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THE STATIC AND DYNAMIC EFFECTS OF MERGERS AND ACQUISITIONS (M&A) ON PRODUCTIVITY IN THE PERIOD POST-SUBPRIME CRISIS: AN EMPIRICAL APPLICATION TO THE BANKING SECTOR IN THE EUROPEAN UNION

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Abstract
This article aims to detect the dynamic effect of M&A of European banks on productivity during the period from 2005 to 2013. The estimation of our model by the GMM method allowed us to detect the following results. First, in the long term, the European banking structure seems to be submitted to the divergence phenomenon which means that the banking industry will probably governed by monopolistic structures which will share the market equally or nearly equal. Second, the production factors(labour and capital) have had positive and significant effects on the banking product. However, the returns to scale are found to be decreasing as long as the sum of the labour coefficient (0.243) of fixed assets (0.16) and liquid assets (0.351) is less than unity. Third, the time had exerted a negative and significant effect on production which questions the validity of the chosen period characterized by the advent of the subprime crisis. Fourthly, the M&A had a significant positive effect on production which affirm that in a pessimistic environment; it seems that the M&A strategies can be effective solutions to overcome the crisis.

Keywords: M&A, Productivity, Dynamic effects, GMM

JEL classification: G15, G21, G24

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1. Introduction

From the 90s, the world has experienced a wave without previous of (M&A) in both the US and Europe. And despite that the phenomenon is not new, its scale and the forms it takes appear highly important. Indeed, financial globalization and increased competition have encouraged the rise of large number of (M&A) and have set the Europe in the heart of concentration movements. The importance of these (M&A) is mainly due to the fact that they are no longer restricted to little firms or limited to one sector. Indeed, in this decade (of the 90s) we have noted an increase in "mega mergers" especially in its second half as indicates by the report of Group-of-Ten (2001); showing that among the 246 mega-mergers that took place in 1990-1999, more than 80% of them were held between 1995 and 1999. Also, it would be important to reveal that this movement of M&A have implied other sectors (in addition to industrial sector) because it spread throughout the economy and particularly the banking sector. As illustration, the work of Amel et al. (2004) showed that the most of (M&A) were held in financial services between 1990 and 2001 and affected especially the banks which represented nearly 53% of all (M&A) in the financial sector, which represent worth 1835 billion of dollars.

The majority of researchers have focused on the static effects of M&A on performance but, they have not given importance to the productivity aspects. Also, the scarce works which have tried to study the effects of M&A on productivity have not developed the dynamic aspects allowing them to see what will be the said effect in the long run. Thus, in the present paper we will try to overcome these deficiencies by trying to answer to the following question: what are the dynamic effects of the M&A on the factor productivity in the European Union banking sector? Our targeting of the EU is explained by several reasons. The first is the frequency of cases of M&A which allows us to build a theoretical framework and to extract some significant results. Secondly, the availability and continuity of data and thirdly the wealth of the European merger and acquisition cases in matter of experiences and outcomes.

So, to respond to this problematic we will see in the second section, the literature review explaining the main mechanisms through which the M&A can transmit the productivity effects.
The third section presents the model and the data. The fourth one will be reserved to interpret the principal results of econometric estimation. The fifth and last section will conclude the paper.

2. The transmission mechanisms of the M&A strategies on production and productivity

No doubt that M&A generate a qualitative and quantitative change in the merged entities. This, is mainly explained by the fact that said M&A change, the capital and the labour structures within the merged entities
Therefore, it would be simple to note that, in both cases of merger and / or of acquisition, there will be born a new entity that will be a new independent economic structure. Thus, it will be important to know the nature of its returns to scale. Also, what is the impact (immediate effect)

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and possible dynamic effects of the increase in capital and labour (resulting from the M&A) of the new entity on its factor productivities?
All things being equal, the positive effects of M&A on productivity can be resulting from a plurality of mechanisms and objectives which can be realized immediately after the firm's integration. These goals are the value maximization, profit increase, economies of scale, reduction of costs and risks, increase of the productivity of production factors.

2.1. The theoretical effects of M&A on maximizing the financial value

Many studies have converged to the fact that M&A contribute to maximizing the financial value of the merged banks. In this line of conduct Berger et al. (1999), the Group-of-Ten (2001); and Piloff and Santomero (1998) have showed that maximizing the company's value is the primary objective for which banks resort to M&A. Also, Jensen and Ruback (1983) have showed that the M&A create value and that the shareholders of target companies are the main winners. The study of Beitel and Schiereck (2001) on European banks has showed that M&A create value both for shareholders of target banks than those of acquiring banks.

Nevertheless, Huson et al. (2004) concludes that it exist a significant negative impact on the long term in terms of market profitability for buyers. This negative impact recorded in the long term, also in target companies but it was not statistically significant. According to Travlos (1987) the results of banks post-M&A depend on the manner of their settlement. Indeed, acquisitions settled in cash lead to positive rates of return, while those paid in shares recorded falls that time their announcement date. The study of Jeffrey et al. (1992) shows a statistically significant loss of nearly 10% amongst the buyer over a period of five years after the operation, which according to the authors is not due to a size effect.

However, other studies have diverged relatively to the main results of the first package of literature review linked to the positive effects of M&A on the maximization of the banks value. Indeed, the 80s US studies, have shown that bank mergers and acquisitions had the effect of decreasing the value of new entities. The same studies have shown the existence of asymmetric effects exerted by the M&A on the different implied actors. Thus, the M&A have had negative effect for the purchaser, a positive effect for the target and a neutral effect for new entity. However, Zhang (1995) and Becher (2000) have shown that the effect can be positive for the different actors.

Theoretically the said maximization may result from the increase of the market capitalization, of the new entity which will occurred when the merger or acquisition will take place via the stock market. Also, it is plausible to assume that the expectations of shareholders of the new entity will be probably optimistic for a possible improvement of its financial results. So, this can lead to two main effects: first, to ensure the stabilization of financial equilibriums of the new entity in (the short run); second to maximize the financial value in the post-M&A period (in the long run). Also, all other things being equal, in such optimistic environment, the factors of production become more productive. This can be explained by the fact that once the financial value is maximized, thus, more investment spending will be engaged allowing the increase of marginal productivity of labour and capital.

2.2. The theoretical effects of M&A on profit

There is a near unanimity on the existence of a positive effect exerted by M&A on maximizing private benefits as shown by Berger et al. (1999) and the Group-of-Ten (2001). The relationship established between the M&A and the profit is mainly due to the fact that they generate some immediate and instantaneous positive effects, on the new entity market share.
Therefore, the merged entities operating on the same market will benefit of an increase of their market share what will result by an increasing their turnover and, all things being equal, of an increase of their profit. Also, other transmission mechanisms are possible.
According to Berger et al. (1999), this is due to the possibility offered to the merged entity to dominate and exercise the leadership in the monetary market which allows them to exercise some control threshold, as an increase of interest rate, applied to credits and the control of a large amount of deposits. Hughes et al. (1999) have showed that M&A have been accompanied by an increase in banks performance, especially for bank mergers located abroad and which benefit for additional profits generated by the geographical differentiation.
However these benefits are not always symmetrical. In this line of conduct Cybo-Ottone and Murgia (2000) have concluded that abnormal returns have a negative effect for the buyer and a positive effect for the target company. The same result where be confirmed by the study of Tourani-Rad and Van-Beek (1999). The authors have noted too that there is an asymmetry among the stockholders of the different banks subject to M&A as long as the stockholders of target banks earn more in terms of positive abnormal returns than the stockholders of the acquiring banks.
Lepetit et al. (2004) have concluded that the M&A have significant positive effects on the profit of merged banks (the target and acquiring banks). The same result had been reproduced by Diaz et al. (2004), showing that acquisition can improve the profit of European merged banks.

2.3. The theoretical effects of M&A on the return of scales

Among the effects the most sought after M&A we can mention, without too much risk, the search for economies of scale. This goal can lead to decrease the average cost and to expand the market share, of the new entities. The empirical studies converge to this idea as shown by Cavallo and Rossi (2001) and Vannet (1996), which have concluded the existence of economies of scale in the banking sector resulting from M&A.
However, the works of Berger and Mester (1997), Allen and Rai (1996), and Altunbas and Molyneaux (1996), covering US banks and an heterogeneous sample of countries including Europe, Southeast Asia and America, have not converge to such a reality. The same conclusion was detected by Barth et al. (2000), showing that US banks during the M&A did not generate sufficient economies of scale, given the strong regulation in banking sector.

2.4. The theoretical effects of M&A on risk minimization

As long as the M&A can positively contribute to the increase in the merged banks size and possibly to maximize their values then it would be plausible to assert that the said M&A can reduce the risks to which banks may be exposed. Indeed, as far as the banks expand their sizes,

so, they reduce the liquidity risk, bankruptcy and the lack of competitiveness etc. In this context, some authors have gone further by confirming, that the M&A can produce the adverse selection behaviour amongst managers. Indeed managers of banks having large sizes, and which they have not financial problems, at the moment of M&A, will be encouraged to be exposed to more risks (perform riskier projects). This rationality leads to increase systematically risks (Demsetz and Strahan, 1997) and to expose more, to the risk of bankruptcy (Boyd and Graham, 1998).

2.5. The theoretical effects of M&A on factor productivity

It is worth noting that the studies which have focused on the effects of M&A on the factor productivity are scarce relatively to those having focused on their effects on the efficiency, the return on assets or on the scale economies of the new merged entities. In general rule, the majority of researches have claimed that the M&A are generating productivity gains. Such gain is due to various reasons: first, the size effect that can take place during the M&A; second, to technological gains that can positively influence the productivity of capital and labour; third to the new managerial strategies that can lead to better economic resource reallocation (X efficiency) Lichtenberg et al. (1992) have concluded that the M&A improve the business efficiency after a takeover. Indeed, the used methodology is to examine the evolution of the total factor productivity for seven years before and seven years after a takeover in the manufacturing sector. The results had shown that before the takeover, the target companies have a productivity total factor significantly lower than that of the other companies. However, in the period post-M&A the gap diminishes significantly over time. After seven years of M&A and of the takeover, the difference between the productivity of acquired businesses and the non-acquired businesses is more significant. According to the author this productivity gain is due partially to the new managerial strategies aiming to restructure the new entities (decrease in total employment, new organisation of economic resources, etc.).

Conyon et al. (2002) have tried to study the impact of mergers of foreign companies on the productivity and wages of target companies over the period that spreads from 1989 to 1994. The authors concluded that such mergers generated a positive effect on wages of 3% and an increase in productivity of 13%.
Haynes and Thompson (1999) have tried to have tried to present an empirical investigation of the impact of acquisition activity on financial intermediary productivity by using an augmented production function approach to investigate the impact of acquisition, after controls for input changes. The sample contains 93 UK building societies over the period, which spread from 1981 to 1993. The authors have concluded that it exists significant and substantial productivity gains following acquisition. Also, they note that the post-merger gains appear to increase substantially in the post-deregulation period, when pressures to minimize cost are widely considered to have increased.
Rezitis (2008) had tried to study the effect of acquisition activity on the efficiency and total factor productivity of Greek banks. The main results are relatively not conforming to theoretical assumptions. Indeed, the author had shown that the effects of mergers and acquisition on technical efficiency and total factor productivity growth of Greek banks are rather negative. He argues that the decrease in total factor productivity for merger banks is due to two main factors. First, the increase in technical inefficiency of merger banks decreased in the period after merging, and second to the disappearance of economies of scale.

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3. Model and data

The principal objective of our model is to respond to three fundamental questions. First, what is the impact of time on productivity? The response to this question allows us to know if the time (T) M&A have a significant effect on bank productivity; this dimension was for long time omitted while its importance. Indeed, the integration of time as explanatory variable can allow us to determine the dynamic aspect of productivity. So, if the time will have positive effect on productivity we deduce that the factor productivity is linked to a vector of variables which is determined by time (experience, learning by doing, technology accumulation, historical returns to scale).
Second, what is the immediate effect of M&A on productivity? This leads to know if exists an instantaneous effect exerted by M&A on productivity. This effect is detected by the integration of dummy variable (MA) taking the value 0 before M&A and the value 1 after M&A
Third, what is the dynamic effect of M&A on productivity? This allows us to detect the nature of dynamic of M&A on productivity by the creation of a composite variable (TxMA) which take on account the interaction of the two dimensions of Time (T) and of the M&A (MA).

It is worth noting that the methodology of our paper will follows formally the approaches of Murray and White (1980), and Haynes nd Thompson (1999) to evaluate the bank production function. These approaches use a generalized Cobb-Douglas form with labour and capital inputs. Thus, to capture the nature of relation between the bank output and the factor productivity we can therefore consider a Cobb-Douglas production function where labour and capital are the two main inputs[1].The main advantage of this formulation is that it is relatively simple and leads to explicit and endogenize the theoretical relationship established between M&A and productivity of commercial banks. The output Q (is calculated as the sum of loans, Securities and Shares) of the bank (i) at time (t) can be expressed as follows:

$$Q_{it} = AL_{it}^{\alpha} K_{it}^{\beta} e_{it}^{\gamma Time}, \qquad (1)$$

where L is the amount of labour, K is the stock of capital (we use two forms of capital: the first consider the value of fixed assets (K1). The second consider the value of liquid assets (K2)[2]), A is a parameter that reflects the state of technology and α and β are coefficients that indicate the importance of the effect of different factors on total production. T represents the time horizon considered in our sample (which spread from 2005 to 2013). Assuming that one bank is submitted to M&A in 2007 thus in this year T is equal to zero. In the period pre-M&A the value of T should be negative (in 2005 T is equal to -2; in 2006, T is equal to -1 and in 2007 T is equal to zero). In the period post M&A the time T will take a positive values; for example in 2008, T take the value 1, in 2009 T take the value 2 etc. To estimate the model it would be important to linearize it, by recourse to the logarithmic form.

$$ln(Q_{it}) = ln(A) + \alpha ln(L_{it}) + \beta ln(K_{it}) + \gamma Time \qquad (2)$$

[1] Other specifications as the translog production function do not modify the conclusions presented in this paper.
[2] All monetary variables are expressed in constant price.

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Following the approach of Megginson et al. (1994); Villalonga (2000), Alexandre and Charreaux (2004), and Issaoui (2009) and to well capture the instantaneous and the dynamic effect of M&A, we will introduce two other variables. The first is a dummy variable (MA) which takes the value (1) in and after the occurring of M&A and the value (0)otherwise. The second is a composite variable (TxMA) which take in consideration the two aspects of time and M&A. This composite variable takes the value 0 before the M&A and positive values in and after the Merger. For example assuming that a bank is merged in 2007 so the value of the (TxMA) is equal to zero (T=0 and MA=1) ; in 2013 the value of (TxMA) is 7 (since T=7 and MA=1). Thus the econometric model (2) can be rewrite as follows:

$$logQ_{it} = cts + \mu logQ_{it-1} + \alpha logl_{it} + \beta logK1_{it} + \lambda logK2_{it} + \gamma TIME_{it} + \delta MA_{it} + \theta(TIME_{it} \times MA_{it}) + \eta_i + \varepsilon_{it} \quad (3)$$

$\mu, \alpha, \beta, \lambda, \gamma, \delta$ and θ represent the coefficients to estimate. *i* design the name of bank (i=1; 2; ...; 60), t represent the time (t = 2005, ... , 2013).

3.1. Sample and variables

The data, extracted from the balance sheets of banks, are provided by the Bankscope database. Such data are annual and cover 16 countries of the European Union. The total number of merged banks is 60 (see Appendix 1).
At this level of analysis, it would be important to note that our sample selection was not arbitrary but was based on three fundamental reasons. First, the choice of the euro area reflects the relative frequency of the number of M&A in commercial banks. However, in other less developed countries these operations are hitherto timid.

Second, although in other developed countries (outside of Europe) there were M&A transactions in the banking sector, they were carried out essentially before 2005. Therefore, to have homogeneous and cylindered panel data, we were obliged to omit them.

Thirdly, in the euro area, banks are subject to a single regulatory and face monetary and macroeconomic policies identical. Therefore, the estimation results may not, under any circumstances, be allocated on institutional or regulatory variables resulting from structural differences in the legal or regulatory structures differentiated but they will be directly attributed to the variables of the model.

3.2. Model specifications

In this paper, we use the dynamic GMM system of Arellano and Bond (1991). Generally, this approach is submitted to two conditions. The first condition is the presence of the lagged depended variable as explain as explanatory variable. The second condition is the presence of instrumental variables in the model. The simple version of the model, without restricted exogenous variables (autoregressive model), this is as follows:

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$$Y_{it} = \alpha Y_{i(t-1)} + \eta_i + \vartheta_{it} \; ; \; |\alpha| < 1 \qquad (4)$$

$E(\vartheta_{it}) = E(\vartheta_{it}\vartheta_{is}) = 0,$ for all t ≠ s: We assume the serial correlation but not necessarily independence over time. Under these assumptions the Y value is delayed by two or more lags and they are considered as validated instruments in the first equation difference.

$$\Delta Y_{it} = \alpha \Delta Y_{i(t-1)} + \varepsilon_{it} \qquad (5)$$

with, $\varepsilon_{it} = \vartheta_{it} - \vartheta_{i(t-1)}$.
This model implies the test of the following linear restrictions:

$$E\left[\left(\bar{Y}_{it} - \alpha \bar{Y}_{i(t-1)}\right) Y_{i(t-j)}\right] = 0 \; ; \; (j = 2, \dots, (t-1) \; ; \; t = 3, \dots, T) \qquad (6)$$

To simplify, we assume: $\bar{Y}_{it} = Y_{it} - Y_{i(t-1)}$. In total, we have $m = (T-2)(T-1)/2$ linear restrictions to calculate.

Under these assumptions, the problem is how to get an optimal estimator α when N is infinite and T is fixed. According to Arellano and Bond (1991) this problem should be solved with the two-step system GMM including instrumental variables. The equation (5) can be written in the vector form as $E(Z_i' \bar{\vartheta}_i) = 0$, with

$$\bar{\vartheta}_i = \begin{bmatrix} \bar{\vartheta}_{i3} \\ \vdots \\ \bar{\vartheta}_{iT} \end{bmatrix} and Z_i = \begin{bmatrix} Y_{i1} & 0 & 0 & \cdots & 0 & 0 & 0 \\ 0 & Y_{i1} & Y_{i2} & \cdots & 0 & 0 & 0 \\ 0 & 0 & 0 & \ddots & 0 & 0 & 0 \\ \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\ 0 & 0 & 0 & 0 & Y_{i1} & \cdots & Y_{i(T-2)} \end{bmatrix}.$$

Z_i matrix size equal (T-2, m).

The model presented below, allows us to analyze the static and dynamic effects of M&A on the productivity of banks in the EU:

$$logQ_{it} = cts + \mu logQ_{it-1} + \alpha logl_{it} + \beta logK1_{it} + \lambda logK2_{it} + \gamma TIME_{it} + \delta MA_{it} + \theta(TIME_{it} \times MA_{it}) + \eta_i + \varepsilon_{it} \qquad (7)$$

First, we check if the sample studied is exactly identical. In other words verify, if the sample it is homogeneous or heterogeneous. This test is a Fisher in which we accept the null hypothesis (homogeneity of the sample) when the calculated Fisher lower than the tabulated value at a threshold of 5% and a degree of freedom *(K, (N -1))*. Then, we test the presence of individual effects η_i without taking in account of delay of the variable to explain $logQ_{it-1}$. This is a test of Hausman, Chi2 at k degree of freedom. The null hypothesis for this test is the presence of the random effect; it will be accepted when the calculated value of Chi2 is less than the tabulated value. Finally, after identifying the fixed effect (individual), we estimate the model using the method of GMM dynamic panel.

Specification test of the model is: $\begin{cases} H_0: individuel\ Homogeneity \\ H_1: individuel\ Heterogeneity \end{cases}$

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$$logQ_{it} = cts + \alpha logl_{it} + \beta logK1_{it} + \lambda logK2_{it} + \gamma TIME_{it} + \delta MA_{it} + \theta(TIME_{it} \times MA_{it}) + \eta_i + \varepsilon_{it} \quad (8)$$

Fisher's test, as estimated by this model leads us to reject the null hypothesis (critical probability is strictly greater than 5%). So we should take into account the heterogeneity of behaviours (individual characteristics). The Hausman test is:

$$\begin{cases} H_0: E(\eta_i \backslash X_i) = 0 \\ H_1: E(\eta_i \backslash X_i) \neq 0 \end{cases} \quad (9)$$

with, $X_i = \{logl_{it}, logK1_{it}, logK2_{it}, TIME_{it}, MA_{it}, (TIME_{it} \times MA_{it})\}$.

Table 1 - Hausman test

	Fe	Re
lnl1	.386	.366
lnk11	.102	.201
lnk22	.480	.539
Time	.076	.056
Ma	-.133	-.124
Tma	-.055	-.055
Chi2	16.55	
P>Chi2	0.011	

According to the results of the Hausman test, the calculated value Chi2 is strictly greater to the tabulated value, at 5% threshold (P> Chi2 = 0.011). Therefore, we reject the null hypothesis meaning that we are in the presence of fixed effect. We specified a model that accounts for the presence of individual effect due to the heterogeneity of individuals. So the model to adopt is as follows:

$$logQ_{it} = cts + \mu logQ_{it-1} + \alpha logl_{it} + \beta logK1_{it} + \lambda logK2_{it} + \gamma TIME_{it} + \delta MA_{it} + \theta TIME_{it} \times MA_{it} + \eta_i + \varepsilon_{it} \quad (10)$$

To eliminate the fixed effect, we propose a transformation of the model. The above model will be transformed into first difference.
Given that $Prod_{it} = logQ_{it} - logQ_{it-1}$, the transformed model will be:

$$Prod_{it} = cts + \mu logQ_{it-1} + \alpha logl_{it} + \beta logK1_{it} + \lambda logK2_{it} + \gamma TIME_{it} + \delta MA_{it} + \theta\,(TIME_{it} \times MA_{it}) + \varepsilon_{it} \quad (11)$$

The model is estimated with GMM then we verify the hypothesis of the presence of lagged (AR (2)). Thereafter, we will verify the Hansen test to check for correlation between instrumental variables and the error term.

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4. Results and interpretation

The estimation of the model with GMM method will be presented in the following table:

Table 2 - GMM Dynamic estimations

Variables	Version 1	Version 2	Version 3	Version 4	Version 5
Lnq(-1)	.2669 (24.32)***	.261 (45.23)***	.43 (73.58)***	.255 (18.94)***	.256 (21.49)***
lnl	.243 (9.88)***	.432 (16.41)***	.165 (8.54)***	.272 (8.61)***	.223 (7.87)***
Lnk1	.160 (8.35)***	-	.365 (38.25)***	.160 (15.20)***	.158 (9.48)***
Lnk2	.351 (23.61)***	.526 (52.05)***	-	.505 (23.14)***	.535 (21.64)***
Time	-.082 (-3.85)***	-.0115 (-2.92)***	-.104 (-8.30)***	-	-.023 (-8.03)***
MA	.179 (2.70)**	-.204 (-12.18)***	.599 (11.43)*	.012 (0.37)	.144 (5.85)***
Time x MA	.059 (2.77)**	-.007 (-1.21)***	.101 (8.41)***	-.022 (-6.55)***	-
Const	.870 (3.80)***	2.38 (11.48)***	4.87 (61.67)***	1.18 (3.38)**	.756 (2.55)***
Sargan	0.000	0.000	0.000	0.000	0.000
Hansen	1.000	1.000	1.000	1.000	1.000
AR (1)	0.152	0.160	0.129	0.151	0.152
AR (2)	0.373	0.372	0.260	0.400	0.444
N	478	479	479	479	478

a/ In the five versions, we have used GMM of Blundell and Bond (1998) Dynamic relation;
b/ *, **, *** means that the parameters are significant at the levels of 10%, 5%, 1%;
c/ The Sargan test tests the instruments validity (instrumental variables used in this model are (time and time x MA). Indeed the instruments are valid if p-value (Pr> Chi2) is superior or equal to 0.05;
d/ The tests AR(1) et AR(2) of Arellano et Bond (1991) verify the hypothesis of auto-correlation of residuals: since the referential equation was transformed in first differences, the residuals obtained should be correlated in order 1 and 2.

The review of estimation results allows us to highlight several important remarks so important which necessitate depth analysis:
- the first result is the positivity and the significance of the coefficient associated to the lagged variable. Indeed, the coefficient of said variable (0. 2669)[3] is positive and significant at 1%. This

[3] All interpretations are made in the base of the first version, which takes into account the completeness of variables.

brings us back to say that in the long period, the European banks will be submitted to the divergence phenomenon. The latter might be the logical result of financial restructuring strategies that were implemented just after the 2007 financial crisis;
- the effect of labour on total production (0.243) is positive and significant at 1%. This means that when employment increases by 1%, the total production of banks increases by 0.243%;
- the Fixed assets (K1) had exercised a positive and significant effect at the level of 1%. The estimated coefficient is equal to 0.160 meaning that when the fixed assets increase by 1% thus, the bank production will increase by 0.160 %. However, the coefficient associated to the liquid assets (K2) is positive and significant at the level of 1%. That coefficient stood at 0.351 (or almost three times the value of the coefficient associated to K1). This seems logical as long as banking activity is inherently based on liquid assets which are determinant of the profit level of banks;
- the effect of time (-. 082) is negative and significant at the level of 1% which means that, as far as time progresses, thus the banking production decreases. A priori, such a result seems strange as long as the majority of previous studies have converged to the fact that time has a positive and significant effect on the firm's performances (accumulation of experience, best organization, know-how etc.). However, without trying to force himself on results and their interpretations, we can focus on the nature of the time frame of our study that spans the period (2005-2013) and in which the financial system experienced one of its deepest crises. Such crises of subprime had exerted adverse effects on almost all of the banks leading them to bankruptcy and integral dissolutions. Thus, given the specificity of this period we can understand, at least in part, the negativity of the sign of the time that could have been changed if the chosen period were considered "normal";
- the positive and significant effect at the level of 1% exerted by the M&A on banking production as proven by the coefficient associated with the dummy variable (M&A), which amounts to 0.179;
- the positive and significant dynamic effect (at 1% level) exercised by the M&A in the long term. In fact, despite that individually, time had exerted a negative and significant effect on the banks productivity, and that the M&A exerts a positive effect thus we note that the total combined effect on productivity (from these two forces (time and M&A)) is positive. The coefficient of the variable (TxMA) is of the order of (0.059) which appears to be equal to the sum of the coefficient of the time variable (-.082) and that of the variable M&A (0.179) which means that the M&A and banking integration, in general, create positive dynamic effects in the long term allowing banks to become more productive and efficient.

4. Concluding remarks

In conclusion we can say that our article has tried to detect the dynamic effect of M & A of European banks on productivity during the period from 2005 to 2013. The estimation of our model by the GMM method allowed us to detect the following results. First, in the long term, the European banking structure seems to be submitted to the divergence phenomenon which means that the banks will be probably governed by monopolistic structures which mean that a minority of banks will govern the financial market. Second, it is shown that the returns to scale are found

In other versions we have tried to decrease the number of the explanatory variables and to see their effects on the coefficients and their significance.

to be decreasing which allows us to confirm that in the short run the M&A cannot achieve their goals and the expected results will be achieved only in the long run.
Third, the time had exerted a negative and significant effect on production which questions the validity of the chosen period characterized by the advent of the subprime crisis. Fourthly, the M&A had a significant positive effect on production Instant banks which allows us to affirm that in a pessimistic environment; it seems that the M&A strategies can be effective solutions to overcome the crisis. Fifth, the dynamic effects of M&A are positive and significant on production which means that the advantage of said M&A appears better in the long term as long as in this time horizon the merged banks are more able to realize their mergers reducing the cost of restructuring and to release more than returns to scale.

References

Alexandre H, Charreaux G (2004). L'efficacité des privatisations françaises. *Presses de Sciences Po (PFNSP).* 55(4): 791-821.

Allen L, Rai A (1996). Operational efficiency in banking, an international comparison. *Journal of Banking & Finance.* 20(4): 665-672.

Altunbas Y, Molyneaux P (1996). Economies of scale and scope in European banking. *Applied Financial Economics* 6(4): 367-375.

Amel D, Barnes C, Panetta F, Salleo C (2004). Consolidation and efficiency in the financial sector: a review of the international evidence. *Journal of Banking & Finance.* 28: 2493-519.

Amel D, Collen B, Panetta F, Salleo C (2004). *Consolidation, Efficiency and Competition in the Financial Sector: A Review of the International Evidence* (éd. Oxford; Amsterdam and San Diego: Elsevier JAI). (M. a. Monetary Integration, Éd.) Bagella: Michele.

Arellano M, Bond S. (1991). Sometests of specification for panel data, Monte Carlo evidence and an application to employment equations? *Review of Economic Studies.* 58: 277-297.

Barth JR, Caprio G, Levine R (2000). Banking systems around the globe: do regulation and ownership affect the performance and stability? *Policy Research Working Paper Series 2325.*

Becher DA (2000). The valuation effects of bank mergers. *Journal of Corporate Finance* (6): 189-214.

Beitel P, Schiereck D (2001). Value Creation at the Ongoing Consolidation of the European Banking Market. *Institute for Mergers and Acquisitions. Working Paper No. 05/01.*

Berger AN, Mester L (1997). Inside the black box: What explains the differences in the efficiencies of financial institutions? *Journal of Banking and Finance.* 21(7): 895-947.

Berger AN, Demsetz RS, Strahan PE (1999). The consolidation of the financial services industry, causes, consequences, and implications for the future. *Journal of Banking and Finance.* 23(2-4): 135-194.

Boyd J, Graham S (1998). Consolidation in U.S. banking: Implications for efficiency and risk. *The New York University Salomon Center Series on Financial Markets and Institutions*. 3: 113-135.

Cavallo L, Rossi PS (2001). Scale and scope economies in the European banking systems. *Journal of Multinational Financial Management*. 11: 515-531.

Conyon M, Girma S, Thompson S, Wright P (2002). The Productivity and Wage Effects of Foreign Acquisition in the United Kingdom. *The Journal of Industrial Economics*. 50(1): 85-102.

Cybo-Ottone A, Murgia M (2000). Mergers and shareholder wealth in European banking. *Journal of Banking and Finance*. 24: 831-859.

Demsetz R, Strahan P (1997). Diversification, Size, and Risk at Bank Holding Companies. *Journal of Money, Credit and Banking*. 29(3): 300-313.

Diaz BD, Olalla M, Azofra S. (2004). Bank acquisitions and performance: evidence from a panel of European credit entities. *Journal of Economics and Business*. 56(5): 377-404.

Group-of-Ten (2001). *Report on consolidation in the financialsector*. Basel, Switzerland.: Bank for International Settlements.

Haynes M, Thompson S (1999). The productivity effects of bank mergers: Evidence from the UK building societies. *Journal of Banking & Finance*. 23(5): 825-846.

Hughes J, Lang W, Mester L (1999). The dollars and sense of bank consolidation. *Journal of Banking & Finance*. 23: 291-324.

Huson M, Malatesta P, Parrino R (2004). Managerial succession and firm performance. *Journal of Financial Economics*. 74(2): 237–275.

Issaoui F (2009). Les effets dynamiques de la privatisation sur l'efficacité des entreprises: application au cas tunisien. *Revue Libanaise de Gestion et d'Économie*. 2(2): 51-99.

Jeffrey F, Gershon J, Mandelker N (1992). The Post-Merger Performance of Acquiring Firms: A Re- Examination of an Anomaly Anup Agrawal. *The Journal of Finance*. 47(4): 1605-1621.

Jensen M, Ruback R (1983). The market for corporate control: The scientific evidence. *Journal of Financial Economics*. 11: 5-50.

Lepetit L, Patry S, Rous P (2004). Diversification versus specialization: an event study of M&As in the European banking industry. *Applied Financial Economics*. 14(9): 663-669.

Lichtenberg J, Lachmann F, Fosshage J (1992). *Self and motivational systems: Toward a theory of psychoanalytic technique* (Vol. 13). Psychoanalytic inquiry book series.

Megginson WL, Nash RC, Van-Randenborgh M (1994). The financial and operating performance of newly privatized firms: An international empirical analysis. *The Journal of finance*. 49(2): 403-452.

Murray R, White R (1980). Economies of scale and deposit taking institutions in Canada: a study of British Columbia Credit Unions. *Journal of Money, Credit and Banking.* 12: 58-70.

Piloff S, Santomero A (1998). The value effects of bank mergers and acquisitions. *Bank Mergers & Acquisitions. The New York University Salomon Center Series on Financial Markets and Institutions.* 3: 59-78.

Rezitis AN (2008). Efficiency and productivity effects of bank mergers: Evidence from the Greek banking industry. *Economic Modelling.* 25(2): 236-254.

Tourani-Rad A, Van-Beek L (1999). Market valuation of European bank mergers. *European Management Journal.* 17(5): 532-540.

Travlos NG (1987). Corporate Takeover Bids, Methods of Payment, and Bidding Firms' Stock Returns. *The Journal of Finance*. 42(4): 943-963.

Vannet R (1996). The effect of mergers and acquisitions on the efficiency and profitability of EC credit institutions. *Journal of Banking & Finance.* 20(9): 1531-1558.

Villalonga B (2000). Privatization and efficiency: differentiating ownership effects from political, organizational, and dynamic effects. *Journal of Economic Behavior & Organization.* 42(1): 43-74.

Zhang H (1995). Wealth effects from US bank takeovers. *Applied Finaneial Economies.* 5: 329-336.

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Appendix 1 - Repartition of the merged banks by country

Country	banks	Time of M&A	LNQ	LNL	LNK1	LNK2
PORTUGAL	Deutsche Bank (Portugal) SA	2011	21.140	6.019	15.969	21.023
CZECH REPUBLIC	Unicredit Bank Czech Republic and Slovakia AS	2013	26.047	7.338	20.610	24.655
	Unicredit Bank Czech Republic and Slovakia AS	1999/2001/2007/2013	26.007	7.306	20.587	24.574
IRELAND	Ulster Bank Ireland Limited	2010	24.299	8.085	19.288	22.782
LATVIA	JscLatvianDevelopment Financial Institution Altum	1997	19.883	6.396	15.638	18.430
BELGUIM	Record Bank SA/NV	1995/2005/2006	23.312	6.601	16.535	21.440
	ING Belgium SA/NV-ING	1975/2003/2006/2006	25.650	9.184	20.681	24.461
HUNGARY	BancoPopolare Hungary Bank Zrt	2013	23.919	4.814	19.351	23.018
	Calyon Bank MagyarorszagZrt-Calyon Bank Hungary	2007	17.558	5.939	14.103	17.908
	Erste Bank HungaryNyrt	1996/2004	21.446	7.841	16.434	19.737
GERMANY	Mizuho Corporate Bank (Germany) AG	2009	19.323	5.002	13.197	19.307
FINLAND	Nordea Bank Finland Plc	2000/2001/2002	25.558	9.023	18.680	24.914
ROMANIA	IntesaSanpaolo Bank Romania SA	2012	21.304	6.486	18.229	19.024
	BancaComercialaRomana SA-Romanian Commercial Bank SA	1999	24.527	8.734	21.161	23.213
SWEEDEN	Nordea Bank Sweden AB (publ)	1994/2002/2004	26.678	8.889	21.799	24.841
SPAIN	Banco de Credito Local de Espaana	1999/2009	22.903	5.678	17.053	20.136
GREECE	Emporiki Bank of Greece SA	2013	23.712	8.740	19.533	21.805
	Agricultural Bank of Greece	2012	23.879	9.254	20.170	22.015
	National Bank of Greece SA	1998/2002	25.108	10.347	21.387	23.301
	National Bank of Greece SA	2007	22.386	7.919	18.571	21.103
FRANCE	KBL Richelieu Banque PrivÃ©e	2008	17.378	4.471	14.275	17.453
	Banque Saradar France	2005	19.107	4.433	13.241	19.307
	Aareal Bank France S.A.	2010	19.684	4.083	11.667	17.860
	Banque Audi Saradar France SA	2005	19.617	4.146	14.165	19.550
	Credit Suisse (France)	1997	19.786	4.940	13.137	19.560
	BancaIntesa (France) SA	2003/2008	20.996	4.443	13.765	20.084
	UBS (France) SA	2003	20.562	5.876	14.777	19.632
	HSBC France	1917/2002/2008/2010	25.675	9.177	19.657	25.009
UK	Citibank International Plc	2000	23.215	8.292	18.570	23.167
	Clydesdale Bank Plc	2004	24.194	8.438	18.791	22.564
	Co-operative Bank Plc (The)	2009	24.356	8.690	18.801	22.616
	Alliance & Leicester Plc	2001/2011	24.708	8.865	19.179	22.713
	Santander UK Plc	1944/1996	26.102	9.588	20.507	24.993

	National Westminster Bank Plc - NatWest	1968/1970	26.091	10.135	21.170	25.712
	Standard Chartered Bank	2008	26.391	11.074	22.087	25.590
	Bank of Scotland Plc	2001/2007/2010	26.832	10.983	22.018	25.713
	Royal Bank of Scotland Plc (The)	1969	27.642	11.587	23.040	26.103
	Santander UK Plc	1944/1996	26.125	9.672	20.565	24.763
LUXEMBOURG	Hauck&Aufhauser Banquiers Luxembourg SA	2013	18.073	3.965	14.311	18.090
	VP Bank (Luxembourg) SA	2001	19.223	4.192	14.384	20.864
	Banco Itau Europa Luxembourg	2009	18.814	3.522	14.171	19.770
	Kaupthing Bank Luxembourg SA	2009	20.614	4.726	14.550	20.075
	Banque Degroof Luxembourg SA	2006	21.062	5.821	17.476	21.044
	Credit Agricole Luxembourg S.A.	1997/1999/2005/2008	21.320	5.873	16.050	21.797
	Credit Suisse (Luxembourg) SA	2002	20.611	5.271	17.022	22.025
	JP Morgan Bank Luxembourg SA	1998	20.227	6.280	15.660	22.048
	Dresdner Bank Luxembourg SA	2010	21.697	5.922	16.891	22.674
	Landsbanki Luxembourg SA	2008	21.161	3.913	14.341	20.334
	Deutsche Bank Luxembourg SA	1999	23.341	5.836	15.248	24.742
	UBS (Luxembourg) SA	1996/1998/2002	21.875	6.154	17.100	23.173
	DekaBank Deutsche Girozentrale Luxembourg SA	2002	21.929	5.880	15.343	22.278
	ING Luxembourg	2003	22.495	6.775	16.739	22.542
	KBL EuropeanPrivate Bankers SA	2005	22.988	7.865	19.023	22.732
	UniCredit Luxembourg SA	1998	23.725	5.556	17.741	22.761
	Banque Internationale Luxembourg SA	2001/2002	23.896	8.000	19.295	23.140
	BNP Paribas Luxembourg	2001/2006/2007/2010	22.996	6.315	16.901	23.616
AUSTRIA	Arab Bank (Austria) AG	2006	18.060	5.183	12.734	18.561
	Valartis Bank (Austria) AG	2009	19.673	4.519	14.021	19.326
	KommunalkreditAustria AG	2009	21.917	4.821	17.283	21.490
	UniCredit Bank Austria AG-Bank Austria	1997/2000/2002	25.654	10.751	21.067	24.181