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DETERMINANTS OF GREEK COMMERCIAL BANKS PROFITABILITY, 1989 - 2000

By

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Abstract

This paper attempts to examine the determinants of the performance of Greek commercial banks over the last decade. This is of interest because of the markedly changes in the structure of the Greek banking system in the nineties. The Greek banking system is still going through a transformation period so as to compete within a rapidly changing international economic environment and to meet the new financial needs of the economy. In the empirical section, we measure the profitability of the commercial banks using the ratios return on assets (ROA) and return on equity (ROE). Our results provide weak evidence of the phenomenon of persistence in profitability. We report that the deregulation of the market in the last decade and the process of European integration with the introduction of the Euro have enhanced the competitiveness of the banking sector. On the strong side of the evidence, the variables related to management decisions are found to assert a major impact on the profitability of Greek commercial banks. (JEL: G21, G24, G31).

1. Introduction

Corporate performance has been one of the main concerns of management experts, investors, and economic analysts. This concern closely relates to the significant impact of the profitability of corporate organisations in general, and commercial banks in particular, on the potential growth of the economy as a whole. A study of the determinants of corporate performance, therefore, could assist managers, investors, and government to plan in advance and deal with the rising uncertainty of the globalised environment. To this end, management should hedge against adverse factors, like uncertainty, and capitalise on other, like strong demand and cost complementarities, that improve performance. Moreover, investors should be able to measure the performance of their portfolios and proceed with readjustments as required, while economic policy makers should also be able to measure the impact of the corporate performance on the economy and its implications on the issues of policy.

The primary objective of this study is to empirically investigate the determinants of the profitability of Greek commercial banks for the period 1989-2000, using a methodology based on the Structure-Conduct-Performance (SCP) framework. The SCP relationship is a general statement on the determinants of market performance. Simply stated, the conduct or rivalry in a market is determined by the structure of the market, especially the number and the size distribution of firms, and the conditions of entry. This rivalry process is reflected on various measures of market performance (i.e. price levels, profits). In addition, Bourke (1989) notes that the determinants of the performance relate to bank management decisions, an internal variable, and to the economic environment, an external variable.

In this paper, in line with Bourke (1989) we opt for the approach of Molyneux & Thornton (1992) and Remoundos (1995) so as to identify some of the major determinants of the profitability of Greek commercial banks. This approach assumes that profitability is explained by internal factors, like management policy decisions (i.e. size, capital adequacy, ownership, cost structure, business risk) and by external factors, like economic environment (i.e. market structure, inflation, money supply growth). Our results show that the profitability of Greek commercial banks is markedly influenced by factors related to management decisions, though changes in the economic environment also assert some impact. Our estimations further reveal that there exist no important relation between structure and performance in the market. As a result, the traditional hypothesis of Structure-Conduct-Performance is not justified in the Greek banking sector.

2. Structure & Performance of the Greek Banking System in the '90s

The structure of the Greek banking system has significantly changed since the beginning of the nineties. The transformation of the banking system came up as a respond to the rapidly changing international economic environment and the rising needs for financing. The necessity to adjust Greek legislation to the EU norms has led in general to the liberalisation of the Greek banking system, and in particular to the abolition of several types of subsidies in the provision of financial services. This development led to new entrants in the market, though it is still merely characterised as oligopolistic. The National Bank, the largest state owned bank, retains its leading position, though its market share follows a declining trend. In similar pattern, the Commercial Bank, the 2nd largest public bank, has seen its market share diminishing since 1995. However, it is evident that the private banks have intensified their presence in the mar-

ket. This is supported by developments in the loan market share, which for the state owned banks decreased to 38% in 2000 from 63% in 1995, while for the private banks increased to 45% in 2000 from 20% in 1995. Note that a similar picture stands for the deposits. Moreover, in 2000 the private banks Alpha and Eurobank-Ergasias have ascend to the second and third position respectively in the ranking of the market for loans and deposits.

TABLE 1

Deposits and Loan Market Share of Greek Commercial banks, 1991-2000

	Deposit Market Share %			Loan Market Share %		
	1991	1995	2000	1991	1995	2000
National Bank	56,8	49,5	35,2	48,3	36,7	24,5
Commercial Bank	16	15,1	10,7	20,2	18,5	11,2
Ionian Bank*	7,4	8,8	-	8,7	8,1	-
ALPHA BANK	8,4	10,6	19,2	9,3	14,5	19,6
Ergo Bank**	4,4	5,6	-	4,3	6,3	-
EUROBANK			11,8			13,3
Pireaus Bank			7,6			7,8

* Acquired from ALPHA BANK in 1999, ** Acquired from EFG in 1999
Source: Commercial Bank, Economic Bulletin, May-June 1995,1996, ALPHA BANK, Economic Research Division, 2001.

Other factors that have contributed to the transformation of the Greek banking system are: the improvement of efficiency of private banks, the implementation of privatization policies, and the acquisitions and mergers in an attempt to reach a critical size (Provopoulos/Kapopoulos (2001)). Commercial banks aim to increase their size not only to enjoy cost complementarities from economies of scale, but also to strengthen their presence in the new market conditions of Europe, formed by the introduction of the Euro. As a result, and despite the new entrants, concentration in the Greek banking market has led to fewer but larger participants. Note that in 2001 there were nine large banking institutions that operated in Greece compared to 18 in 1997 (ALPHA BANK (2001)). However, the five firms asset concentration ratio fell to 71.2% in 2000 from 75.2% in 1998 (Papademos (2001)). This is due to the fact that the bulk of mergers and acquisitions (M&A) in Greece mainly concern small and medium size banks. In parallel, competition in the market has intensified as a result of rising growth rate in mortgage and consumer credit, increasing

supply of saving and investment products, introducing new participants, and enhancing the inter-border supply of financial services (Papademos (2001)).

The performance of the Greek banks, measured by the Return on Equity (ROE) and the Return on Assets (ROA) ratios, appeared to be stronger in the period 1995-1998 compared to their EU counterparts, even though exhibited a declining trend. The efficiency in the Greek banking system has also improved in the late nineties compared to the beginning of the decade, as Greek banks have continued to present performance comparable or above the EU average. This development appears to carry on in the new decade, despite the conditions formed by intensifying competition and by increasing investment costs (Provopoulos/Kapopoulos (2001)).

TABLE 2

Profitability in Greece & EU, 1995-1998

	1995		1996		1997		1998	
	GREECE	E.U.	GREECE	E.U.	GREECE	E.U.	GREECE	E.U.
ROE %	20,2	11,4	15,9	14,2	16,3	13,9	17,2	17,4
ROA %	1,00	0,54	0,74	0,62	0,82	0,62	1,02	0,78

Source: ECB, EU Banks' Income Structure, April 2000.

Moreover, the profitability of Greek commercial banks after soaring in 1999, declined in 2000 due to the cost related to M&A activities and to the adverse developments in the stock market. Note that Athens Stock Exchange General Index plunged by 39% in 2000. The impact of the stock market on profitability stems out not only from income related to activities of investment banking, but also from trading gains. At this point it is worth mentioning that interest income consists the most important source of profit for Greek commercial banks. Although the loan-deposit interest rate spread has narrowed, the net interest income as a percentage of total income (54.6% in 2000, 51.6% in 1997:) and total assets (2.51% in 2000, 2.18% inl997) has sustained an upward trend. This development comes in contrast to what has taken place in the European market. The answer to this contradiction can be found on the increase of lending activities. The loan-deposit interest rate spread declined by 2.5% in the period 1999 to 2000, and remained at high levels (6.5%) compared to the European average (Papademos (2001)). The net-interest income is expected to further enhance performance due to the high growth rate of credit expansion in consumer and mortgage lending. This optimism is also based on

the continuation of expansion in consumer's loans market. The latter was about 4% of GDP in 2000 and 6% of GDP in 2001, compared to 14% in Portugal and 11% in Italy in 2000. Moreover, mortgage lending is close to 6% of GDP in Greece relative to 40% in Portugal, 13% in Italy and 22% in France (ALPHA BANK (2001)).

Despite costs related to M&A activities and the adoption of Euro, commercial banks in Greece are expected to continue to present profitability close or above EU average due to the increasing demand for financial services. One of the most important profit sources is expected to be the market of loans. Note that loans in Greece in 1999 covered 36.6% of total assets, while in the E.U. the loans/assets ratio ranged from 36.7% in Sweden to 60.7% in Netherlands (Bank of Greece (2001)). There is, therefore, potential for Greek banks to expand lending towards either the private or the public sector. Moreover, banks' lending as a percentage of GDP in Greece remains at low levels compared to the EU. The lending of banks as a percentage of GDP in 1999 was 11.3% in Italy, 30.7% in Spain, 32.5% in France, 50.8% in Portugal, while in Greece approached 11.1% of GDP (Bank of Greece (2001)). Bancanssurance and asset management services are also expected to further improve Greek commercial banks profitability. Another indication of the development prospects of Greek banking market is reflected on the ratio of total assets to GDP, which is reported as one of the lowest in the EU. In 1999, Greek banks' total assets counted for 126% of GDP.

To the above developments and expectations, commercial banks hold a central position in the banking system, since they embody the main financier of the national economy. The lending of commercial banks corresponded to 75% of total lending in 2000, compared to 57% and 45% in 1995 and 1990 respectively. To this end, the safety and soundness of Greek commercial banks ensures and enhances the growth prospects of the economy, since bank profitability forms the most important line of defense for covering losses and strengthening capital adequacy (Norton, 1992).

3. Model and Results

The aim of this section is to examine the detrimental factors of the profitability of the Greek commercial Banks based on the theoretical framework of the Structure-Conduct-Performance (SCP). In specific, our model follows the earlier work of Molyneux & Thornton (1992) and Remoundos (1995), and it is

based on the assumption that the profitability of commercial banks is affected by the management decisions and the external economic environment.

In detail, the internal factors are determined by bank's management decisions and policy objectives, such as size, capital adequacy, liquidity, credit risk, personnel expenses and ownership status. The external factors that influence profits are the growth rate of money supply, the interest rates, the consumer price index, the stock market performance, and the concentration of the market. With regards to the preferred definition of bank performance, Gilbert (1984) and Molyneux (1993), after reviewing related literature, suggest that the only bank performance ratios that does not present measurement problems are the profitability ratios, ROA and ROE.

The adopted model takes the following form

$$\Pi_{it} = \alpha_i + \Sigma\beta X_{it} + \Sigma\gamma Z_{it} + \varepsilon_{it}, \quad (1)$$

where Π refers to Bank's profitability and it is defined as ROA as well as ROE. X_{it} represents the variables of the budget, while Z_{it} are external variables.

Moreover, the internal variables are: personnel expenses to assets ratio (PRSEXP), natural logarithm of bank's assets (logAS) and its value squared ($logAS^2$), bank's owneship status as a dummy variable (Gov), equity to assets ratio (EQAS), loan loss provisions to loans ratio (LLR), and loan to assets ratio (LNAS). On the other hand the variables that are independently defined from the financial results of commercial Banks are: concentration ratio measured by Herfindahl index, consumer price index (CPI), narrow money supply (M2), and Athens Stock Exchange yearly percentange change (ASE).

Our data set takes the form of a 'panel', since it combines time series with cross section observations. The main advantage of using a panel data set is that it allows the detail account of the dynamic developments of the Greek Banking sector. It covers the period of 1989-2000 and includes the major commercial Banks of that period[1]. This particular period is of interest due to the significant changes in the market structure. The liberalisation of the banking system led to the radical transformation of the market into more competitive forms within EU. The globalisation of the economic environment also contributed to the opening of the Greek Banking system to strategic allies from abroad.

In addition to the above model, we opt for a dynamic transformation of equation (1). A dynamic model incorporates more information and as a result the detrimental factors of the profitability are more efficiently estimated. The transformation of equation (1) into a simple dynamic form is written as follows

$$\Pi_{it} = a_i + \Sigma\beta X_{it} + \Sigma\gamma Z_{it} + \delta\Pi_{it-1} + \varepsilon_{it} \quad (2)$$

where δ represents the velocity of return to equilibrium after a shock in profitability, Π. In competitive conditions we expect a short adjustment to equilibrium, while a value of δ close to one will imply less competitive conditions (see Eichengreen and Gibson (2001)).

The estimation of the above equation follows the method of seemingly unrelated regression (SUR) so as to correct for the existence of possible heterogenous relationship between different Banks.

In addition, we estimate equation (2) with fixed effects, where it is assumed that differences in the characteristics of the banks are taken into account by differences in the constant. So, equation (2) is written as

$$\Pi_{it} = \mu\ \alpha_i + \Sigma\beta X_{it} + \Sigma\gamma Z_{it} + \delta\Pi_{it-1} + \varepsilon_{it}, \quad (3)$$

where μ captures differences in the constant term of the corresponding Greek banks.

The data set of this paper come from the data bank of EuraCD, the published accounts of commercial Banks, and the data set of the system Effect (1993-2000). Our sample includes seventeen commercial banks and covers the period 1989-2000.

Table 3 presents the empirical estimations of equation 2 for the preferred alternative definitions of profitability, that is ROA and ROE[2]. These results show that the estimated coefficients have the expected from the theory sign and magnitude. In specific, the lagged coefficient of the profits is positive and statistical significant for the covered period, implying that the profits of the previous period determine, to some degree, the future profits. As a consequence, there exist some evidence of the phenomenon of persistence. However, it is worth mentioning that the coefficients ROA(-1) and ROE(-1) are not quite large in magnitude, 0.18 and 0.19 respectively, This result is merely explained by the on going structural changes that have taken place in the banking system during the last years.

As expected, the coefficient of the variable of the personnel expenditure over total assets (PRSEXP) is negative and statistically significant, showing that an increase in these expenditures reduces the profitability of the Greek Banks. It is worth mentioning that the personnel expenditure is a major cost center for the banking institutions.

One would expect that the impact of loan loss reserves on profitability is negative and significant. However, the coefficient of loan loss reserves is not statistically significant at 10% level, insinuating that its influence is negligible. On the contrary, the ratio of loans to assets (LNAS) has a positive and statistically significant effect on the profitability of the Greek commercial Banks, especially in the case where the dependent variable is ROE. This result reflects the observed change of direction in the last years in the banking system towards more aggressive forms of expansion, based on significant positive income effect from interest. A characteristic of the healthy status of the Banks is the ratio of equity to assets (EQAS). This coefficient is positive and statistically significant.

The results of Table 3 further show that the profitability is a linear function of the size of the Banks. The latter is measured by the logarithm of assets (logAS), as well as by its square ($logAS^2$). The sign of the coefficient of logAS is positive , while in the case of logAS turns negative. This result implies that there exist economies of scale to exploit up to a marginal point. The marginal point is found to correspond to the average size of the Greek banks. From that point onwards the size of the banks start to negatively affect profitability (see Eichenreen & Gibson (2001)).

The status of ownership appears not to assert a significant statistical impact on profitability. Similar is true for the inflation. However, the money supply (M2), representing an approximation of the size of the market, asserts a positive and statistically significant impact on the profitability.

The performance of the Athens Stock Exchange in the late nineties is argued by many financial analysts to have enforced profitability. Our findings confirm this argument. The impact of the general index of the Athens Stock Exchange (ASE) is positive, though small in magnitude and statistically significant only in the case of the regression with ROA as the dependent variable. Moreover, a 10% increase of the general index of ASE is expected to increase profitability (ROA) by 0.09%.

Lastly, the impact of the market's structure, as it is measured by the Herfindahl index (HI), is positive, though it is small in magnitude (0.004), reflecting the oligopolistic structure of the market. Notice, however, that this impact is statistically significant only at 10% level in the case where the dependent variable is

ROE. As a consequence, the relationship between the degree of concentration and profitability is not strong. Based on this result we argue that the traditional hypothesis of Structure-Conduct-Performance is not verified.

TABLE 3

Factors that Affect Profitability of the Greek Commercial Banks

Dependent Variable **ROA** Number of Observations 128					Dependent Variable **ROE** Number of Observations 128				
Variable	**Coeff.**	**S.E**	**t-Stat**	**Prob.**	**Variable**	**Coeff.**	**S.E**	**t-Stat**	**Prob.**
ROA(-1)	0.18	0.06	2.97	0.00	*ROE(-1)*	0.19	0.05	3.39	0.00
PRSEXP	-0.24	0.06	-3.70	0.00	*PRSEXP*	-3.89	1.18	-3.27	0.00
LLR	0.01	0.009	1.39	0.16	*LLR*	0.26	0.25	1.04	0.29
LNAS	0.01	0.002	3.76	0.00	*LNAS*	0.25	0.04	5.13	0.00
EQAS	0.08	0.010	8.17	0.00	*EQAS*	0.45	0.11	4.08	0.00
LOGAS	1.69	0.520	3.24	0.00	*LOGAS*	0.28	0.11	2.50	0.01
$LOGAS^2$	-0.10	0.035	-3.01	0.00	$LOGAS^2$	-0.0001	0.00	-2.27	0.02
GOV	0.11	0.155	0.76	0.44	*GOV*	1.07	2.07	0.51	0.60
CPI	-0.001	0.010	-0.11	0.90	*CPI*	0.26	0.17	1.45	0.14
M2	0.01	0.004	3.68	0.00	*M2*	0.43	0.07	5.71	0.00
ASE	0.009	0.0007	3.96	0.00	*ASE*	0.002	0.01	0.21	0.82
HI	0.0001	0.0001	1.21	0.22	*HI*	0.004	0.002	1.67	0.09
Hausman Test	X^2=10.2 P-value = (0.115)				X^2=3.6597 P-value (0.306)				
R^2	0.56				0.56				
Adjusted R^2	0.44				0.44				

Conclusion

The liberalisation of the Greek Banking System, the harmonisation of the Greek legal system so as to meet the European standards, and the radical technological changes (expansion of ATM network across the country, internet banking, etc) have markedly affected the structure of the banking market. Moreover, the Greek banks, through a process of acquisitions-mergers and expansion into North East Europe, have attempted to enforce their position in the new banking era created by the adoption of the Euro. This strategy is expected to exploit economies of scale and support the provision of new financial services, such as asset management, and bancassurance. In addition, the expansion of the market share of private banks is a step towards the direction of in-

tensifying competition. In parallel, the improvement of competitiveness of the state owned banks and the increase of the demand for financial services act together so as to enforce further competition. This enforcement took place mainly in the second half of the nineties, though it is still on going.

The purpose of this study was to examine the determinants of the profitability of the Greek commercial Banks in the nineties. The profitability of the commercial banks was measured as the indexes of return on assets (ROA) and return on equity (ROE). The study was based on the theoretical framework of the Structure-Contact-Performance. Our results show that the future performance of the Greek banks is affected by the profitability of the previous period, though not to a large degree. This implies that there exist the phenomenon of persistence. We have evidence showing that the structural changes in the market during the last decade have positively contributed to profitability and have improved competition. The estimations, however, do not support the Structure-Conduct-Performance hypothesis. As a consequence, we argue that some oligopolistic profits are present. On the strong side of the evidence, we show that the variables that are directly related to the strategic planning of the banks (i.e. personnel expenses, loans to assets ratio, equity to assets ratio) are the ones that mainly explain profitability. The reported results also argue that economies of scale play a significant role in the market, while it is the "critical size" (the size that benefits most from the economies of scale) that has a positive impact on profitability. Finally, the size of the market, an external variable, defined by the supply of money, significantly influences profitability.

Notes

1. These banks are: Alpha Bank, Agricultural Bank, Aspis, Bank of Athens, Bank of Attiki, Commercial Bank, Bank of Crete, Egnatia Bank, Ergasias Bank, Eurobank, General Bank, Ioniki Bank, Bank of Macedonia-Thrace, Doriki-Telesis, National Bank, Bank of Piraeus, Xios Bank.

2. The adjusted coefficient of dermination (adjusted R^2) is quite high for this type of panel analysis for both reported regressions (0.443 and 0.442 respectively). Therefore the independent variables of the above model explain to a large extent the independent variables. In addition, we test for the existence of fixed effects in the underlying data generating process of the panel, which was found to be a plausible hypothesis. On the contrary, the random effects model was rejected.

3. From preliminary regressions it was found that the market share is not statistically significantly related to profitability, while it contributes to the inefficient estimation of the rest of the variables according to the hypothesis testing that we implemented. As a consequence the efficient hypothesis is not verified.

References

ALPHA BANK, 2001, *Information memorandum for Share Capital Issue.*

Abdulla J. Y., 1994, *An empirical analysis of commercial banks performance in Bahrain,* Giordano Dell' Amoro Foundations Savings and Development 18, No 3, pp. 307 - 321.

Berger A.N., 1995, *The Profit Structure Relation in Banking: Test of Market-Power and Efficient Structure Hypothesis, Journal* of Money, Credit and Banking, vol. 27, no 2, pp. 404-431.

Bourke P., 1989, *Concentration and other determinants of bank profitability in Europe, North America and Australia,* Journal of Banking and Finance 13, pp. 65 - 79.

Einchengreen B. and Gibson H. 2001, *Greek Banking at the Dawn of The New Millennium,* CEPR.

Evanoff D.D. and Fortier D.L., 1988, *Re-evaluation of the structure-conduct-performance relationship in banking,* Journal of Political Economy 85, Feb., pp. 147-162.

Gilbert R.A, 1984, *Studies of bank market structure and competition: A review and evaluation,* Journal of Money, Credit and Banking 16, pp. 617 - 645.

Gortsos C, 1999, *The Greek Banking System,* Hellenic Banks Association, Sakoulas Publishers.

Molyneux P. and J. Thornton, 1992, *Determinants of European banL· profitability: A note,* Journal of Banking and Finance 16, pp. 1176 - 1178.

Molyneux P., 1993, *Structure and Performance in European Banking,* Doctoral Dissertation, University of Wales, Bangor.

Norton J. J., Recent developments in regulation and supervision of US financial institutions, IEF, Research Monographs 92/2

Osborn D.K. and J. Wendel, 1983, *Research in structure, conduct and performance in banking, 1964 - 1979,* Research Paper 83-003, College of Business Administration, Oklahoma State University, July.

Papademos L. 2001, Euro, Greek economy and the banking system, *Hellenic Banks Association,* 1st Semester.

Provopoulos G. - Capopoulos P. 2001, *Dynamism of Greek Financial System, Critiki Publications.*

Remoundos P., 1995, Determinants *of Greek Commercial Banks Profitability 1989-1993, M.A Thesis,* University of Wales, Bangor.

Short B.K., 1979, *The relation between commercial banL· profit rates and banking concentration in Canada, Western Europe and Japan,* Journal of Banking and Finance 3, pp. 209 - 219.

Smirlock M., 1985, *Evidence of the (non)relationship between concentration and profitability in banking,* Journal of Money, Credit and Banking 17, pp. 69 - 83.

Bank of Greece, Annual Report, 2001.

Vassiliou D., 1992, *Economies of scale in Greek commercial banking: A first endeavor,* International Review of Economics and Business 39, No. 10 - 11, pp. 979-1007.

Zopounidis C, Despotis D.K., and Stavropoulou E., 1995, *Multivariate evaluation of Greek banking performance,* Applied Stochastic Models and Data Analysis 11, pp. 97-107.