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**Article**

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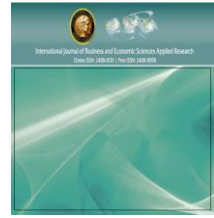
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**A model for predicting Inactivity in the European Banking Sector**

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**Abstract**

**Purpose** – The paper will addresses the issue of inactivity and will try to detect its causes using econometric models. The Banking sector of Europe has been under transformation or restructuring for almost half a century.

**Design/methodology/approach** – Probit models and descriptive statistics have been used to create a system that predicts inactivity. The data was collected from Bankscope.

**Findings** – The results of the econometric models show that from the six groups of indicators, four have been found to be statistically important (performance, size, ownership, corporate governance). These findings are consistent with the theory.

**Research limitations/implications** – The limitation is that Bankscope does not provide any longitudinal data regarding ownership, management structure and there are some many missing values before 2007 for some of the financial ratios and data.

**Originality/value** – The paper's value and innovation is that it has given a systemic approach to find indicators of inactivity.

**Keywords:** Banks, Europe, Inactivity

**JEL Classification:** G15, G32, G33

## **1. Introduction**

Since the end of 1950's Europe has created a mechanism of change and integration, the European Union. The banking sector of Europe had to comply with or to adapt to this political and economic change. This macro (political and economic) environment change has created a larger number of transformation drivers (deregulation and legal isomorphism, product inflation and complexity, stock market development). Europe was and is diverse and the banking system across Europe hasn't the same characteristics (ownership, legal framework, etc.) and path of development (in some countries there are a large number of banks while in other only a few).

During this transformation period some banks have faced problems or changed their strategy. The result is inactivity. Inactivity can take many forms or has many causes (merger & acquisition (MA), liquidation, default-bankruptcy, etc.). Having in mind the diversity of the European banking system, many scholars have argued that there is convergence trend in Europe (Casu and Girardone, 2010; Murinde, Agung and Mullineux, 2004; Schmidt, Hackethal and Tyrell, 2001) and other countries (Brau et al., 2014). The basic argument is that the convergence on the legal - regulatory system of Europe has enough momentum.

Others (Rughoo and Sarantis, 2014; Gibson and Tsakalotos, 2013; European Central Bank, 2012; Busch, 2002) challenge this hypothesis.

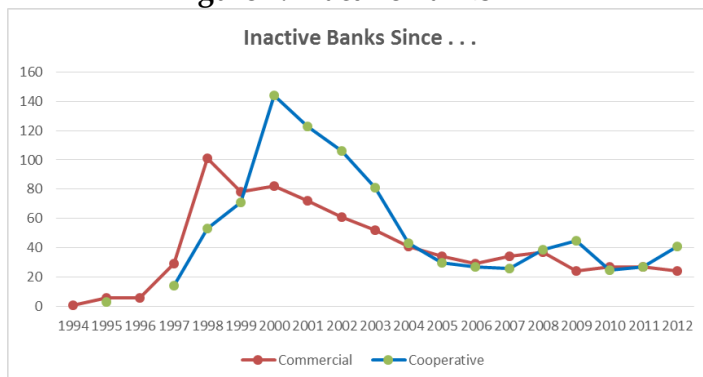
The paper attempts to address the issue of inactivity, to locate the causes of inactivity and create a system that can predict inactivity. To do that an analysis of the banking system is done and a probit model has been created.

## **2. The Banking System of Europe**

The banking system of Europe has gone through two decades of turbulence. Through the 1990's a wave of mergers, liquidations and bankruptcies has swept the sector. This wave was at its peak the last years of the 1990's and the 2000-2004 period. Since then the number of exits from the sector has been relatively stable (see, Figure 1).

It is notable that the cooperative banks suffered more than the commercials. This fact can be attributed to their smaller size, ownership structure, management efficiency, etc. The crises of 2002 doesn't seem to have any effect on the trend and the number of inactive banks per year is lowering until 2006. Small increase is observed during the crisis of 2008, but the number is stabilized the years that follow 2009. The explanation for these results on inactivity can be explained if the causes of inactivity are studied in the paper.

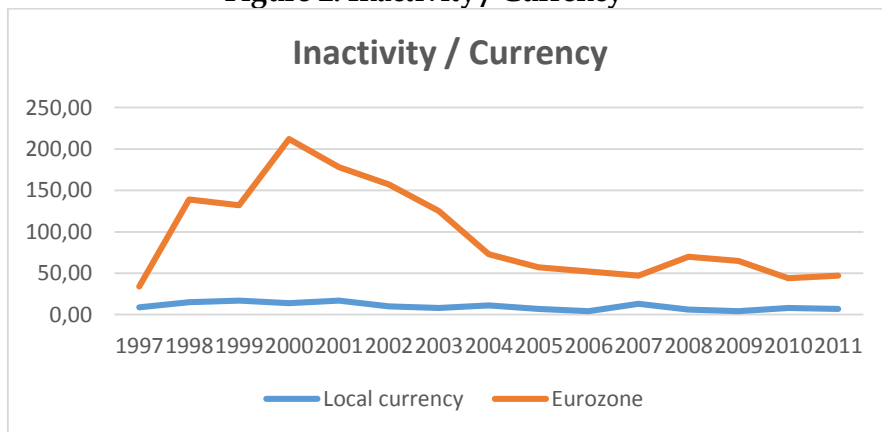
**Figure 1: Inactive Banks**



The analysis of the exits from the sector (see Figure 2) shows that the majority of the exits are caused by mergers (80.57%, see Table 1). The main reason is the adoption of Euro, which took place on 1 January 1999. The vast majority of M&As have occurred during the pre-Euro period

(1998-2001). This event was a game changer. The Euro has created a larger market and banks tried to adapt to the new market (see, Figure 2). European banks seem to be seeking a new strategic advantage (size and alliances – geographical expansion).

**Figure 2: Inactivity / Currency**



Bankruptcies take place in three distinctive periods (1999-2002, 2008-2009 and 2011-2012). These periods are the same with the ones that scandals or crises took place, and they

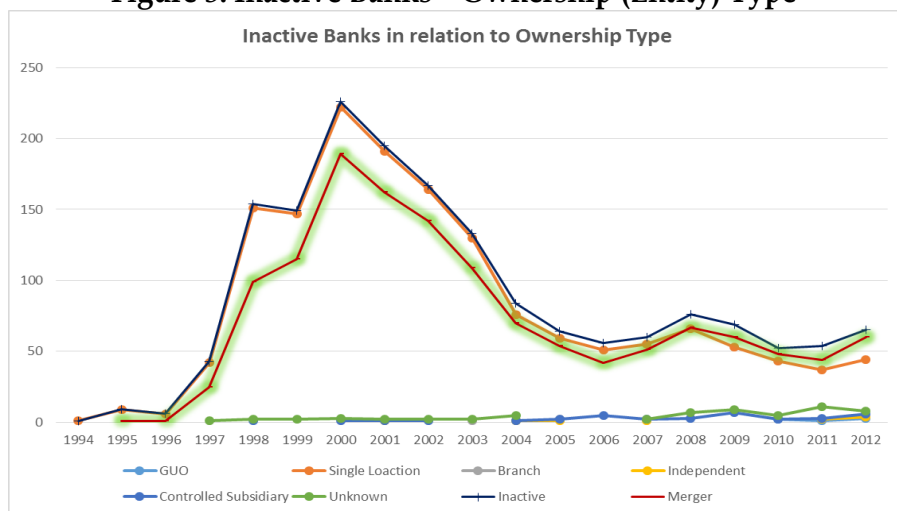
must be direct or indirect result of these failures (in regulation, ethics, corporate governance, risk management, financial management, etc.).

**Table 1: Causes of inactivity in the European Banking Sector**

	Dissolved, In Liquidatiuon	Merger	Bankruptcy	Total
<b>Number</b>	308	1339	15	1662
<b>%</b>	18,53%	80,57%	0,90%	100,00%

The analysis of the ownership and banks' entity show that the banks that were recorded as inactive during the last two decades were mostly banks that their activity was focused in a single country (see Figure 3). This trend is observed from 1994 to 2004. This period is within Euro adoption period as a common currency. From that point on inactivity appears to

have other targets (since the main cause is M&As ) or is caused by the consolidation of subsidiaries. The driver of inactivity of M&As during the whole period of analysis. Especially, for the period after the 2002 crisis, M&As seem to be the main driver (although at a lower level number of inactivity).

**Figure 3: Inactive Banks – Ownership (Entity) Type**

GUO - Global Ultimate Owner (ownership of at least 50.01%)

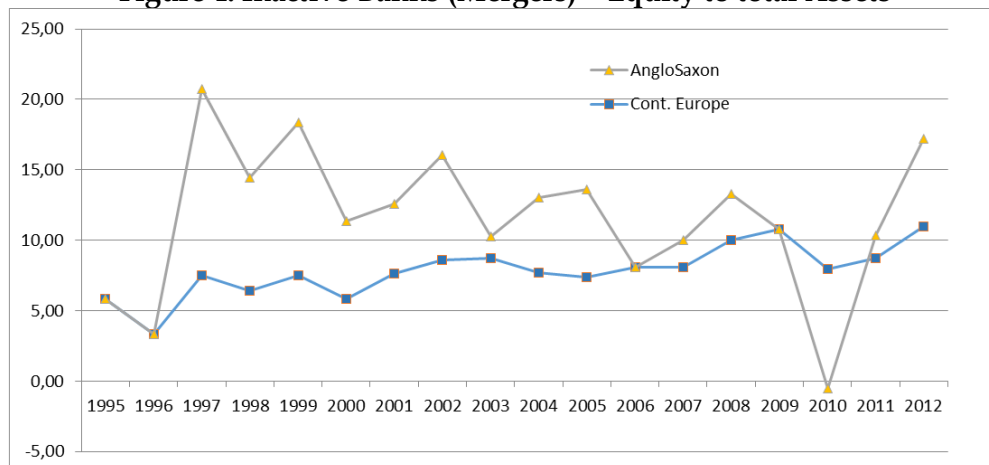
The merger wave of 1998-2004 may have two separate causes. The first one (before 2001) is the

consolidation of capital – assets and the acquisition of market share or achievement of competitive

advantage, due to the greatest bull market ever and the continuous development of the financial sector.

The second (after 2001) one can be attributed to the uncertainty of the market after the crises of 2001-2002.

**Figure 4: Inactive Banks (Mergers) – Equity to total Assets**



The causes can be analyzed using performance and size indicators like Return on Assets (ROA) and Equity to Total Assets (ETA) ratios. High ROA M&As are an indication of the incentive that drove to inactivity. High ROA is attractive for hostile takeovers. It is hypothesized that in Continental Europe countries the incentive is the drive to cumulate the size (see, Figure 4) of the bank in order to acquire a competitive advantage or a better chance to survive.

The merger – liquidation wave of 1998-2004 has create a different market (from 4.500 banks in Europe in 1994, in 2012 only 2.873 remained). A third of the banks (36,73%, see, Table 2) didn't manage to adapt to the

new environment or their strategy to the challenges of the market was to seek safety in size and in cooperation with other banks. This hypothesis is supported by the fact that the vast majority of the banks that were merged or dissolved, were single location banks (meaning that the smaller banks in equity and capital were the targets for mergers) (see, Table 3).

The wave didn't affect at the same extend all countries. Germany, Italy France, Spain, Luxemburg and UK had the largest reduction in the number of active banks (see, Table 3). Especially, in Germany and Italy the percentage of financial market restructuring is very high (16.25% and 6.07%, respectively).

**Table 3: Dissolves - Mergers by Country**

Country	No of Dissolves - Mergers	% of Dissolves - Mergers	Reduce of No of Banks in each country
AUSTRIA	26	1,6%	0,57%
BELGIUM	42	2,5%	0,93%
BULGARIA	6	0,4%	0,13%
CYPRUS	5	0,3%	0,11%
CZECH REPUBLIC	16	1,0%	0,35%
DENMARK	25	1,5%	0,55%
ESTONIA	6	0,4%	0,13%
FINLAND	5	0,3%	0,11%
FRANCE	171	<b>10,3%</b>	<b>3,78%</b>
GERMANY	736	<b>44,3%</b>	<b>16,25%</b>
GREECE	13	0,8%	0,29%
HUNGARY	12	0,7%	0,27%
IRELAND	14	0,8%	0,31%
ITALY	275	<b>16,5%</b>	<b>6,07%</b>
LATVIA	9	0,5%	0,20%
LITHUANIA	4	0,2%	0,09%
LUXEMBOURG	71	<b>4,3%</b>	<b>1,57%</b>
MALTA	2	0,1%	0,04%
NETHERLANDS	26	1,6%	0,57%
POLAND	23	1,4%	0,51%
PORTUGAL	14	0,8%	0,31%
ROMANIA	8	0,5%	0,18%
SLOVAKIA	11	0,7%	0,24%
SLOVENIA	11	0,7%	0,24%
SPAIN	65	<b>3,9%</b>	<b>1,44%</b>
SWEDEN	7	0,4%	0,15%
UK	60	<b>3,6%</b>	<b>1,33%</b>
<b>Total</b>	<b>1.663</b>	<b>100,0%</b>	<b>36,73%</b>

Although the data used per se do not reveal the nature of these mergers, Martynova and Renneboog (2006) have shown that a small portion of merger activity involves transatlantic parties (bidders or targets). Even the majority of Intra-

European activity is not cross border. On the contrary the majority of the merger activity in Europe (about 80%) is observed within national borders. "Fragmented and mostly domestically-oriented European companies resorted to takeover deals

as a tool to survive the tougher regional competition created by the new market” (Martynova and Renneboog, 2006). The findings of the two researchers strengthens the argument that the merger activity in Europe aimed at achieving competitive advantage, to create economies of scale and to obtain larger market share.

Financially, the dissolved or merged banks presented a wide spectrum of values on the selected three ratios (Total Capital Ratio, Equity to Net Loans and Growth of Gross Loans). No pattern seems to present itself (eg. Low TCR values). A hypothesis is that there are market formulating factors that differ from country to country (eg. Growth of gross loans is quite different from country to country).

The map of the financial sector in Europe after fifteen years of turbulence (positive or negative) has changed dramatically, but the factor of spatial dispersion of the sector remains the same. Germany has the largest number of banks (almost the 40% of the total number), followed by Italy (18,62%), France (7,45%), Austria (6,68), UK (4,8%) and Spain (4,18). The largest economies of the EU have the largest number of banks. In terms of total equity (TE) and interest income on loans (IIL) the European market has different

variance. Using these ratios as classification factors, France (26%) has the largest banking sector in Europe, followed by Germany (14,25%). The concentration of equity capital and income from loans is different from the concentration of banks (as institutions). That means that there is a difference in size and hence a difference in importance.

As expected, ownership is more dispersed in the Anglo-Saxon corporate governance system. Only 5,33% of the banks have ownership concentration higher than 50,01%, whereas in the Continental Europe system ownership concentration above the threshold of 50,01% is 18,97%. This finding is in accordance with the one that Franks et al. (2008) reported (UK ownership concentration is 18%, Germany 43% and Italy 68%). On the other hand the difference of ownership concentration between North and South is also substantial. Countries that were ranked to the Anglo-Saxon corporate governance system seem to have the majority of their banks to be controlled subsidiaries (77,51%). PIGSs’ banks are very close to the average of every type of ownership<sup>1</sup>.

Another important factor for the evolution of the financial sector is the corporate governance structure. Bankscope provides data about the committees working in every bank,

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<sup>1</sup> Bankscope does not provide historical data for ownership. The only data given is for the last year of entry and can only

be used to classify the sample and to make panels.



through data given for the members of the board of directors. Using this information an index was constructed. The index of Good Corporate Governance Practices is calculated as the sum of the number of committees (remuneration, nomination, risk management, etc.). Such indexes are used widely (see e.g. Lazarides and Drimpetas, 2011).

Table 4 presents the average of the Good Practice Index for every dimension of the study. The highest numbers are calculated for the banks which have a major controlling shareholder or they are controlled subsidiary. One finding worth mentioning is the high average for the Continental Europe corporate governance system (mainly because some committees are legally mandatory) whereas for the Anglo-Saxon corporate governance system (voluntary adoption of good

practices) the average of the index low.

In order to test the hypothesis that there was a change in financial management during the last eight (8) years, a number of ratios have been selected and calculated (see Table 5). NLTA's analysis shows that the banks of countries of the Continental Europe corporate governance system have higher average than the ratios calculated for the Anglo-Saxon countries. Continental Europe countries' are more exposed to loan risk. There was no significant change through time. Hence, the legal, events (scandals) or other initiatives didn't have significant impact in improving this ratio, but it seems that has an impact on the GGL ratio. The ratio seems to be getting smaller through time. The banks reduced their loan growth, in order to maintain the level capitalization of their business.

**Table 4: Good Practice Index**

<b>Good Practices Index</b>	<b>Cont. Europe CG</b>	<b>Anglo Saxon CG</b>	<b>Total</b>
0	279	48	327
1	94	6	100
2	132	6	138
3	34	2	36
4	14	5	19
5	16		16
6	2	1	3
7	1		1
<b>Average</b>	<b>1,075</b>	<b>0,735</b>	<b>1,039</b>
<b>Total</b>	<b>572</b>	<b>68</b>	<b>640</b>

The ratio ETA (Equity / Total Assets) in the Anglo-Saxon, South and PIGS countries is significantly higher than in the ones of the Continental Europe. The central Europe's economies have lower levels of ETA. The same can be said for the ENL, Tier and TCR ratios. Banks with higher ENL, ETA, Tier and TCR ratios are considered to be better situated to handle risks (operational, credit risk) and have better capital adequacy and they have lower levels of leverage. These ratios do not appear to change significantly through time in every spatial dimension used in this paper but there are differences among the different geographical groups. (e.g. the return ratios (ROA and REP) reveal significant differences between Anglo-Saxon and Continental Europe countries (the difference may be attributed to higher leverage levels in central Europe banks)).

The recent developments of the 2008-2009 crises have created a spatial division of Europe. The financial market handles risk by trying to detect it. Fitch is one of the main ranking agencies. Table 10 and 11 depict the way that Fitch ranked and approached the European financial market. On average the PIGS banks were ranked 14 times and ranked lower than Not PIGS banks. Furthermore, Fitch focused more on the Anglo-Saxon countries banks (15,29 average times). The fact of higher count of rankings can be explained by the interest of the market participants (due to more developed and efficient markets) and their total assets (22% of the total assets of the European banking sector). Overall, the countries that have a large banking sector (in terms of assets and equity) receive better rankings (see, Table 10).

**Table 5: Active Banks, Ratios**

Ratios*	No	Not PIGS	PIGS	North	South	Cont. Europe CG	Anglo Saxon CG
NLTA	2833	60,24	56,82	54,70	58,88	57,94	40,99
NLTA 3	2841	57,75	55,80	54,48	60,12	56,28	50,01
NLTA 8	2846	57,53	55,75	54,85	58,81	56,30	48,82
ETA	2848	10,55	13,86	10,02	12,91	10,37	16,86
ETA 3	2865	10,52	14,50	10,08	12,78	10,36	17,13
ETA 8	2865	10,50	14,21	9,85	13,30	10,35	16,58
GGL	2802	8,48	1,39	8,74	6,07	7,96	9,99
GGL 3	2813	10,35	6,84	9,69	11,51	9,28	25,17
GGL 8	2815	13,08	14,30	12,16	16,07	12,12	30,69
EL	2845	16,27	21,16	16,13	17,80	15,29	37,32
EL 3	2855	16,87	34,47	16,79	21,23	16,85	35,36

Ratios*	No	Not PIGS	PIGS	North	South	Cont. Europe CG	Anglo Saxon CG
EL 8	2858	16,85	31,61	16,57	21,13	16,55	36,81
TIER	1231	15,03	11,50	13,64	16,44	14,79	18,46
TIER 3	1323	15,25	11,63	13,81	16,77	15,07	16,02
TIER 8	1380	15,46	11,16	13,55	17,67	15,18	17,71
TCR	1745	17,97	15,78	17,83	18,09	17,70	24,85
TCR 3	1745	17,77	15,45	17,37	18,42	17,53	23,16
TCR 8	1747	17,93	15,20	17,27	19,22	17,59	23,56
ENL	2781	26,45	38,14	27,43	26,24	25,35	59,57
ENL 3	2833	29,36	45,01	17,51	25,09	27,74	74,02
ENL 8	2838	29,86	40,86	16,63	26,08	28,29	68,78
ROA	2867	0,22	-0,10	0,27	0,01	0,23	-0,23
ROA 3	2873	0,27	0,01	0,20	0,19	0,22	-0,14
ROA 8	2872	0,34	0,35	0,31	0,43	0,37	-0,02
REP <sup>2</sup>	2867	1,06	1,04	1,13	0,88	1,09	0,69
REP 3	2872	1,04	1,04	1,07	0,93	1,05	0,74
REP 8	2872	1,08	1,14	1,09	1,08	1,11	0,69

\* NLTA = Net loans / Total Assets, ETA = Equity / Total Assets, GGL = Growth of Gross Loans, EL = Equity / Liabilities, TCR = Total Capital Ratio, ENL = Equity / Net Loans, ROA = Return on Assets, REP = Recurring Earnings Power. The number 3 indicates that it is the average of three years and the number 8 that it is the average of eight years.

### 3. Data, variables and empirical approach

The data used for the empirical analysis cover the period from 2004 to 2011, is focused on the twenty seven (27) European Union countries and only commercial and cooperative banks. The total number of banks, initially, collected from Bankscope were 4.573. After the analysis of outliers the sample was reduced to 4.536 banks (2.873 active and 1.663 inactive). In order to create a more homogenous and usable sample, the

initial data were filtered and new ratios were calculated. The final data is comprised of 640 banks. The selection criteria were: a) size of assets (more than 2 billion Euros) and b) the ratio of Equity to Total Assets is higher than 10%.

The dependent variable (inactivity) is binary and (1 if the bank is inactive and 0 if the bank is active). A large number of independent variables have been used. More than four metrics of performance (e.g. ROA, ROE, Operating profits,

<sup>2</sup> Recurring Earning Power: is the ratio of Profit before Taxes plus Loan Loss Provision minus Income from Associates and minus Exceptional Income to Average Assets

dividends, etc.), size (assets, loans, growth, etc.), capital structure. Overall the number of independent variables as more than 80. It is useful to analyze the sample using the fundamental characteristics of the corporate environment.

Ownership and type of entity variable shows that the sample is not

very different from the one that was described in the second section of the paper (see, Table 6). 187 inactive banks were found and the majority of them are Single location banks. The majority of inactivity is caused by M&As. A small number is caused from liquidation and bankruptcy (see, Table 7).

**Table 6: Sample - Entity type**

<b>Entity type</b>	<b>GUO*</b>	<b>Single location</b>	<b>Branch locations</b>	<b>Independent companies</b>	<b>Controlled subsidiary</b>	<b>Unknown</b>	<b>Total</b>
<b>Active</b>	58	18	16	10	351		453
<b>Inactive</b>	3	159		4	11	10	187
<b>Total</b>	61	177	16	14	362	10	640

**Table 7: Sample - Status**

<b>Status</b>	<b>Active, no longer with accounts on Bankscope</b>	<b>Dissolved, In liquidation</b>	<b>Dissolved (merger)</b>	<b>Bankruptcy</b>	<b>Total</b>
<b>Active</b>	450	3			<b>453</b>
<b>Inactive</b>		29	156	2	<b>187</b>
<b>Total</b>	<b>450</b>	<b>32</b>	<b>156</b>	<b>2</b>	<b>640</b>

A Good Practice Corporate Governance Index is calculated. The calculation of the index is based on the reported good practices of corporate governance (i.e. duality of roles, audit committee, etc.). The index is the sum of the number of the good practices that were reported.

Table 8 shows that majority of the banks involved in a M&A applies none of the good practices. This is an indication that the corporate governance system is weak and perhaps is the underlining factor of the M&A.

**Table 8: Sample - Good Corporate Governance Index by Status**

Good Corporate Governance Index	Active	Dissolved, In liquidation	Dissolved (merger)	Bankruptcy	Total
0	157	27	142	1	327
1	91	4	5	0	100
2	128	1	8	1	138
3	36	0	0	0	36
4	19	0	0	0	19
5	15	0	1	0	16
6	3	0	0	0	3
7	1	0	0	0	1
<b>Total</b>	<b>450</b>	<b>32</b>	<b>156</b>	<b>2</b>	<b>640</b>

The best performance of the index is observed for the controlled subsidiaries (see, Table 9) and the GUO banks. Banks that are more

universal or are less ownership concentrated tend to implement a larger number of good practices.

**Table 9: Sample - Good Corporate Governance Index by Entity type**

Good Corporate Governance Index	GU O	Single location	Branch locations	Independent companies	Controlled subsidiary	Unknown	Total
0	17	162	13	7	119	9	327
1	7	6	1	2	83	1	100
2	21	8	0	3	106	0	138
3	8	0	0	2	26	0	36
4	3	0	0	0	16	0	19
5	5	1	1	0	9	0	16
6	0	0	0	0	3	0	3
7	0	0	1	0	0	0	1
<b>Total</b>	<b>61</b>	<b>177</b>	<b>16</b>	<b>14</b>	<b>362</b>	<b>10</b>	<b>640</b>

The two corporate governance systems of Europe's banks show different ratio of inactivity. In the Continental Europe system the ratio is 30,6%, while in the Anglo-Saxon

system the ratio is almost half (17,6%). This finding is consistent with the hypothesis that the banking sector in Europe has gone through a M&A wave.

**Table 10: Sample – Inactivity by corporate governance system**

	<b>Continental Europe</b>	<b>Anglo-Saxon</b>	<b>Total</b>
<b>Active</b>	397 (69,4%)	56 (82,4%)	<b>453</b>
<b>Inactive</b>	175 (30,6%)	12 (17,6%)	<b>187</b>
<b>Total</b>	<b>572</b>	<b>68</b>	<b>640</b>

#### **4. Methodology**

A probit model is used to achieve two things. The first is to identify the factors that affect inactivity and the second is to create a model that predicts inactivity.

There are a great number of factors that have to be taken into account (seven). The evaluation of the system is even more complex because there are policy, regulating factors or events that there is not precedence. Furthermore the system has to provide a way to be tested and test the hypothesis and provisions of the model.

Table 11 shows the possible outcomes of the system – model. The first and most comprehensible criteria are the Type I, Type II and T total errors. MType I is the ratio of missing signals (i.e. when no early warning signal was issued despite a crisis occurred or else False Positive (FP)) to the number of periods when a signal should have been issued, while Type II is the ratio of wrong signals (i.e. when a signal was issued while no crisis occurred or else True Negative (TN)) to the number of periods when no signal should have been issued. T total is the sum of Type I and Type II errors.

**Table 11: Possible Outcomes**

		Predicted Class	
		0	1
Actual Class	0	False Negative (0, 0)	True Negative (0, 1)
	1	False Positive (1, 0)	True Positive (1, 1)

The value of these regressions is their ability to create a table of predictability. All of these metrics are informative, but in different ways. For example, the overall percentage quickly summarizes the success of a predictive method in a global sense. However, when there is an extreme

imbalance between the two kinds of events being classified, then it is easy to formulate a useless rule with a very high overall percentage – just predict that every event will be the more frequent type. Overall percentage mostly measures success in classifying the more frequent event

type. A method can have very poor predictive success with the low frequency event and still score very highly on overall percentage. Sensitivity addresses success in classifying the event type (crisis) that is probably of most interest to the decision-maker: What proportion of crises are correctly predicted? A tradeoff between success with crises and success with non-crises is necessary. Specificity measures success at predicting non-crises. Sensitivity and specificity are useful tools for the development of a prediction rule. In the development phase, one tests a potential rule on events whose true binary classification is known and assesses how many of each type are correctly classified. A good potential rule should have high success rate in each type. However, it is possible for a predictive rule to have both high sensitivity and high specificity and yet be poor at prediction. This seemingly paradoxical situation occurs when there is an extreme imbalance between the two types of events and the potential rule generates a large number of false positives (C). The sensitivity and specificity metrics are supplemented with TPR and TNR, which measure the proportion of predictions that are correct. Indeed, many policymakers may be interested only in the success rate of their predictions. If so, then TPR and TNR are of primary importance. Sensitivity and

specificity are retrospective and developmental measures; TPR and TNR are potentially prospective and applicational.

The task to extract signals from indicators can be done by using probit – logit analysis transforms the variable into crisis probabilities (eg. Demirguc Kunt and Detragiache, 1998).

In a discrete choice model, a binary classification set-up first maps various explanatory variables into the probability of a systemic banking crisis, i.e. either a probit or a logit mapping function transforms the variables into a continuous indicator variable between 0 and 1. This indicates the crises or inactivity probability. If the probability exceeds a specified threshold, a signal is issued. A discrete choice model can include one or several indicator variables at a time. While in the case of the multivariate signalling approach a joint condition needs to be fulfilled for a crisis to be signaled (e.g. all indicator variables breaching a specific threshold), in a multivariate discrete choice model each variable included reflects the marginal contribution of that variable. All variables then jointly determine a continuous crisis probability which, when exceeding a specific (optimised) threshold, signals a crisis.

## **5. Empirical results**

A number of regressions have been attempted in order to find a suitable early warning system of

inactivity. These regressions are seeking to find the indicators of inactivity. Three main inactivity causes are examined. The first one is generic and covers the total number of causes, the second examines the indicators for the dissolved or in liquidation banks and the third the main reason – cause, which is the M&As.

In all regressions an indicator of size, performance, ownership, capital structure and corporate governance. Each and every one of these indicators have been identified as compatible with the theories of crises, inactivity and bank failure.

The results of the regressions for all causes or phenomena of inactivity

has an overall predictive rate of 88,1%. Alternatively, a different measure of performance has been used (Net Income - Cash Dividends/ Total Equity, Nicdte). This model even though it has high overall predictability, the independent variables (Nicdte) is not statistical important. An alternative for the performance indicator (ROA and ROE) is used to compensate for this problem. The model with ROA has the same predictability, but the performance variable is not statistical important as well. ROE seems to be a better performance indicator (see, Tables 12 and 13).

**Table 12: Regression results**

METHOD	Optimal Error Criterion	Overall%	Sensitivity = TPR = 1-P(Type I error)	PPV = Precision Positive	Specificity = TNR = 1-P(Type II error)	NPV = Precision Negative
Probit regression	0,257	88,1	83,2	76,2	90,0	93,3

Optimal Error Criterion  $[w \cdot FP + (1-w) \cdot FN] / TP$ , with  $w=0.5$ .

Overall% is the overall success rate  $= 100 \cdot (TP+TN) / (TP+FP+FN+TN)$ .

Sensitivity = TPR  $= 1-P(\text{Type I error}) = 100 \cdot TP / (TP+FN)$

Specificity = TNR  $= 1-P(\text{Type II error}) = 100 \cdot TN / (FP+TN)$

PPV (positive predictive value)  $= 100 \cdot TP / (TP+FP) = \text{precision positive}$

NPV (negative predictive value)  $= 100 \cdot TN / (TN+FN) = \text{precision negative}$

**Table 13: Regression Predictors**

Predictor	Probit	Logit	OLS
GoodPractIndex	-0,5837***	-1,1769***	-0,1006***
Entity_type	-0,4937***	-0,8712***	-0,1340***
Et	-0,0368*	-0,0684***	-0.0073***



Predictor	Probit	Logit	OLS
Roe	0,0114***	0,0210**	0,0011**
Constant	1,6722***	2,9911***	0,9396***

\*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$

## 6. Discussion – Conclusions

Bankruptcy has been found to be a phenomenon that doesn't happen often. On the contrary, M&As and liquidation are the main inactivity phenomena. In all other events or causes (total causes, in liquidation, M&As), all groups of indicators (performance, size, ownership, corporate governance) except two (capital adequacy or capital structure and growth) are statistically important. This finding is very important because it shows that emphasis is given on more dynamic indicators (performance and size), corporate governance and ownership.

Capital adequacy and solvency didn't improve, despite the alarming events that took place during the last 10-12 years. Banks have become more restrained in their credit expansion (probably because they were obliged to do so, due to stricter regulation). There is no evidence of financial development or the possibility of reaching the previous levels of profitability and activity (see for example the GGL and ROA ratio).

Especially, the last two groups of indicators that are statistically important (ownership, corporate

governance) can be seen as opportunity indicators due to the fact that the predicted sign is negative. Hence, higher number of corporate governance good practices applied and as ownership concentration is higher or the bank is a subsidiary or independent, the probability of inactivity is smaller. On the contrary, as size and performance gets bigger and better, so does the probability to be a merge target.

Overall, the model has a good predictability ratio and can be used to predict inactivity. The signs of the independent variables are in line with the main stream theories. Hence, the negative signs of corporate governance index (Black et al., 2006; Brown, 2005; ISS, 2005; Standard & Poor's, 2002; Bebchuk et al., 2004; Becht, 1999, the size variable (Et) and ownership status) are consistent with the theory that these factors are factors that play a negative role in implementing strategies of M&As or in creating a more stable and solvent financial environment. The fact that the sign of ROE is positive is due to the fact that high ROE can be seen as an incentive for a M&E.

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