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**"FOOD FIRMS: WAS PERFORMANCE ENHANCED BY M&A  
IN THE YEARS 1996-2000?"**

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**ABSTRACT**

The paper compares economic and financial performance of companies which experienced M&A with those which did not. Comparisons have been made with four criteria of performance one year before and one or two year after M&A announcement. The analysis focuses on M&A where the acquirer gets a majority shareholding of the target company in the French food businesses from 1996 to 2000.

The results of the tests show that M&As did not have much effect on corporate performance. But in 2000, M&A seem to have impacted EBITDA to capital employed and ROE of acquirers.

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## **PROBLEM STATEMENT AND OBJECTIVES**

Our main research question is: “Did food firms which experienced a merger or an acquisition perform better than those which did not after the acquisition?”

The 1996-2000 wave of mergers & acquisitions in the U.S.A. and Europe has affected the food and agribusiness sector. Compared to other periods, a high number of M&A has been observed. Value of transactions was large and produced many cross-border manufacturing firms. But some companies faced troubles after merging or acquiring. Data from that period will be used for the research work.

The paper is structured as follows. Section one reviews literature on the topic. Section two presents the research model, hypotheses, method and data. Section three delivers the results. Finally, conclusions are drawn and recommendations are provided.

## **1. PREVIOUS FINDINGS**

Review of the literature on M&As reports three main topics: motives, types (*i.e.* hostile vs. friendly takeovers) and performance with attempts to associate, on one hand, motives and types, with performance on the other hand. Our attention is focused on the food manufacturing sector and most recent studies.

### **Motives**

Literature mentions many reasons for merging or acquiring. Two major types of motives can be found: 1/ operational motives 2/ speculative motives. On one side, *operational* M&A aim at increasing performance while on the other side *speculative* M&A target short term capital gain.

Operational motives include:

- efficiency gains (Goldberg, 1983; Declerck, 1997; Ward & Jong-In Lee, 2002)
- diversification (Goldberg, 1983),
- market power (Goldberg, 1983; Declerck, 1997),
- access to market channel (Hudson & Herndon, 2002).

Most of the time several motives can be found for a given M&A.

Speculative motives: in period of cheap cost of capital due to low interest rates like in the late 1990s, corporations paid high prices with high leverage.

### **Performance**

Traditionally, the research hypothesis is: “M&A improves performance”. The performance under scrutiny can be the acquirers or acquired firms. Our research focuses on the acquirer performance. Results from most previous studies provide mix results. For example, Ward & Jong-In Lee (2002) found a positive relationship between M&A and profits in their study of the M&A in the US meatpacking sector. Source of higher profits is possibly procurement economies. Aw & Chatterjee (2004) focused on the post-takeover performance of cross-border acquisitions involving British firms. They found that UK firms acquiring large targets experienced negative cumulative abnormal returns over the period 1991-1996. Powell & Stark (2005) showed that takeovers completed in the UK over the period 1985-1993 resulted in modest improvements in operating performance

The problem of assessing, whether a merger & acquisition (M&A) constitutes an improvement in terms of economic and financial performance, has arisen for each wave of M&A. The 1995-2000 wave of takeovers seems special, because compared to previous waves about half M&A were cross-border deals (i.e. food companies merged with or acquired similar businesses in other countries).

## 2. RESEARCH MODEL, HYPOTHESES AND METHOD

The research model, hypotheses, method and data are presented and discussed in this section.

### Model

Since the major objective of the paper is to evaluate M&A effect on performance, we model firm performance after M&A as follows:

$$P_{N+t} = F(P_{N-t'}, M_N)$$

Where P is a performance variable, M is the M&A indicator, N is the M&A year and t and t' are time indexes.

Post M&A performance,  $P_{N+t}$ , is a function of past performance,  $P_{N-t'}$ , and M&A.

We took t' equal to 1, the latest year available previous to the M&A. It is either 1 or 2.

The hypothesis we are testing is: M&A does not affect the acquirers' performance compared to the performance of companies which did not experienced M&A.

### Measures of performance

Four different measures of performance are used: three of them capture the economic performance and one the financial performance. These variables are defined as follows.

#### Economic profitability of capital employed

1. ROCE = "Return on capital employed"

ROCE = EBITDA / (net fixed assets + required working capital)

where EBITDA stands for "Earnings before interest, corporate taxes, depreciation and amortization" and

Required working capital = inventory + trade account receivables – trade account payables

2. Operating margin = EBIT / Sales

where EBIT stands for "Earnings before interest and corporate taxes", which measures the operating income

3. EBITDA / CE = EBITDA / Capital Employed

where capital employed = net fixed asset + required working capital)

#### Financial profitability, which is a measure of value creation for shareholders

4. ROE = "Return on Equity" = net income / equity capital

These ratios are computed every year over the period 1996-2000 from selected samples of acquirers and non-acquirers.

### **Data and Samples**

Samples were built from a set of about 700 M&A in the French food business from 1996 to 2000 (AGIA Alimentation, 1996-2000) according to the following steps in order to focus on M&A where the acquirer gets a majority shareholding of the target company:

1<sup>st</sup> step: elimination of types of M&A that are not relevant for the study

All companies, which experience at least one of the following events, are excluded:

- acquisition of brand, license or franchising
- alliance
- divestiture
- joint-venture
- acquisition of a minority shareholding

2nd step: elimination of M&A carried out by agricultural co-operatives

Agricultural co-operatives do not have the objective of maximizing equity shareholders' capital. Their objective is to maximize agricultural products brought by members. So, it is not possible to compare their financial ratios with those from corporations.

3rd step: selection among companies acquiring a majority shareholding of the target company

In the population of companies, which have acquired a majority shareholding of the target company, two types are also excluded:

- companies with more than one takeover during the 1996-2000 period because those events may disturb the analysis
- takeovers made by financial funds over food companies, since financial funds do not belong to the food sector and mainly look for capital gains in the short term in reselling the target as soon as possible

4th step: collection of financial data about the companies that are selected from the DIANE data bank released by Bureau van Dijk Electronic Publishing. Several food companies are excluded from samples because of missing data.

Over the 1996-2000 period, about 40 M&A were selected. The sample, S, is made of 5 sub samples, S1 to S5, each for a year covering the period. Hence, S1 contains year 1996 M&As and S5 contains year 2000 M&As. Samples size are respectively: 9 (1996), 7 (1997), 6 (1998), 9 (1999) and 6 (2000).

A second sample of food companies, which did not experienced M&A during the 1996-2000 period is built to serve as control group for testing hypotheses. Ten companies were selected randomly from this sample to form the control group, C.

## Statistical Analysis

Because samples are small and information is limited parametric models are not appropriate. We used a non-parametric statistical technique to assess the effect of M&A on performance. The method is based on performance ranking between two groups, one being submitted to M&A and the other not: The test is known as the « *Wilcoxon Rank-Sum test* » (Lehmann, 1975).

This test and similar tests are often used in experimental sciences to assess the effect of a treatment, or an event, with a small number of statistical units and continuous effect variables. The rationale of the test is to compare indicator variables between samples from two populations one submitted to treatment or the event (the treated units) and the other not (the control units). The comparison is made on the sum of the ranks of the treated units. If the treatment has a positive effect on the variables being monitored,  $V$ , and if the composition of the two groups was similar, then treated units must exhibit higher  $V$  value. When the units from the two groups are ranked on the value of the control variables, the rank of the treated units must be lower than the ranks of the control units. The sum of the rank of the treated units is a good indicator of the treatment effect. For example, if the size of the two groups is 5 and if the ranks of the treated units are 1, 2, 3, 4 and 5, and the ranks of the control units are 6, 7, 8, 9, 10, then the treatment has probably a positive effect. The ranks are simply obtained by ordering firm based on the value of the variable. Such a test does not measure the amplitude of the effect but rather its direction, i.e. positive or negative, compared to the control group. The distance between the statistical units is not taken into account, only their ranks matter.

While in laboratory experiments statistical units are selected randomly from a homogenous population, in observational settings the population from which treated units and the control units are drawn is often not homogeneous. Difference between groups can be linked to the initial status of the units rather than to the effect of the treatment. It is recommended to test hypothesis of no difference between groups before the treatment is applied. Another alternative is to test the evolution of the value between before and after the treatment, e.g., the ratio or the difference, rather than on the value itself.

In this research companies which experienced M&A form the treated group, and those who did not form the control group. It is also recommended having groups of similar size.

We would like also to pin point the fact that is quite easy to test if the effect is positive or negative. If a positive effect is expected, then a descending ordering process is appropriate. If a negative effect is expected, then an ascending ordering is appropriate.

Since the data are gathered from observations it is necessary to test the absence of difference between the two groups before M&A occurs. The test has been performed on the five treated groups, S1 to S5, with the same control group, C, one year before takeover.

If  $N$  is the year of M&A for companies which experienced M&A, the corresponding hypothesis is:

$H_1 =$  In year  $N-1$ , there is no significant difference in terms of economic and financial performance between companies which experienced M&A and companies which did not experience M& in year  $N$

If  $H_1$  is rejected, then the structure of the two groups cannot be considered similar. If an *ex post* difference between groups is identified, then it cannot be associated only with the M&A effect. It is a mixture of the initial performance level and the M&A effect. A test based on the evolution of the value of the performance rather than on the value itself is required.

If  $H_1$  is rejected, this may suggest that companies which engaged into M&A are different from those which did not. Depending on the sum of the ranks, either very low or very high, one can conclude that M&A is rather common among high performance firms or low performance companies.

Even if  $H_1$  cannot be rejected, we think it is still interesting to test for the evolution of the performance. Our argument runs as follows: Let's suppose that the performance difference are evenly, by an increment of  $X$ , and alternatively distributed among companies in the two groups, i.e.  $X, 2X, 3X, 4X, 5X$ , etc, with even multipliers for control units and odd for treated units (or the opposite). Let suppose that  $H_1$  is rejected. Now suppose the M&A effect is homogeneous and equals to  $X/2$  and that there is not other effects, then the sequence becomes  $1.5X, 2X, 3.5X, 4X, 5.5X$ , after the treatment. Because ranks are not changed, the M&A effect is not identified simply because it is too small (i.e. performance increases by a fraction of the performance level between units). If a test is performed on the evolution (the difference or the ratio), all treated units will be ranked above the control units and the test will identify a positive M&A effect.

The Rank-Sum method is performed to test the following hypotheses:

#### **Firm performance level hypotheses**

$H_2$  = there is no significant difference in economic and financial performance between companies which experienced M&A and companies which did not experience M&A in year  $N+1$ .

$H_3$  = there is no significant difference in economic and financial performance between companies which experienced M&A and companies which did not experience M&A in year  $N+2$ .

#### **Firm performance change hypotheses**

$H_4$  = M&A do not impact the economic and financial performance of companies tested in year  $N+1$

$H_5$  = M&A do not impact the economic and financial performance of companies tested in year  $N+2$

For each sample, the following conclusions may be drawn from the 8 possible combinations of results of the 3 types of tests.

**Table 1 - Conclusions according to the possible results of the 5 tests, assuming positive M&A effect**

Result Case	Hypotheses			Conclusion M & A effect
	H <sub>1</sub> - no <i>ex ante</i> difference in performance level	H <sub>2</sub> / H <sub>3</sub> - no <i>ex post</i> difference in performance level	H <sub>4</sub> / H <sub>5</sub> – no progression in performance	
1	A	A	A	No effect
2	A	A	R	Positive but “small” effect
3	A	R	A	Inconclusive
4	A	R	R	Positive effect
5	R	A	A	Negative effect
6	R	A	R	Inconclusive
7	R	R	A	No M&A effect and initial level effect
8	R	R	R	M&A effect and initial level effect

A = the hypothesis is accepted

R = the hypothesis is rejected

On the direction of the effect: The test is based on the rank of the members of the treated (M&A) population. If *ex ante* performance difference cannot be rejected and *ex post* performance difference can be rejected, this can be interpreted as if M&A has a negative effect or a relative negative effect. The performance of control units have been increasing faster than the performance of the treated (or decreasing slower).

Inconclusive results: There is a contradiction between an *ex post* difference which can not be explained by an *ex ante* difference and an *ex post* progress in performance.

### Statistical Implementation

For detail on the statistical implementation of the Wilcoxon Rank-Sum tests, see Lehman (1975). The implementation is easy. First the sum of the ranks (SR) of the treated group is computed. Then SR is transformed to form a statistic,  $W_{xy}$ , as follows:  $W_{xy} = SR - \frac{1}{2} n(n+1)$ , where  $n$  is the size of the treated group.  $W_{xy}$  computed with the data is finally compared to table value at an appropriate risk level. A 5 % error risk, or the closest value to 5%, is used to reject the above null hypotheses. If  $W_{xy}$  is lower than the table value, then the hypothesis of no difference cannot be accepted.

For example, if the size of treated group is 6 and the size of control group is 9, the table indicates 12 as the threshold value for a risk level of 0.044.

### 3. RESULTS

The hypotheses  $H_1, H_2, H_3, H_4, H_5$  for the 5 years from 1996 to 2000 are tested for the four financial ratios: ROCE, operating margin, EBITDA to capital employed and ROE.

The values of  $W_{xy}$  are computed every year in order to produce relevant tests...

#### Results at the firm performance level:

For the 5 years, the hypotheses  $H_1, H_2, H_3$  cannot be rejected at the 5 % error risk. Hence, table 2 show figures on year 2000.

**Table 2 - Results at the firm performance level in year 2000**

M&A Year 2000	$W_{xy}$ threshold in the table for $x = 6$ and $y = 9$	Observed $W_{xy}$ 1999	Observed $W_{xy}$ 2001	Observed $W_{xy}$ 2002
ROE	12	41	30	27
Operating margin	12	25	19	22
EBITDA / CE	12	29	25	30
ROCE	12	26	22	20

Note: results are non significant if the observed value is greater than the threshold value.

So, in terms of performance level, there is no significant difference in economic and financial performance between companies which experienced M&A and those which did not.

#### Results about the firm performance change

For the years 1996 to 1999, the hypotheses  $H_1, H_2, H_3$  cannot be rejected at the 5 % error risk. But for the year 2000, results are different and shown in table 3.

**Table 3 - Results about the firm increase in performance before and after 2000**

Year N = year 2000	Years N+1/N-1 2001/1999	$W_{xy}$ threshold in the table	S or NS result and risk level	Years N+2/N-1 2002/1999	$W_{xy}$ threshold in the table	S or NS result and risk level
ROE	4	12	S (0.002)	10	12	S (0.025)
Operating margin	14	12	NS	22	12	NS
EBITDA/CE	11	12	S (0.033)	17	12	NS
ROCE	15	12	NS	21	12	NS

For  $W_{xy}$  threshold found in the table,  $x = 6$  and  $y = 9$

S = Significant difference

NS = Non significant difference

Value inside parenthesis are risk level.

Note: results are non significant if the observed value is greater than the threshold value.

Companies which experienced M&A in the year 2000 increased their performance:

- in terms of ROE in year N+1 and N+2
- in terms of EBITDA / CE in year N+1

The results are not strongly significant, but enough significant to infer conclusions.

### **Consequences**

Each year from 1996 to 1999, the 5 hypotheses are rejected for all four ratios. This correspond to the case 1 mentioned in table 1. It means that for companies which experienced M&A on those years, there was no significant effect on economic and financial performance.

But for the year 2000, results are those of case 2 mentioned on table 1:

- for 2 years N+1 and N+2 in terms of ROE
- for 1 year N+1 in terms of EBITDA / CE

So, companies which experienced M&A in the year 2000 do not have significant difference in performance levels in comparison with companies which did not experienced M&A, but they their performance increased:

## **4. CONCLUSION AND RECOMMENDATIONS**

The results of the tests show that M&A carried out from 1996 to 2000 did not have strong effect on the financial performance of food companies. But in 2000, M&A seem to have impacted EBITDA / CE and ROE of tested companies.

If acquirers' performance is improved, improvement is weak since it may be observed in performance change, but not in performance level. So, such an improvement will not impact the financial competitiveness of the firm substantially.

When a company buys a target, it could be valuable to test the two firms in order to know whether the acquirer was performing better than the target. Unfortunately here, data were missing to implement such a test.

If there exist synergies, it seems that they appear first on EBITDA / CE and ROE. For ROE, acquirers' improvement of performance is statistically significant one year and two years after takeover. But for EBITDA / CE, acquirers' improvement of performance is statistically significant one year after takeover, but is not significant two years after takeover. So, it is difficult to infer strong recommendations for corporate managers.

Further, companies which experience M&A may need more than one or two years to implement synergies and get financial benefits of their strategy. It may take time to "digest" its target, particularly in economic crisis time as it was the case in France in 1996 and 1997.

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