Journal of Applied Finance & Banking, Vol. 10, No. 2, 2020, 55-77
ISSN: 1792-6580 (print version), 1792-6599(online)
Scientific Press International Limited

Mergers and Acquisitions and how they affect the Labor productivity. Evidence from the Greek Banking system.

Dr. Kyriazopoulos Georgios[1] and Thanou Efthymia[2]

Abstract

This paper aims to study the Labor Productivity of the four Greek Systemic Banks after all Mergers and Acquisitions, with the use of human financial ratios for the implementation of the Euro in Greece during the time period 2002-2017.
The four Greek Systemic Banks, which are the major credit institutions of the country and were created during the economic crisis and strengthened after continuous acquisitions and mergers, led to the need to measure employee productivity in order to determine whether there is improvement or deterioration following the Mergers and Acquisitions that they have made.
In particular, this paper presents and analyzes the systemic banks of the country before and after the economic crisis as well as the Mergers and Acquisitions that took place in the period 2012-2013. Continuing, it discusses and presents the framework of labor productivity as well as the financial ratios that will be used to measure the bank productivity of labor, the results of which will be analyzed and compared with better productivity among the banks examined.
Finally, conclusions will be drawn to answer the question of whether labor productivity increases or reductions are achieved following Mergers & Acquisitions transactions carried out by Greek systemic banks.

JEL classification numbers: G21, G34, O4, F65
Keywords: Banks, Mergers & Acquisitions, Productivity, Ratios Financial Analysis

---

[1] Assistant Professor, Accounting and Finance Department University of Western Macedonia, Kozani Greece Vice President of International Conference of Development and Economy (I.CO.D.ECON.) *Corresponded Author.
[2] Msc Banking & Finance
Article Info: Received: September 26, 2019. Revised: October 9, 2019.
Published online: March 1, 2020.

1. Introduction

The banking system is characterized as the cornerstone of modern and developed countries on a global basis as its role and effectiveness contributes to the growth and stability of the economy. Its intermediary and financial role, as well as its ongoing evolution into financial services providers, are the driving force of the various sectors that make up an economy, as they are closely linked. Thus, the development and stability of the domestic banking system is crucial to the growth of an economy. The same is true of the Greek Banking System, which has undergone significant growth over the years, especially since the 1990s, and its results reflect perfectly in the Greek economy.

The Greek banking system has seen significant developments through the liberalization of capital movements, the safeguarding of the right to free cross-border banking services and the accession of Greece to the UN, as they made it fully internationalized in the world market, with the result , to strengthen its role in the development of the Greek economy and in particular to develop it, both domestically and geographically (South-Eastern Europe) and in the provision of financial services and products. In particular, Greek banks in the period 2002-2007 developed rapidly, mainly from the availability - providing the Greek economy with more favorable financing to businesses and households with historically low interest rates, significantly boosting consumer credit in the country.

However, the continued growth, growth of assets, competitiveness in maximizing efficiency and the development of their networks at national and international levels of Greek banks began to decline due to the global financial crisis that erupted in 2007 and constituted a "brake". the expectations of continued growth and prosperity created within the country. The Greek banking system began to be adversely affected in October 2008 by the crisis, which brought to light various fiscal problems such as high deficits and debts, the effects of which shifted to the banking system, undermining and dropping Greek banks in a series of different ways. problems such as the downgrading of their capital position in the international financial sector and their ability to finance businesses and households. They have acquired liquidity crises as they have been excluded from international interbank and non-market markets, crises of loyalty to investors and depositors, and have been faced with ongoing sustainability issues.

Due to the importance of their role in the country, it is therefore of great interest to monitor and examine these credit institutions, in particular their development in various sectors prior to the forthcoming and subsequent acquisitions and mergers.

On the basis of the above, the present work attempts to measure the Productivity of the Greek Systemic Banks' Aftermath and Mergers. The structure of the work is as follows.

Chapter 1 presents the introductory concepts and definitions of mergers and acquisitions, their formulas, incentives, valuation methods and, ultimately, the Acquisitions and Mergers made by the Hellenic System Banks in the significant period 2012-2013 in which their recapitalization began and ended.

Continuing, Chapter 2 deals with the definition and concept of productivity, its relationship to the economy, the factors that influence it, and the ways in which it is measured. In addition, the concept of Labor Productivity, its course in the banking sector, as well as indicators for measuring the Credit Productivity of credit institutions are presented.
In conclusion, Chapter 3 presents the Measurement of Labor Productivity of the four Greek Systemic Banks following acquisitions and mergers by using ratios, so that conclusions can be drawn on the existence or increase of labor productivity in these 4 banks under consideration of all acquisitions and mergers that they made.

2. Literature Review

The name "Bank" derives from the "table" furniture on which the first bankers were stationed, a type of present-day silver dealing in money trading.
Closer to this is the definition that adheres to the rules of the Basel Committee (Basel II) and in particular in accordance with Banking Directive 2004/39 / EC, which defines' "Credit institution is the enterprise whose business consists of accepting deposits or other repayable funds by the public and the granting of loans or other credit on its behalf and the electronic money institution."[3]
Banking Institutions are companies that provide financial services to the economy for the ultimate purpose of the profit sought in the financial form of their assets, which separates them from other productive units. Their presence and their economic role contribute to the accumulation of capital and the growth of the economy to a greater extent than in the case of an economy where money is used for trading, but the financial institutions are absent.[4]
Systemically Important Financial Institutions (SIFIs) are those whose financial failure due to their size, complexity and systemic interconnection will cause significant disruption - disruption to the wider / global (global) system. economic activity.[5]
The above illustrates the enormous social and economic role of banking institutions, which in short consists of raising the capital and its productive use. This role is also evidenced by the fact that banks' boom is linked to the growth of the country's economy and that the upward trend of a country's economy is in line with the boom of banking institutions. In particular, in small countries, banks take on the role of financier of the economy and are a shield against various risks.[6]

2.1 Mergers and Acquisitions (M&A)

During the 1990s, the banking sector internationally experienced impressive mergers and acquisitions. M&A in the banking sector has included factors such as the liberalization and consolidation of financial markets, the strengthening of

---

[3] Angelopoulos P., (2010), Banking and the Financial System
[4] Kosmidou K., Zopounidis K., (2003), Banking Risk Management Systems, p. 33
[5] *Financial Stability Board (FSB), Addressing SIFIs, http://www.fsb.org/what-we-do/policy-development/systematically-important-financial-institutions-sifis/* (retrieved 19/9/2019)
[6] Sakkelis Emm., (2000), Accounting and Auditing of Commercial Banks, p. 22

banking systems supervision, the advancement of technology and the development of new information systems. These factors have led to increased competition between banks, which have therefore sought to increase their efficiency, expand the scope of their operations and extend the range of services they offer.

However, in the Greek banking market the activity in mergers and acquisitions was relatively slow and comparatively smaller. The main determinants that led to M&A in Greece during the second half of the 1990s were Greece's then expected accession to the euro area and the significant loss of revenue it would entail, the application of new technology, which favors M&A among of banks, and the need to deal with possible competition from foreign banking institutions[7]

An Acquisition is defined as the transaction in which a business acquires one or all of its holdings (shares or shares) in another for a consideration. The acquisitions are divided into simple and mergers. In a mere takeover, the acquired business continues to exist as a subject of the law, while in a merged takeover, the business that transfers its assets to another in exchange for cash ceases to exist as a legal subject. A merger is defined as the act by which one or more companies are liquidated without their liquidation, while simultaneously transferring all of their assets in exchange for another, which either exists or is created for this purpose. The consideration consists of the holding interests of the business to which the assets of the liquidated companies were transferred and are given to those who previously participated in the enterprises that were legally ceased to exist.[8]

Depending on the process of their acquisition, Acquisitions and Mergers are distinguished as follows:[9]

- Amicable or Friendly when the two companies wish to merge or acquire and jointly determine the consideration
- Hostile when the target company management does not approve the proposed acquisition and tries to avoid it. In particular, the process of acquiring a listed company is characterized by a normally competitive business, with the latter to gradually acquire - and despite any reactions - control of the former.
- Leveraged Buy-Out is the form of takeover where its financing is largely (at least 75%) from bank lending and not from the equity of the acquiring company.
- Management Buy-Out, when a business is acquired by its executives.

2.1.1 The Mergers & Acquisitions of the Greek Systemic Banks

During the period 1994-1998 in Greece, there was a large wave of acquisitions and mergers between the existing banks, with the result that the banking landscape changed significantly as new banking groups were formed.

[7] BoE, (2004), Financial Bulletin Issue 22, https://www.bankofgreece.gr/BogEkdoseis/oikodelt200401.pdf, (Retrieved 10/01/2019)

[8] Papadakis V. (2016), Business Strategy: Greek and International Experience, p. 589

[9] Papadakis V. (2016), Business Strategy: Greek and International Experience, pp. 590-593

The most significant acquisitions during that period were:

1. Of Alpha Bank Credit Group SA, as it acquired 51% of the share capital of Ionian Bank and Laiki Bank (1999).
2. Piraeus Bank Group as it acquired Bank of Macedonia-Thrace (1997), Credit Lyonnais Greece (1997), Bank of Chios (1998), and National Westminster Bank Greece (1998).
3. Of the E.F.G Eurobank group as it acquired Interbank Bank (1996), Bank of Athens (1998), Bank of Crete (1998), and Labor Bank (1999).

Thus, the landscape of the Greek credit system has changed dramatically as it strives to align itself with the corresponding international events and international requirements by restoring full and free competition.
Subsequently, the period from 2001 to 2010 is marked by a recession in relation to the surge of the previous period in M&A, with new banks being added to the competitive Greek banking landscape. The banking groups that starred in the past decade, having gone through an extensive and intense period of acquisitions and mergers, have taken considerable time to integrate them with the acquiring banks, in the areas of organizational structure, homogenization, management processes, management the reduction of surplus human resources and, in general, the reduction of operating costs in relation to revenue.
The year 2012 is considered a focal point for the Greek banking landscape as the acquisitions and mergers that took place that year brought about a complete overhaul, as they created the so-called four "pillars" of the Greek banking system, or the four "Systemic Greek Banks". The main reason for the Greek systemic banks to be defined was the ongoing domestic economic downturn, which led to a continuous increase in non-performing bank loans and that the liquidity crisis of that year had become a solvency crisis. The M&A carried out in the Greek banking system then helped to strengthen and obtain adequate capital adequacy, to become more concentrated and efficient, to eliminate excess capacity and to exploit synergies and economies of scale.

Thus, for 2012 the following M&A took place in the Greek banking landscape:

1. Piraeus Bank acquired the Agricultural Bank of Greece (ATE) and the General Bank (Geniki Bank).
2. The National Bank of Greece (NBG) acquired the Lesvos-Limnos Cooperative Bank, the Achaian Cooperative Bank and the Lamia Cooperative Bank.

The M&A wave continued in 2013 in the Greek banking landscape as several commercial and co-operative banks faced a capital adequacy problem and were put into a consolidation regime.

Thus, through the bidding process the following acquisitions and mergers were made:

1. National Bank of Greece (NBG) acquired First Business Bank (FBB) as well as Probank.
2. Alpha Bank acquired Emporiki Bank, Cooperative Bank of Western Macedonia, Cooperative Bank of Euboea and Cooperative Bank of Dodecanese.
3. Piraeus Bank acquired Millennium Bank, Bank of Cyprus, Cyprus Popular Bank (CPB) and Hellenic Bank.
4. Eurobank Bank acquired the Postal Savings Bank (TT) and Proton Bank.

2.2 Definition and Concepts of Productivity

The relationship between productivity and economic growth, employment and people's standard of living is inextricably linked. Improving productivity in an economy generally leads to higher per capita income, which is the most important criterion of a people's standard of living, as the state ensures equitable income distribution, adequate social benefits, security, equal opportunities, protection of the natural. environment and respect for human rights.

In particular, Improving the productivity of any business improves its competitiveness and results in increased market share and increased profits. Given that there is sound social dialogue to safeguard employee rights, the increase in business profits results in, in addition to higher shareholder income, and employee benefits (increased wages, improved working conditions, and training). Investing in training and upgrading of employee skills, which is possible when business profitability is increased, leads to further productivity improvement. It can also lead to lower prices and better quality of products for the benefit of consumers. The benefit for shareholders, employees and consumers translates into an increase in their real incomes and purchasing power.

In addition, the state benefits from increased taxation of profits through which it can support its social and development policy to provide citizens with more and better health, education, transport, communications infrastructure and more. Better infrastructure coupled with increased purchasing power of citizens leads to an improved standard of living, as citizens can better meet their needs and preferences. Finally, when there is increased productivity in a country, new investments can and do result in an increase in output equivalent to economic growth. This leads to new, better jobs and a qualitative and quantitative increase in overall employment. Productivity is an important element that leads to economic growth and progress.

The definition of Productivity has been variously expressed in both international and Greek literature, with no particular differences. For the most part, productivity is defined as the ratio of output (outputs) to outputs (inputs) used. Business inputs include the inputs used by the business in the production process (such as labor and capital), while output (output) is usually measured in revenue or other components of Gross Domestic Product (GDP).[10]

Alternatively, productivity is expressed as[11]:
Productivity = (Product Derived Q) / (Inputs used) (1)
keeping the quality of the product produced constant. Inputs include all inputs, ie Labor (L), Capital (C), and Ground (G). This concept is used indefinitely in both product production and service production.

A common phenomenon is the link between productivity and the concept of profitability. Productivity mainly refers to the technical or productive function of the company, while profitability refers to its financial function. However, both productivity and efficiency are included in the broader concept of efficiency.[12]
It is noteworthy that production and productivity are two complementary concepts, but not necessarily mutually exclusive. Specifically, production, as a function, aims at the creation of economic goods and services, with the combined activation of the factors of production. Productivity on the other hand implies minimizing the sacrifices to derive the same result or maximizing the result with the same sacrifices. Thus, an increase in production does not necessarily indicate an increase in productivity. On the contrary, an increase in productivity also implies an increase in output under certain conditions.[13]

2.2.1 Banking Labor Productivity Measurement Indicators.

Credit institutions differ in the method of measuring labor productivity in relation to the rest of the economy and its sectors. In particular, the measurement of labor productivity for systemic banks in Greece will be made using specialized financial indicators that can effectively interpret the labor productivity of these credit institutions as they differ significantly from the rest of the economy.

i) Ratio Net Interest Income Per Employees
According to the OECD, the indirect measure for estimating the level of productivity in banking institutions is estimated using the difference between the interest received and the interest paid, as it is their main and traditional activity. The OECD has rated this banking product as "Financial Intermediation Service Indirectly Measured.[14]

In particular, this intermediation consists of two components: 1) bank credit and 2) savings through deposits. Banking credit to businesses and households is the most

[10] Kendrick J.W., (1993), «Productivity: Why it matters – How it's measured»
[11] Grönroos, C. (2001), «A Service Quality Model and its Marketing Implications»
[12] Lipovaj D., Mandaraka M., (1995), Measuring and Analyzing Industrial Productivity, p.56
[13] Malissos K., (1984), Productivity and Counter productivity, p. 48
[14] OECD,(2007), Estimates of Labour Productivity Levels, http://www.oecd.org/sdd/productivity-stats/40526489.pdf, (Retrieved 22/02/2019)

important source of income for banks. Loans provide relatively higher yields, as they are less liquid than other assets, and have a high risk of default. Therefore, according to the above, the output of this category (Financial Intermediation) is measured as the difference between the borrowing rate and the reference rate

Therefore, the resulting index is:[15]
(Net interest income) / (Number of employees) (5)

ii) Ratio Earnings-per-employee Earnings Index
This index is an activity ratio and shows how effective the bank is with its employees. Theoretically, the higher the index result - expressed in monetary terms - the better for the bank. The index gives a good picture of employee productivity, however, considering that large firms such as banks will have lower prices than other companies based on innovation and high technology eg software companies, although they do not means they are more profitable than a bank. Using the Earnings-per-Employee Earnings Index is used to compare the bank over time, both individually and with the banking industry.[16]
Note that in addition to boosting employee productivity, the indicator's output could be boosted by a number of other factors such as making the bank more efficient by using better and more advanced technology than before, or by launching a new and successful one. product, which made huge profits. However, there is a way that the result of the index could be increased directly by the employees. This could be for employees to receive higher education or to be better qualified in their jobs.[17]

Therefore, the index is calculated as follows:[18]
(Earnings before Tax) / (Number of Employees) (6)

iii) Ratio Total Assets per Employee
It is a measure of employee productivity in a bank. It is also a measure of the banks' risk management as productivity is measured.[19]
The ratio of total assets per employee reflects the dynamism and improvement of the capacity of a bank or industry[20]
Theoretically, the higher the index result - expressed in monetary terms - the better for the bank. The use of this index is used to compare the bank over time both individually and with the banking industry.

---

[15] Athanasoglou P., Georgiou E., Staikouras C., (2008), Assessing output and productivity growth in the banking industry, https://www.bankofgreece.gr/bogekdoseis/paper200892.pdf, (Retrieved 22/02/2019)
[16] Lazaridis Th., Konteos G., Sariannidis N., (2013), Contemporary Financial Analysis, pp.278-279
[17] Investopedia, Operating Performance Ratios: Sales / Revenue Per Employee, https://www.investopedia.com/university/ratios/operating-performance/ratio2.asp, (Retrieved 24/02/2019)
[18] Athanassoglou P., Brissimis S., (2004), The Effect of Mergers and Acquisitions on the Effectiveness of Banks in Greece, https://www.bankofgreece.gr/BogEkdoseis/oikodelt200401.pdf, (Retrieved 24/02/2019)
[19] Melas K. (2008), Introduction to Banking Financial Management, p. 77
[20] Klimis K., Tsopoglou S., (2007), Longitudinal Analysis of the Greek Banking Sector, https://www.hba.gr/5Ekdosis/UplPDFs/deltia/1_2007/77_93.pdf, (Retrieved 24/02/2019)

Therefore, the ratio is calculated as follows[21]
(Total Assets) / (Number of Employees) (7)

iv) Ratio Salary Expenditure Per Employee
Banks are increasingly adding to the list of performance criteria the operational efficiency, which refers to the control of the costs and productivity of its employees.[22]
Excessive increases in operating costs cause increased risks to the institution's profitability. This index is also a measure of banks' management risk as wage costs are by far the most basic and fixed expense of banks. It will also be used mainly in combination with employee labor productivity (based on the Net Interest Income Index per employee). The result is expressed in monetary terms and the index is used to compare the bank over time, both individually and with the banking industry.

Therefore, the index is calculated as follows:
(Salary Expenses) / (Number of Employees) (8)

3. Measuring Bank Productivity Using Personnel Ratios, Main Results.

In this Chapter, the productivity of Greek systemic banks' labor productivity will be measured using productivity indices. The purpose of this measurement is to determine whether M&A leads to increased labor productivity in the systemic banks as well as the comparison of productivity between banks (sectoral comparison of results).
The measurement and analysis take place over a period of fifteen years, and in particular for the period 2002-2017, with a focus on the years in which the banks concerned were acquired and merged. It should be noted that all the data obtained for the investigation are from the published financial statements of the systemic banks under consideration. Note that all calculation was made in €.

3.1 Comparison of the four Greek Systemic Banks on the basis of Labor Productivity

As mentioned above, labor productivity indicators are often used as an indefinite measure of the productivity and efficiency of a firm's workforce. There are also a number of indicators that can be used by businesses and therefore those that are most appropriate will inevitably vary with the business activities of the companies. Although the application of these indicators varies across industry sectors, they are often used in the service sector, where staffing levels are high. These indicators can help determine the level of sales an enterprise needs to ensure that its workforce operates effectively, that is, employees are working at maximum capacity and that

[21] Melas K. (2008), Introduction to Banking Financial Management, p. 77
[22] Thomadakis S., Xanthakis M., (2011), Money & Capital Markets, p 63

the business does not have over or insufficient staff.
Productivity ratios can also have a financial impact on the company: for example, if productivity can be increased without having to hire additional staff, this will in theory lead to increased profits.
This section presents the aggregate results of the Personnel Productivity Indicators for the 4 systemic Greek banks after all the mergers and acquisitions they carried out during the years 2002 - 2017. Within this period, the financial crisis that hit the Greek economy in 2009 and significantly affected the Greek banking sector.

i) Net Interest Income Index / Number of Employees
In the table 1 below we present a comparative analysis of the Ratio Net Interest Income Index / Number of Employees of the Four Systemic Banks.
The index of net interest income per number of employees is a measure of the difference between interest and similar income [23] and interest and similar expenses [24] that the bank has on each use in relation to the total number of employees. The difference between the interest received and the interest paid is the main and traditional activity of each bank. The result corresponds to employees productivity in earning interest income.
The evolution of labor productivity resulting from the measurement of net earnings per employee is on the rise with slight fluctuations over the period 2002-2017, due to the continuous increase in net interest income and a constant number of employees.
Continuing, the 2011-2013 period is a turning point for the 4 systemic Greek banks as there are sharp declines in productivity and increases in staff numbers. Also we can noticed that the recapitalization start and ends this time period.

[23] Interest and similar income are: Loans and advances to credit institutions, Loans and advances to customers, Securitized loans, Portfolio securities, Available-for-sale securities, Held-to-maturity securities, Mortgage investments, Mortgage investments.
[24] Interest and similar expenses include: Liabilities to credit institutions, Liabilities to customers, Debt securities and other borrowings, Derivatives, Other interest

Table 1: Comparative Presentation of the Ratio Net Interest Income Index / Number of Employees of the Four Systemic Greek Banks

YEARS	NET INTEREST INCOME / NUMBERS OF EMPLOYEES			
	NBG	*ALPHA BANK*	*PIRAEUS BANK*	*EUROBANK*
2002	66,226	185,975	85,694	98,214
2003	73,253	103,500	85,526	112,643
2004	87,138	123,300	92,379	141,476
2005	97,197	136,929	103,937	162,986
2006	113,902	158,809	132,210	160,672
2007	135,352	159,581	143,918	158,890
2008	150,635	151,691	165,245	151,929
2009	170,753	151,717	154,579	132,143
2010	190,120	156,860	166,949	123,272
2011	191,138	162,726	163,802	171,314
2012	145,132	135,836	69,442	117,328
2013	115,590	102,925	90,868	80,253
2014	155,316	158,051	113,813	110,350
2015	141,472	165,399	119,463	110,157
2016	147,915	194,236	127,636	122,945
2017	151,428	202,372	124,396	127,655
Average	***133,285***	***150,929***	***121,241***	***130,139***

Source Author's Calculations from Published Financial Statements

According to the table 1 above, the Productivity Index Net Interest Per Employee Earnings Index is the main measure of labor productivity as it reflects the main and traditional activities of the bank and the resulting result corresponds to employee productivity in earning interest income. .

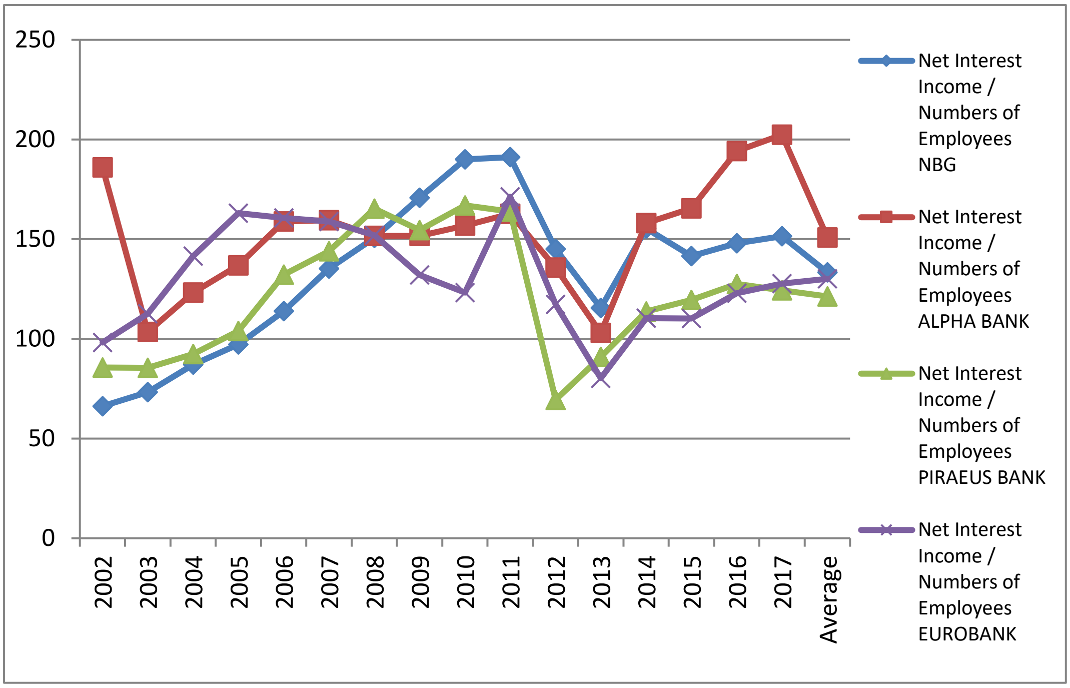
For the period 2002-2017, the systemic bank that recorded the highest results of this ratio over time is Alpha Bank. During the period under review, this bank did not vary significantly in its results even during the period of financial crisis 2008-2017. An interesting point is the year 2013 where M&A and productivity declined which did not last as there was a significant increase in the following year due to a reduction in staff and a reduction in interest on similar expenses.

After Alpha Bank, the National Bank of Greece follows, which its results were quite high until 2011. However, during the 2012-2013 M&A period, there was a decline in labor productivity due to reduced net interest income. In 2014, it registers a rise again.

Continuing, Eurobank, follows which its results have fluctuated over time, and especially after M&A in 2013, which saw lower labor productivity over time. The reason for this sharp decline was the decrease in net interest income but also in the increase in the number of staff employed by the banks.

Finally, Piraeus Bank for the period 2002-2017 also presents several fluctuations, focusing on the period 2012-2013 where M&A took place. In this period, the lowest labor productivity results were recorded, mainly due to the sharp increase in the bank's workforce, which came from the six acquired banks. It is interesting in the case of Piraeus Bank as for 2015 and 2016 it is the most profitable from net interest income compared to the other banks, but it records low labor productivity relative to the others, due to its large workforce.

It is worth noting that all four banks, after M&A, increased their labor productivity. The main reasons for this increase, however, are the following. It is primarily due to the gradual decrease in the number of employees due to restructuring and rationalization of costs in their branch network. In addition, from 2014 onwards the banks concerned have a decrease in interest income as they are mainly due to the significant impairments they make on loans and advances to customers. However, there is also a parallel decrease in interest expense. The decline in this interest category is quite high as the banks concerned have reduced interest expense on customer liabilities (deposits) and reduced Eurosystem borrowing costs. Also, this decrease in interest expense is due to the termination of the Greek Government Securities Issuance Program by banks under Law 3723/2008. Thus, net interest income appears to be constantly increasing due to parallel reductions in interest income and expense, which are "bold" in the case of interest expense.



Source: Table 1

Figure 1: Aggregate Demonstration of the Productivity Evolution of the Greek Systemic Greek Banks Based on the Ratio Net Interest Income / Number of Employees (2002-2017)

In the above Figure 1, the Labor Productivity of NBG developments are evident, but have fallen sharply after M&A. The best position is Alpha Bank, which after its M&A has the highest productivity since 2014. For Eurobank and Piraeus Bank, they are on a similar path as they record similar results in the labor productivity ratio. It is worth noting, however, that their low productivity levels are due to the high absorption of workers, as a result of M&A.

ii) Ratio Earnings before Tax / Number of Employees
This ratio is an activity ratio and shows how effective the bank is with its employees. The index gives a good picture of employees productivity, however, considering that firms with large numbers of staff, such as banks, will have lower prices than other companies based on innovation and high technology. However, there are several factors that can affect the outcome of the ratio beyond employees. On the evolution of Labor Productivity based on the Ratio Earnings before Tax / Number of Employees for the four Systemic Greek Banks, it is as follows:

Table 2: Presentation of the Ratio Earnings before Taxes / Number of Employees of the Four Systemic Greek Banks.

YEARS	*EARNINGS BEFORE TAXES / NUMBER OF EMPLOYEES*			
	NBG	*ALPHA BANK*	*PIRAEUS BANK*	*EUROBANK*
2002	20,176	27,053	31,115	35,743
2003	27,935	48,086	27,971	48,277
2004	26,113	58,754	21,209	59,209
2005	45,322	65,162	58,405	79,926
2006	61,038	99,671	87,987	80,712
2007	77,131	79,766	101,632	92,245
2008	46,581	44,412	26,661	26,014
2009	30,891	64,075	39,600	0,000
2010	-26,114	5,315	1,117	-4,573
2011	-1,077,657	-574,876	-1,566.222	-920,516
2012	-262,334	-186,815	-151,008	-225,470
2013	-39,994	193,070	123,688	-212,676
2014	-200,882	-75,102	-218,419	-232,299
2015	-359,321	-186,294	-242,900	-237,042
2016	2,570	16,059	-13,186	-4,729
2017	-25,255	12,640	-93,170	-2,785
Average	***-103,363***	***-22,405***	***-110,345***	***-88,623***

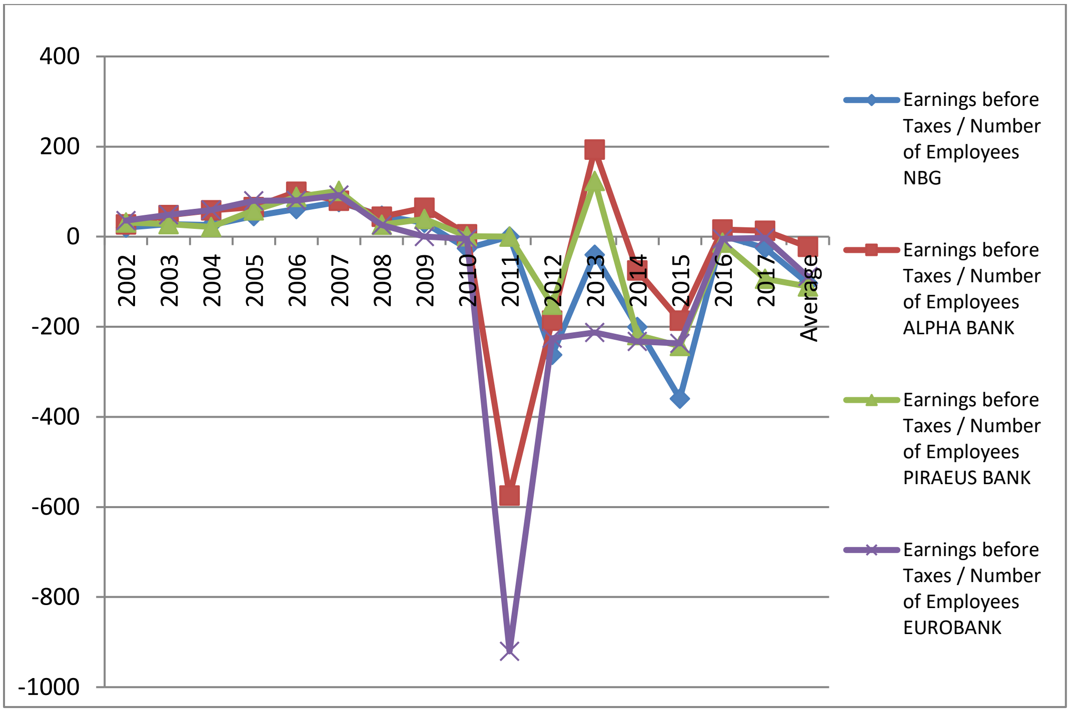
Source Author's Calculations from Published Financial Statements

Based on the above Table 2, the Ratio Earnings before Taxes-per-Number of Employees gives a good picture of employee productivity, however, considering that firms with a large number of staff, such as banks, will outperform other firms based on innovation and high performance. technology eg software companies, however, does not mean that they are more profitable than a bank. However, there are no rules to judge what is the ideal - satisfactory level for this particular index that measures labor productivity. It does not in any way indicate how profitable or successful the business / bank is.

For the period 2002-2017, the bank with the best labor productivity results was Alpha Bank. In particular, throughout the financial crisis it had better results, but for several years it remained loser, but to a lesser extent than other banks. Focusing on the bank's M&A in 2013, it then recorded the highest labor productivity over time due to the extraordinary income generated by Negative Goodwill from the acquisition of Emporiki Bank.

Eurobank has the second-best labor productivity results but workers in the last eight years are generating losses instead of profits due to the bank's negative profitability. Finally, the National Bank of Greece and Piraeus Bank follow where the highest negative results on labor productivity are recorded, due to the huge losses recorded

in the results of their use. There is an exception in Piraeus Bank where in 2013 it achieved positive results in the index, due to extraordinary earnings from Negative Goodwill recognized after the acquisition of the three Cypriot banks.
In conclusion, using the Ratio Earnings before Taxes-per-Number of Employees cannot provide a clear picture of employee productivity, as for the period 2008-2017, banks are affected by continued negative profitability due to the increased impairment they recognize in their loans. their portfolios as well as their participation in the PSI program, where Greek bonds were impaired and the banks were severely impaired. Thus, the result of the indicator cannot be completely increased by the number of staff and qualifications as it is reduced by other factors mentioned earlier.



Source: Table 2

Figure 2: Aggregate Demonstration of the Ratio Earnings before Taxes / Number of Employees of the Four Systemic Greek Banks.

According to the above Figure 2, it is observed that for the period 2002-2008, all four banks had a similar course in their labor productivity based on pre-tax profits. Alpha Bank is in the best position as it records better results over time. Immediately after, Eurobank is followed by a fairly large decline in 2011 which continues even after the M&A it carried out in 2013. For National and Piraeus banks, both of them in 2002-2008 had a good productivity index however due to the financial crisis and in particular due to PSI in 2011, they recorded the worst productivity as shown in the chart. In addition, they continued to have quite high negative effects on their labor productivity due to the negative profitability they face.

In conclusion, the result of the index cannot be completely increased by the number of staff and qualifications as it is reduced by other factors such as the bank's provisioning policy and its participation in Greek bond market (PSI) programs. impaired. M&A in this case had no significant effect on labor productivity as measured by the bank's profitability.

iii) Ratio Total Assets per Number of Employees

The Ratio Total Assets per Number of Employees as mentioned above shows the dynamics and improvement of the productive capacity of a bank or industry. It also shows the extent to which the institution's assets per employee correspond to a measure of bank risk management.

Concerning the evolution of Labor Productivity based on the Total Assets / Number of Employees for the four Systemic Banks, it is as follows:

Table 3: Ratio Total Assets / Number of Employees of the 4 Systemic Greek Banks

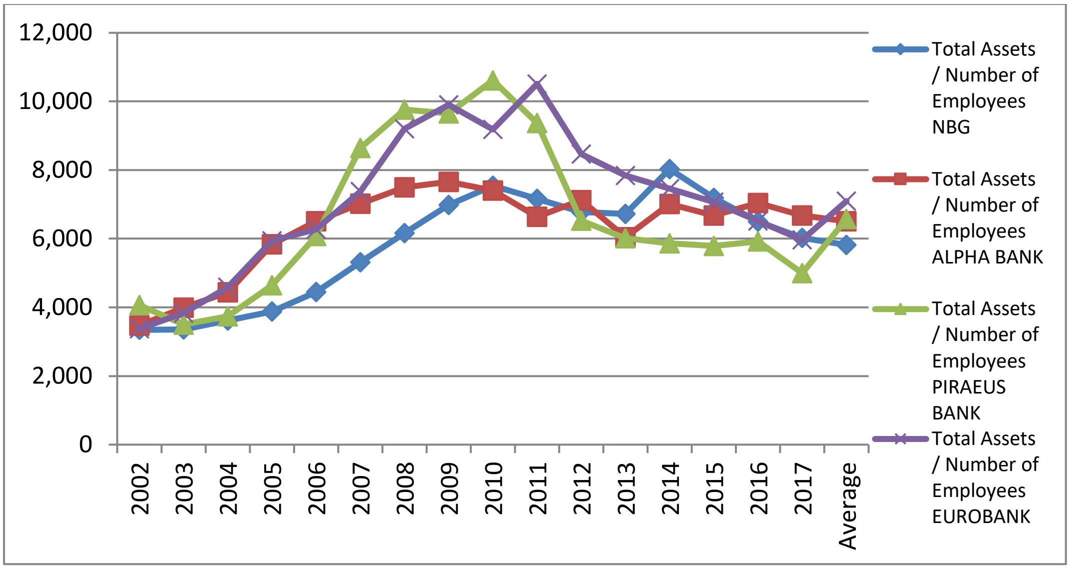
YEARS	***TOTAL ASSETS / NUMBER OF EMPLOYEES***			
	NBG	***ALPHA BANK***	***PIRAEUS BANK***	***EUROBANK***
2002	3,342,713	3,472,236	4,060,728	3,374,180
2003	3,357,034	3,992,396	3,501,437	3,831,973
2004	3,621,742	4,435,530	3,742,094	4,584,052
2005	3,876,805	5,834,274	4,645,169	5,944,437
2006	4,442,714	6,510,107	6,079,549	6,273,593
2007	5,311,627	7,024,455	8,639,729	7,374,379
2008	6,166,399	7,496,144	9,765,266	9,205,242
2009	6,981,514	7,657,853	9,649,310	9,906,349
2010	7,538,541	7,404,888	10,613,777	9,184,146
2011	7,162,815	6,635,844	9,371,592	10,512,138
2012	6,781,432	7,119,470	6,523,380	8,463,187
2013	6,721,242	6,043,934	6,018,233	7,844,267
2014	8,029,985	7,010,215	5,867,880	7,455,429
2015	7,193,043	6,680,325	5,793,821	7,064,488
2016	6,498,001	7,039,927	5,921,108	6,521,166
2017	6,022,575	6,671,640	4,994,287	5,970,523
Average	***5,815,511***	***6,504,800***	***6,574,210***	***7,094,347***

Source Author's Calculations from Published Financial Statements

The Ratio Total Assets per Employee as mentioned above shows the dynamics and improvement of the productive capacity of a bank or industry.

It is also a measure of banks' risk management as productivity is measured. For the

period 2002-2017, the bank with the best results of this particular labor productivity index over time was Eurobank. In detail, this bank has had the largest and fastest increase in its total assets over time, while also increasing the number of employees who have had the best productivity over time, with maximum output in 2011. Focusing on 2013 where the bank did M&A, there was a decrease in productivity due to the increase in staff. However, for the period 2012-2013 where acquisitions and mergers took place in the banking landscape, Eurobank had the highest productivity results compared to the other banks under consideration.
Piraeus Bank, where it has the second best productivity results, however, which in 2012-2013, where it had undertaken M&A, saw a drop in productivity due to the very large increase in the staff employed as a result of the six acquired banks. Although M&A declines in productivity as a result of the simultaneous decline in both its total assets and its employees, Piraeus Bank is Greece's largest bank on the basis of its Total Assets and employs the largest number of employees in 2017.
Finally, Alpha Bank and the National Bank of Greece, where they themselves are experiencing a decline in the productivity of their work due to the simultaneous increase in their total assets and the number of employees. However, this decline continues, as both are shrinking their assets and rationalizing staff through layoffs.
In conclusion, by studying and analyzing this indicator labor productivity based on total assets per employee it is observed that after the financial crisis and after and after the M&A there is a sharp decline in the assets of all banks and a simultaneous decrease in the employed staff. Thus, this index cannot adequately show productivity from 2008-2017 due to the policy of asset shrinkage which results in proportional reductions in staffing as banks try to achieve capital adequacy through these policies.
Diagrammatically, labor productivity based on the Ratio Total Assets / Number of Employee of the four Greek Systemic Banks is shown as below in the figure 3.



Source: Table 3

Figure 3: Aggregate Demonstration of the Productivity Evolution of the 4 Greek Systemic Banks Based on the Ratio Total Assets / Number of Employees (2002-2017)

Observing the above aggregate figure 3, Eurobank and Piraeus Bank have a similar track record in productivity results until 2009 and their 'galloping' trend is evident compared to the other two. However, since 2011, the decline in the productivity ratio has been evident in all the banks concerned, and in particular for Piraeus Bank, where in 2017 it recorded the lowest productivity ratio compared to the rest.

In conclusion, the policy of shrinking banks' assets also leads to a corresponding reduction in staff. In addition, it has been observed that there has been no apparent "qualitative" and positive economic impact after the M&A done as productivity does not increase even though banks try to remove surplus staff.

iv) Ratio Salary Expenses per Number of Employees

This ratio is a measure of banks' management risk as wage costs are by far their most basic and stable expense and excessive increases in operating costs cause increased risks to the institution's profitability. It can also be used in relation to employee productivity. Finally, regarding the evolution of Salary Expenses per Number of Employees for the four Greek Systemic Banks, it is described in the table 4.

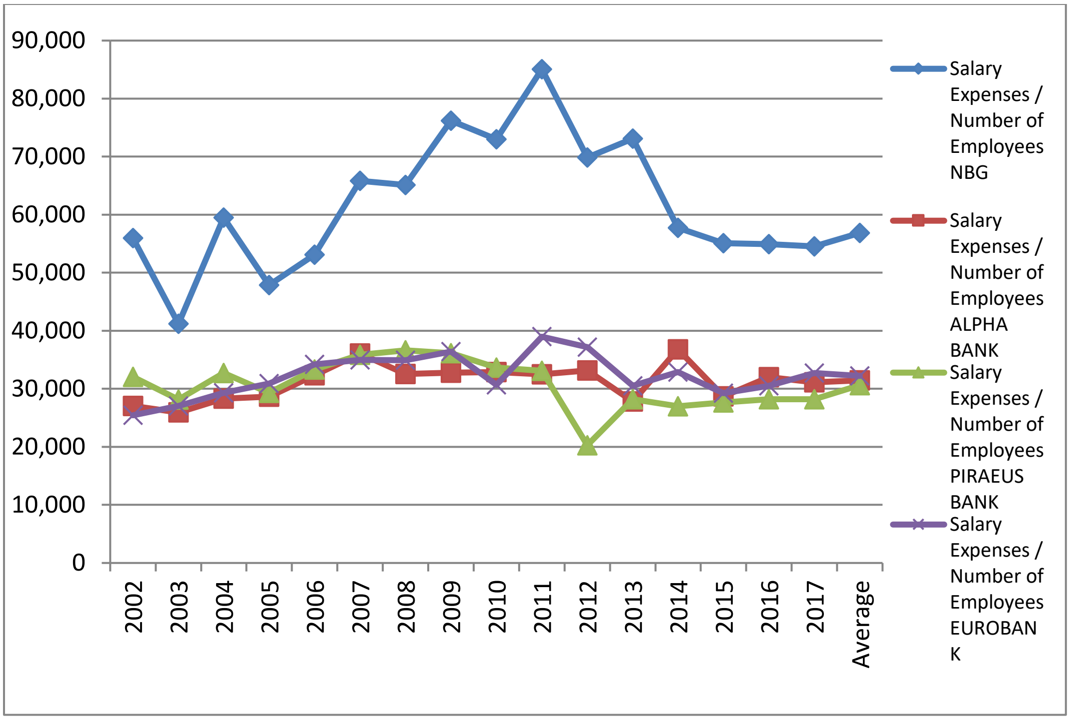
Table 4: Ratio Expenses for Salary per Number of Employees of the Four Systemic Greek Banks (2002-2017)

YEARS	*Salary Expenses / Number of Employees*			
	NBG	***ALPHA BANK***	***PIRAEUS BANK***	***EUROBANK***
2002	55,970	27,053	32,056	25,445
2003	41,194	25,931	28,176	27,041
2004	59,526	28,291	32,715	29,307
2005	47,887	28,639	29,284	30,916
2006	53,112	32,343	33,307	34,215
2007	65,814	36,070	35,880	34,997
2008	65,133	32,561	36,633	34,916
2009	76.168	32,801	36,128	36,409
2010	73,024	32,884	33,648	30,691
2011	85,078	32,523	33,102	38,979
2012	69,861	33,181	20,288	37,161
2013	73.094	27,824	28,230	30,525
2014	57,716	36,817	26,973	32,917
2015	55,103	28,677	27,644	29,273
2016	54,952	32,018	28,225	30,511
2017	54,528	31,139	28,202	32,726
Average	*56,841*	*31,447*	*30,656*	*32,252*

Source Author's Calculations from Published Financial Statements

According to table 4 the ratio salary expenses per number of employees for NBG has the biggest price one year (2011) before the recapitalization starts. The second biggest price for this ratio to this bank is one year after the recapitalization finished (2012). We can also notice that the world financial crisis had already strike the Greek Banking System and the NBG did not made domestic M&A of other banks that they have so many employees, those years. All the other 3 systemic Greek Banks have smaller price of the ratio Expenses for Salary per Number of Employees than NBG, the years 2011-2013 even though they made M&A that had much more employees than NBG.

In the figure 4 below we can see the volatility of the Ratio Salary Expenses per Number of Employees.



Source: Table 20

Figure 4: Volatility of the Ratio Salary Expenses per Number of Employees

From the above Figure 4 we can clearly observe that NBG have the biggest prices of the ratio Expenses for Salary per Number of Employees during the examined time period 2002-2017. This bank have also the major volatility of this ratio. The ratio volatility of the ratio Expenses for Salary per Number of Employees for all the other banks are ranges between 20-40 thousand Euros. In the year of recapitalizations 2012 Piraeus Bank even though made a lot of M&A have the smallest price of this ratio of all the other Greek Systemic Banks. This means that the Management of this Bank in this section of expenses probably was the best.

4. Conclusions

The purpose of this research was to measure the labor productivity of the four Greek systemic banks following acquisitions and mergers over the period 2002-2017. Labor productivity was measured by a series of specialized financial ratios appropriate to the banks' business activities.

In particular, the purpose of this research was to monitor the banking productivity over time and to analyze the fluctuations of this course, especially during the financial crisis in Greece and during the banking sector where there were repeated acquisitions and mergers. the credit institutions of the country, which eventually formed the four systemic banks and today constitute the main "pillars" of the Greek

financial market. al system and the domestic economy.
The overview of the evolution of labor productivity has shown that its increase since 2008 is not entirely due to the capacity of systemic bank staff but to various parameters related mainly to the policies adopted by the respondent's banks.
In particular, according to Aggregate Figure 1, which shows the evolution of labor productivity based on the Net Interest Income Per Employee Index for the four systemic banks, which is the main indicator for measuring bank productivity, it has been observed since 2002 -2009 the majority of banks had upward productivity which was largely due to the staff employed in conjunction with the services and products provided to consumers for the purpose of the production of interest income. However, there has been a decline in productivity since 2011 and in particular in the period 2012-2013 where M&A took place due to a decrease in net interest income and an increase in staff. Alpha Bank in particular and the NBG on average have had the best productivity of labor based on this index relative to Piraeus Bank and Eurobank. However, after M&A, all four banks have seen an increase in their labor productivity due to the decline in staffing and the simultaneous reductions in interest income initially due to impairment in loans and advances to customers and expenses from interest due to reduced customer liabilities (deposits) and reduced Eurosystem borrowing costs. Thus, net interest income appears to have increased and, while reducing the number of employees, the banks concerned have been recording increased labor productivity since 2014.
Subsequently, in trying to measure productivity based on the Earnings-per-employee and Total Assets-per-employee ratios, it was clear that banks' policies for achieving capital adequacy put labor productivity second. In particular, according to Aggregate Figure 2, which shows the evolution of productivity based on Earnings before Taxes, from 2011-2017 labor productivity recorded negative values for the majority of banks. In particular, all banks in 2011 recorded negative productivity due to PSI and in particular Piraeus Bank. Alpha Bank, on the other hand, has been the only bank to record Profit before Tax since 2016. Banks' policies in this case show employees to generate losses instead of profits because of the increased depreciation of their loan portfolios, which (impairment) adversely impacts the Bank's Income Statement to the extent that they consistently incur Pre-Tax Losses from five years.
The same phenomenon can be seen in Figure 3, where it shows the evolution of productivity based on Total Assets per Employee, as since 2011 there has been a decline in productivity due to the policy of shrinking total assets in order to achieve capital adequacy. The fall in productivity in particular is exacerbated by the M&A conducted by the banks in question and is clearly evident in the case of Piraeus Bank, which also recorded the lowest productivity results for 2017. Eurobank's best results over time.
At the end according to the Figure 4 there is big deference in the Ratio Expenses for Salary per Employees between NBG and the other three Greek Systemic Banks. NBG has the biggest price of this ratio and the major volatility which maybe happens because of the bigger number of employees.

In conclusion, the measurement of labor productivity since the onset of the financial crisis in 2008 and the 2012-2013 period in which the M&A in the banking sector took place did not have any qualitative results as an increase in labor productivity was not solely based on employee capacity. However, in this case it is mainly due to the continuous reductions of employees, but also due to various strong factors mentioned above. In short, the productivity of the work of the employees in the four Greek systemic banks has not been clearly distinguished since 2008, and mainly after M&A.

In conclusion, the four systemic banks are not fully competitive with each other in terms of their employees' labor productivity as initially all are at approximately the same level, and then the chronic problem of non-performing loans affecting the banks in question causes negative effects on its productivity. as it does not allow for qualitative results that are entirely based on it without the deduction of impairment (whether interest income or interest income pre-tax profits, as well as total assets) due to Non-performing Loans. Although these banks have undertaken M&A to strengthen the domestic banking system, exploit economies of scale, and in particular to achieve capital adequacy through recapitalization due to capital erosion, they continue to be at risk of forced collapse of the NPLs makes them both inefficient and unproductive on multiple levels.

References

i) Articles

[1] Grönroos, C. (2001), «A Service Quality Model and its Marketing Implications». European Journal of Marketing, Vol.18, No 4

[2] Kendrick J.W., (1993), «Productivity: Why it matters – How it's measured». Productivity Press pp.1-1.4, Portland

[3] Kyriazopoulos G., Petropoulos D., (2010), "What are the Advantages and Disadvantages from Banks Mergers and Acquisitions? Does Altman's Z-Score model for Bankruptcy motivate Banks for Mergers and Acquisitions? Evidence from the Greek Banking System" Presented at ICOAE International Conference Athens.

ii) Books

[4] Angelopoulos P., Banking and the Financial System Published by Stamoulis Ltd Athens 2010.

[5] Kosmidou K., Zopounidis K., Banking Risk Management Systems, The case of Asset Liability Management" Published by Klidarithmos, Athens 2003.

[6] Lazaridis Th., Konteos G., Sariannidis N., Contemporary Financial Analysis, Self-Published (2013),

[7] Lipovaj D., Mandaraka M., Measuring and Analyzing Industrial Productivity, Published by Symmetria Athens 1995.

[8] Malissos K., Productivity and Counter productivity, Published by Gutenberg 1984

[9] Melas K. Introduction to Banking Financial Management Published by Exandas Athens 2008.
[10] Papadakis V., Business Strategy: Greek and International Experience Published by Mpenos Athens 2016.
[11] Sakkelis E., Accounting and Auditing of Commercial Banks Self - Published 2000
[12] Papailias Th., Productivity and Work Pay, Published by Stamoulis Ltd Athens 2002
[13] Pavlitsas K., Charitoudi G., Introduction to Economics, Self - Published 2011.
[14] Thomadakis S., Xanthakis M., Money & Capital Markets, Published by Stamoulis Ltd Athens 2011.
[15] Travlos N., Mergers and Acquisitions: International Experiences and the Greek Perspective, Trends - The Greek Economy 2000, Published by Epilogi Athens 2000.

iii) E-Journal Articles
[16] Athanasoglou P., Georgiou E., Staikouras C., (2008), Assessing output and productivity growth in the banking industry, https://www.bankofgreece.gr/bogekdoseis/paper200892.pdf, (Retrieved 22/02/2019)
[17] Bank of Greece (BoE), (2004), Financial Bulletin Issue 22, https://www.bankofgreece.gr/BogEkdoseis/oikodelt200401.pdf, (Retrieved 10/01/2019)
[18] Financial Stability Board (FSB), Addressing SIFIs, http://www.fsb.org/what-we-do/policy-development/systematically-important-financial-institutions-sifis/ (retrieved 19/9/2019)
[19] Investopedia, Operating Performance Ratios: Sales / Revenue Per Employee, https://www.investopedia.com/university/ratios/operating-performance/ratio2.asp, (Retrieved 24/02/2019)
[20] INE, (2016), Productivity Evolution and the Impact on the Competitiveness of the Greek Economy, https://ineobservatory.gr/wp-content/uploads/2016/04/FINAL-MELETH-42-6o-PDF_8-3-2016 .pdf, (Retrieved 10/02/2019)
[21] OECD,(2007), Estimates of Labour Productivity Levels, http://www.oecd.org/sdd/productivity-stats/40526489.pdf, (Ανακτήθηκε 22/02/2019)
[22] Klimis K., Tsopoglou S., (2007), Longitudinal Analysis of the Greek Banking Sector, https://www.hba.gr/5Ekdosis/UplPDFs/deltia/1_2007/77_93.pdf, (Retrieved 24/02/2019).