Efficiency Measures In The Banking Industry In OECD Countries

Anastasia Maggina, Business Consultant, Greece

ABSTRACT

Looking at the banking industry worldwide, the consideration is concentrated on efficiency measures from a financial accounting point of view rather than the managerial or operations research context. Prior research studies have classified countries in groups according to productivity or other criteria related to technology. In this study factor unit prices, capacity indicators and exogeneous variables are regressed on various endogeneous variables. I also examine a larger number of countries than have been examined in previous studies. The results indicate groupings that are not consistent with prior classifications.

Keywords: efficiency measures, banking industry, classification of OECD countries

INTRODUCTION

The implications of European Economic and Monetary Union act pressures and enhance forces for new functions of the banking industry within cross-border and worldwide movements of scare resources. Focused on sources of income as a main issue of restructuring terms in the banking industry, we stress changes in competitive conditions to put banks profile in a contextual model structure. OECD countries provide data that are not consistent with traditional sources of income by banks. Data show that non-interest income has accounted for in recent years for 20-40% of total net income in the countries studied. Statistics in financial statements of banks previously edited as Profitability of Banks -an issue of OECD series may provide empirical findings tabulated in numbers that can be comparable between countries and useful in a globalized business environment.

The purpose of this paper is to illustrate probable similarities or proximities of banks' operations in a selected number of countries. Ratios used in other studies are the guidelines in the organization of this study. Endogeneous variables, factor unit prices, capacity indicators, and exogeneous variables are also employed.

The remainder of the paper is organized as follows: Section 2 discusses the relevant literature. Section 3 describes the data sources employed, and Section 4 discusses the main results. Section 5 concludes the paper with suggestions for further future research.

REVIEW OF THE LITERATURE

A large number of studies have examined the efficiency of financial institutions, mainly in an operational research paradigm. There are about 130 studies of financial institution efficiency covering 21 countries that apply five different frontier approaches. Studies of frontier efficiency rely on accounting measures of costs, outputs, inputs, revenues, profits, etc. to impute efficiency relative to the best practices within the available sample. The five different types of approaches employed in evaluating the efficiency of financial institutions are classified into two main groups: nonparametric and parametric frontiers.

Nonparametric Frontiers include Data Envelopment Analysis and the Free Disposal Hull Approach.

Data Envelopment Analysis is a linear programming technique where the set of best practices or frontier observations are those for which no other decision making unit or linear combination of units has as much or more

of every output (given inputs) or as little or less of every input (given outputs). The Full Disposal Hull Approach is a special case of DEA model where the points on lines connecting the DEA vertices are not included in the frontier.

Parametric approaches include the Stochastic Frontier Approach, Distribution Free Approach, and Thick Frontier Approach. The Stochastic Frontier Approach, also referred as the Econometric Frontier Approach, specifies a functional form for the cost, profit or production relationship among inputs, outputs, and environmental factors, and allows for random error. The Distribution Free Approach also specifies a functional form of the frontier, but separates the inefficiencies from random error in a different way. The Thick Frontier Approach specifies a functional form and assumes that deviations from predicted performance values within the highest and lowest performance quartiles of observations (stratified by size class) represent random error, while deviations in predicted performance between the highest and lowest quartiles represent inefficiencies.

The existing literature on Spanish Banking System efficiency has traditionally centered on the analysis of scale and scope economies under the implicit assumption that all firms are efficient. In such a vein, countries have been classified as follows: France, Spain and Belgium appear as the countries with the most efficient banking systems whereas the UK, Austria and Germany show the lowest efficiency levels. Banking systems have also been classified by productivity into two groups: Austria, Italy, Germany and Belgium belong to the more productive one, and the USA, the UK, France and Spain to the less productive one.

In a context of ongoing developments of the banking industry worldwide, a further consideration of banks' efficiency in a greater number of countries than in prior studies will shed more light to issues of international competition that globalization inevitably implies.

METHODOLOGY

An international assessment of the banking industry is set in a context of the New Industrial Organization literature as it has been employed by De Bandt and Davis (2000).The inputs are in each case, i) financial capital proxied by some indicator of bank's liabilities, ii) labor, which may be measured by total staff number, and iii) other inputs as described below. For each of these inputs, we have bank specific input prices, which indicates that banks are not necessarily price takers in factor markets, or may face local factor markets.

Several different specifications of the tests are presented in the banking literature. Molyneux et. al. (1994) as well as Bikker and Groeneveld (1998), both of which examine EU banks, use the ratio of interest revenue to total balance sheet assets as an endogeneous variable, while Nathan and Neave (1989) on Canada,and Vesala (1995) on Finnish banks, use the logarithms of interest revenues. The latter choice appears to us as the most appropriate for economic reasons. As noted by Vesala (1995), a ratio of interest revenues to assets provides a price equation. The log specification may also reduce the possible simultaneity bias. The following equation is thus estimated to run on a panel data set (time series and cross section) of banks:

$$\log R = \sum_{j=1}^{i} logW_{i,t} + \sum_{n=1}^{i} \hat{a} logS_{i,t} + \sum_{n=1}^{k} \tilde{a} n logX_{i,t} + \dot{a}_{i,t}$$

for t=1.....T where T is the number of periods observed and i=1....i where I is the total number of banks. Subscripts i and t refer therefore to a proportion of assets in order to measure the impact of other types of inputs).

where:

R = gross interest revenues or total gross revenues.

Wit = a three dimensional vector of factor prices with j=3 inputs: unit wage cost per employee, interest rate paid on liabilities, and other costs.

S_{it} = scale variables measuring the capacity level at which the bank operates (assumed to be fixed in the short-run) including equity and fixed assets.

X_{it} = a vector of exogeneous and bank-specific variables that may shift the cost and revenue schedule (business mix). Loans are employed as a proportion of assets and deposits as a proportion of deposits plus money market liabilities.

Specifically the variables are measured as

Endogeneous Variables
- Interest Revenues
- Total Revenues (Interest Revenues+Other Operating Income+Other Income)
- Net Income/Total Assets

Factor Unit Prices
- Personnel Expenses/(Deposits+Loans)
- Interest Paid/(Deposits+Other Liabilities) where Other Liabilities= (Interbank Time and Demand Deposits+Long-term Borrowing,etc)
- Other Non-Interest Expense/Total Assets

Capacity Indicators
- Equity
- Fixed Assets+Cash and Due from Banks+Other Non-Earning Assets

Exogeneous Variables(=Indicators of Business Mix)
- Loans/Total Assets
- Deposits/Deposits and Money Market Funding

Obviously, all groups of variables are important and fully justified. For example, factor prices as reflected in revenues indicate the market power of the banking industry in each country considered. Factor unit prices, capacity indicators and exogeneous variables are employed as independent variables coded as follows: V1, V2, V3, V4, V5 and V6. Endogeneous variables are used alternatively as dependent variables.

In Table 2 the dependent variable is the gross income, in Table 3 the dependent variable is the interest income while in models presented in Table 4 the dependent variable is the rate of return. Stepwise regression includes regression models in which the choice of predictive variables is carried out by an automatic procedure. In our case the procedure takes the form of a sequence of F-tests.

For each country, using a stepwise algorithm, the variable that explains the most gross income is selected. The equation of the fitted model is given in Table 2(as we can see for each country, an intercept as well as a slope for the selected variable are given). Also, in Table 2 the R-Squared statistic, for each country, is given, which indicates the percentage of the variability of gross income that the fitted model explains (the closer to 1 the better the model). For each model the standard error of the estimate is given as well, which shows the standard deviation of the residuals. The standard error of the estimate can be used to construct prediction limits for new observations. Furthermore, the Durbin-Watson statistic is given. Durbin-Watson statistic tests the residuals to determine if there is any significant correlation based on the order in which they occur in the data file. As far as the Durbin-Watson statistic is close to the value 2 there is no indication of serial autocorrelation in the residuals otherwise (values smaller than 1) we have evidences that there is indication of serial autocorrelation in the residuals. Finally, for each country's model, we applied normality tests and the results are also reported in Table 1. In cases, where the p-value (Shapiro-Wilk sig) is greater than 0.05 we can not reject the hypothesis that the residuals come from a Normal distribution. Finally, we checked the validity of constant variance using graphical techniques.

Application of stepwise regression for each country independently has been employed.Each Table in next section reports the results for different dependent variable. In Table 2 the dependent variable is the gross income, in Table 3 the dependent variable is interest income while in models presented in Table 4 the dependent variable is rate of return. In each Table the results of a stepwise regression for each country separately are given. Stepwise regression includes regression models in which the choice of predictive variables is carried out by an automatic procedure. In our case the procedure takes the form of a sequence of F-tests.First the results of fitting a linear model to describe the relationship between gross income and one independent variable is employed. For each country, using a stepwise algorithm, the variable that explains the most, the dependent variable is selected. The equation of the fitted model is given in Table 2 to 4 (as shown for each country an intercept as well as a slope for the selected variable are given).

Additionally, for each model the standard error of the estimate is given which shows the standard deviation of the residuals. The standard error of the estimate can be used to construct prediction limits for new observations. Furthermore, the Durbin-Watson statistic is given. Durbin-Watson statistic tests the residuals to determine if there is any significant correlation based on the order in which they occur in the data file. Finally, for each country's model, we applied normality tests and the results are also reported in Table 2 to 4 In cases, where the p-value (Shapiro-Wilk sig) is greater than 0.05 we can not reject the hypothesis that the residuals come from a Normal distribution. Finally, for models we check the validity of constant variance using graphical techniques.

DATA

Table 1: Number of Banks Analyzed by Country and Year

Country	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Australia	1250	1240	1210	1165	1104	1063	1053	1041	1019	995
Austria	32	32	115	29	28	29	147	31	28	29
Belgium	122	120	10	119	121	150	147	143	140	131
Canada	--	10	10	10	10	11	11	11	9	9
Chech Republic	--	--	--	--	--	53	56	58	54	51
Denmark	206	199	523	119	113	112	113	114	117	92
Finland	589	553	1981	438	370	358	357	351	350	348
France	2050	2021	3716	1823	1701	1635	1618	1453	1401	1288
Germany	4089	3913	19	3517	3769	3613	3500	3392	3284	3111
Greece	--	15	15	19	19	20	19	18	20	19
Hungary	--	--	--	--	--	--	44	43	42	43
Iceland	41	41	35	36	36	34	33	33	33	31
Ireland	--	--	--	--	--	--	--	44	48	52
Italy	403	391	379	368	351	25	284	271	264	255
Japan	145	145	144	143	141	222	140	139	136	136
Korea	--	--	21	23	24	24	24	25	25	26
Luxemburg	166	177	187	513	218	173	220	221	215	209
Mexico	13	13	13	13	14	15	42	41	39	39
Netherlands	170	180	173	177	175	152	174	174	172	169
New Zealand	--	--	--	21	20	20	18	15	17	18
Norway	179	164	156	155	153	35	153	153	154	154
Poland	--	--	--	--	1740	1694	1591	1475	1378	1272
Portugal	27	29	33	35	27	35	37	37	39	44
Spain	334	333	12	323	319	419	316	318	313	307
Sweden	14	14	457	9	8	59	10	13	15	15
Switzerland	454	455	56	444	434	37	393	382	370	360
Turkey	53	53	47	56	58	10488	55	55	55	59
UK	52	49	47	41	39	37	37	40	44	44
USA	12728	12370	11950	11495	11001	10488	9983	9575	9187	8817

This table indicates the number of banks analyzed in this study for each country.

Data for this study were obtained from the Organisation for Economic Co-Operation and Development (OECD) publication "Financial Statements of Banks." Data on twenty nine countries were obtained and included in the data set. All banks were represented the sample for each country except in case of Denmark, Greece, Hungary, Japan, Korea, Luxemburg, Mexico, Portugal, Sweden, Turkey, UK, and US where only commercial banks are considered. The analysis is restricted to a sample in the period 1988-1997. The sample is unbalanced in few countries where the time series of available data is shorter than ten years. On average and for the time period considered, the lowest number of banks is 12 for Sweden and 10579 in US. A listing of countries analyzed in this study are presented in Table 1.

EMPIRICAL FINDINGS AND DISCUSSION

The model was tested using multiple regression. Time-series analysis was conducted for each one of the countries considered to study the effect of selected variables such as personnel expenses/(deposits+loans), interest paid/(deposits+other liabilities), equity, fixed assets+cash and due from banks, loans/total assets, deposits/(deposits and money market funding on returns accruing to banks during a year. The basic objective is to explain the impact of each variable considered and cross-sectional differences between variables and between countries. To conduct these tests independent regressions were run for each country. First, gross income was regressed on six variables reflecting factor unit prices, capacity indicators and exogeneous factors. The above analysis was repeated for interest income, and rate of return (net income/total assets).

As far as the residuals resulted from linear regression fitting (Table 2), it is noted that except for the case of Turkey, in all other cases the assumption of normality is valid. Additionally, there is no indication of significant serial autocorrelation in all cases except for Germany, Mexico, the Netherlands, and Portugal. The best fitting model (in terms of R-squared) is observed in the cases of Hungary, Canada, Ireland, USA (the results for Turkey, Germany, Mexico, the Netherlands, and Portugal can not be reliable since we have violations of either the assumption of autocorrelation or the assumption of normality).

In Table 3 the results of fitting a linear model to describe the relationship between Interest Income and one independent variable are reported. For each country, using a stepwise algorithm, the variable that explains the most interest income is selected. As far as the residuals resulted from linear regression fitting, it is noted that except for the cases of Portugal, Switzerland and Turkey, in all other cases the assumption of normality is valid. Additionally, there is no indication of significant serial autocorrelation in all cases apart from Austria, Portugal, and USA. The best fitting in terms of R-squared is observed in the cases of Korea and Poland (the results for Portugal, Switzerland, Turkey, Austria, and USA cannot be validate since we have violations of either or both the assumptions of autocorrelation and normality).

Table 4 reports the results of fitting a linear model to describe the relationship between Rate of Return and one independent variable. For each country, using a stepwise algorithm, the variable that explains the most rate of return is selected. As far as the residuals resulted from linear regression fitting, it is noted that for the cases of Austria, Belgium, Canada, Germany, Hungary, Iceland, Ireland, Italy, Korea, Luxemburg, New Zealand, the Netherlands, Norway, Sweden, USA, Finland, and Switzerland, the assumption of normality is not valid. So the results for the above mentioned cases cannot be reliable. No indication of significant serial autocorrelation was observed in all cases. The best fitting in terms of R-squared is observed in the case of Mexico.

Table 2: Gross Income Regressed on V1, V2, V3, V4, V5, V6

Gross Income		Unstandardized Coefficients						Model Summary and Model Diagnostics				
Country	**Sample Size**	**(Constant)**	**V4**	**V6**	**V3**	**V1**	**V5**	**Adjusted R Square**	**Std. Error of the Estimate**	**Durbin-Watson Statistic**	**Shapiro-Wilk Statistic**	**Shapiro-Wilk Sig.**
Austria	10	-3533.50	0.63	---	---	---	---	0.90	8166.98	1.27	0.95	0.68
Belgium	10	96824.90	---	0.02	---	---	---	0.97	11109.05	2.08	0.93	0.43
Canada	10	829.17	---	---	0.73	---	---	0.99	930.33	2.20	0.92	0.40
France	11	202050.43	---	---	0.24	---	---	0.90	13311.23	2.31	0.88	0.12
Germany	10	37069.84	---	---	0.43	---	---	0.96	5611.88	0.87	0.92	0.41
Greece	10	23133.43	---	---	0.80	---	---	0.98	34566.04	2.10	0.98	0.94
Hungary	10	19689.32	---	0.10	---	---	---	0.99	3102.65	2.79	0.88	0.32
Iceland	10	39119.65	---	---	---	-727580.34	---	0.98	405.00	2.20	0.98	0.94
Ireland	10	1969.53	0.18	---	---	---	---	0.99	6.54	---	0.88	0.33
Italy	10	32583.96	---	---	0.33	---	---	0.91	3931.53	2.94	0.91	0.27
Korea	10	2786.29	---	0.10	---	---	---	0.78	1355.57	1.02	0.90	0.27
Luxenburg	10	25725.19	---	0.01	---	---	---	0.83	19988.08	1.19	0.96	0.74
Mexico	10	12113.11	---	---	0.70	---	---	0.94	5508.09	0.88	0.94	0.58
Netherland	10	1364.25	---	0.08	---	---	---	0.99	1118.99	0.99	0.90	0.20
Norway	10	22951.23	---	---	0.15	---	---	0.71	1794.94	1.89	0.94	0.56
Poland	10	217.91	---	0.15	---	---	---	0.97	857.57	2.43	0.95	0.72
Portugal	10	246028.92	---	---	0.27	---	---	0.89	80158.80	0.80	0.91	0.31
Spain	10	1411.69	---	---	0.28	---	---	0.96	125.03	1.94	0.94	0.51
Sweden	10	101996.38	---	---	---	---	-117245.55	0.78	8222.72	1.40	0.92	0.37
Switzerland	10	-20613.25	---	---	0.75	---	---	0.88	2906.98	1.73	0.97	0.92
Turkey	10	47616.86	0.11	---	---	---	---	0.70	112991.99	---	0.77	0.01
UK	10	12745.14	0.15	---	---	---	---	0.97	905.77	1.72	0.99	0.99
USA	10	56129.94	---	---	0.55	---	---	0.99	4704.74	1.14	0.96	0.84

Table 1: Stepwise Regression with dependent the Gross Income (Criteria: Probability-of-F-to-enter <= .010, Probability-of-F-to-remove >= .050).

Table 3: Interest Income Regressed onV1, V2, V3, V4, V5, V6

Interest Income		Unstandardized Coefficients						Model Summary and Model Diagnostics				
Country	**Sample Size**	**(Constant)**	**V2**	**V4**	**V6**	**V1**	**V3**	**Adjusted R Square**	**Std. Error of the Estimate**	**Durbin-Watson Statistic**	**Shapiro-Wilk Statistic**	**Shapiro-Wilk Sig.**
Australia	10	232433.22	595023.67	---	---	---	---	---	---	---	0.96	0.75
Austria	10	904473.33	---	0.97	---	---	---	0.67	21383.94	0.96	0.90	0.22
Belgium	11	-719911.78	6621848.43	1.20	---	---	---	0.73	173330.59	---	0.94	0.53
Canada	11	45101.16	---	0.16	---	---	---	0.61	5580.54	1.25	0.95	0.67
Chech	6	---	---	---	---	---	---	---	---	---	0.85	0.20
Denmark	11	41859.38	236522.19	---	---	---	---	0.73	8095.31	2.15	0.87	0.09
Finland	11	6128.75	266434.93	---	---	---	---	0.90	5809.12	1.94	0.91	0.25
France	11	---	---	---	---	---	---	---	---	---	0.93	0.40
Germany	10	---	---	---	---	---	---	0.82	28190.72		0.91	0.29
Greece	10	---	0.36	---	---	---	---	0.94	102246.86	1.99	0.95	0.74
Hungary	10	---	---	---	---	---	---	---	---	---	0.99	0.94
Iceland	10	20276.09	29679.53	---	---	---	---	0.59	2992.64	---	0.97	0.93
Ireland	10	---	---	---	---	---	---	---	---	---	0.86	0.28
Italy	10	72261.97	---	---	---	---	0.74	0.81	13991.13	1.82	0.92	0.37
Japan	10	21455.68	2724779.16	---	---	---	---	0.93	24216.15		0.92	0.32
Korea	10	-7833.54	---	0.38	---	---	---	0.99	621.60	2.59	0.85	0.10
Luxenburg	10	---	---	---	---	---	---	---	---	---	0.96	0.79
Mexico	10	738678.48	---	---	---	-20923076.92	---	0.85	40001.36	2.27	0.87	0.10
New Zealand	10		---	---	---	---	---	---	---	---	0.92	0.39
Netherland	10	-2340710.70	---	---	---	211306497.97	---	---	---	2.04	0.80	0.06
Norway	10	---	---	---	---	---	---	---	---	---	0.86	0.07
Poland	10	2675.09	---	---	0.29	---	---	0.98	1412.17	2.21	0.96	0.82
Portugal	10	642572.88	---	---	---	---	0.68	0.84	246509.53	0.81	0.81	0.02
Spain	10	16602.34	---	---	---	-298072.21	---	0.90	545.49	2.87	0.90	0.21
Sweden	10	---	---	---	---	---	---	---	---	---	0.90	0.24
Switzerland	10	---	---	---	---	---	---	---	---	---	0.76	0.00
Turkey	10	-7185.93	---	---	0.88	---	---	0.99	37014.42	2.71	0.65	0.00
UK	10	---	---	---	---	---	---	---	---	---	0.95	0.72
USA	11	950534.21	---	---	---	-28388502.72	---	0.73	19631.63	0.94	0.95	0.64

Table 2: Stepwise Regression with dependent the Interest Income (Criteria: Probability-of-F-to-enter <= .010, Probability-of-F-to-remove >= .050).

Table 4: Rate of Return Regressed on V1, V2, V3, V4, V5, V6

Rate of Return		Unstandardized Coefficients						Model Summary and Model Diagnostics				
Country	**Sample Size**	**(Constant)**	**V2**	**V4**	**V3**	**V6**	**V5**	**Adjusted R Square**	**Std. Error of the Estimate**	**Durbin-Watson Statistic**	**Shapiro-Wilk Statistic**	**Shapiro-Wilk Sig.**
Australia	10	---	---	---	---	---	---	---	---	---	0.92	0.39
Austria	10	---	---	---	---	---	---	---	---	---	0.44	0.00
Belgium	11	---	---	---	---	---	---	---	---	---	0.83	0.04
Canada	11	---	---	---	---	---	---	---	---	---	0.79	0.01
Chech	6	---	---	---	---	---	---	---	---	---	0.89	0.38
Denmark	11	0.02	-0.11	---	---	---	---	0.65	0.00	2.32	0.94	0.54
Finland	11	---	---	---	---	---	---	---	---	---	0.84	0.05
France	11	0.00	---	0.00	---	---	---	0.71	0.00	1.75	0.86	0.07
Germany	10	---	---	---	---	---	---	---	---	---	0.54	0.00
Greece	10	---	---	---	---	---	---	---	---	---	0.97	0.88
Hungary	10	---	---	---	---	---	---	---	---	---	0.89	0.41
Iceland	10	---	---	---	---	---	---	---	---	---	0.76	0.01
Ireland	10	---	---	---	---	---	---	---	---	---	0.75	0.00
Italy	10	0.01	---	---	0.00	---	---	0.77	0.00	1.54	0.81	0.02
Japan	10	---	---	---	---	---	---	---	---	---	0.93	0.49
Korea	10	---	---	---	---	---	---	---	---	---	0.79	0.02
Luxenburg	10	---	---	---	---	---	---	---	---	---	0.81	0.02
Mexico	10	0.02	---	---	---	0.00	---	0.79	0.00	1.54	0.92	0.33
New Zealand	11	---	---	---	---	---	---	---	---	---	0.83	0.02
Netherland	10	---	---	---	---	---	---	---	---	---	0.81	0.03
Norway	10	---	---	---	---	---	---	---	---	---	0.74	0.00
Poland	10	---	---	---	---	---	---	---	---	---	0.94	0.66
Portugal	10	---	---	---	---	---	---	---	---	---	0.87	0.10
Spain	10	---	---	---	---	---	---	---	---	---	0.85	0.06
Sweden	10	---	---	---	---	---	---	---	---	---	0.84	0.04
Switzerland	10	---	---	---	---	---	---	---	---	---	0.84	0.05
Turkey	10	---	---	---	---	---	---	---	---	---	0.96	0.75
UK	10	---	---	---	---	---	---	---	---	---	0.90	0.20
USA	10	0.02	-0.04	---	---	---	---	0.93	0.00	2.72	0.76	0.00

Table 3: Stepwise Regression with dependent the Rate of Return (Criteria: Probability-of-F-to-enter <= .010, Probability-of-F-to-remove >= .050).

CONCLUSIONS AND SUGGESTIONS FOR FURTHER FUTURE RESEARCH

Financial institutions efficiency measured in a financial accounting point of view is an issue of timeliness in an era of considerable changes in the banking industry worldwide. In the eve of EMU, the case of banks in Greece is of high importance since interest rates are not capable of accumulating deposits as in the old past and speculation in foreign currency is severely limited. Since income structure changes internationally, variables that define the business mix in the banking industry may differentiate in various countries. From factor unit prices, capacity indicators and other exogeneous variables, the most significant ones differentiate according to the endogeneous variables used as the dependent variables. Gross income is explained more by variable V3 (equity).Net income is explained more by the constant term. Rate of return cannot be explained at all.

In other words, gross income is the most appropriate dependent variable. A longer span of time divided in specific time periods may approximate the research model to furnish evidence related to various macro events in each country considered in this study and thus separate past from recent evolution of the banking industry in the context of a prospect of a globalized business environment or a still nationalistic one. In such a setting a probable globalization of magnitudes is also investigated in an indirect way.

AUTHOR INFORMATION

Anastasia G. Maggina is a Ph.D. holder in Accounting who graduated from the Aristotle University of Thessaloniki. She has taught at Greek Universities and American Universities in Greece and has worked at the Center of Planning and Economic Research (Ministry of National Economy) and as a senior Consultant. She has published in scholarly journals, such as Journal of Multinational Financial Management, Global Journal of Business Research, Advances in Financial Planning and Forecasting, Research in Governmental and Nonprofit Accounting, Journal of Management Consulting, International Review of Economics and Business, International Journal of Managerial and Financial Accounting, etc. and in several Greek newspapers. She has published several books and monographs in Greek, has translated several monographs and manuals, and has provided professional services in various Committees and AAA Meetings.

REFERENCES

1. Berger, A.N. and D.B. Humphrey (1997), "Efficiency in Financial Institutions: International Survey and Directions for Future Research", *European Journal of Operational Research*, 98, pp. 175-212
2. Bikker, J.A. and J.M. Groeneveld (1998), "Competition and Concentration in the EU Banking Industry", Research Series Supervision No. 8, De Nederlandsche Bank, Amsterdam
3. De Bandt, O. and E.P.Davis (2000), "Competition, Contestability and Market Structure in European Banking Sectors on the Eve of EMU", *Journal of Banking and Finance*, 24, pp. 1045-1066
4. Dietsch, M. and A. Lozano-Vivas (2000), "How the Environment Determines Banking Efficieny: A Comparison Between French and Spanish Industries", *Journal of Banking and Finance*, 24, pp. 985-1004
5. Molyneux, P., Lloyd-Williams, D.M. Thornton (1994), "Competitive Conditions in European Banking", *Journal of Banking and Finance*, 18, pp. 445-459
6. Nathan, A. and E. Neave (1989), "Competition and Contestability in Canada's Financial System: Empirical Results", *Canadian Journal of Economics*, 22, pp. 576-594
7. Pastor, J.M., F. Perez and J. Quesada (1997), "Efficiency Analysis in Banking Firms: An International Comparison", *European Journal of Operational Research*, 98, pp. 395-407
8. Statistics of Financial Statements of Banks, OECD
9. Vesala,J. (1995), *"Testing Competition in Banking: Behavioral Evidence from Finland"*, Bank of Finland Studies, E:I,Helsinki.

NOTES