Determinants of profitability of domestic UK commercial banks: panel evidence from the period 1995-2002

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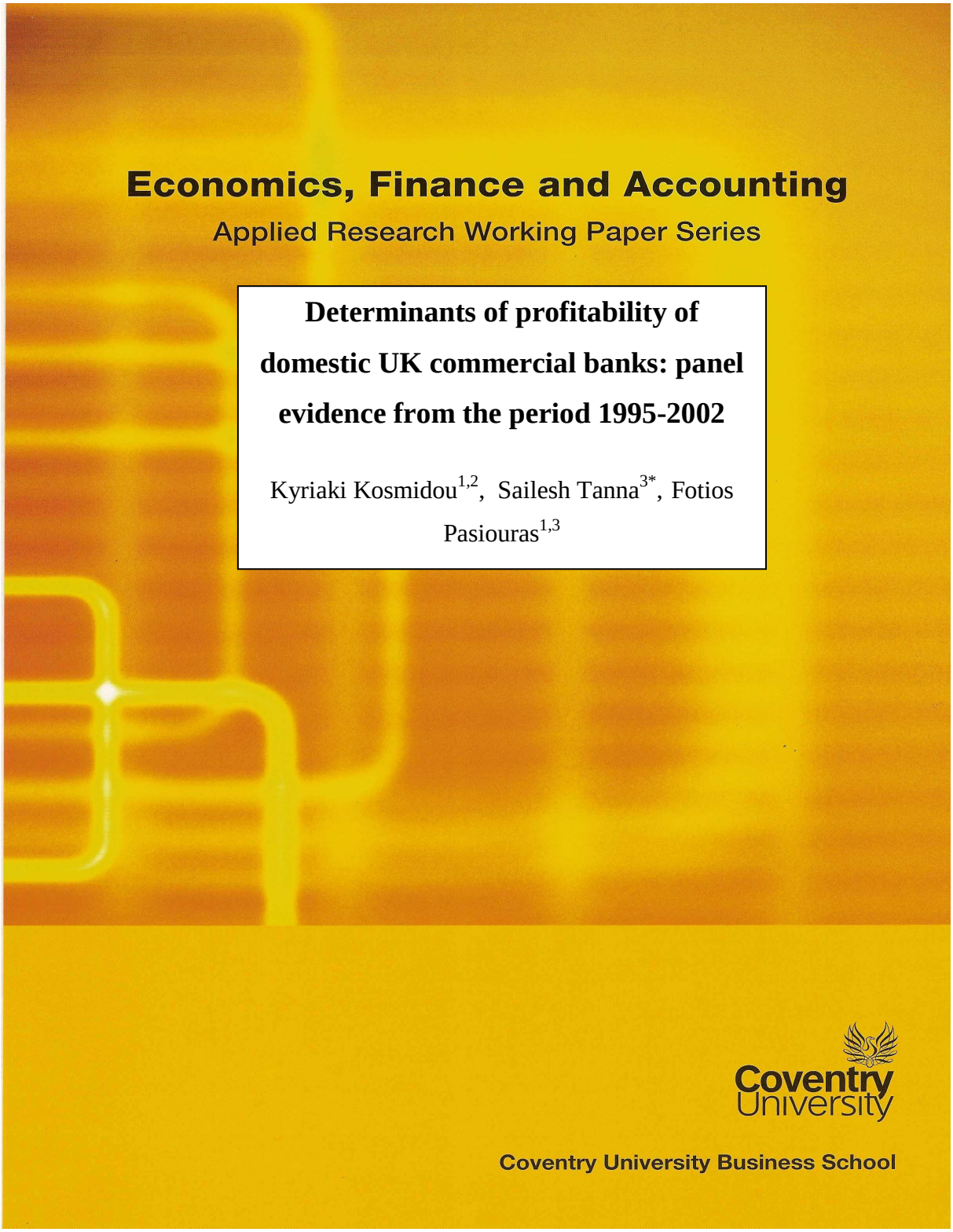

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Abstract

This paper investigates the impact of bank-specific characteristics, macroeconomic conditions and financial market structure on UK owned commercial banks' profits, during the period 1995-2002. The results show that the capital strength of these banks has a positive and dominant influence on their profitability, the other significant factors being efficiency in expenses management and bank size. These bank-specific determinants are robust to the inclusion of additional macroeconomic and financial market measures of bank performance, which add little to the explanatory power but nevertheless appear to have positively influenced profitability.

Keywords: Banks, Performance, Profitability, UK

JEL Classification: G21, C23, L25

I. INTRODUCTION

The UK banking sector has experienced substantial growth and change in recent years, as witnessed by the rapid expansion of its total assets since 1990. In August 2003, the total assets of both domestic and foreign banks reached 4,234bn GBP, more than three times the 1990 total of 1,266bn GBP. The assets of domestic (i.e. UK-owned) banks constituted nearly half of the total assets of the UK banking sector, and increased by 5% since 1990. This period of rapid growth in the UK banking sector has coincided with major structural changes, including the conversion of building societies into banks and the deregulation of the banking industry allowing non-financial firms to compete in the financial services market. For example, the Building Societies Act, 1986 allowed a number of building societies to convert into banks, especially over the period 1994-1997. Similarly the Building Societies Act, 1997, ensured the remaining building societies enjoyed greater commercial freedom. Furthermore, according to McCauley and White (1997) and White (1998), the UK experienced more merger and acquisition activity in its banking sector (in value terms) between 1991 and 1996 than its European partners. Finally, and more recently, new players such as supermarkets, insurance companies and football clubs have been allowed to compete in the retail financial market offering financial services such as credit cards, unit trusts etc. These changes have greatly enhanced the scope for increased competition in financial services bringing wider choices for consumers.

It is reasonable to assume that all the above changes posed great challenges to the UK banks as the environment in which they operated changed rapidly, which consequently affected their performance. However, despite these structural changes academic research on the UK banking sector has been rather limited (Drake, 2001). The purpose of this paper is to investigate the determinants of profitability of

domestic commercial banks in the UK during the period 1995-2002, which has witnessed substantial growth and change following deregulation of the UK banking industry. In the literature reviewed below we find a number of studies investigating the determinants of bank profitability for other countries, while prior studies on UK banks have focused mainly on other aspects of bank performance. For example, Drake (2001) and Webb (2003) study the efficiency of the UK banking sector. Holden and El-Bannany (2004) investigate the significance of information technology developments on the profits of major UK banks. Kosmidou et al. (2006a) analyse performance factors to identify the distinguishing characteristics of UK foreign and domestic banks' profits. Other studies on bank profitability have considered UK banks as part of a larger sample pooled across a number of countries (e.g. Molyneux and Thorton, 1992; Pasiouras and Kosmidou, 2006).

Our study differs from the aforementioned studies in three main respects. First, we focus solely on the profitability performance of the UK owned banks[1]. Second, we consider a representative sample of large and small banks over a more recent period, thus providing more appropriate and recent empirical evidence. Third, our empirical analysis separates the influence of internal, bank specific influences from external, market related factors, thus enabling us to investigate the impact of the environment (i.e. of the evolving change in the UK banking sector) conditional on the internal factors determining UK commercial bank profitability.

Apart from the regulatory changes mentioned above, there are other reasons why the UK banking sector merits further investigation. First, over the past decade the UK banks have been announcing rates of return well above standard international

[1]Excluding foreign banks from our sample enables us to isolate the potential influence of ownership and other determinants from the multinational banking literature on performance (e.g. Williams, 1998; Minh To and Tripe, 2002; Kosmidou et al. 2004) and thus allows us to concentrate on factors that typically determine domestic banking sector profitability.

rates (Quignon, 2000). Second, Llewellyn (2005) argues that the excess returns for the UK banks is due partly to the higher degree of concentration in the UK banking system, associated with the unique design of the British banks operating almost exclusively on the shareholder value principle, as opposed to the stakeholder value business approach found in European countries. Third, the UK banking sector makes a significant contribution to the UK economy, accounting for an estimated 3.7% of the UK's GDP, which is more than half of that generated by the financial sector as a whole (British Bankers Association, 2004). At the same time, the UK banking industry provides jobs for over 1.6% of UK employees and 40% of financial services employees (Maslakovic and McKenzie, 2002). Our study contributes to the literature by focusing on a relevant period of structural change and growth in the UK banking environment, and highlighting the empirical significance of factors affecting UK owned commercial banks' profits.

The rest of the paper is structured as follows: Section II provides a brief review of the literature. Section III discusses the set of variables used for econometric estimation. Section IV describes the data and methodology. Section V presents the empirical results, and Section VI concludes.

II. LITERATURE REVIEW

In this section we provide a brief review of the relevant literature, distinguishing between studies that have examined the determinants of bank profitability and studies that have focussed on the performance of UK banks. This distinction is drawn here to highlight, in the case of the former, the underlying factors determining domestic banking sector profitability, and in the case of the latter, evidence relating to profit performance and efficiency of UK banks.

The determinants of profitability

Following the early studies of Short (1979) and Bourke (1989), the literature has argued that financial market structure and entry barriers constitute the main external force driving bank profits. However, more recent studies distinguishing managerial (internal) from environmental (external) factors treat financial market structure (represented by regulatory conditions or concentration) as just one of a number of external influences that affect bank profitability, to include trade interdependence, economic growth, inflation, market interest rates and ownership. Among the internal, management controllable factors are bank specific financial ratios representing cost efficiency, liquidity, asset quality, and capital adequacy.

Empirical studies on the bank profitability literature have focused mainly on a specific country, including the US (Berger, 1995; Angbazo, 1997), Greece (Mamatzakis and Remoundos, 2003; Kosmidou, 2006), Australia (Pasiouras et al. 2006), Malaysia (Guru et al., 1999), Colombia (Barajas et al., 1999), Brazil (Afanasieff et al., 2002) and Tunisia (Ben Naceur, 2003). Molyneux and Thorton (1992) were the first to investigate a multi-country setting by examining the determinants of bank profitability for a panel of European countries, followed by Abreu and Mendes (2001), Staikouras and Wood (2003), and Pasiouras and Kosmidou (2006). Other multi-country studies include Hassan and Bashir (2003), who examine profitability for a sample of Islamic banks from 21 countries; and Demirguc-Kunt and Huizinga (1999) who consider a comprehensive set of bank specific characteristics, as well as macroeconomic conditions, taxation, regulations, financial structure and legal indicators to examine the determinants of bank net interest margins in over 80 countries. The main conclusion emerging from these

studies is that internal factors explain a large proportion of banks profitability; nevertheless external factors have also had an impact on their performance. Some recent studies also focus on the impact of regulations on banks performance and profitability (e.g. Barth et al., 2003, 2004), and report only weak evidence to support that bank supervisory structure and regulations affect bank profits.

Evidence on UK bank performance

Ashton (1998) examines the efficiency of the UK retail banking sector over the period 1984-1995, using a time trend to measure average technical change. A panel data SUR estimator is applied on models of bank production based on the translog cost function, represented by "intermediation" and "production" approaches. The results indicate a significant technical change for the production models but insignificant for the intermediation models. Negative technical change occurs for the larger bank group, found to be significant for the production models but insignificant for the intermediation models. The production based approach therefore suggests a "catching up" to the average state of technology, while the intermediation approach indicates a shift in the cost function.

Berger et al. (2000) estimate cost and profit frontiers to compare the efficiency of banks in France, Germany, Spain, UK and US. Cost and profit efficiency are found to be higher for domestic banks than for foreign banks in three countries (i.e. France, Germany, UK), although the differences are not statistically significant. By contrast, for the US case, they show that domestic banks are on average less cost efficient than foreign banks. Drake (2001) also uses a frontier methodology and panel data for the main UK banks over the period 1984-1995 to investigate the relative efficiencies and to analyse productivity change within the banking sector. The results

provide important insights into the size–efficiency relationship and offer a perspective on the evolving structure and competitive environment within which banks operate. Webb (2003) applies Data Envelopment Analysis to investigate the efficiency of large UK retail banks over the period 1982-1995, and finds lower mean inefficiency levels in comparison to past studies, with reduced efficiency for all banks in the sample, and falling overall long run average efficiency trend over the period of the analysis.

Kosmidou et al. (2004a) employ a statistical cost accounting method on a sample of 36 domestic and 44 foreign banks operating in the UK, to examine the relationship between profits and asset-liability composition. The results indicate differences between high profit and low profit banks, as well as between domestic and foreign banks. Using a multicriteria decision aid methodology, Kosmidou et al. (2004b) find that domestic banks exhibit higher overall performance compared to foreign banks over the period 1996-2002. Kosmidou et al. (2006a) use logistic regression to examine how foreign banks differ from domestic banks in the UK and find that the latter are characterized by higher return on equity, net interest revenue to total earning assets, and loans to customer & short-term funding. Finally, Kosmidou et al. (2006b) compare the performance of large and small UK banks and reveal that small banks exhibit higher overall performance compared to large ones.

III. PERFORMANCE MEASURES AND DETERMINANTS

Performance Measures

In line with earlier studies that examined the determinants of banks' profits, we rely on two commonly used measures of profit performance. The first is the return on assets (ROAA), calculated as net profit after tax divided by average total assets.

This is probably the most important measure used in comparing the operating performance of banks, and we use the average value in order to control for differences that occur in assets during the fiscal year. The second measure is the net interest margin (NIM), which is net interest income[2] expressed as a percentage of earning assets[3], thereby showing the profitability of the bank's interest-earning business.

Independent Variables

As potential determinants of UK banks' profits, we consider five bank-specific measures and four measures representing the influence of market structure and macroeconomic conditions. Table 1 provides a description of all the variables considered in this study, indicating also their likely association with bank performance.

[Insert Table 1 Here]

The five measures used as internal determinants of performance are: cost to income ratio (COST) as an indicator of efficiency in expenses management; ratio of liquid assets to customer and short term funding (LIQUID) to represent liquidity; ratio of loan loss reserves to gross loans (LOSRES) as an indicator of banks' asset quality; ratio of equity to total assets (EQAS) representing capital strength; and the total assets of a bank representing its size (SIZE).

The cost to income ratio (COST) measures the overheads or costs of running the bank, including staff salaries and benefits, occupancy expenses and other expenses such as office supplies, as percentage of income. It is typically used as an indicator of

[2] Net Interest Income is calculated by subtracting interest expense (i.e the interest the bank must pay to its depositors and creditors from whom it has borrowed funds) from interest income (i.e income from loans and securities).

[3] This is the sum of all bank's assets that earn interest, including loans and investments in fixed-income securities. It can also be defined as total assets less fixed assets and non-interest earning assets.

management's ability to control costs. Since higher expenses normally mean lower profits and vice versa, COST is expected to have a negative effect on bank profits and margins.

The ratio of liquid assets to customer plus short term funding (LIQUID) is a deposit run off ratio that indicates what percentage of bank customer and short term funds could be met if they were withdrawn suddenly. As Golin (2001) mentions, "*it is critical that a bank guards carefully against liquidity risk - the risk that it will not have sufficient current assets such as cash and quickly saleable securities to satisfy current obligations e.g those of depositors – especially during times of economic stress*" (p. 273) Without the required liquidity and funding to meet short-term obligations, a bank may fail. Therefore, the higher value of this ratio makes the bank more liquid and less vulnerable to failure. However, liquid assets are usually associated with lower rates of return, and so generally a negative relationship is expected between this variable and profitability.

The ratio of loan loss reserves to gross loans (LOSRES) is a measure of bank asset quality[4] that indicates how much of the total portfolio has been provided for but not written off. Assuming a similar charge-off policy, a high ratio could signal a poor quality of loans and therefore a higher risk of the loan portfolio. However, with a sound quality of loans, a high ratio could imply a positive relationship between risk and profits, according to the risk-return hypothesis. It is therefore difficult to hypothesise the sign of this relationship although a negative impact of LOSRES on bank profitability would suggest a poor quality of loans that reduce interest revenue and increase the provisioning costs.

[4] Asset quality refers mainly to the quality of the bank's earning assets, the majority of which comprises its loan portfolio (credit risk), although it will also include its securities portfolio (market risk) and off-balance sheet items. As Golin (2001) argues "*the challenge for bank management is to minimize the risk of loan defaults and to price loans so that returns are more sufficient to cover loan losses*" (p. 166).

Although loan loss provisions and cumulative loss reserves provide early lines of defense against bad loans, it is the strength of a bank's capital that forms the ultimate line of defense against the risk of insolvency. This becomes apparent considering that if the bank will face a serious asset quality problem and loan loss reserves will be insufficient to allow all bad loans to be written of, the excess will have to be written off against shareholder's equity. Thus the ratio of equity to total assets (EQAS) is considered one of the basic ratios for capital strength (Golin, 2001). It is expected that the higher this ratio, the lower the need for external funding and therefore the higher the profitability of the bank. Additionally, well-capitalized banks face lower costs of going bankrupt which reduces their costs of funding.

The final internal determinant is the bank's size, measured by its total assets. Large bank size might result in scale economies with reduced costs, or scope economies that result in loan and product diversification, thus providing access to markets that a small bank cannot entry. The evidence on such economies is not conclusive though. Some studies have found scale economies for large banks (European Commission, 1997; Berger and Humphrey, 1997; Altunbas et al., 2001) while others have found scale economies for small banks or diseconomies for larger banks (Vander Vennet, 1998; Pallage, 1991).

Turning to the external determinants, we consider four measures, two of which represent the influence of macroeconomic conditions and the other two of financial market structure. The rate of GDP growth (GDPGR) and inflation (INF) are the two macroeconomic variables. GDPGR reflects the state of the economic cycle and is expected to have an impact on the demand for banks loans. Inflation affects the real value of costs and revenues although it may have a positive or negative effect on profitability depending on whether it is anticipated or unanticipated (Perry, 1992).

The two variables representing market structure are concentration in the banking industry (CONC) and stock market capitalisation (MACPASS). The former is calculated by dividing the total assets of the five largest banks in the market with the total assets of all banks operating in the market. A positive effect of this variable would signify a high degree of concentration since, according to the Structure-Conduct Performance (SCP) hypothesis, banks in highly concentrated markets tend to collude and therefore earn monopoly profits[5] (Short, 1979; Gilbert, 1984; Molyneux et al., 1996). However, not all studies have found evidence to support the SCP hypothesis. From the 45 studies reviewed by Gilbert (1984) only 27 provided evidence that the SCP paradigm holds. MACPASS is expressed as the ratio of stock market capitalization to the total assets of deposit money banks, and provides an indication of the complementarity or substitutability between bank and stock market financing. Demirguc-Kunt and Huizinga (1999) found this variable to be negatively related to bank performance, and suggested that relatively well-developed stock markets can substitute for bank finance.

IV. DATA AND METHODOLOGY

Data

Financial data for the UK owned banks were obtained from the Bankscope Database of Bureau van Dijk's company, supplemented by macroeconomic and stock market information from the Euromonitor International Database. Banks had to meet the following conditions in order to be included into the sample, given the period of investigation: First, they had to be UK owned banks among the financial institutions

[5] Collusion may result in higher interest rates spread (e.g. higher interest rates being charged on loans and less interest rates being paid on deposits), higher fees being charged and so on (Goddard et al, 2001).

operating within the UK banking sector, according to the nationality analysis of the Bank of England (as at 31st December 2002)[6]. Second, they were classified as commercial banks in the Bankscope Database. Third, they had available data (obtained from the annual balance sheet and income statements in the Bankscope Database) for at least one year between 1995 and 2002. This yielded an unbalanced panel data for 32 commercial banks, consisting of 224 observations. The time period 1995-2002 was partly chosen by data availability but encompasses the period of significant structural change in the UK banking sector. Table 2 shows the fairly low data correlations among the independent variables, except between inflation (INF) and stock market capitalisation (MACPASS), and to some extent between INF and concentration (CONC).

[Insert Table 2 Here]

Methodology

To examine the determinants of the profits of UK owned banks, we adapt the following fixed effects formulation, distinguishing between bank specific and market related factors:

$$y_{it} = \mu_i + \delta_t + \alpha_b^{'} X_{b_{it}} + \alpha_m^{'} X_{m_{it}} + \varepsilon_{it} \qquad (1)$$

where y_{it} is the dependent variable of the *i*th bank at time *t*, and the vectors X_b and X_m represent bank specific and market related set of variables respectively. It is

[6] Institutions included within the United Kingdome banking sector (at 31stDecember 2002) – nationality analysis, available at: http://www.bankofengland.co.uk/mfsd/ms/030303/bklist.doc

assumed that the disturbance ε_{it} is a normally distributed random variable, whereas the parameters μ_i and δ_t constitute the fixed effects. We estimate the same linear specification for the two dependent variables, ROAA and NIM; in each case both with and without the market related variables X_m. The joint impact of these additional variables is assessed by the improvement in the overall explanatory power of the equation.

All the models were estimated using fixed-effects regression, where we eliminated the firm-level heterogeneity through the use of mean deviation data. However, we included a linear time trend to take account for the impact of firm level effects over time, as well as other time period dummies in the regression[7]. The preference for a fixed effects model over a random effects model was based on the use of the Hausman test (Baltagi, 2001). We also employed the Breusch-Pagan test to check for residual heteroskedasticity, and estimated the models using White's transformation in order to control for cross-section heteroskedasticity.

IV. RESULTS

Tables 3 and 4 report the estimated models for ROAA and NIM respectively. The overall explanatory power (in terms of adjusted R^2) for both models is high, and is not associated with high correlation among some of the trended variables (e.g. INF and MACPASS)[8]. The external factors are all individually significant, although

[7] With the inclusion of TIME, only 6 other year dummies were included, which were found to be jointly insignificant according to the LM statistic reported in Tables 3 and 4. The cross-section dummies were automatically eliminated by the use of the LSDV estimation method for an unbalanced panel.

[8] Dropping either of these variables did not make much difference to the overall results or the explanatory power. On the other hand, reasonably high explanatory power has also been reported on profitability studies for other countries, e.g. Williams (1998), Minh To and Tripe (2002), Staikouras and Wood (2003), Pasiouras et al. (2006).

jointly they appear to contribute little or no further to the explanatory power. None of the time dummies were significant, and so were omitted from the regressions.

[Insert Table 3 and 4 here]

As expected the coefficient of the cost to income ratio (COST) is negative and significant in all cases, suggesting that efficiency in expenses management is a robust determinant of UK bank profits. Guru et al. (1999), Kosmidou (2006) and Pasiouras et al. (2006) also confirm this inverse relationship for Malaysia, Greece and Australia respectively.

As in previous studies, the results concerning liquidity are mixed. This ratio (LIQUID) has a positive effect on ROAA, consistent with Bourke (1989) and Kosmidou (2006). On the contrary, Molyneux and Thorton (1992) and Guru et al. (1999) reveal a negative effect of liquidity on bank profits. However, in our case LIQUID has the expected negative sign on NIM but is only significant in the presence of external factors. Kosmidou (2006) and Pasiouras et al. (2006) also confirm this negative effect on net interest margin. Our results show that the effect of liquidity on UK bank profits is not clear-cut, and varies with the measure of profitability used.

The impact of loan loss reserves (LOSRES) is positive and significant on NIM, suggesting that higher risks result in higher margins for UK banks (and therefore supporting the risk-return hypothesis). On the other hand, the effect of LOSRES on ROAA is not significant.[9] Kosmidou (2006) in her study of the Greek banking system obtains similar results for both ROAA and NIM.

[9] However, this effect might be the result of the way the accounting ratios are obtained, since LOSRES is a cumulative stock that varies according to the amount of new loan provisions added each year. But Provisions are subtracted from Operating Profit Before Provisions, Taxes and Extraordinary Items.

Capital strength makes a significant contribution to the profitability of the UK banks, as the relatively high coefficient of the equity to assets ratio (EQAS) shows. The ratio is positive and significant for both ROAA and NIM, and its effect remains dominant whether we include the external factors or not. This finding is consistent with previous studies (Berger, 1995; Demirguc-Kunt and Huizinga, 1999; Ben Nacuer, 2003; Kosmidou, 2006; Pasiouras et al., 2006) and indicates that well capitalized UK banks face lower costs of going bankrupt, which suggests reduced cost of funding or lower need for external funding, implying higher profits.

Next, we find an inverse relationship between bank size and profitability, significant in all cases, suggesting that larger banks tend to earn lower margins and profits. This is consistent with prior evidence suggesting either economies of scale/scope for smaller banks or diseconomies for larger banks. For example, Kosmidou et al. (2006b) compare the performance of UK banks over the period 1998-2002 and find that smaller banks performed better than larger banks. Moreover, it has been suggested that small UK-owned banks are more profitable with high regulatory capital ratios (Bank of England, 2003).[10]

We turn now to the effects of macroeconomic and financial structure variables, which are all individually significant in explaining UK bank profits. The positive impact of GDPGR supports the argument of the positive association between growth and financial sector performance, and is also confirmed by Kosmidou (2006) and Hassan and Bashir (2003). Similarly, the positive association between inflation and bank performance is consistent with the findings of previous studies (e.g.

ROAA is also then obtained after subtracting Taxes and Extraordinary Items to arrive at Profits after Tax.

[10] Vander Vennet (1998) also finds evidence of economies of scale only for the smallest banks with assets under ECU 10 billion in the EU, with constant returns thereafter and diseconomies of scale for the largest banks exceeding ECU 100 billions. Other studies confirm similar findings for the European countries (Rodriguez et al., 1993; Pallage, 1991), Tunisia (Ben Naceur, 2003) and Australia (Pasiouras et al., 2006).

Claessens et al., 1998; Demirguc-Kunt and Huizinga, 1999). The positive association supports the theory that inflation was anticipated giving banks the opportunity to adjust interest rates accordingly, resulting in revenues that increased faster than costs, thus implying higher profits. The positive impact of concentration (CONC) supports the Structure-Conduct Performance (SCP) hypothesis and reflects the oligopolistic structure of the UK banking market. Demirguc-Kunt and Huizinga (1999) and Hassan and Bashir (2003) also find this positive association in a multi-country context. Finally, the positive effect of MACPASS suggests that a larger stock market relative to the banking sector increases UK bank profits and margins. Ben Naceur (2003) also confirms this finding suggesting that as stock markets enlarge, more information becomes available. With more information, it becomes easier to identify and monitor potential borrowers, consequently leading to an increase in bank activity and profitability.

VI. CONCLUSIONS

This study investigates the impact of bank-specific characteristics, macroeconomic conditions and financial market structure on UK owned commercial banks' profits, measured by return on average assets (ROAA) and net interest margins (NIM). An unbalanced panel data set of 224 observations, covering the period 1995-2002, provided the basis for the econometric analysis. The results show that capital strength, represented by the equity to assets ratio, is the main determinant of UK banks profits providing support to the argument that well capitalized banks face lower costs of external financing, which reduces their costs and enhances profits. Studies for other countries also support this finding (Berger, 1995; Demirguc-Kunt and Huizinga, 1999; Ben Nacuer, 2003; Pasiouras and Kosmidou, 2006; Pasiouras et al.,

2006). The other significant determinants are cost-to-income ratio and bank size, both of which impact negatively on bank profits. The impact of liquidity on bank performance is not clear-cut, and varies with the measure of profitability used. Specifically, liquidity is negatively related to NIM but positively related to ROAA. The impact of loan loss reserves is also not clear-cut, being positive and significant on NIM (suggesting that higher risks result in higher margins) but negative and insignificant on ROAA.

The addition of external factors has a relatively small impact on the overall explanatory power of the regression, but individually they appear to have significantly influenced bank profitability. Specifically, we observe that the macroeconomic environment (proxied by GDP growth and inflation) has a positive impact on bank performance, as do concentration in the banking industry and stock market development.

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Table 1- Variables Description

VARIABLES	DESCRIPTION
Dependent	
ROAA	The return on average total assets of UK owned banks
NIM	The net interest income of the banks expressed as a percentage of their earning assets.
Independent	
Banks characteristics (Internals Factors)	
COST	This is the cost to income ratio. It provides information on the efficiency of the management regarding expenses relative to the revenues it generates. Higher ratio implies less efficient management.
LIQUID	This is a measure of liquidity calculated as liquid assets to customer & short term funding. Higher ratio denotes higher liquidity.
LOSRES	This is the ratio of Loan Loss Reserves to Gross Loans. It indicates how much of the total portfolio has been provided for but not charged off and is used as a measure of bank's asset quality and risk. Given a similar charge-off policy, the higher the ratio the poorer the quality and therefore the higher the risk of the loan portfolio.
EQAS	This is a measure of capital strength, calculated as equity to total assets. High ratio implies low leverage and therefore lower risk.
SIZE	The accounting value of the bank's total assets.
Macroeconomic and Financial Structure (External Factors)	
GDPGR	The annual change in real Gross Domestic Product (GDP) (1995 US$)
INF	The annual UK inflation rate
MACPASS	The ratio of stock market capitalization to total assets of the deposit money banks* (US$ 1995). This variable serves as a proxy of financial development as well as a measure of the size of financial market and the relationship between bank and market financing.
CONC	The C_5 concentration measure calculated by dividing the assets of the five largest banks with the assets of all banks operating in the market.

Source:
Bankscope Database for internal factors and CONC. Euromonitor International Database for other external factors.
*Total Assets of the deposit money banks is the summation of IFS lines 22a through 22f

Table 2 - Independent Variables Correlations

	RES	EQAS	COST	LIQ	SIZE	GDPGR	CONC	MACPASS	INF
RES	1.000								
EQAS	0.385	1.000							
COST	-0.010	-0.094	1.000						
LIQ	0.057	-0.144	0.178	1.000					
SIZE	-0.146	-0.294	-0.088	-0.247	1.000				
GDPGR	-0.051	0.014	0.063	0.009	0.012	1.000			
CONC	0.125	-0.019	-0.031	-0.009	-0.069	-0.206	1.000		
MACPASS	-0.046	0.023	0.095	0.048	-0.057	0.167	-0.464	1.000	
INF	-0.098	0.023	0.087	0.038	0.001	0.147	-0.770	0.906	1.000

Table 3 - Unbalanced pooled ROAA models

Independent Variables	Dependent Variable: ROAA	
COST	-0.073	-0.074
	(0.000)*	(0.000)*
LIQUID	0.042	0.031
	(0.000)*	(0.003)*
LOSRES	-0.005	-0.002
	(0.579)	(0.786)
EQAS	0.305	0.319
	(0.000)*	(0.000)*
SIZE	-0.020	-0.010
	(0.000)*	(0.000)*
GDPGR		0.008
		(0.000)*
INF		0.009
		(0.000)*
MACPASS		0.009
		(0.000)*
CONC		0.006
		(0.000)*
Adjusted R^2	0.883	0.885
Breusch-Pagan test (LM)	15.999 ($x^2_{0.005,5} = 16.749$)	15.999 ($x^2_{0.05,5} = 16.919$)
F-statistic	152.646	122.444
	(0.0000)*	(0.0000)*

Notes: 32 Banks, period 1995-2002, No. of observations =224, p-values in parentheses, *Significant at the 1% level

Table 4 - Unbalanced pooled NIM models

Independent Variables	Dependent Variable: NIM	
COST	-0.023 (0.000) *	-0.023 (0.000)*
LIQUID	-0.034 (0.316)	-0.052 (0.000)*
LOSRES	0.112 (0.000) *	0.089 (0.005) *
EQAS	0.523 (0.000)*	0.497 (0.000)*
SIZE	-0.043 (0.000)*	-0.021 (0.000)*
GDPGR		0.023 (0.000)*
INF		0.029 (0.000)*
MACPASS		0.001 (0.000)*
CONC		0.005 (0.000) *
Adjusted R^2	0.919	0.919
Breusch-Pagan test (LM)	15.999 ($x^2_{0.005,5} = 16.749$)	15.999 ($x^2_{0.05,5} = 16.919$)
F-statistic	1123.271 (0.0000)*	342.571 (0.0000)*

Notes: 32 Banks, period 1995-2002, No. of observations =224, p-values in parentheses, *Significant at the 1% level