR&IRR	-0.11
Average Size of Operations	0.48
Opportunity Cost of Reserves	2.42
Implicit Interest Payments	-7.62
Management Quality	-2.45
Inflation	-3.53
Real GDP Growth	4.63

Note: These elasticities represent the economic significance of the bank margin's determinants in the conventional banks case, given that the results regarding Islamic banks turned out to be insignificant.
Source: BankScope and own elaboration.

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