

MERGING ACTIVITY IN THE GREEK BANKING SYSTEM: A FINANCIAL ACCOUNTING PERSPECTIVE

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Abstract

The purpose of this paper is to assess the overall financial performance and value implications of recent mergers and acquisitions in the Greek banking system. The *operating performance* (OP) methodology is based on accounting data and observes the *pre-* and *post-*merger financial performance of banks. The *event study* approach utilizes stock returns of acquiring and target banks around the announcement date of the merger to determine the presence of abnormal returns. Consistent with the international literature, OP results do not provide much evidence of performance gains resulting from bank mergers. Nevertheless, merged banks seem to outperform the group of non-merging banks. The event study approach indicates that mergers create value on a net aggregate basis.

JEL Classification: M41, G20

Keywords: Banks, M&As, Operating Performance, Event Study

1. Introduction

The worldwide credit system has undergone a process of restructuring and reorientation, both at structural and organizational levels. The banking sector has been at the center of this process. Phenomena of mergers and acquisitions (M&As), globalisation and internationalization of services and products, changes in organizational structures, innovation in human resources related practices, are just a few examples of changes in the banking industry.

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Until the early 1990s, the Greek banking system operated under a suffocating bureaucratic *status quo* of rules and regulations that restricted competition and market development. The recent transformation of the banking sector in Greece is attributed to three factors, namely, *convergence with European standards*, *competition* and *privatization* (Bryant, Garganas and Tavlas (2001)). EU membership has fostered the convergence of banking services, while the introduction of the euro and European integration has intensified interbank competition. The privatization of public banks has further reshaped the Greek banking industry. The restructuring of the sector has mainly occurred via privatization and M&As, with ownership remaining in domestic hands. These developments are likely to continue; however, a greater role for foreign institutions (via ownership of Greek banks and/or formation of strategic alliances) is expected to emerge.

In recent years, researchers have focused attention on scale economies and efficiency of the Greek banking system. The relevant literature can be classified into the pre- and post-1993 period, when the liberalization of the financial sector was initiated. In particular, Karafolas and Mantakas (1993), using a translog cost function, analyse economies of scale over the period 1980-1989, and find that the average cost curve is not a U-type. However, when the sample period is expanded beyond 1993 (Apergis and Rezitis, 2004), the estimation of translog cost functions indicates significant economies of scale for the great majority of Greek banks involved in M&As. Eichengreen and Gibson (2001), using a panel of Greek banks over the period 1993-1998, also report that bank size is an important determinant of profitability, albeit in a non-linear fashion. In particular, economies of scale seem to exist up to medium sized banks, but they disappear for larger banks. Athanasoglou and Brissimis (2004) reach similar conclusions applying the operating performance approach. Noulas (1997), using the data envelopment analysis (DEA) methodology to assess the efficiency of state vs. private banks for 1992, finds that state banks experienced technological progress, whereas private banks exhibited higher technical efficiency. Measures of economic efficiency over the deregulation period (1993-1998) provide mixed evidence. Christopoulos and Tsionas (2001) utilize the stochastic frontier approach to estimate the economic efficiency of the Greek banking system. Their results suggest that significant technical and allocative inefficiencies are present for both small and large banks, although these inefficiencies show a strong negative trend during the period of examination. Nevertheless, this finding seems to be sensitive to the selection of the methodology employed. Christopoulos, Lolos and Tsionas (2002) use a heteroskedasticity frontier model to measure cost efficiency over the same sample period and conclude that small and medium sized banks are almost fully efficient, while larger banks suffer from low cost efficiency.

When DEA methodology is employed (Tsionas, Lolos and Christopoulos, 2003), the empirical results show that the Greek banking system operates at high overall efficiency levels, and that larger banks are more efficient than smaller banks. Similar findings are reported by Spathis, Kosmidou and Doumpos (2002) and Halkos and Salamouris (2004). Specifically, Spathis, Kosmidou and Doumpos (2002) use multi-criteria decision aid methods (M.H.DIS and UTADIS) to identify the financial ratios that affect the classification of banks according to their size. The evidence suggests that for the period 1990-1999, large banks are more efficient than small ones, and that this superiority in efficiency mainly originates from the presence of economies of scale. Halkos and Salamouris (2004) apply the DEA methodology for the period 1997-1999 and also report a strong positive correlation between size and efficiency, thus suggesting that M&As lead to a continuous increase of average efficiency.

Nevertheless, the aforementioned studies do not explicitly focus on the impact of M&As on the cost and profit efficiency of the Greek banking institutions. This issue is investigated by Athanasoglou and Brissimis (2004). The authors employ the operating performance approach concentrating on revenue, cost, profit and productivity ratios in the pre-M&As period (1994-1997) and post-M&As period (2000-2002). Overall, M&As seem to positively affect the merged banks' profitability, and to a lesser extent, cost efficiency.

The present study attempts to shed further light on the effects of M&As in the Greek banking system. Specifically, it focuses on specific merger deals that took place in the period 1999-2000, and addresses two questions: first, whether banks' overall performance improved after mergers; and, second, whether the announcement of a bank merger or acquisition resulted in a net aggregate improvement in welfare. To study M&As as dynamic events we apply two different methodologies: the operating performance approach and the event study methodology. We believe that the assessment of overall performance and the quantification of value implications of M&As is necessary for the evaluation of the restructuring of the Greek banking system in the post-deregulation period. The conclusions drawn could also prove useful for the analysis of the banking performance in other medium-sized economies that are undergoing similar structural changes.

The remainder of the paper is structured as follows. Section 2 presents a brief overview of the recent developments in the Greek banking system. Section 3 summarises the findings of the relevant literature. Section 4 presents the empirical results, and finally, Section 5 summarises and concludes the paper.

2. A brief note on recent developments in the Greek banking market

The structural changes in the Greek banking system were initiated in the early 1980s when the role of the Bank of Greece in conducting quasi-independent monetary policy was enhanced (Law 1266/1982). The Report of the Karatzas Committee in 1987 set the stage for an extensive deregulation process of the market, motivated by the internationalization of competition and the establishment of the single European market for financial services.¹ Following this report, most controls on the operation of financial markets and institutions were relaxed by the mid-1990s. The main changes included, among others, the liberalization of interest rate determination, the free movement of short and long-term capital and the abolition of various rules regarding the operation of credit institutions (Noulas, 1999). In addition, the Single European Act and the First and Second Banking Directives have further intensified cross-border competition, by allowing banks from other Member States to do business in Greece. Finally, the domestic banking system faces competition not only from its European counterparts, but also from markets. The growth of national and European markets for various financial instruments (bonds, equities, derivatives, etc.) allows corporate and retail clients to choose from alternative sources of finance (Eichengreen and Gibson, 2001).

The Greek banking landscape has been changing rapidly as a result of this deregulation and liberalization process. Since the mid-1990s, Greek banks have entered a phase of M&As dictated by (a) government measures of privatization of previously state-owned banks², and (b) market discipline, i.e., the need for banks to achieve the necessary critical mass to reap economies of scale and scope, and to share the high information technology costs (Provopoulos and Kapopoulos, 2001). The first step towards the restructuring of the Greek banking system took place in 1992 when Commercial Bank *absorbed* Investment Bank. The big explosion in consolidation activity occurred in the late 1990s and early 2000s, leading to the creation of large banks by Greek standards.³ Furthermore, Greek banks have been expanding in regional markets (mainly in the Balkans), and have been promoting strategic cooperation with well-known international credit institutions⁴ in order to take advantage of synergistic effects and know-how transfers, to expand distribution networks and to

1. These stages are described in detail in the Report of the Karatzas Committee (1987).

2. For a discussion of this point, see Tsionas, Lolos and Christopoulos (2003).

3. Eleven merger deals between commercial *Greek* banks took place in the period 1997-2002 (Athanasoglou and Brissimis, 2004).

4. For example, the Commercial Bank cooperates with Credit Agricole and Bank of Piraeus with Bank of Tokyo Mitsubishi.

secure a position in major international financial centers (London, New York, etc.). The further integration of the Greek banking sector should not be precluded, considering the ongoing restructuring of the financial sector in Europe and worldwide.

3. Literature review

The examination of bank M&As as dynamic events has been carried out using two basic types of methodology: event studies and comparisons of pre-merger and post-merger performance. Event studies analyse stock returns relative to a portfolio of stocks representing the market. Event studies exhibit a great deal of variation with respect to their findings, sample size, sample selection and period of time over which returns are calculated and compared. The majority of these studies report a negative influence on the returns of the bidding bank's shareholders after a merger announcement (Subrahmanyam, Pangan and Rosenstein (1997), Pilloff (1996), Baradwaj, Dubofsky and Fraser (1992)), and only a few find significant positive returns (Desai and Stover (1985)). The findings appear to be more consistent among studies focusing on specific segments of the market. Acquiring banks in inter- and intra-state mergers, for example, seem to experience negative returns on and after the announcement day (Amihud, DeLong and Saunders (2002), Kaen and Tehranian (1989)). Overall, the shareholders of bidding banks seem to earn very little from M&As. One possible explanation is that merger gains are not completely achieved because managers of acquiring banks may have hubris (the *hubris hypothesis*) and make mistakes in evaluating target firms (Roll, 1986). Alternatively, managers may not be acting in the interests of shareholders (the *managerialism hypothesis*). Perhaps they embark on M&As to maximize their own utility at the expense of their firm's shareholders (Berkovitch and Narayanan, 1993). Target banks, on the contrary, enjoy positive abnormal returns before and after the announcement date (Hawawini and Swary (1990), Baradwaj, Fraser and Furtado (1990)). European event studies have a distinct cross-border focus (Cybo-Ottone and Murgia (2000), Tourani-Rad and Van Beek (1999) and Beitel and Schiereck (2001)) and observe significant value creation for the target banks and no significant value destruction for the shareholders of the bidding banks.

Clearly, most event studies find negligible evidence of aggregate net value creation and only document what appears to be wealth redistribution. This may be attributed to several factors. First, merger announcements mix information regarding the proposed acquisition with information concerning the financing of the acquisition. Hawawini and Swary (1990) and Houston and Ryngaert (1994) find that the returns to acquirer banks are significantly higher in mergers financed through cash

and preferred stock than mergers financed through common stock.⁵ Second, in the midst of a consolidation wave, acquisitions are largely anticipated, and positive merger effects may not appear in announcement date stock returns. Third, the capitalization of expected merger gains before the announcement may create an attenuation bias that could shrink positive returns into insignificant average returns for the combined bank on the announcement day.⁶ Nevertheless, it should be noted that the insignificant returns to the merged banks do not necessarily imply that there are no efficiency gains from bank M&As. Calomiris and Karceski (2000) point out that efficiency gains can flow to bank customers. So, small positive returns to the merged banks may simply reflect the fact that banks capture only a small fraction of the gains.

The examination of pre- and post-merger bank performance can take various formats. A number of studies utilize accounting data (OP studies), while others investigate the impact of M&As on cost and profit efficiency relative to an industry benchmark. OP studies utilize mean-difference tests based on performance-related ratios (e.g., ROE, ROA, etc.) from a stage prior to a deal to a period thereafter. The findings of the US studies are generally consistent. They find that on average mergers improve profitability (Frieder and Apilado (1983)), especially when they involve banks being inefficient prior to the merger (Akhavain, Berger and Humphrey (1997)). Nevertheless, these profit gains evaporate when other efficiency measures are jointly examined. Rose (1987), Berger and Humphrey (1992) and Rhoades (1993) show that operating efficiency, employee productivity and the profitability of acquiring and target banks do not significantly improve after merger (relative to that of non-merging firms). The (scarce) European literature provides evidence that is not consistent with the bulk of USA empirical studies. Vander-Vennet (1996) suggests that opportunities for efficiency gains exist for cross-border acquisitions and domestic mergers between partners of equal size.

The OP studies have the advantage of focusing on actual observed operating results of a merger. Nevertheless, one should identify a number of inherent problems. First, it is important to distinguish between improved cost and/or profit ratios

5. This finding contradicts the free cash flow hypothesis (Jensen, 1986) which implies that firms with high free cash flow are more likely to make bad acquisitions than firms with low free cash flow (Lang, Stulz and Walkling, 1989).

6. An anonymous referee suggested that market inefficiencies may also explain the finding of negligible aggregate net value creation. Since M&As are more evident in periods of market overvaluation, it is likely that stock prices do not immediately react to the merger announcement. This obstacle is at least partially overcome with the selection of a relatively wide post-merger event window.

and increased operational efficiency; the terms are not synonymous. The estimation of cost and profit efficiency allows the distinction between socially beneficial and socially harmful mergers. A merger is beneficial to society if operational efficiency gains are higher than any social losses that may occur from an increase in the exercise of market power. Akhavein, Berger and Humphrey (1997) and Berger (1998) find that US merged banks experience significant profit efficiency gains relative to other large banks, and improvements are greatest for the banks with the lowest efficiencies prior to merging. The European evidence is somewhat different. Huizinga, Nelissen and Vennet (2001) find that the cost efficiency of European banks is positively affected by the merging activity, while profit efficiency improves only marginally. Furthermore, merging banks do not seem to exercise greater market power by decreasing their deposit rates. Overall, their findings suggest that European bank M&As are socially beneficial.

Another possible problem of OP studies is that they typically analyze operating performance for periods of 1 to 6 years after a merger occurs. During these years, many factors unique to the merged firm may affect the bank's performance. Over a longer period of time, these unique factors potentially constitute a more serious problem to be dealt with. Hence, a number of researchers (e.g., Rhoades (1993)) and bank analysts suggest investigating the post-merger performance of banks for a period of 3 years. A different point of view is to ignore the impact of unique factors altogether. If the initial proposition is that mergers improve the overall performance of banks, the failure of OP studies to support this argument simply implies that efficiency and general performance gains from mergers are somehow squandered and short-lived.

A last possible problem of OP studies is that accounting data can be affected by manipulation to make figures look better. However, if bank mergers do have an impact on the overall performance of the merging entities, this is bound to become apparent in the published accounts. This explains why market analysts and bank regulators find accounting data useful for making decisions and investments, allocating resources and assessing the performance of banks.

4. Empirical Analysis

4.1 Operating Performance Studies

The general methodology of the OP studies is to compare pre- and post-merger performance of merging banks. To address this issue we construct a number of performance indicators composed of variables capturing bank profitability, operating efficiency, employee productivity, liquidity, credit risk and capital ade-

quacy.⁷ The sample consists of 9 banks, which engaged in merging activity in the period 1999-2000, and 4 non-merging banks (namely, the *control* group). Table 1 lists these banks and reports the year of merger announcement, the year of merger completion and their classification according to their market shares. The merged banks include Alpha Bank Ionian Bank, Eurobank, Ergasias Bank, Pireaus Bank, Macedonian & Thrace Bank, Chios Bank, Egnatia Bank and Bank of Central Greece. We focus on merger deals between Greek banks of relatively similar size that occurred at the peak of merging activity. Only 1 out of 9 banks in the sample (EFG Eurobank) participated in M&As with other *Greek* banks prior to the case examined in the present study.⁸ In order to consider the performance implications of bank M&As leaving other factors aside, the accounting ratios are compared with those obtained by the control group.⁹

Profitability ratios are of the utmost importance since they illustrate the ability of a bank to generate profits from either its assets or the equity. Operational efficiency ratios account for the possible reductions in operating expenses. Labour productivity ratios are self explanatory. Liquidity ratios illustrate the ability of a bank to meet its short-term liabilities. Capital adequacy ratios illustrate banks' viability in the long run and define their solvency. Finally, credit risk ratios exhibit the exposure of a bank to default loans.

7. Financial indicator ratios are reported in Appendix 1.

8. EFG Eurobank acquired Interbank in 1997 and Bank of Crete in 1999, and merged with Bank of Athens in 1999. The size of these banks, according to their total assets, was at least 5 times smaller than the size of Ergasias Bank (target bank of the merger deal examined in the present study). For further information regarding the size of acquiring and acquired Greek banks see Athanasoglou and Brissimis (2004) – Table 1.

9. The control group consists of 2 large banks (Agricultural Bank and Commercial Bank) and 2 smaller banks (Bank of Attica and Aspis Bank). An anonymous referee suggested the extension of the control group to the whole industry (including the acquiring and acquired banks). Nevertheless, this would not allow us to distinguish between changes in bank performance due to M&As and changes resulting from external factors that affect the whole banking system.

Table 1. Greek banks examined in the present study

Year of Announcement	Year of Completion	Acquirer Bank	Classification	Target Bank	Classification	Control Group	Classification
1998	2000	Pireaus Bank ¹	8	Macedonian & Thrace Bank	10	Agricultural Bank ¹	3
1999	2000	Pireaus Bank ¹	8	Chios Bank ¹	11	Commercial Bank ¹	4
1999	1999	Bank of Central Greece ²	17	Egnatia Bank ²	19	Bank of Attica ¹	15
1999	2000	EFG Eurobank ¹	5	Ergasias Bank ¹	6	Aspis Bank ¹	17
1999	2000	Alpha Bank ¹	2	Ionian Bank ¹	7		

Notes: The first column refers to the year of merger announcement. The second column refers to the year of merger deal completion. Classification is calculated on the basis of market shares according to total assets. Classification data are reported in Gibson and Demenagas (2002) – Table 1.

¹. Classification year: 1999

². Bank of Central Greece absorbed Egnatia Bank. The new entity is named Egnatia Bank. Classification year: 1997

Tables 2a-2e report the pre- and post-merger financial accounting ratios for both the merged and non-merging banks. The pre- and post-merger average figures correspond to a 3-year period [(1997-1999) and (2000-2002), respectively], whereas the average figures for the control group refer to the full sample period (1997-2002). Interesting points emerge from the analysis. First, in the pre-merger period, acquirers seem to be more profitable (Table 2a) than target banks (and non-merging banks) as evidenced by ROA, ROE and NPM. Furthermore, EM figures indicate differences in the capital structure of the acquirer and target banks. More specifically, acquiring banks seem to be less levered than target banks, hence illustrating their unused debt capacity. In the post-merger period, the profitability of the combined entities seems to worsen in relation to that of pre-merger acquirer banks, but it still remains above the pre-merger target and control group mean.

Table 2b reports measures regarding total operating efficiency and inelastic expenses. These ratios illustrate potential savings for operating expenses resulting from acquisition activity. In terms of TOE, bidding banks seem to be more efficient than target banks, but in the post-merger period the combined entities do not experience cost savings. Personnel and management expenses/Total revenues and Personnel and management expenses/Total expenses ratios further support this finding. Both measures significantly worsen in the post-merger period, thus indicating that cost inefficiency may be attributed to the fact that merging activity does not lead to branch closure and a reduction in employees. Nevertheless, when compared with the control group, the operating expenses record of merged banks is superior over the entire sample period.

In terms of labor productivity (Table 2c), acquiring and target banks are of almost equivalent level in the pre-merger period, and both underperform the control group. Merging activity seems to enhance labor productivity, as is evidenced by Total assets/Number of employees. This may seem counterintuitive given the finding of cost inefficiency reported in Table 2b; yet the enhancement of the productivity ratio may result from the expansion of the numerator (increases in assets), rather than from reductions in the number of employees. This conjecture is further reinforced when Net profits/Number of employees and Number of employees/Number of subsidiaries ratios are examined. Neither ratio exhibits any signs of significant improvement in the post-merger period, hence confirming the results of Table 2b. It should be pointed out, however, that, with the exception of the latter ratio, merging activity seems to improve labour productivity above the control group mean.

Table 2d reports liquidity ratios. These measures seem to worsen in the post-merger period. At first glance, one might argue that this finding questions the soundness of the banking system altogether. Nevertheless, a fall in liquidity is not neces-

sarily a bad thing. More effective asset management, for example, may result in lower liquidity and increased earnings obtained from less liquid assets such as loans. The credit risk ratio (Table 2e) also worsens in the post merger period illustrating the fierce competition among commercial banks in the credit market. The Amount due from customers/Total assets ratio provides an implicit indication of higher precarious claims in the post-merger period (Table 2e). The mean ratio for the merged banks is considerably above the target and bidding mean, and it tracks the control group mean. The rapid growth of the credit market is likely to lead to increased capital adequacy considerations; this is evidenced by the two declining capital adequacy ratios (CC and Owner's equity/Amount due from customers). Again, this finding should be interpreted with caution. On the one hand, it suggests that the combined entities are likely to experience more difficulties in meeting their long-term liabilities. On the other hand, the Greek banking system represents a rather special case in the sample period. During this period a number of Greek banks raised a significant amount of (cheap) capital taking advantage of the booming stock market. Their intention was not to keep capital adequacy ratios at high levels, but to use the capital to expand their business in later years either in the domestic market (e.g., through M&As), or abroad (e.g., in the Balkans).

Table 2a. Profitability Ratios (1997-2002)

Banks	ROA (%)		ROE (%)		NPM		EM	
	Pre-merger	Post-merger	Pre-merger	Post-merger	Pre-merger	Post-merger	Pre-merger	Post-merger
Alpha Bank (A) ¹	2.22	1.17	27.18	16.78	24.57	15.80	12.24	14.88
Ionian Bank (T) ²	0.28		1.73		1.93		25.72	
EFG – Eurobank (A)	1.08	1.60	10.38	9.55	5.90	10.00	9.80	10.11
Ergasias Bank (T)	3.90		44.76		29.79		11.60	
Egnatia Bank (A) ³	1.13	1.50	10.97	12.11	7.75	14.13	12.10	8.00
BCG (T) ³	-0.01		-8.23		-7.37		10.89	
Piraeus Bank (A)	-2.41	0.97	14.60	11.72	25.07	12.43	6.59	11.87
Chios Bank (T)	1.80		26.56		16.30		16.36	
Macedonian-Thrace (T)	-0.20		-3.84		2.64		10.47	
Average Acquirers	1.71	1.31	15.78	12.54	15.82	13.09	10.18	11.22
Average Targets	1.15		12.20		8.66		15.01	
Control Group ⁴	1.19		11.41		11.38		11.31	

Data Source: ICAP and published balanced sheets

¹ (A) stands for *acquirer* bank ² (T) stands for *target* bank ³ Egnatia & BCG: Pre-merger period (1997-1998); post-merger period (1999-2002) ⁴ The control group consists of 4 non-merging banks, namely Aspis Bank, Commercial Bank, Agricultural Bank and Bank of Attica.

Table 2b. Operating Efficiency Ratios (1997-2002)

Banks	TOE (%)		Personnel & Management Expenses / Total Revenues (%)		Personnel & Management Expenses / Total Expenses (%)	
	Pre-merger	Post-merger	Pre-merger	Post-merger	Pre-merger	Post-merger
Alpha Bank (A) ¹	54.23	78.54	19.62	27.19	24.64	24.77
Ionian Bank (I) ²	84.64		21.40		25.67	
EFG – Eurobank (A)	88.40	83.60	17.76	22.87	20.70	27.40
Ergasias Bank (I)	47.80		12.97		27.00	
Egnatia Bank (A) ³	97.16	80.85	31.55	30.65	33.50	37.55
BCG (I) ³	107.00		2.85		2.65	
Pireaus Bank (A)	64.63	91.33	19.70	27.00	30.50	29.87
Chios Bank (I)	83.90		21.80		26.10	
Macedonian-Thrace (I)	90.60		22.00		25.60	
Average Acquirers	76.11	83.58	22.16	26.93	27.34	29.90
Average Targets	82.79		16.20		21.40	
Control Group⁴	91.02		29.98		33.28	

Notes: See Table 2a.

Table 2c. Labour Productivity Ratios (1997-2002)

Banks	Total Assets/ No of Employees		Net Profits / No of Employees		No of Employees/No of Subsidiaries	
	Pre- merger	Post- merger	Pre- merger	Post- merger	Pre- merger	Post- merger
Alpha Bank (A) ¹	1.30	3.50	0.07	0.04	21.50	21.20
Ionian Bank (I) ²	1.46		0.16		18.30	
EFG – Eurobank (A)	2.43	2.81	0.04	0.05	27.97	21.81
Ergasias Bank (I)	1.98		0.08		20.43	
Egnatia Bank (A) ³	1.28	1.56	0.005	0.02	27.35	24.20
BCG (I) ³	0.9		-0.006		24.00	
Pireaus Bank (A)	2.78	3.32	0.07	0.03	20.60	18.20
Chos Bank (I)	2.42		0.04		21.00	
Macedonian-Thrace (I)	1.44		0.004		18.20	
Average Acquirers	1.62	2.80	0.05	0.04	24.36	21.35
Average Targets	1.64		0.06		20.39	
Control Group⁴	1.95		0.02		16.52	

Notes: See Table 2a.

Table 2d. Liquidity Ratios (1997-2002)

Banks	Loans/ Deposits		Cash+Reserves+Secu rities / Total Assets (%)		Cash+Reserves+Sec urities/Total Deposits (%)	
	Pre- merger	Post- merger	Pre- merger	Post- merger	Pre- merger	Post- merger
Alpha Bank (A) ¹	0.60	0.79	40.80	26.00	60.20	46.40
Ionian Bank (I) ²	0.34		52.90		63.20	
EFG – Eurobank (A)	0.52	0.81	13.77	7.30	19.37	10.40
Ergasias Bank (I)	0.49		20.64		25.45	
Egnatia Bank (A) ³	0.78	0.84	17.55	9.40	22.50	12.93
BCG (I) ³	0.55		19.40		23.15	
Pireaus Bank (A)	0.67	0.87	18.67	8.40	30.16	14.61
Chios Bank (I)	0.50		12.90		20.40	
Macedonian-Thrace (I)	0.50		15.06		21.20	
Average Acquirers	0.64	0.83	22.70	12.78	33.06	21.09
Average Targets	0.48		24.18		30.68	
Control Group⁴	0.81		16.97		27.60	

Notes: See Table 2a.

Table 2e. Credit Risk and Solvency Ratios (1997-2002)

Banks	Amount due from customers/Total Assets (%)		Capital Coverage (%)		Owner's equity/Amount due from customers (%)	
	Pre-merger	Post-merger	Pre-merger	Post-merger	Pre-merger	Post-merger
Alpha Bank (A) ¹	40.50	48.97	8.30	6.70	20.40	20.10
Ionian Bank (I) ²	28.43		3.90		14.10	
EFG – Eurobank (A)	36.43	54.00	11.31	10.16	30.90	18.90
Ergasias Bank (I)	39.73		8.87		22.40	
Egnatia Bank (A) ³	59.45	64.55	8.35	12.58	14.50	19.98
BCG (I) ³	46.15		9.20		19.90	
Pireaus Bank (A)	31.70	49.00	17.20	8.57	31.50	17.97
Chios Bank (I)	34.00		7.30		22.60	
Macedonian-Thrace (I)	37.90		11.30		32.10	
Average Acquirers	42.02	54.13	11.29	9.50	24.33	19.24
Average Targets	37.24		8.11		22.22	
Control Group⁴	54.58		10.53		20.53	

Notes: See Table 2a.

4.2 Event Studies

Event study methodology directly allows an assessment of the impact of merging activity on value creation for shareholders. The standard empirical framework we use is described in Dodd and Warner (1983)¹⁰ and involves the stock price analysis of the acquirer and the target bank in a period surrounding the announcement of the merger (the *event window* period). The announcement day ($t=0$) is defined as the first day on which the information reaches the market. The necessary financial data (stock returns and the banking index) and announcement days are drawn from the *Naftemporiki* newspaper.

The market model follows the form:

$$R_{jt} = \alpha_j + \beta_j R_{Mt} + \varepsilon_{jt} \quad (1)$$

where

$$R_{jt} = \text{price return to security } j$$

$$R_{Mt} = \text{rate of return to the national branch index.}$$

OLS parameters α_j and β_j are estimated during a period of 252 trading days (one full year – daily observations) prior to the event window. Expected returns \hat{R}_{jt} are then calculated:

$$\hat{R}_{jt} = \hat{\alpha}_{jt} + \hat{\beta}_{jt} R_{Mt} \quad (2)$$

Abnormal returns of a stock j (AR_{jt}) in the event window are computed by subtracting the expected return from the observed stock return in the event window. The measure of abnormal performance of security j during the event window period is given by the cumulative abnormal return (CAR_j), i.e.,

$$CAR_j = \sum_{t_1=-20}^{t_2=+20} AR_{jt} \quad (3)$$

Finally, all merger deals are aggregated and presented in a single framework. For a sample of N securities, the measure of total abnormal performance is given by the mean cumulative abnormal return:

10. Fama (1976) provides a discussion of the market model.

$$\overline{CAR} = \frac{1}{N} \sum_{j=1}^N CAR_j \quad (4)$$

The effects on shareholders of the targets and of the acquirers are analysed both separately and in combination. The assessment of the entire transaction as a whole is particularly important because it allows us to determine whether wealth is transferred from the shareholders of the bidders to the shareholders of the targets, or wealth is created on a net basis. Abnormal returns for the combined entity are computed as the weighted average of the abnormal returns of the (averaged) acquirer (AR_{At}) and the abnormal returns of the (averaged) target (AR_{Tt}):

$$AR_{combined,t} = \frac{MV_A * AR_{At} + MV_T * AR_{Tt}}{MV_A + MV_T} \quad (5)$$

where MV = market capitalisation of the separate entities on day $t=-21$. $AR_{combined,t}$ are then cumulated accordingly to eq. (3).

To test for the significance of the mean cumulative abnormal return a Z-test statistic is calculated (Dodd and Warner, 1983). The standard error of the test statistic for the combined entity is further adjusted according to the suggestions of Houston and Ryngaert (1994). To ensure the validity of the test statistics, the mean cumulative abnormal returns are tested for normality using the Watson empirical distribution test. Results indicate that all three return variables analysed (for the target, the acquirer and the combined entity) satisfy the assumption of a normal distribution at the 1% significance level.

As mentioned in Section 3, the determination of the event study window is of great importance. The magnitude of any valuation is sensitive to the length of the event window. A 41-day period, surrounding the announcement of a merger is selected for the present study. The event window of 20 days before the announcement captures possible leakages of information before the merger is announced. The event window of 20 days after the announcement captures the possible stock price reactions after the merger is announced. Since the Athens Stock Exchange (ASE) exhibits weak form efficiency at best¹¹, it is likely that new information is not fully and immediately incorporated in stock prices; hence, the selection of a relatively wide post-merger event window. Table 3 reports mean CARs for 4 merger deals¹². A

11. Siourounis (2002) and Kavussanos and Dockery (2001) provide recent evidence for the inefficiency of the ASE market.

12. Egnatia Bank was not listed in the ASE prior to the merger deal, and hence it is excluded from the empirical analysis.

summary plot of the development of the cumulative abnormal returns in the event window is presented in Figure 1.

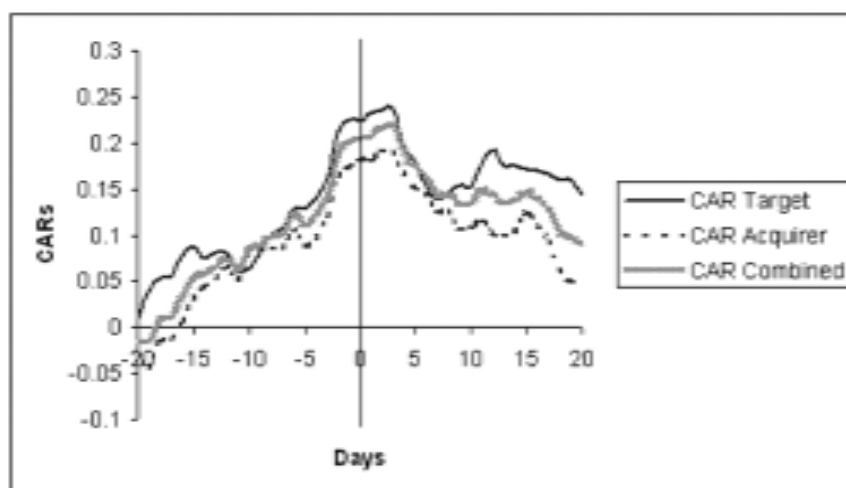
Table 3. CARs

No of Mergers	Event window	CARs	Watson test (q -value)	Pos.	Neg.	Z-test (q -value)
4						
Acquirers	[-20;+20]	0.049**	0.349	2	2	0.026
Targets	[-20;+20]	0.143**	0.108	2	2	0.028
Combined	[-20;+20]	0.091***	0.370	2	2	0.006

Notes: Watson empirical distribution test for normality of mean CARs. Z-test for mean CARs significance according to Dodd and Warner (1983). The standard deviation of the mean CAR significance is adjusted according to the suggestions by Houston and Ryngaert (1994).

** = significant at the 10%; ** = significant at the 5%; *** = significant at the 1% level.*

Figure 1. CARs



Given that our sample consists of only 4 merger deals, the results must be viewed with caution. In general, the preliminary findings are consistent with those reported in the majority of international studies. The shareholders of targets earn significant positive returns (14.3%). Merger deals of Greek banks are thus a clear success for the targets' shareholders. Contrary to most of the studies that have a US-focus, there is also evidence for smaller but significant positive abnormal returns (4.9%) accruing to the shareholders of the bidders. Beitel and Schiereck (2001) report similar findings for nationally bidding European banks. Finally, results for the combined entity of the bidder and the target show significant cumulated abnormal returns (9.1%), suggesting that the analysed transactions create value on a net aggregate basis. Therefore, M&As of Greek banks in the period 1997-2002 may be considered on average as being clearly successful from an overall economic viewpoint.¹³ Given this finding it seems that the *managerialism hypothesis* and the *hubris hypothesis* cannot be supported in the case of Greece. On the contrary, synergistic gains seem to be shared between the owners of the bidding and the target bank, with the latter receiving a larger proportion.

Figure 1 provides some useful insights into the market's reaction to a merger announcement. CARs tend to follow a steadily increasing path prior to the announcement, possibly reflecting leakage of information. CARs reach their maximum short after the announcement date, and subsequently settle down at a lower level. Overall, it seems that the Greek banking sector overreacts to the arrival of new information (i.e., the announcement of the merger), hence questioning the efficacy of the *efficient market hypothesis*. The latter contradicts the findings of Stengos and Panas (1992) who find support for the weak and semi-strong form of efficiency using data on selected stocks from the Greek banking sector.

5. Conclusions

This paper examines the financial and operating performance of 5 recent merger deals in the Greek banking sector, employing conventional pre- vs. post-merger comparisons and event study methodology. Operating performance results for the entire sample are broadly consistent with those reported in the international litera-

13. Given the insufficient number of observations, it is not possible to apply non-parametric tests (such as the Wilcoxon signed rank test) to test whether outliers drive the results. Nevertheless, looking at the figures of CARs of individual merger deals (available upon request) it is quite likely that this is the case in our sample. The *success* of the merger deal of Pireaus Bank and Macedonia-Thrace Bank seems to outweigh the moderate or even negative CARs of the other three merger agreements.

ture. Profit, operating efficiency and labour productivity ratios of the bidding and target banks do not improve after merger. Nonetheless, when compared with the corresponding ratios of non-merging banks (the *control* group), we conclude that merger activity has a positive impact on banks' operating performance. Liquidity measures worsen in the post-merger era, possibly indicating a shift in output from securities to loans, a higher-valued but riskier product, hence raising credit risk and capital adequacy considerations. The event study methodology finds that from the combined view of the target and bidding Greek banks, M&A transactions are on average successful and create value on a net basis. On balance, we conclude that the emphasis on M&As, as an argument for the survival of Greek banks in the competitive European market, seems convincing. Nevertheless, the long-run success of Greek banking sector restructuring via M&As necessitates a more careful monitoring of the endogenous factors related to banking operations (e.g., expansion in the credit market and capital adequacy).

APPENDIX 1

The following table lists and defines the alternative proxies employed in the analysis.

Performance Indicators	Proxies	Preferred Direction
Profitability	Return on Assets (ROA)= Net income/Total assets	Increasing
	Return on Equity (ROE)= Net income/Total equity	Increasing
	Net Profit Margin (NPM)= Net income/Total Revenues	Increasing
	Equity Multiplier (EM)= Total assets/Total equity	Depends ^a
Operating Efficiency	Total Operating Efficiency (TOE)= Operating expenses/Operating Revenues	Decreasing
	Personnel and Management Expenses/ Total Revenues	Decreasing
	Personnel and Management Expenses/ Total Expenses	Decreasing
Labour	Total Assets/No. of employees	Increasing
Productivity	Net income/No. of employees	Increasing
	No of employees/No. of subsidiaries	Decreasing
Liquidity	Loans/Deposits	Decreasing
	Cash+Reserves+Securities/ Total assets	Increasing
	Cash+Reserves+Securities/ Total deposits	Increasing
Credit Risk	Amount due from customers/ Total assets	Decreasing
Solvency	Capital Coverage (CC)= Owner's equity/Total assets	Increasing
	Owner's equity/Amount due from customers	Increasing

^a EM indicates the extent of financial leverage, and thus that of unused debt capacity.

References

- Akhavein, J. D., Berger, A. N. and Humphrey, D. B. (1997), "The effects of megamergers on efficiency and prices: Evidence from a bank profit function", *Review of Industrial Organisation*, Vol. 12, pp. 95-139.
- Amihud, Y., DeLong, L. G. and Saunders, A. (2002), "The effects of cross-border bank mergers on bank risk and value", *Journal of International Money and Finance*, Vol. 21, pp. 857-877.
- Apergis, N. and Rezitis, A. (2004), "Cost Structure, Technological Change, and Productivity Growth in the Greek Banking Sector", *International Advances in Economic Research*, Vol. 10, pp. 1-15.
- Athanasoglou, P. P. and Brissimis, S. N. (2004), "The impact of M&As on the efficiency of banks in Greece", *Bank of Greece Economic Bulletin*, Vol. 22, pp. 7-34 (in Greek).
- Baradwaj, B. G., Dubofsky, D. A. and Fraser, D. R. (1992), "Bidder returns in Interstate and Intrastate Bank Acquisitions", *Journal of Financial Services Research*, Vol. 5, pp. 261-273.
- Baradwaj, B. G., Fraser, D. R. and Furtado, E. P. H. (1990), "Hostile Bank Takeover Offers: Analysis and Implications", *Journal of Banking and Finance*, Vol. 14, pp. 1229-1242.
- Beitel, P. and Schiereck, D. (2001), "Value creation at the ongoing consolidation of European banking market", Institute for Mergers and Acquisitions (IMA), Working Paper No. 05/01.
- Berger, A. N. and Humphrey D. B. (1992), "Megamergers in Banking and the Use of Cost Efficiency as an Antitrust Defense", *Antitrust Bulletin*, Vol. 37, pp. 541-600.
- Berger, A. N. (1998), "The Efficiency Effects of Bank Mergers and Acquisition: A Preliminary Look at the 1990s Data" in Amihud, Y. and Miller, G., *Bank Mergers and Acquisitions*, Boston: Kluwer, pp. 79-111.
- Berkovitch, E. and Narayanan, M. P. (1993), "Motives for Takeovers: An Empirical Investigation", *Journal of Finance and Quantitative Analysis*, Vol. 28, pp. 347-362.
- Bryant, R. C., Garganas, N. C. and Tavlas, G. S. (2001), "Greece's Economic Performance and Prospects", Bank of Greece and the Brookings Institution, pp. 43-95.
- Calomiris, C. W. and Karceski, J. (2000), "Is the bank merger wave of the 1990s efficient? Lessons learned from nine case studies", in Kaplan S. N., *Mergers and Productivity*, Chicago: University of Chicago Press.
- Christopoulos, D. K. and Tsionas, E. G. (2001), "Banking Economic Efficiency in the Deregulation Period: Results from Heteroscedastic Stochastic Frontier Models", *The Manchester School*, Vol. 69, pp. 656-676.
- Christopoulos, D. K., Lolos, S. E. G. and Tsionas, E. G. (2002), "Efficiency of the Greek banking system in view of the EMU: a heteroscedastic stochastic frontier approach", *Journal of Policy Modeling*, Vol. 24, pp. 813-829.
- Cybo-Ottone, A. and Murgia, M. (2000), "Mergers and shareholder wealth in European banking", *Journal of Banking and Finance*, Vol. 24, pp. 831-859.
- Desai, A. S. and Stover, R. D. (1985), "Bank holding company acquisition, stockholder returns, and regulatory uncertainty", *Journal of Financial Research*, Vol. 8, pp. 145-156.
- Dodd, P. and Warner, J. (1983), "On corporate governance: A study of proxy contests", *Journal of Financial Economics*, Vol. 11, pp. 401-438.
- Eichengreen, B. and Gibson, H. D. (2001), "Greek Banking at the Dawn of the New Millennium" in Bryant, R. C., Garganas, N. C. and Tavlas, G. S. (2001), "Greece's Economic Performance and Prospects", Bank of Greece and the Brookings Institution, pp. 545-597.

- Fama, E. F. (1976), "Foundations of Finance: Portfolio Decisions and Securities Prices", New York: Basic Books, Inc., pp. 63-132.
- Frieder, L. A. and Apilado, V. P. (1983), "Bank Holding Company Expansion: A Refocus Rationale", *Journal of Financial Research*, Vol. 6, pp. 67-81.
- Gibson, H. D. and Demenagas, N. A. (2002), "The Competition in the Greek Banking System: An Empirical Study Over the Period 1993-1999", *Bank of Greece Economic Bulletin*, Iss. 19, pp. 7-20 (in Greek).
- Halkos, G. E. and Salamouris, D. S. (2004), "Efficiency measurement of the Greek commercial banks with the use of financial ratios: a data envelopment analysis approach", *Management Accounting Research*, Vol. 15, pp. 201-224.
- Hawanini, G. A. and Swary, I. (1990), "Mergers and Acquisitions in the US Banking Industry: Evidence from the Capital Markets", New York: North Holland.
- Houston, J. F. and Ryngaert, M. D. (1994), "The overall gains from large bank mergers", *Journal of Banking and Finance*, Vol. 6, pp. 1155-1176.
- Huizinga, H. P., Nelissen, J. H. M. and Vander-Vennet, R. (2001), "Efficiency effects of bank mergers and acquisitions in Europe", Universeit Gent-Faculteit Economie en Bedrijfskunde, Working Paper No. 106/2001.
- Jensen, M. C. (1986), "Agency Costs of Free Cash Flow, Corporate Finance Takeovers", *American Economic Review*, Vol. 76, pp. 323-339.
- Kaen, F. R. and Tehranian, H. (1989), "New Hampshire Bank Mergers: The Returns to Acquiring Bank Shareholders", in Gup, B. E., *Bank Mergers: Current Issues and Perspectives*, Boston: Kluwer, pp. 141-155.
- Karafolas, S. and Mantakas, G. (1996), "A note on cost structure and economies of scale in Greek banking", *Journal of Banking and Finance*, Vol. 20, pp. 377-387.
- Karatzas Committee (1987), "Report of the Commission for the Restructuring and the Modernisation of the Greek Banking System" (headed by Th. Karatzas), *Hellenic Bank Association*, Athens (in Greek).
- Kavussanos, M. G. and Dockery, E. (2001), "A Multivariate Test for Stock Market Efficiency: The Case of ASE", *Applied Financial Economics*, Vol. 11, pp. 573-579.
- Lang, L. H. P., Stulz, R. M. and Walkling, R. A. (1989), "Managerial Performance, Tobin's Q and the Gains in Tender Offers", *Journal of Financial Economics*, Vol. 24, pp. 137-154.
- Noulas, A. (1997), "Productivity growth in the Hellenic banking industry: state versus private banks", *Applied Financial Economics*, Vol. 7, pp. 223-228.
- Noulas, A. (1999), "Profitability and efficiency of the Greek banks (1993-1998)", *Bulletin Union Greek Banks*, Iss. 4, pp. 53-66.
- Pilloff, S. J. (1996), "Performance changes and shareholder wealth creation associated with mergers of publicly traded banking institutions", *Journal of Money, Credit and Banking*, Vol. 28, pp. 294-310.
- Provopoulos, G. and Kapopoulos, P. (2001), "The Dynamics of the Financial System", Athens: Kritiki (in Greek).
- Rhoades, S. A. (1993), "Efficiency Effects of Horizontal (In-Market) Bank Mergers", *Journal of Banking and Finance*, Vol. 17, pp. 411-422.
- Roll, R. (1986) "The Hubris Hypothesis of Corporate Takeovers", *Journal of Business*, Vol. 59, pp. 97-216.

- Rose, P. S. (1987), "The Impact of Mergers in Banking: Evidence from a Nationwide Sample of Federally Chartered Banks", *Journal of Economics and Business*, Vol. 39, pp. 289-312.
- Siourounis, G. D. (2002), "Modelling Volatility and Testing for Efficiency in Emerging Capital Markets: The Case of the Athens Stock Exchange", *Applied Financial Economics*, Vol. 12, pp. 47-55.
- Spathis, C., Kosmidou, K. and Doumpos, M. (2002), "Assessing profitability factors in the Greek banking system: A multicriteria methodology", *International Transactions in Operational Research*, Vol. 9, pp. 517-530.
- Stengos, T. and Panas, E. (1992), "Testing the Efficiency of the Athens Stock Exchange: Some Results from the Banking Sector", *Empirical Economics*, Vol. 17, pp. 239-252.
- Subrahmanyam, V., Rangan, N. and Rosenstein, S. (1997), "The role of outside directors in bank acquisitions", *Financial Management*, Vol. 26, pp. 23-26.
- Tourani-Rad, A. and Van Beek, L. (1999), "Market Valuation of European Bank Mergers", *European Management Journal*, Vol. 17, pp. 532-539.
- Tsionas, E. G., Lolos, S. E. G. and Christopoulos, D. K. (2003), "The performance of the Greek banking system in view of the EMU: results from a non-parametric approach", *Economic Modelling*, Vol. 20, pp. 571-592.
- Vander-Vennet, R. (1996), "The Effect of Mergers and Acquisitions on the Efficiency and Profitability of EC Credit Institutions", *Journal of Banking and Finance*, Vol. 20, pp. 1531-1558.