

Determinants of Bank Profitability in Macao

Anna P. I. Vong

Faculty of Business Administration, University of Macau

Hoi Si Chan

Faculty of Business Administration, University of Macau

Abstract

This paper examines the impact of bank characteristics as well as macroeconomic and financial structure variables on the performance of the Macao banking industry. Our results show that the capital strength of a bank is of paramount importance in affecting its profitability. A well-capitalised bank is perceived to be of lower risk and such an advantage will be translated into higher profitability. On the other hand, the asset quality, as measured by the loan-loss provisions, affects the performance of banks adversely. In addition, banks with a large retail deposit-taking network do not achieve a level of profitability higher than those with a smaller network. Finally, with regard to macroeconomic variables, only the rate of inflation exhibits a significant relationship with banks' performance.

1. Introduction

As financial intermediaries, banks play an important role in the operation of an economy. This is particularly true in the case of Macao where no debt market exists. Here, banks are the sole providers of funds, and their stability is of paramount importance to the financial system. As such, an understanding of determinants of their profitability is essential and crucial to the stability of the economy.

In banking literature, the determinants of profitability are empirically well explored although the definition of profitability varies among studies. Disregarding the profitability measures, most of the banking studies have noticed that the capital ratio, loan-loss provisions and expense control are important factors in achieving high profitability. In Macao, a relatively few studies have been performed on the determinants of bank profitability. The study of Wong and Cheung (1997) is by far the principal one which concludes that the banking industry in Macao is rather concentrated, with one single group of banks generating the highest level of profits. However, the factors which explain such a good performance are not empirically explored in the study.

The objective of this paper is to examine the contribution of bank-specific as well as macroeconomic and financial structure factors to the variation in profitability across banks and over time in Macao. Utilising bank level data for the period 1993-2007, we adopt the panel data regression to determine the important factors in achieving high profitability. To this end, a comprehensive set of internal characteristics is examined. Meanwhile, when studying the relationship between profitability and bank-specific characteristics, macroeconomic as well as financial structure indicators are also included to control for the effect of external factors.

The remainder of the paper is organised as follows. A review of the relevant literature regarding the determinants of banking profitability is given in Section 2. Section 3 presents the data and methodology to be applied while Section 4 contains the empirical results. Lastly, the conclusion will be given in Section 5.

2. Literature Review

There is an extensive body of literature that seeks to identify the determinants of bank performance. While some studies¹ focus on the understanding of bank profitability in a particular country, others² concentrate their analysis on a panel of countries. No matter whether it is a single country or a panel of countries study, the determinants of bank profitability can be divided into two main categories, namely internal factors and external factors.

2.1 Internal determinants

Internal determinants of bank performance can be defined as factors that are influenced by a bank's management decisions. Such management effects will definitely affect the operating results of banks. Although a quality management leads to a good bank performance, it is difficult, if not impossible, to assess management quality directly. In fact, it is implicitly assumed that such a quality will be reflected in the operating performance. As such, it is not uncommon to examine a bank's performance in terms of those financial variables found in those financial statements.³ Of those statements, the balance sheet and income statement are the two principal ones.

(i) Balance sheet

The balance sheet is an integral part of financial statements that highlights the financial position of a bank at a single point in time. It reflects the bank's management policies and decisions in the allocation of resources. Balance sheet items are direct indicators of the earning power and the cost of banks. From the financial statement, a variety of variables capable of influencing the bank's performance can be discerned. The determinants that receive most attention in the banking literature are costs, asset and liability composition and size. As a measure of bank costs, the

¹ Examples of studies include Berger (1995) and Guru et al. (2002).

² Such studies include Demirguc-Kunt and Huizingha (1999) and Abreu and Mendes (2000), to name a few.

³ Financial data in ratio form is better since results are comparable across firms and over time.

capital ratio has long been a valuable tool for assessing capital adequacy and should capture the general safety and soundness of banks. It is generally believed that well-capitalised banks face lower expected costs of financial distress and such an advantage will then be translated into high profitability.

In his study of the determinants of banks' performance for twelve countries selected from Europe, North America and Australia, Bourke (1989) notices a significant positive relation between capital adequacy and profitability. He shows that the higher the capital ratio is, the more profitable a bank will be. Similarly, the studies of Berger (1995) and Anghazo (1997) conclude that banks which are well-capitalised are more profitable than the others in the USA.

The positive relation between the capital ratio and profitability is not limited to the US banking industry. In the study of banking profitability across eighteen European countries for the period 1986-1989, Molyneux and Thornton (1992) also find that the capital ratio impacts banks' performance positively although such relationship is confined to just the state-owned banks. Demirguc-Kunt and Huizinga (1999) conduct a more comprehensive study which examines the determinants of banking performance for 80 countries, both developed and developing, during the period 1988-1995. They conclude that foreign banks have higher profitability than domestic banks in developing countries, while the opposite holds in developed countries. Nevertheless, their overall results show support for the positive relationship between the capital ratio and financial performance.

In addition to the capital ratio, many researchers include the asset and liability composition ratios as internal determinants of bank performance. Deposits and loans are considered to be the most important balance sheet indicators because they represent a sign of traditionalism of banking activities. Although bank loans are the main source of revenues and are expected to affect profits positively, findings from various studies are not conclusive. While the study by Abreu and Mendes (2000) documents a positive relationship between the loan ratio and profitability, studies by Bashir and Hassan (2003) and Staikouras and Wood (2003) show that a higher loan ratio actually impacts profits negatively. The latter study notices that banks with

more non-loan earnings assets are more profitable than those that rely heavily on loans.

Finally, the size of bank is also included to account for size-related economies and diseconomies of scale. Size is a result of a bank strategy, but the variable alone does not guarantee the earning of excess returns. Boyd and Runkle (1993), in their banking performance study, conclude that an inverse relation exists between size and profitability. Similar results are obtained by Miller and Noulas (1997) in the USA, Naceur (2003) in Tunisia and Jiang *et al.* (2003) in Hong Kong, implying that larger banks achieve a lower level of profits than smaller ones. However, findings from both Sinkey (1992) and Staikouras and Wood (2003) are mixed. The former shows that firm size impacts banking profitability negatively for large banks but positively for small ones. The latter also concludes that medium-sized banks earn the highest return followed by small banks. This may suggest that inter-bank market is competitive and efficient since banks with a large retail deposit-taking network do not necessarily gain a cost advantage.

(ii) Income statement

While the balance sheet concentrates on a bank's financial position, the income statement measures the success of its operations for a given period of time. Ratios obtained from the income statement are also known as operations ratios because they illustrate the management efficiencies in generating revenue and at the same time controlling cost.

One of the most important internal factors that can be constructed from the income statement is the efficiency in expenses management. As conventional wisdom suggests, the higher the expense of a bank, the lesser the bank's profitability will be. Such a negative relation between expenses and profitability has been supported by studies of Bourke (1989) and Jiang *et al.* (2003), implying that profitable banks are able to operate at lower cost.

On the contrary, Molyneux and Thornton (1992) find that the expense variable affects European banking profitability positively. They propose that high profits earned by firms in a regulated industry may be appropriate in the form of higher salary and wage expenditures. Their findings support the efficiency wage theory, which states that the productivity of employees increases with the wage rate. This positive relationship between profitability and expenses is also observed in Tunisia (Naceur 2003) and Malaysia (*Guru et al.* 2002). The proponents argue that these banks are able to pass their overheads to depositors and borrowers in terms of lower deposit rates and/or larger lending assets.

Apart from overhead expenditures, banks are also subject to direct taxation through corporate tax and other taxes. Although the tax rate on corporate profits is not a choice for banks, yet the bank management should be able to allocate its portfolio to minimise its tax. Since consumers face an inelastic demand for banking services, most banks are able to pass the tax burden to the consumers. Such a positive relationship between the tax variable and profitability is confirmed by Demirguc-Kunt and Huizinga (1999), Bashir (2000) and Jiang *et al.* (2003).

Another important determinant which could be derived from the income statement is the non-interest income ratio. When banks are more diversified, they can generate more income sources, thereby reducing its dependency on interest income which is easily affected by the adverse macroeconomic environment. The results of Jiang *et al.* (2003) show that diversified banks in Hong Kong appear to be more profitable. Gischer and Juttner (2001), however, find that fee-income generating businesses actually exert a negative impact on banks' profitability. They attribute such a finding to the fact that those fee-income generating businesses, such as trades in currencies and derivatives, credit cards provisions, are subject to more intense competition, especially on an international basis than those traditional interest income activities.

2.2 External determinants

External determinants of bank profitability are factors that are beyond the control of a bank's management. They represent events outside the influence of the bank.

However, the management can anticipate changes in the external environment and try to position the institution to take advantage of anticipated developments. The two major components of the external determinants are macroeconomic factors and financial structure factors.

(i) Macroeconomic variables

Macroeconomic conditions may affect banking performance in a number of ways. Firstly, there will be a higher demand for bank credit in times of economic boom than in times of recession. A high aggregate growth rate may strengthen the debt servicing capacity of domestic borrowers, and therefore, contribute to less credit risk. Alternatively, adverse macroeconomic conditions hurt banks by increasing the amount of non-performing loans. Thus, it is expected that an improvement in economic growth helps bank performance. Bourke (1989) presents evidence that economic growth, if particularly, associated with entry barriers to the banking market, would potentially lift banks' profits. Other studies that recognise the importance of market growth on banking performance include Guru *et al.* (2002), Gerlach *et al.* (2004), Bashir (2000) and Nier (2000).

Secondly, it is generally believed that a rising interest rate should lead to higher banking sector profitability by increasing the spread between the saving and the borrowing rates. Hanweck and Kilcollin (1984) find that this relationship is particularly apparent for smaller banks in the USA during the 1976-1984 period. They notice that falling interest rates during recession lead to slower growth in loans and increase in loan loss. Consequently, banks, particularly the small ones, may have difficulty in maintaining profit as market rate drops. Further studies by Demirguc-Kunt and Huizinga (1999), Staikouras and Wood (2003) and Cheang (2005) all notice a positive relationship between interest rates and bank profitability.

Finally, the effect of inflation is also another important determinant of banking performance. In general, high inflation rates are associated with high loan interest rates and thus high income. Perry (1992), however, asserts that the effect of inflation on banking performance depends on whether inflation is anticipated or unanticipated.

If inflation is fully anticipated and interest rates are adjusted accordingly, a positive impact on profitability will result. Alternatively, unexpected rises in inflation cause cash flow difficulties for borrowers, which can lead to premature termination of loan arrangements and precipitate loan losses. Indeed, if the banks are sluggish in adjusting their interest rates, there is a possibility that bank costs may increase faster than bank revenues. Hoggarth *et al.* (1998) even conclude that high and variable inflation may cause difficulties in planning and in negotiation of loans.

The findings of the relationship between inflation and profitability are mixed. Although the studies of Guru *et al.* (2002) in Malaysia and Jiang *et al.* (2003) in Hong Kong show that higher inflation rate leads to higher bank profitability, the study of Abreu and Mendes (2000), nevertheless, reports a negative coefficient for the inflation variable in European countries. In addition, Demirguc-Kunt and Huizinga (1999) notice that banks in developing countries tend to be less profitable in inflationary environments, particularly when they have a high capital ratio. In these countries, bank costs actually increase faster than bank revenues.

(ii) Financial structure variables

Many studies in the banking literature investigate whether financial structure, which is defined as the relative importance of banks, plays a role in determining banking performance. In general, a high bank asset-to-GDP ratio implies that financial development plays an important role in the economy. This relative importance may reflect a higher demand for banking services, which in turn, attracts more potential competitors to enter the market. When the market becomes more competitive, banks need to adopt different strategic moves in order to sustain their profitability.

Demirguc-Kunt and Huizinga (1999) present evidences that financial development and structure variables are very important. Their results show that banks in countries with more competitive banking sectors, where bank assets constitute a large portion of GDP, generally have smaller margins and are less profitable. Also, they notice that countries with underdeveloped financial systems tend to be less efficient and adopt less-than-competitive pricing behaviours. In fact, for these countries, greater

financial development can help to improve the efficiency of the banking sector. Consequently, the market structure of the banking industry shows important implications for profitability.

Furthermore, studies by Smirlock (1985), Bourke (1989) and Staikouras and Wood (2003) suggest that industry concentration has a positive impact on banking performance. The more concentrated the industry is, the greater the monopolistic power of the firms will be. This, in turn, improves profit margins of banks. However, there are also some studies that report conflicting results. For example, Naceur (2003) reports a negative coefficient between concentration and bank profitability in Tunisia. Also, Karasulu (2001) finds that the increasing concentration does not necessarily contribute to profitability of the banking sector in Korea.

3. Data and Methodology

The bank-specific variables being examined in this study are derived from both the income statements and the balance sheets of commercial banks published in the Macao SAR Official Gazette Series II. The data set covers a 15-year period from 1993 to 2007, with a sample of five different banks which account for about 75% of the total asset and the same percentage of loans in the banking sector as at the end of 2007.⁴ All the accounting information is consolidated on 31 December of each year.

With regard to the macroeconomic variables, the data of economic growth, inflation rate and interest rates are obtained from the Macao Statistics and Census Service as well as the Monetary Authority of Macao. The real interest rate is calculated by taking the difference between the nominal interest rate and the inflation rate.

In this study, the performance of a bank is measured by its return on assets (ROA). The ROA, defined as net income divided by total assets, reflects how well a bank's management is in using the bank's real investment resources to generate profits. As

⁴ In a similar study conducted by Jiang *et al.* (2003), their sample size includes 14 banks, but their operations in Hong Kong accounted for about 45% of total assets and 48% of total loans of the banking sector at the end of 2000.

for the determining factors of bank performance, they are divided into internal and external, and the description of them is provided in the following section.

3.1 Internal determinants

- The capital ratio (EQTA), which is measured by total equity over total asset, reveals capital adequacy and should capture the general average safety and soundness of the financial institution. Empirical evidence on the relation between the capital ratio and profitability is not conclusive.
- Asset composition (LOTA), which is proxied by total loans divided by total asset, provides a measure of income source. Loans are the largest segment of interest bearing assets and are expected to have a positive relationship with bank performance. Other things being constant, the more the deposits that are transformed into loans, the higher the level of profit will be. However, it could be the case that banks that are rapidly increasing their loan books have to pay a higher cost for their funding requirements, and this could lead to a negative impact on profitability.
- The effect of fund source (DETA) on profitability is captured by the deposits/total assets ratio. Being the major and perhaps the cheapest source of funding for banks, it is generally believed that customer deposits impact banking performance positively as long as there is a sufficient demand for loans in the market. However, if there is insufficient loan demand, more deposits in fact may depress earnings, since this type of funding is costly in terms of the required branching network.
- The effect of asset quality (PRTO) on profitability is defined as loan-loss provisions over total loans. It is a measure of capital risk, as well as credit quality. If banks operate in more risky environments and lack the expertise to control their lending operations, it will probably result in a higher loan-loss provision ratio. Hence, the ratio is expected to have a negative relationship with profitability.
- The expense management variable (NETA), which is defined as the ratio of non-interest expenses to total assets, provides information on variations in operating costs. The effect of the variable on banking performance is mixed.

On the one hand, a negative relationship implies that efficient banks are able to operate at lower costs. On the other hand, a positive coefficient may be found if banks are able to transfer a portion of their operating costs to their borrowers and depositors.

- The importance of fee-based services of banks and their product diversification (NIGI) is captured by the non-interest income to gross income ratio. Although fee-based services add income to banks, those services in general generate lesser profits when compared to loans. When banks shift from interest income services to non-interest come services, profitability may decline. Therefore, the ratio is expected to have a negative effect on profitability.
- The tax variable (TOPB), which is defined as taxes over operating profits before tax, shows the ability of banks to allocate its portfolio to minimise its taxes. If a positive relationship exists between the tax variable and the profitability, it implies that the bank is able to pass the tax cost on to its customers by increasing the fees and the interest spread.
- The market share (INDE) of each individual bank is captured by the value of deposits (in logarithms). The log of deposits is used instead of deposits in order to reduce the scale effect. Empirical evidences shows that this variable has a combined effect on profitability. A positive relationship indicates that the bank enjoys economies of scale, while a negative relationship implies that the bank suffers from diseconomies of scale when it expands to a larger size.

3.2 External determinants

Following the description of the internal determinants, we are going to have a discussion about the macroeconomic as well as the financial structure variables used in the present study. The macroeconomic factors include economic growth, real interest rate and inflation, whereas the financial structural factors comprise the Lerner Monopoly Index and the size of the banking sector.

Firstly, economic growth (RGDP), which is measured by the real GDP growth rate, is hypothesised to affect banking profitability positively. This is because the default

risk is lower in upturns than in downturns. Besides, higher economic growth may lead to a greater demand for both interest and non-interest activities, thereby improving the profitability of banks.

Secondly, the real interest (RINT) is also expected to have a positive relationship with profitability. In the essence of lend-long and borrow-short argument, banks, in general, may increase lending rates sooner by more percentage points than their deposit rates. In addition, the rise in real interest rates will increase the real debt burden on borrowers. This, in turn, may lower asset quality, thereby inducing banks to charge a higher interest margin in order to compensate for the inherent risk.

Finally, high inflation (INFL) is associated with higher costs as well as higher income. If a bank's income rises more rapidly than its costs, inflation is expected to exert a positive effect on profitability. On the other hand, a negative coefficient is expected when its costs increase faster than its income.

With regard to the influence of financial structure variables on banking performance, both the Lerner Monopoly Index (LMM) and the size of the banking sector (SIBS) are examined. The LMM, a measure of market power, is calculated by the difference of price and marginal cost divided by price. The measure is grounded on the idea that dominating firms are price-makers and can vary their outputs to maximise profits by passing the cost changes to customers. Since the market structure of the Macao banking sector is close to an oligopolistic one, a positive relationship is expected between the Lerner Monopoly Index and profitability. As for the SIBS, it is captured by the ratio of total assets of all banks to GDP. This variable helps to trace out the cross-sectional effect of the financial structure, and its impact on bank profitability can be either positive or negative, depending on the relative importance of bank financing in the economy.

3.3 Methodology

Panel regression techniques are used to analyse the internal determinants as well as the external determinants. Panel data are commonly used because of the following

reasons. First, it has the advantage of giving more informative data as it consists of both the cross sectional information, which captures individual variability, and the time series information, which captures dynamic adjustment. In short, panel modeling helps to identify a common group of characteristics while, at the same time, taking the account the heterogeneity that is present among individual units. Second, this technique allows for the study of the impact of macroeconomic developments on profitability after controlling for bank-specific characteristics, with less collinearity among variables, more degrees of freedom and greater efficiency.

The consensus from the literature on bank profitability is that the appropriate functional form of analysis is the linear one. To this extent, Short (1979) and Bourke (1989) consider several functional forms and conclude that the linear model produces results as good as any other functional forms. Thus, in this study, a linear model is used to analyse the cross-section time series data to isolate the profitability determinants of Macao banks.

The basic regression equation is as follows:

$$I_{it} = C + \sum \alpha B_{ijt} + \sum \beta X_{kt} + u_{it}$$

where I_{it} is the dependent variable and is observation on profitability (ROA) for bank i at time t ; the independent variables include the intercept C , the j -th bank-specific characteristics of bank i at time t , B_{ijt} , the k -th external variable, X_{kt} , that all banks take as given. α and β are coefficients while u_{it} is the error term.

Panel data models are usually estimated using either fixed effect⁵ or random effect⁶ techniques. According to Judge *et al.* (1988), if the number of time series data (T) is large and the number of cross-sectional units (N) is small, there is likely to be little difference in the values of the parameters estimated by the two models. Since there are only five cross-sectional units that involve 15 years' data in this study, the regressions in our study are estimated by the fixed effect model.

⁵ The fixed effects model allows the partial regression coefficients to be common across cross-sectional units, but the intercepts in the regression model are taken to be distinct among individual bank.

⁶ A random effect model assumes that a common mean value for the intercept (= C) exists and the cross-sectional differences in the intercept values of each bank are reflected in the error term ε_i .

4. Empirical Results

The empirical evidence on the determinants of banks' profitability or return on assets (ROA) is based on balanced panel data, where all the variables are observed for each cross-section and each time period. In this study, three econometric specifications are estimated. The first regression includes only the bank-specific variables. In the second regression, the macroeconomic indicators are added while in the third regression, in addition to those already mentioned factors, financial structure variables are included. The estimations are performed by the generalised least squares (GLS) technique, which is especially suitable for data sets where serial correlation and/or heteroscedasticity might be present (Pindyck and Pubinfeld 1991).

As indicated in Table 1, the ROA regression shows the highest explanatory power (0.7208) when both internal and external variables are included in the estimation. Among the internal determinants, the EQTA, LOTA, PRTO and INDE variables show a significant impact on bank profitability. In line with the studies of Berger (1995) and Staikouras and Wood (2003), the positive coefficient estimate for the ratio of equity to total assets (EQTA) indicates an efficient management of banks' capital structure. Hence, our result suggests that a bank's performance can be improved if it is well-capitalised and borrows less to finance their operations. As for the loan-to-total assets ratio (LOTA), rather than affecting profitability positively, it actually reduces the return on assets. The inverse relationship between LOTA and ROA supports the earlier finding of Vong (2005) that severe competition in the credit market and interbank placement of idle funds abroad have jointly reduced the profitability of banks. This is especially true in Macao where banks rely on traditional lending activities.

The provision to total loans ratio (PRTO) is found to have a significant negative impact on banks' return on assets. As discussed in the literature, asset quality is reflected in the ratio. Though banks tend to be more profitable when they are able to undertake more lending activities, yet due to the credit quality of lending portfolios

and the general practice in Macao,⁷ a higher level of provision is needed. Such a high level of provisions against total loans in fact depresses banks' return on assets significantly.

Table 1: Determinants of Profitability or Return on Assets (ROA)

Regression	(1)		(2)		(3)	
<i>Bank Characteristics</i>						
EQTA	0.15319	***	0.17399	***	0.17099	***
	(0.04672)		(0.04538)		(0.04764)	
LOTA	-0.01681	*	-0.02511	***	-0.02364	**
	(0.00998)		(0.01047)		(0.0107)	
DETA	0.0163		0.01668	*	0.01304	
	(0.01084)		(0.01044)		(0.01066)	
PRTO	-0.26077	***	-0.19208	***	-0.16322	***
	(0.03387)		(0.05352)		(0.06025)	
NETA	0.10473		0.12784		0.12452	
	(0.20732)		(0.23505)		(0.23445)	
NIGI	-0.00408		-0.00188		0.00095	
	(0.00404)		(0.004)		(0.00453)	
TOPB	-0.02674	*	-0.02243		-0.02575	*
	(0.01482)		(0.01488)		(0.015)	
INDE	-0.01463	***	-0.01461	***	-0.0172	***
	(0.00476)		(0.00578)		(0.00705)	
<i>Macro variables</i>						
RGDP			0.00003		0.00005	
			(0.0001)		(0.0001)	
RINT			0.0005		0.00019	
			(0.0004)		(0.00053)	
INFL			0.00088	***	0.00082	*
			(0.00034)		(0.0005)	
<i>Financial Structure</i>						
SIBS					0.00461	
					(0.00329)	
LMM					0.0033	
					(0.0056)	
<i>Adjusted R-square</i>	0.6931		0.7185		0.7208	
<i>DW statistics</i>	1.09972		1.0872		1.0463	
<i>No. of observations</i>	75		75		75	

Notes:

(i) The regression is based on fixed effect estimation and is estimated using GLS estimation pooling bank level data across five banks in Macao for the 1993-2007 period.

(ii) Standard errors are given in parenthesis. *, ** and *** denote significance levels of 10, 5 and 1 percent respectively.

⁷ A general provision of 1% on loans is needed even though the loan is of good quality. For more risky loans, a higher level of provision is required.

In addition to the above characteristics, the negative sign on bank size (INDE) suggests that larger banks achieve a lower ROA than smaller ones. This shows that the interbank market is competitive and efficient since banks with a large retail deposit-taking network do not necessarily enjoy a cost advantage against other banks. Therefore, rather than size, efficiency is more important in affecting bank profitability.

Among the external determinants, only the inflation rate (INFL) shows the strongest impact on banks' return on assets. This may imply that bank management may anticipate the rate of inflation and react accordingly. Consequently, banks in Macao tend to be more profitable in inflationary environments. As for the other variables, namely economic growth, the real interest rate, the sector size and the market power, they all show no impact on bank profitability.

5. Conclusion

It is generally agreed that a strong and healthy banking system is a prerequisite for sustainable economic growth. Banks in Macao have been undergoing major challenges in the dynamic operating environment over the past decade. In order to withstand negative shocks and maintain financial stability, it is important to identify the determinants that mostly influence the overall performance of banks in Macao.

In the first place, individual bank characteristics are able to explain a substantial part of bank profitability in Macao. Banks with more equity capital are perceived to have more safety and such an advantage can be translated into higher profitability. On the other hand, our results reveal that a higher loan-to-total assets ratio may not necessarily lead to a higher level of profits. Due to the competitive credit market condition and the successive cuts in interest rate, the interest spread, i.e. the important determinant of profitability, becomes narrower. A lower spread together with a higher loan-loss provisions lead to lower profitability. Therefore, instead of loan size, it is the spread and the quality of the loan that matter. Lastly, our study shows that smaller banks, on average, achieve a higher return on assets than larger ones.

Concerning the macro-economic indicators, only the inflation rate plays an important role in explaining the banks' return on assets. The positive relationship between inflation and bank performance suggests that a bank's income increase more with inflation than its costs.

References

Abreu, M. and V. Mendes (2000), Commercial Bank Interest Margins and Profitability: Evidence for Some EU Countries, presented on the 50th International Atlantic Economic Conference.

(www.iaes.org/conferences/past/charleston_50/prelim_program/index.htm)

Angbazo, L. (1997), "Commercial Bank Interest Margins, Default Risk, Interest-rate Risk, and Off-balance Sheet Banking," Journal of Banking and Finance, Vol. 21, 55-87.

Bashir, A. (2000), Determinants of Profitability and Rates of Return Margins in Islamic Banks: Some Evidence from the Middle East, Grambling State University, Mimeo.

Bashir, A. M. and M. K. Hassan (2003), Determinants of Islamic Banking Profitability, presented on the ERF 10th Annual Conference.

(www.erf.org.eg/tenthconf/Financial_Markets_Presented/Kabir_Bashir.pdf)

Berger, A. (1995), "The Relationship between Capital and Earnings in Banking," Journal of Money, Credit and Banking, Vol. 27, No. 2, 432-456.

Bourke, P. (1989), "Concentration and Other Determinants of Bank Profitability in Europe, North America and Australia," Journal of Banking and Finance, Vol. 13, 65-79.

Boyd, J. and D. Runkle (1993), "Size and Performance of Banking Firms: Testing the Predictions of Theory," Journal of Monetary Economics, Vol. 31, 47-67.

Cheang, N. (2005), "How Do Interest Rate Movements Affect Interest Margin of Macao Banks?," AMCM Quarterly Bulletin, Issue 15, 51-74.

Demirguc-Kunt, A. and H. Huizinga (1999), “Determinants of Commercial Bank Interest Margins and Profitability: Some International Evidence,” World Bank Economic Review, Vol. 13, 379-408.

Gerlach, S., W. Peng, and C. Shu (2004), “Macroeconomic Conditions and banking performance in Hong Kong: A Panel Data Study,” Hong Kong Monetary Authority Research Memorandum, April.

Gischer, H., and J. D. Juttner (2001), Profitability and Competition in Banking Markets: An Aggregative Cross Country Approach.
(www.econ.mq.edu.au/staff/djjuttner/BankProfit1.pdf)

Guru B., J. Staunton and B. Balashanmugam (2002), “Determinants of Commercial Bank Profitability in Malaysia,” University Multimedia Working Papers.

Hanweck, G. A. and T.E. Kilcollin (1984), “Bank Profitability and Interest Rate Risk,” Journal of Economics and Business, Vol. 36, 77-84.

Hoggarth, G., A. Milne and G. Wood (1998), “Alternative Routes to Banking Stability: A Comparison of UK and German Banking Systems,” Bank of England Bulletin, 55-68.

Jiang, G., N. Tang, E. Law and A. Sze (2003), “Determinants of Bank Profitability in Hong Kong,” Hong Kong Monetary Authority Research Memorandum, September.

Judge, G., W. Griffiths, R. Hill, T. Lee and H. Lutkepohi (1988), Introduction to the Theory and Practice of Econometrics, John Wiley and Sons, New York.

Karasulu, M. (2001), “The Profitability of the Banking Sector in Korea,” IMF Country Report, July.

Miller, S. and A. Noulas (1997), "Portfolio Mix and Large-bank Profitability in the USA," Applied Economics, Vol. 29, 505-12.

Molyneux, P. and J. Thornton (1992), "Determinants of European Bank Profitability: A Note," Journal of Banking and Finance, Vol. 16, No. 6, 1173-8.

Naceur, S. B. (2003), "The Determinants of the Tunisian Banking Industry Profitability: Panel Evidence," Universite Libre de Tunis Working Papers.

Nier, E. (2000), The Profitability of Banks: A Cross-country Study with a Particular Focus on UK Banks, Papers presented at the 12th annual Australian Finance and Banking Conference.

Perry, P. (1992), "Do Banks Gain or Lose from Inflation?," Journal of Retail Banking, Vol. 14, No. 2, 25-30.

Pindyck, R. S. and D. L. Rubinfeld (1991), Econometric Models and Economic Forecasts, N.Y.: McGraw-Hill.

Short, B. (1979), "The Relationship between Commercial Bank Profit Rates and Banking Concentration in Canada, Western Europe and Japan," Journal of Banking and Finance, Vol. 3, 209-19.

Sinkey, J. Jr. (1992), Commercial Bank Financial Management in the Financial Services Industry, N.Y.: Macmillan Publishing Company.

Smirlock, M. (1985), "Evidence on the (Non) Relationship between Concentration and Profitability in Banking," Journal of Money, Credit and Banking, Vol. 17, No. 1, 69-83.

Staikouras, C. and G. Wood (2003), The Determinants of Bank Profitability in Europe, Paper presented at the European Applied Business Research Conference.

Vong, L.K. (2005), "Loans and Profitability of Banks in Macao," AMCM Quarterly Bulletin, Issue No. 15, April, 91-107.

Wong, Y. F., and O. L. Cheung (1997), "A Comparative Study of the Lending and Performance of Banks in Macau: Portuguese, Foreign, PRC and Local Banks," Proceedings of the third South China International Business Symposium, University of Macau, 221-40.