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The Determinants of American Banking M&A Operations Performance: an Analysis by Line of Activities

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Abstract

The aim of this paper is to identify the determinants that affect the operating performance of banking M&A strategies. Our contribution compared to former works is to analyze M&A operations performance by line of activities. Our sample includes 92 American banking M&A operations over the period 2001-2006. We have used an approach that compares the pre-M&A operating performance with the *expost* one measured using accounting ratios (return on equity (ROE) and return on assets (ROA)) or technical efficiency measures.

The main results suggest that M&A operations induce an improvement in post-M&A operations performance and that the development of more intermediation before the M&A operations leads to an improvement in the ROE and a deterioration in technical efficiency.

JEL classifications: C33, G21, G24, G34

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1. Introduction

Over the past decade, the global productive systems, and mainly that of the United States, have entered into a rapid redeployment phrase. This results in a restructuring of the industrial tissue through M&A operations. The deregulation measures implemented by the United States, technogical and financial innovations as well as globalization have led to the development of such acquisitions.

Following these financial mutations, the M&A operations have substantially increased in recent years in all sectors and mainly in the financial one. The financial system was the most active in terms of M&A volume. It represented 20% of M&A global activity in the year 2010 according to Mergers & Acquisitions review (First Nine months 2010). Indeed, M&As in the American banking sector have changed dramatically. The value of American banking M&A operations increased by 869, 62 million dollars in 2010 against 629,376 in 2009 an increase of 38, 2%. Thes statistics are also obtained from Mergers & Acquisitions review.

The M&A operations play a crucial role in restructuring the economy. They have become essential for the conquest of markets and a cardinal way of development in order to achieve better efficiency and strengthen competitiveness. This huge restructuring movement that takes place in the United States is also justified by the concern to hedge against increased competitionⁱ, the desire to create value and research of synergies, through economies of scale and scope or by generating an improvement in operating performance. In this respect, the question of the impact of M&A operations on the performance usually represents an important point in research studies. It has been the subject of many researches but the results found are still mitigated.

Therefore, the purpose of this paper is to explain the determinants of the American banking post-M&A operating performance, processing by an analysis by lines of activity. For that purpose, we will introduce three types of determinants. The first one relates to financial determinants such as the size of the bidder and the target banks. The second one reflects the industrial specificities like the variables related to the line of activities. The third type refers to the determinants associated to the transaction such as the nature of M&A operations and methods of payment.

This paper is an extension of previous works. The introduction of industrial determinants constitutes the contribution of our study. It's important to note, that no work, according to our knowledge, has analyzed the performance of M&A operations with a view "banking activity" (see Ben Slama et al. 2012). So our study represents a first step trying to fill this empirical gap. Moreover, in our methodological plan we have used an approach which compares post-M&A performance with the pre-M&A one. This article is split into three sections. The first section provides a relevant literature review of the performance. The methodology adopted is discussed in the following section. The last section highlights the results and relating interpretations.

2. Review of previous studies

In this section, we review relevant studies in the areas of the performance of M&A operations and its determinants.

2.1. The effect of M&A operations on the operating performance

The determinants of the effect of M&A operations on the operating performance of a bank are a focal point in countless studies. Empirical literature stipulates that M&A operations induce contradictory results.

The first American studies during the 1980s didn't raise a significant improvement in cost efficiency. In this respect, De Young (1997) concluded that 58% of the banks in the sample generated a very minor improvement in cost X-efficiency, by using a thick frontier approach on a sample of 348 deals. Interestingly, mergers in which the acquiring bank had recent experience with acquisitions were more likely to generate post-merger cost efficiency gains. However, Peristiani (1997) shows that the acquirer banks failed to improve cost X-efficiency after the merger but the target banks realized an improvement in scope efficiency relative to a control sample.

In contrast, these results during the 1990s have been mitigated. Berger (1998) used a sample involving small and large banks from 1990 to 1995 found a little improvement in cost X-efficiency. He suggests that there isn't any improvement in cost efficiency when large banks are involved. Nevertheless, Houston, James and Ryngaert (2001) found an improvement in cost efficiency for large banks. However, Akhavein, Berger and Humphrey (1997), showed an improvement in profit efficiency in a study involving US "Megamergers" over the period 1980 to 1990. Similarly, Berger (1998) found the same results in a study over the period elapsing from 1990 to 1995 by including small and large banks.

As for studies concerned with profitability ratios, their results are mixed. Some American studies found a significant improvement in profitability ratios following the operation of M&A (Cornett & Tehranian, 1992; Altunbas & Marqués, 2008). However, most American studies such as Berger and Humphrey (1992), Linder and Crane (1993), Beccali and Frantz (2009) and Pilloff (1996) proved that there isn't any improvement in these ratios. Indeed, Rhodes (1996) also found that horizontal M&A operations don't lead to any improvement in cost ratios. His study focused on 988 M&A operations made over the period 1981 to 1986.

2.2. The determinants of the performance of M&A operations

The performance of M&A operations may be affected by factors related to the transaction like the type of operation (domestic, cross-border), the methods of payment or the factors inherent to the bank such as the target's size, the bidder's profile ("glamour firm" or "value firm") and the level of activity sector proximity between the target and the bidder banks.

2.2.1. The factors related to the transaction

A. The type of M&A operation

Transactions that take place at an international level (cross-border) permit the banks acceed to new markets, capitalize profits from the advantages of the host country (Eun, Kolodny & Scheraga, 1996; Healy, Palepu & Ruback, 1992). However, other studies stated that cross-border operations generate a decline in post-M&A performance (Moeller & Schlingemann, 2005; Martynova, Oosting, & Rennebook, 2007). This may be due to the difficulty to control the target bank because of legal, cultural and geographical differences between the two countries. Then, this leads to integration difficulties of the new entity into the group.

Vander Vannet (1996) postulated that domestic M&A operations induce a significant improvement in profitability ratios. Nevertheless, cross-border M&A operations lead to the improvement of cost efficiency. Chosh (2001) and Gugler, Mueller, Yurtoglu and Zulehner (2003) didn't emphasize any differences between domestic and cross-border operations.

B. Methods of payment

The payment method is an explanatory factor of the *expost* performance. Countless studies showed that there is a significant relationship between the financing of the transaction in cash and the *expost* performance (Linn & Switzer, 2001); (Denis & Denis, 1995). Meyers and Majluf (1984) suggested a payment in shares if these are overvalued. Other works agreed that there isn't a significant relationship between methods of payment and post M&A performance such as Healy et al. (1992).

C. The positioning of M&A operation: friendly or hostile

A friendly operation is an operation achieved with the consent of both leaders of the target and the acquirer banks while hostile operation is an operation carried out against the opinion of the target bank's managers. In his work, Heavly (1992) pointed out that friendly bids generated an improvement of post M&A performance whereas hostile bids didn't have any positive effect on *expost*-performance. Unlikely, Martynova et al. (2007) didn't raise any significant difference in post-M&A performance operation whether hostile or friendly.

2.2.2. The factors related to the bank

A. The target bank's size

Several works showed that the target bank's size affects significantly post-M&A performance as stated by Switzer (1996) and Linn and Switzer (2001). This is explained by the fact that the acquisition of a target bank with a relatively large size can generate economies of scale thus resulting in an improvement in post M&A performance. However, Yen and André (2007) and Altunbas and Marqués (2008) found that the acquisition of a large bank leads to a deterioration of the performance. This may be due to a difficulty for the bidder bank to control the target one because of its enormous size. Integration problems of the target bank and achievement of synergies can occur when the target is a large bank. Healy et al. (1992) as well as Martynova et al. (2007) highlighted the lack of significant relationship between the target bank's size and its *expost* performance.

B. The profile of a bidder bank: "glamour firm" or "value firm"

According to Rau and Vermaelen (1998) banks qualified as "glamour firms" are those which have a high market to book ratio. This latter is defined as the ratio market value of equity to its accounting value. A high ratio means that the market rewards past performances and anticipates future good results for the future. The banks "value firms" type are those which have a low ratio market to book. They are undervalued by the market and have a low potential growth. This distinction is crucial because it registers quite significant differences in performance on the long term.

That's why, Rau and Vermaelen (1998) hypothesized that "glamour firms" have a lower performance than "value firms". However, Dutta and Joy (2009) didn't raise any significant relationship between the ratio market to book and post-M&A performance.

C. The degree of proximity of activity's sectors between the target and the bidder

The degree of similarity between the target and the bidder banks affects significantly post-M&A performance. Healy et al. (1992) noted that if the activities of the target bank are closer to the Bidder's ones, the operation is more likely to create value. Nevertheless, the works of Kruse, Park, Park and Suzuki (2007) showed that conglomerate M&A operations create more value than horizontal ones. Martynova et al. (2007) revealed that there isn't any significant relationship between operating performance and the degree of similarity between target and the bidder's activities sector.

3. Methodology

This section presents our hypothesis development and the methodology used.

3.1. Research hypothesis

H-1: M&A operations allow an improvement in post M&A performance

Studies carried out on the American market stipulated that M&A operations generate a significant improvement in the operating performance (Akhavein et al. ,1997; Cornett & Tehranian ,1992; Kwan & Wilcox , 2002; Altunbas & Marqués ,2008 ; Knapp, Gart & Chaudhry, 2006). However, De Young (1997), Berger (1998) and Berger and Humphrey (1992) showed an insignificant improvement in the operating performance. Contrarily, Prestiani (1997), Piloff (1996), Linder and Crane (1993) and Rhoades (1993) point out that M&A operation didn't induce any improvement in performance.

H-2: Exante performance has an impact on Expost performance

The pre-M&A performance has a significant impact on the *expost* performance which implies the presence of a mean reversion process. The proponents of this hypothesis are Healy et al. (1992) and Knapp et al. (2006).

H-3: The profiles of both financial and line of activities of the target or the bidder banks before the M&A operation have an impact on the *expost* performance.

We note that a bank's profile provides information about its financial or activity profile. The financial profile is measured by the bidder's size while the activity profile is measured by the variables related to the activity of the bank.

Switzer (1996) and Linn and Switzer (2001) showed that the acquisition of a huge target bank can generate economies of scale. Whereas, Yen and André (2007) and Altunbas and Marqués (2008) found that the acquisition of a large-sized bank affects negatively the *expost* performance. Healy et al. (1992) and Martynova et al. (2007) pointed out that there isn't a significant relationship between the target bank's size and its post M&A performance.

H-4: The factors related to the operation affect the change in post-M&A performance.

The factors related to the operation are the nature of the operation whether it is cross-border or domestic operation and the method of payment (equity, hybrid or cash).

The assessment of empirical studies reveals that the nature of the M&A operation is a determinant factor of the operation performance. Indeed, Eun et al. (1996) and Healy et al.

(1992) showed that cross-border operations lead to an improvement in performance. However, other studies emphasized that cross-border operations register a decline in performance (Vander & Vannet, 2002; Moeller & Schlingemann, 2005; Martynova et al., 2007). Vander Vannet (1996) postulated that domestic M&A operations induced a significant improvement in the ratios of profitability.

Ghosh (2001) and Gugler et al. (2003) didn't put into evidence any difference between the performance of domestic and cross-border operations. The method of payment is an explanatory factor of the *expost* performance. Linn and Switzer (2001), Denis and Denis (1995) showed that a financing in cash leads to an improvement in performance while Myers and Majluf (1984) recommended a payment in shares. Nevertheless, Healy et al. (1992) postulated that there isn't any significant relationship between the method of payment and the post-M&A performance.

3.2. The sample

To conduct this study, the sample constructed includes the American banks whose data are spread out over the period 2001-2006. The information inherent to the banks which have undertaken M&A operation are obtained from "Mergermarket" database. The selected banks involved any sorts of credit institutions, investment banks, financing banks, retail banks providing insurance services, leasing and funds management.

Besides, these banks can be qualified as target or bidder banks. This latter is an American bank while the target bank can be located in the United States or in any other country. These banks can be involved in a domestic or cross-border operation. A cross-border operation is an operation in which the target bank's headquarters aren't located in the same country as the bidder. There are 92 transactions (11 are cross-border and 71 are domestic).

Besides, we point out that we have used a control sample to calculate the overall technical efficiency. This sample includes statu-quo banks that have never made any M&A operation during the period of study. To extract data, we have taken the banks that belong to the top 200 and whose data are available in the database "Bankscope".

3.3. Identification and measures of variables

We have introduced three variables in our study namely financial variables, variables related to the lines of activity and control variables. The two first variables are extracted from "Bankscope" while control variables are those specific to the transaction and are obtained from the database "Merger market".

3.3.1. Financial variables

In order to identify the effect of M&A operation on performance, we have used two measures of performance: profitability ratios and productive efficiency measures.

The variable size introduced in our study is measured by applying the natural logarithm for total assets.

A. Accounting ratios

There are two types of profitability ratios namely the ratios of return on equity (ROE) and return on assets (ROA). The ROE as defined by Pilloff (1996), Kapp et al. (2006) and De Long and De Young (2007) is the net income to the book value of equity. Return on assets is defined as the ratio of net income to net assets.

B. Measures of productive efficiency

The effect of M&A operation on performance can be understood through other more complex measures of performance that refer to the measure of productive efficiency.

Productive efficiency as submitted by Farrell (1957) is a measure of performance of bank's costs and profits compared to either the most efficient or the best bank. It can be divided into the overall technical efficiency (OTE) and the allocative efficiency (AE).

Allocative efficiency reflects the ability of a bank to choose the adequate combination factors of production given their prices in the market while the overall technical efficiency reflects the ability to control technology. Indeed, the overall technical efficiency can be divided into pure technical efficiency (PTE) and scale efficiency (SE) so (OTE=PTE*SE). Pure technical efficiency measures the proportional reduction in the use of inputs if they're not wasted whereas scale efficiency indicates the proportional reduction in the use of inputs if the bank operates at constant return on scale.

In this perspective, we have estimated the overall technical efficiency only and its components using a non parametric approach namely the data envelopment approach initiated by Farrell (1957) and developed by Charnes, Cooper and Rhodes (1978). This approach was preferred in our study because of the smallness of the sample's limited size. We also note that we have applied an input oriented approach and the model used is the variable returns to scale model (VRS) developed by Charnes et al. (1978).

The definition of inputs and outputs follows the intermediation approach postulated by Sealey and Lindley (1977) who considered that the bank collected deposits in order to transform them into loans by integrating capital and labor. Thus, according to available data, there are three inputs(X1= personnel expenses, X₂= total deposits, X₃= capital) and two outputs (Y1= net loans and Y₂= total securities).

3.3.2. Control variables

Control variables reflect the transaction's specific characteristics. We have used two variables such as the nature of the M&A operation (cross-border or domestic) and methods of payment (cash, stock or mixed). This variable takes the value 1 if the nature of the operation is cross-border and 0 otherwise. Similarly, for the method of payment the financing of the operation in cash is associated with the value 1 and 0 otherwise. These variables aim to control the determinants of change in performance.

3.3.3. Variables related to line of activities

The analysis of a performance following line of activities constitutes the contribution of our work. Indeed, no work, to our knowledge, has examined the M&A operations performance with a view "banking activity".

In this context, we will use two measures related to lines of activity: a measure of activity and a measure of diversification. These measures of activity have been proposed by Laeven and Levine (2007). The first measure indicates the nature of the bank's main activity. Thus, the bank can refocus on retail activity (traditional activity) that consists in transforming deposits into loans or in wholesale activity.

A high level of this measure indicates that the bank specializes in the retail activity while a low level means that the bank chooses a specialization in the wholesale activity. This measure as proposed by Laeven and Levine (2007) is equal to:

Activ = Nets Loans/ Total operating assets

The second measure is a measure of portfolio's diversification .This measure means that the bank refocuses on its main activity (wholesale or retail) or it seeks to diversify its portfolio. A high level indicates that the bank has a diversified portfolio and in parallel a low level implies that the bank has opted for a concentration in specialization. This measure is as follows:

$$Div = 1 - \frac{Net Loans - Other earning assets}{Total earning assets}$$

3.4. The model

In our study, we have used a cross-sectional regression to determine the relation between the *expost* performance and the *exante* one. The regression's equation is thus as follows:

Per _{M & A, post} =
$$\alpha$$
 + β Per _{M & A, pre} + ε_t (1)

Per: indicates the annual average of the bank's performance for each M&A operation. This performance can be measured either with the ratios of profitability (ROE, ROA) or measures of the operating efficiency (overall technical efficiency, pure technical efficiency and efficiency of scale).

Per $_{M\&A, post}$: refers to the combined bank's performance after the date of acquisition. The post- M&A analysis period spreads over two yearsⁱⁱ.

Per $_{M\&A, pre}$: emphasizes the average of the performance of both the bidder and the target banks in the two years preceding the M&A operation. We note that the period post and pre-M&A spreads over two years for three reasons. First, it is difficult to distinguish the effect of M&A operation from the other operations when the bank merger many times. Second, if we choose a long period the effect of the economic factors can affect the performance thus leading to an incorrect result. Third, when we choose a long period, the size of the sample decreases specially for cross-border operations.

We also note that Per_{Ai} denotes the combined bank's performance from in the *i*th year following the acquisition. Per _{B1B2} refers to the average performance of the hypothetical bank from the second year to the first year prior to the acquisition.

B: measures the change in performance independently of M&A operation. It reflects any correlation in performance between pre-and post-M&A years. It can be apprehended as a rate

of return to the average according to Healy et al. (1992). Thus, β Per M&A, signals the effect of previous performance on post-M&A performance.

 α : is the average change in performance independently of the pre-performance. Therefore, it measures the effect of the M&A operation itself on the performance. A negative α implies that the M&A operation has a negative effect on performance and vice versa. It represents the average change in performance.

Besides, in order to determine the effect of bidder's and target's size on performance, we have added the variable size to equation 1.

Per $M \& A, post = \alpha + \beta Per M \& A, pre + \gamma Size A, pre + \delta Size C, pre + \varepsilon_t$ (2)

Furthermore, we have introduced to the previous model the variables related to the lines of activity in order to determine if a bank's activity affects its performance.

 $Per_{M\&A, post} = \alpha + \beta Per_{M\&A, pre} + \gamma Size_{A, pre} + \delta Size_{C, pre} + a Activ_{A, pre} + b Activ_{C, pre} + c Div_{A, pre} + d Div_{C, pre} + \varepsilon_{t}$ (3)

With:

Activ: is a measure of activity

Div: is a measure of portfolio diversification

Eventually, variables specific to the transaction like the nature of the M&A operation and the method of payment are introduced to control the determinants of the change in performance.

Per _{M & A}, pre vs post =
$$\alpha + \lambda_1 Cross + \lambda_2 Cash + \varepsilon_t$$
 (4)

With:

Per _{M&A, pre vs. post}: $\Delta Per = Per_{post} - Per_{pre}$

Per $_{post}$ = the average of Per $_{post1}$ and Per $_{post2}$

Cross = 1 if the M&A operation is cross-border, 0 otherwise.

Cash = 1 if the payment method is cash, 0 otherwise.

4. Results and interpretations

In this section, we will undertake a descriptive analysis of the variables associated with profitability ratios and those associated to technical efficiency then we will initiate a discussion of the estimation results of our model.

4.1. A descriptive analysis

4.1.1. A descriptive analysis of the accounting ratios

Descriptive statistics related to the first measure of performance namely the accounting ratios are summarized in Annex 1.

Generally speaking, and on average, return on assets and on equity is higher in the first year following the date of the M&A transaction. We also note that the return on equity is on average considerably higher than the return on assets either before or after date of acquisition. We also emphasize that, on average, target and bidder banks register an improvement in their post-M&A performance in the first year and a deterioration of this latter during the second one.

Besides, regarding variables related to the line of activity, we report that the target and the bidder banks are characterized by certain similarities. We also noted that both bidder and target banks develop, on average, their main activities in the same proportions. Similarly, they have the same structure of portfolio diversification. The two banks have nearly the same ratio of diversification that rises to 57%.

Eventually, 50% of the transactions are paid in hybrid and most of them are domestic. Moreover, the examination of matrix correlation informs us about the lack of correlation between variables (see Annex 2).

4.1.2. A descriptive analysis of the overall technical efficiency

In order to calculate the scores of efficiency, we have reduced the number of transactions retained to calculate the ratios of profitability to 77 only. This is due to a lack of information about efficiency measures concerning certain banks. The set of observations are summarized in Appendix3.

Descriptive statistics related to the efficiency are given in Annex 4. We note that, on average, the overall technical efficiency, pure technical efficiency and the scale efficiency of American banks decrease after M&A operation. We also note that the examination of the correlation matrix indicates the absence of correlation between variables (see Annex 5).

4.2. Interpretations of estimation results

Basically, we will on the one hand examine the effect of M&A operations on the ratios of profitability. On the other hand, we will use the same approach but by focusing on the overall technical efficiency.

4.2.1. The effect of M&A operations on the accounting ratios

Initially, we have undertaken a regression of post-M&A performance of the combined bank on the pre-M&A performance. This, in order to reveal the direct effect of M&A operation on the performance which is captured by the coefficient α in regression equation number 1. Estimation results in cross-section by the method of least squares are recapitulated in table 1.

[Insert table 1 here]

The results achieved lead us to make several conclusions. We have observed that the coefficient α is significantly positive in the two years following the M&A operations for the ROE as well as for the ROA. This proves that M&A operations have a positive impact on ROA and ROE. Thus, undertaking M&A operations leads to an improvement in the ratios of profitability over the two years following the operation.

Moreover, the test of the mean reversion for the ROA and the ROE allows us to reject the null hypothesis (H₀: B=1).So pre-M&A performance has a significant impact on post-M&A performance. As a result, we notice the presence of mean reversion process in all years.

Secondly, we have estimated the second regression equation. Then, we have regressed *expost* performance on the pre-performance, the bidder's size and the target's size. Table 2 gives us the estimation results.

[Insert table 2 here]

In this regard, when the dependant variable is ROE, we point out that the coefficient associated to the bidder's size is positive and significant. This implies that the bidder's size has a positive effect on performance. Hence, the expansion of the bidder bank's size favors an improvement in performance. This result finds its justification in the achievement of economies of scale. Therefore, a large-size bidder promotes the improvement of costs, thus generating an improvement in post-M&A performance.

This improvement corresponds to the first and the second years following the date of acquisition. A1% increase of the bidder's size induces an increase in the return on equity of 0, 9%. The performance of M&A operation rises with the acquirer's size. Furthermore, the coefficient associated to the variable size $_C$ (size of the target) is significant and negative for the second year following the M&A operation. This implies a negative relationship between the size of the target and the post-M&A performance.

Therefore, the acquisition of a large-sized target bank entails diseconomies of scale due to the difficulty to monitor and control the target bank. This could also be explained by the existence of organizational and managerial logics divergences between the acquirer and the target bank. An increase of 1% in the target's size leads to a decrease of 0, 01% in performance.

In addition, in order to identify the effect of bank's activity on the performance, we have introduced two measures namely a measure that reflects the activity of intermediation and another measure which is inherent to portfolio's diversification. Estimation results of equation 3 are reported in table 3 below.

[Insert table 3 here]

The findings reveal the following interpretations. We note that the coefficients associated to the measure of activity are significant for the two combined entities. Thus, the reinforcement of the skills within the main activity of the bank seems to influence significantly the post-M&A performance of the combined bank.

Indeed, if the bidder bank has adopted a strategy of refocusing on its core activity before the date of acquisition this affects positively the performance of the combined bank during the first year following the date of acquisition. This implies that post-M&A performance of the

combined bank is especially higher when the bidder bank focuses on its core activity. Thus, when the variable Activ $_A$ increases by one unit, that is when the acquirer bank develops more its principal activity (of intermediation or non intermediation), the post M&A performance of the combined bank rises by 1.39 units.

Nevertheless, the acquisition of a target bank which is developing more its pre-M&A principal activity (of intermediation or non intermediation) induces deterioration in the performance of the combined bank by 0, 73 units during the first year. This performance doesn't improve until the end of the year. It is 0, 94 units. This can be due to the transfer of knowledge from the bidder bank to the target one. The merger between two banks developing further their main activities (retail or wholesale) generates a medium-term improvement of the M&A performance of the combined bank. The results found raise the fact that the measure of activity is an explicative factor of the performance of the combined bank.

However, it is pointed out that the coefficients associated to the measure of diversification aren't significant. Thus the diversification measure isn't-a priori-a discriminatory factor in the analysis of post -M&A banking performance of the combined bank.

In a third step, we have introduced control variables such as the nature of operations and methods of payment in order to determine the factors that explain the change in post-M&A performance that's to say the factors that affect the M&A operations performance. Table 4 and 5 highlight the estimation results.

[Insert tables 4 and 5 here]

In this regard, we notice that the coefficient associated to a method of payment in cash is positive and statistically significant when the dependant variable is the ROA and the ROE. This assumes that the payment in cash affects post M&A's performance of the combined bank.

Referring to the theory, we note that most studies conducted in a Northern American context have put into evidence that the operations financed in cash are more efficient than those financed by stocks. These studies are consistent with our results. This financing method is preferred given that the cost of financing by stock is more expensive than the cost of debt and that acquisition by exchange of shares induces a change in the division of the power and the control of the acquirer bank. That's why shareholders of the bidder bank prefer a payment in cash.

The introduction of variables inherent to the nature of M&A's operations leads us to make the following conclusions. We observe that the coefficient associated to the variable Cross is significant and negative. So, cross-border operations affect negatively the performance of the combined bank. Indeed, this may be due to the fact that cultural and managerial differences in cross-border M&A operations make the integration into the new group very difficult, thus inducing a deterioration in performance. We have just affirmed the importance of geographical relatedness between the bidder and the target stipulated by a lot of theorists.

4.2.2. The effect of M&A operations on efficiency

In order to determine the effect of M&A operations on the performance measured via efficiency, we will use the same previous approach. Therefore, the regression results of post-efficiency on pre-efficiency are presented in the table 6.

[Insert table 6 here]

On the one hand, we find that the direct effect of M&A operations incorporated in the coefficient α is positive and significantly different from zero in most cases. Indeed, M&A operations induce a positive effect on the overall technical efficiency for the two years following the date of acquisition. The M&A operation allows better control of technical aspects of production by avoiding excessive use of inputs.

Moreover, the undertaking of M&A operation leads to a favorable pure technical efficiency for the second year following the date of acquisition given that the coefficient is positive and significant. This implies a proportional reduction in the use of inputs if they aren't wasted. We also note that M&A operation results in an improvement in the efficiency of scale for the first year following the date of the conclusion of the transaction. Thus, conducting an M&A operation enables the combined bank to operate at a constant return to scale thus avoiding an excessive use of inputs and reducing additional costs.

On the other hand, the introduction of the variables related to pre-M&A size reveals that it has a negative influence on the overall technical efficiency. Therefore, the bigger the size is the more technically inefficient the combined bank becomes. This may be due to poor managerial organization and to the inability to control costs.

In fact, we find that the signs associated with the coefficients that reflect the main activity of the acquirer are significant and negative for the first two years following the date of the conclusion of the contract. Thus, an increase of one unit of the pre-M&A main activity of the bidder bank generates a decrease in the performance of the combined bank by 0, 96 units and 0, 22 units during the first and the second years, respectively. This implies that the refocusing of the acquiring bank into its core activity leads to a deterioration of the post M&A overall technical efficiency.

These results stipulate that the bad integration of the principal activity between the two merged entities may result, a priori, in deterioration, in the overall technical efficiency of the combined bank. This is explained by the fact that the bidder bank developing further its activity of diversification has an expertise that allows it to achieve a successful M&A operation. Otherwise, acquiring banks may fail to integrate their activities with to those of the targets', leading to deterioration in the performance of the combined bank. Moreover, we note that the activity of the diversification is not a discriminatory factor in the analysis of the evolution of the *expost* overall technical efficiency of the combined bank. The estimation results of the regression equation (2) and (3) are presented in table 7 and 8, respectively.

[Insert tables 7 and 8 here]

Finally, in order to determine the other factors that influence the efficiency of M&A's operation we have introduced control variables. We seek to identify the determinants that play a crucial role in the success of such operations.

Initially, we proceed to a regression of post-efficiency versus pre-efficiency on the method of payment and the nature of the M&A operation in order to identify the determinants of change in post-M&A performance. Thus, we seek to understand the impact of geographical

diversification and the method of payment in cash on the overall technical efficiency of the combined bank.

The examination of the estimation results predicts that the coefficient associated with the method of payment in cash is not statistically significant. These estimation results reported in table 9 postulate that payment in cash doesn't affect the overall technical efficiency of the combined bank. This result coincides with the work of Healy et al. (1992). In addition, we find that the nature of cross-border M&A operations isn't an explanatory factor for post-M&A efficiency because the coefficient associated isn't significant. In this respect, we note that there is no difference between the performance of post-M&A cross-border and domestic operations. In fact, this result is in agreement with the works carried out by Gugler et al. (2003).

[Insert table 9 here]

Moreover, we will distinguish between domestic and cross-border M&A operations in order to test the robustness of our results. The estimation results reported in table 10 suggest that cross-border M&A operations haven't any significant impact on the overall technical efficiency of the combined bank. Thus, the effect of M&A operations on *expost* performance remains unchanged whatever the nature of such operations.

[Insert table 10 here]

5. Conclusion

The approach used consists of making a comparison between post-M&A performance and pre-M&A one. The performance is measured using accounting ratios namely the return on assets and the return on equity (ROE) or via measures of overall technical efficiency (pure technical efficiency and scale efficiency). The introduction of industrial specificities represents our contribution in comparison with former works.

The main results suggest that M&A operations are associated with an improvement in ROE, ROA and ETG. Cross-border operations lead to a deterioration in ROE. The operations financed in cash generate an improvement in ROE and ROA. A huge pre-M&A bidder size has a positive effect on ROE and ROA and a negative impact on ETG. The development of more intermediation activity before M&A operation, either by the target or the bidder bank induces an improvement in ROE and a deterioration in ETG.

Our study has some limits. We have only used mergers between financial institutions. We have excluded mergers between banks and the insurance sector and the multiple mergers (the banks that have done more than one M&A operation during the period of study). This leads to a reduction of the sample.

Our study may be extended by incorporating other M&A operations (either by creating a new entity or by exchange or stock). Furthermore, a comparison of pre and post-M&A performance of the banks that have been involved in an M&A operation with those that can't be carried out. Moreover, a study of the effect of the bank governance on the operating performance is an interesting point to develop. A good governance measured via the concentration of the property in the hands of leaders is assumed to improve the overall technical efficiency, the ROA and the ROE. We can also study the effect of M&A operations on long-term operating performance.

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ⁱⁱ We note that the period post and pre-M&A spreads over two years for three reasons. First, it is difficult to distinguish the effect of M&A operation from the other operations when the bank merger many times. Second, if we choose a long period the effect of the economic factors can affect the performance thus leading to an incorrect result. Third, when we choose a long period, the size of the sample decreases specially for cross-border operations.

ⁱ There are several laws and regulations that govern the American M&A operations like the Hart-Scott-Rodino Act which states that the FTC (the competition office) and the Department of Justice should be noticed about large mergers and acquisitions before they occur. Furthermore, the Committee on M&A (ABA) has to review the legality of M&A as well as the negotiation process. The "Astute Diligence" also allows the control of the due diligence process. The merger enforcement guidelines (DJO) outline the present enforcement policy of the Department of Justice and the Federal Trade Commission concerning horizontal acquisitions and mergers. The Competition Office (FTC) is committed to prevent mergers and acquisitions that are likely to reduce competition and lead to higher prices, lower quality goods or services, or less innovation. For example, the purchase of U.S. ports by Dubai Ports in 2006 was banned by U.S. laws in order to fight against the formation of monopoly.

Per _{M&A, post} = $\alpha + \beta$ Per _{M&A, pre} + ε_t									
ROA									
post, pre	α	β	test for β≠1	AdjR2					
A1, B1B2	1.086*** (0.085)	0.178*** (0.065)	157.51***	0.066					
A2, B1B2	0.555***(0.112)	0.463***(0.085)	39.15***	0.238					
ROE									
post, pre	α	β	test for β≠1	AdjR2					
A1, B1B2	6.706 ***(1.383)	0.492***(0.101)	24.82***	0.199					
A2, B1B2	5.071***(1.646)	0.452***(0.121)	20.38***	0.1260					

	T	able	1:	Estimation	results of	regression	equation	1
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***, **,* statistical significance at 1%, 5% and 10%. The values in parentheses represent standard deviation.

Table 2: Estimation results of regression equation 2

Per M&A, p	$\alpha + \beta \operatorname{Per}_{M\&A},$	$_{\rm pre} + \gamma \text{ size }_{\rm A, pre} + \delta$	size C , pre + ε_t		
ROA					
post, pre	α	β	γ	Δ	AdjR2
A1, B1B2	0.705*(0.418)	0.151**(0.069)	0.040(0.031)	(-) 0.180(0.036)	0.0660
A2, B1B2	0.067(0.550)	0.430***(0.091)	0.041(0.091)*	(-) 0.010(0.0485)*	0.2326
ROE					
post, pre	α	β	γ	Δ	AdjR2
A1, B1B2	0.393(4.535)	0.425(0.106) ***	0.901*(0.343)	- 0.532(0.404)	0.2439
A2, B1B2	(-) 0.002(5.529)*	0.399(0.129) **	0.682*(0.418)	-0.380(0.493)	0.1340

***, **,* statistical significance at 1%, 5% and 10%. The values in parentheses represent standard deviation.

Table 3: Estimation results of regression equation 3

Per M&A, post = $\alpha + \beta$ Per M&A, pre + γ size A, pre + δ size c, pre +a Activ A, pre +b Activ C, pre + c Div A, pre +d Div C, pre + ε_t

ROA

post, pre								
	α	β	γ	δ	a	b	c	d
A1, B1B2	- 0.272	0.176**	0.040	0.018	1.390**	- 0.739*	0.250	- 0.340
	(0.774)	(0.076)	(0.031)	(0.038)	(0.473)	(0.399)	(0.282)	(0.307)
A2 B1B2	- 0.970	0.353***	0.036	0.004	0.307	0.943*	0.005	0.199
A2, D1D2	(1.062)	(0.105)	(0.042)	(0.052)	(0.649)	(0.547)	(0.387)	(0.421)
ROE								
post, pre				2				
	α	β	γ	ð	a	b	c	d
A1, B1B2	- 2.678	0.424***	0.982*	- 0.383	5.244	- 3.318	- 1.452	-1.808
	(8.374)	(0.110)	(0.360)	(0.440)	(5.460)	(4.199)	(3.246)	(3.268)
	0.731	0.397**	0.773*	- 0.435	- 1.688	3.752	- 3.103	- 1.839
A2, B1B2	(10.220)	(0.134)	(0.439)	(0.537)	(6.664)	(5.126)	(3.962)	(3.989)

***, **,* statistical significance at 1%, 5% and 10%. The values in parentheses represent standard deviation.

Table 4: Estimation results of regression equation 4

Per M&A, pre V	vs. post = $\alpha + \lambda 1$ Cross-	+λ2 Cash+ εt
Δ ROE	Coefficient	Standard
		deviation
constant	(-) 0,060*	0,611
Cross	(-) 4,362**	2,015
Cash	3,486**	1,55

***, **,* statistical significance at 1%, 5% and 10%.

Table 5: Estimation results of regression equation 4

Per M&A, pre	vs. post = $\alpha + \lambda 1$ Cross-	-λ2 Cash+ εt
ΔROA	Coefficient	Standard deviation
constant	0,019	0,071
Cross	(-) 0,292	0,235
Cash	0,312*	0,181

***, **,* statistical significance at 1%, 5% and 10%.

Tabla 6	Estimation	regults of	rograssion	aquation 1
I able 0.	. Estimation	results of	regression	equation 1

Per M&A, post = α + β Per M&A, pre + ϵ t

, 1				
OTE				
post, pre	α	β	test for β≠1	AdjR2
A1, B1B2	0 .062*** (0 .022)	0.004 (0.083)	140.59***	(-) 0.0133
A2, B1B2	0 .046*** (0.015)	0.008(0.057)	298.28***	(-) 0.0130
РТЕ				
post, pre	α	β	test for β≠1	AdjR2
A1, B1B2	0.071 (0 .045)	0.400*** (0.119)	24.85	0.1187
A2, B1B2	0.129*** (0.042)	0.161 (0.110)	57.34	0.0148
SE				
post, pre	α	β	test for β≠1	AdjR2
A1, B1B2	0.147*(0.081)	0.713*** (0.121)	5.49	0.3068
A2, B1B2	0.226 (0.092)	0.561*** (0.137)	9.94	0.1710

***, **,* statistical significance at 1%, 5% and 10%. The values in parentheses represent standard deviation.

Table	7:	Estimation	results	of	regression	equation	2

Per _{M&A, post} = $\alpha + \beta$ Per _{M&A, pre} + γ size _{A, pre} + δ size _{C, pre} + ε_t									
OTE									
post, pre	α	β	γ	δ	AdjR2				
A1, B1B2	0.364 (0.1719)	- 0.0001 (0.0823)	- 0.0245* (0.0125)	0.0069 (0.0145)	0.0265				
A2, B1B2	0.1432 (0.1208)	0.0072 (0.0578)	(-) 0.0067 (0.0088)	0.0009 (0.0102)	(-) 0.0282				

***, **,* statistical significance at 1%, 5% and 10%. The values in parentheses represent standard deviation.

Tableau 8: Estimation results of regression equation 3

Per M&A, post = $\alpha + \beta$ Per M&A, pre + γ size A, pre + δ size C, pre +a ActivA, pre+b Activ C, pre + c Div A, pre +d Div C, pre + ε_t

OTE								
post, pre	α	β	γ	δ	a	b	c	d
F, F	0.9813***	0.005	- 0.018	- 0.016	- 0.691***	0.210	- 0.136	0.076
A1, B1B2	(0.268)	(0.077)	(0.012)	(0.014)	(0.174)	(0.131)	(0.104)	(0.111)
	0 4520**	0.016	0.000	0.000	0.222*	0.042	0.027	0 1 1 0
A2, B1B2	(0.4530^{**})	-0.016	-0.002	-0.008	-0.223*	-0.043	(0.037)	-0.119 (0.084)
	(0.205)	(0.050)	(0.007)	(0.010)	(0.151)	(0.077)	(0.077)	(0.001)

***, **,* statistical significance at 1%, 5% and 10%. The values in parentheses represent standard deviation.

Table 9: Estimation	results o	f regression	equation 4
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Per M&A, pre	vs. post = $\alpha + \lambda 1$ Cros	$s+\lambda 2$ Cash+ ε_t
ΔΟΤΕ	coefficient	Standard deviation
constant	(-) 0,379	0,047
Cross	0,185	0,169
cash	0,123	0,12

***, **,* statistical significance at 1%, 5% and 10%.

Table 10: Robustness test of estimation results of regression equation 4

Per M&A, pos	Per _{M&A, post} = $\alpha + \beta$ Per _{M&A, pre} + ε_t												
OTE domestic													
post, pre	α	В	test for β≠1	AdjR2									
A1, B1B2	0.066*(0.0250)	- 0.001 (0.094)	112.46***	- 0.0149									
A2, B1B2	0 .047 *(0.0170)	0.008 (0.064)	236.11***	-0.0147									
OTE cross-	border												
post, pre	α	В	test for β≠1	AdjR2									
A1, B1B2	0.031** (0.0099)	0.059(0.032)	841.47***	0.2805									
A2, B1B2	0.045** (0.0144)	0.012 (0.047)	441.01***	- 0.1824									

***, **,* statistical significance at 1%, 5% and 10%. The values in parentheses represent standard deviation.

variables	Mean	standard deviation	Min	max
ROA post1	1.288	0.428	0.17	2.73
ROE post1	12.971	5.209	1.74	28.09
ROA post2	1.079	0.621	(-) 2.27	2.8
ROE post2	10.828	5.934	(-) 17.11	25.525
ROA pre	1.131	0.666	(-) 3.42	3.372
ROE pre	12.712	4.826	(-) 7.06	28.105
ΔROA	0.052	0.608	(-) 2.045	3.02
Δ ROE	(-) 0.811	5.294	(-) 20.345	15.547
Total assets~A	16.650	1.972	10.196	20.889
Total assets~C	14.724	1.658	9.985	20.283
Activ-A	0.699	0.138	0.091	0.921
Activ-C	0.683	0.166	0.125	1.310
Div-A	0.564	0.214	0.156	0.986
Div-C	0.575	0.214	0.034	0.996
Equity	0.329	0.472	0	1
Cash	0.208	0.408	0	1
Mixed	0.461	0.501	0	1
Cross-border	0.109	0.314	0	1
Domestic	0.890	0.314	0	1

Annex1: Descriptive statistics of accounting ratios

Number of observations 92

	roa post1	roe post1	roa post2	roe post2	roa pre	roe pre	A ROA	ΔROE	total assets~A	total assets~C	Activ-A	Activ-C	Div-A	Div-C
roa_post1	1.000													
roe_post1	0.833	1.000												
roa_post2	0.520	0.520	1.0000											
roe_post2	0.573	0.722	0.871	1.0000										
ROA pre	0.277	0.334	0.496	0.282	1.0000									
ROE pre	0.375	0.456	0.422	0.368	0.834	1.000								
Δ ROA	0.313	0.193	0.149	0.338	-0.743	-0.565	1.000							
ΔR OE	0.389	0.480	0.359	0.580	-0.438	-0.480	0.799	1.000						
Total assets~A_	0.217	0.358	0.264	0.263	0.334	0.342	-0.154	0.011	1.000					
Total assets~C_	0.132	0.194	0.201	0.155	0.301	0.319	-0.181	-0.108	0.698	1.000				
Activ-A	0.263	0.130	0.097	0.075	0.012	-0.000	0.128	0.106	-0.221	-0.341	1.000			
Activ-C	0.031	0.065	0.331	0.208	0.250	0.115	-0.094	0.043	0.080	0.056	0.302	1.000		
Div-A	-0.08	-0.054	-0.004	-0.050	0.096	0.076	-0.139	-0.125	0.253	0.193	-0.698	-0.165	1.000	
Div-C	-0.01	0.027	-0.0506	-0.088	0.158	0.115	-0.203	-0.141	0.120	0.046	-0.303	-0.685	0.217	1.000

Annex 2: The analysis of the correlation (ROA and ROE)

							The total of
Year	2001	2002	2003	2004	2005	2006	observations
Bidder bank	14	6	21	20	14	1	76
Target bank	14	6	21	20	14	1	76
Statu quo bank	91	95	101	101	97	103	588
The total of observations	119	107	143	141	125	105	740

Annex 3: The number of observations

Annex 4: descriptive statistics of the overall technical efficiency

Variables	Mean	Standrad	Min	Max
OTE post 1	0.062	0.159	0.01	1
OTE post_1	0.005	0.138	0.01	1
PTE post_1	0.187	0.285	0.011	1
SE post_1	0.594	0.318	0.022	1
OTE post_2	0.048	0.108	0.003	0.781
PTE post_2	0.176	0.248	0.01	1
SE post_2	0.577	0.331	0.008	1
OTE pre	0.159	0.218	0.019	0.85
PTE pre	0.288	0.257	0.029	1
SE pre	0.625	0.250	0.039	0.998
Δ OTE	- 0.336	0.374	-0.961	0.961
Total assets~_A	16.452	1.930	10.196	20.644
Total assets~C	14.727	1.656	9.985	20.283
Activ-A	0.709	0.140	0.091	0.921
Activ-C	0.691	0.173	0.125	1.310
Div-A	0.542	0.212	0.156	0.986
Div-C	0.549	0.202	0.034	0.996
Equity	0.342	0.477	0	1
Cash	0.210	0.410	0	1
Mixed	0.447	0.500	0	1
cross-border	0.092	0.291	0	1
domestic	0.907	0.291	0	1
The number of obser	rvations			77

	OTE	PTE	SE	OTE	PTE	SE	OTE	PTE	SE		Total	Total				
variables	post 1	post_1	post_1	post_2	post_2	post_2	pre	_pre	pre	Δ OTE	assets~A	assets~C	Activ-A	Activ-C	Div-A	Div-C
OTE_post_1	1.000															
PTE_post_1	0.480	1.000														
SE_post_1	0.252	-0.462	1.000													
OTE_post_2	0.451	0.222	0.171	1.000												
PTE_post_2	0.228	0.4756	-0.225	0.427	1.000											
SE_post_2	-0.072	-0.304	0.334	0.165	-0.596	1.000										
OTE_pre	0.005	-0.120	0.225	0.017	-0.166	0.252	1.000									
PTE_pre	0.033	0.360	-0.177	0.076	0.166	0.016	0.742	1.000								
SE_pre	-0.146	-0.447	0.559	-0.092	-0.338	0.424	0.450	-0.088	1.000							
Δ OTE	0.120	0.547	-0.495	0.114	0.340	-0.272	0.209	0.745	-0.729	1.000						
Total assets~_A	-0.250	0.022	-0.088	-0.109	-0.022	0.261	-0.035	-0.027	0.174	-0.135	1.000					
Total assets~C	-0.131	0.093	-0.062	-0.067	0.025	0.217	-0.052	-0.070	0.308	-0.254	0.675	1.000				
Activ-A	-0.365	-0.328	-0.077	-0.239	-0.306	0.122	-0.048	-0.078	-0.060	-0.013	-0.136	-0.324	1.000			
Activ-C	-0.040	-0.021	-0.100	-0.042	0.018	-0.032	-0.090	-0.126	-0.038	-0.060	0.117	0.075	0.322	1.000		
Div-A	0.129	0.130	0.080	0.196	0.180	-0.043	0.115	0.005	0.166	-0.107	0.171	0.166	-0.647	-0.160	1.000	
Div-C	0.082	-0.140	0.094	-0.077	-0.188	0.112	-0.066	-0.164	-0.026	-0.095	0.085	0.046	-0.322	-0.651	0.192	1.000

Annex 5: The analysis of the correlation (the overall technical efficiency