Ownership Structures and Agency Problems:

THE FRENCH BANKS CASE

HAJER SELLAMI
Doctor, teaching lecturer
École supérieure de statistique et de l'analyse de l'information of Tunis

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Introduction

Since its emergence, the theory of the firm has evolved to fit with the firm environment changing and increasing complexity. Indeed, the current firms are different from the first family firms that acted in closed and local markets. Therefore, we moved from the traditional theory, which considers the firm as a manufacturing unit with a profit maximization goal, to the current theory of the ownership rights which consider the firm as a set of contractual relationship between different agents, each one works by his own interest (Williamson, 1963; Alchian and Demsetz, 1972; Jensen and Meckling, 1976;....).

According to Berle and Means (1932), then to Fama and Jensen (1983a), the separation between the functions of decision and control is due to the fact that the owners do not manage their company by themselves but delegate this management to the managers, and are satisfied with a more or less exerted control role; the separation of these two functions generates conflicts of interest or agency problems between owners and managers. Indeed, according to the theory of the ownership rights, the managers can pursue strategies which maximize their own utilities instead of those of the company they direct by paying themselves higher salaries, hiring excessive staff,..., that is to say, a use of more inputs than necessary to have a certain level of output.

In the banking sector, Edwards (1977), Hannan (1979) and Hannan and Mavinga (1980) found consistent evidence of such opportunistic behaviour of the managers in the US banking institutions working on concentrated markets. The assumption of this work is based on the fact that the banks managers can extract many advantages from the company they manage, especially when the bank has a market power.

* hajer_sellami@yahoo.fr

However, according to several studies[1], the importance of these agency problems and the costs while resulting depends more on the control to which the managers are subjected, and thus on the ownership structure of each company, than on the nature of the market.

In several countries, the banking sector is composed of two forms of companies: the mutual companies and the stock companies. Contrary with those of the joint stock companies, the managers of the mutuals are not subjected to the direct control of the owners, neither to that of the financial market, nor to the pressures of the shareholders to maximize the profits. So, they can rely on more freedom to grant immoderate advantages leading to an ineffective management and to significant agency costs. The control of these costs constitutes a challenge for the mutual companies through the conversion to stock companies or through the demutualisations.

The relationship between the ownership structure (mutual or stock) and the agency problems in the financial institutions has interested various authors.

The first works which compared the behaviours of the mutual and stock US savings and loan associations through tests of differences in average of a certain number of ratios, confirm the assumption of expense preference behaviour for the managers of the mutuals (Nicols, 1967; O'Hara, 1981).

Verbrugge and Goldstein (1981), Verbrugge and Jahera (1981), Blair and Placone (1988) and Gropper and Beard (1995) also examined the effect of the ownership structure of US banks on their agency costs. Those works used the Edwards model (1977) which estimates a cost function including a dummy variable to differentiate the mutual companies from the stocks. Except those of Blair and Placone, the findings of the other works converge in favour of the expense preference behaviour of the managers of the mutuals compared to those of the joint stock companies.

Recent Literature (Mester, 1993; Cebenoyan *and al.*, 1993; Altunbas *and al.*, 2001; Hasan and Lozano-Vivas, 2002; ...) adopted a different approach to compare the behaviour of the mutual companies and the joint stock

companies. The authors use the stochastic frontier approach to determine the cost inefficiency scores of the two types of ownership structures. According to those works, if the mutual companies are less efficient than the stocks, it is because their managers do not adopt a value maximization behaviour but an opportunistic behaviour, and thus they would be faced to more agency problems materialized by expense preference of the managers. If it would be true that the stock banks are more efficient than the mutual ones, the phenomenon of demutualisation could only continue and be encouraged since it would increase the efficiency of the financial institutions. The study of the banks efficiency is thus of public interest since it would reduce the credit costs and improve the quality of the banking services.

The aim of this paper is to compare the agency costs, measured by the cost inefficiencies, of a sample of French mutual and joint-stock banks during the period 1995-2001, and to bring new prospects to the literature.

Indeed, this is the first empirical inquiry into such issues in the French banking industry. The evolution of the banking systems and the increased mutual to stock conversions of many financial institutions particularly in the United States and in the United Kingdom, led several economists to call in question the perennity of the French mutual banks in a system as competitive as the current system, and to raise the question of the need to demutualise. In the Anglo-Saxon countries, the demutualisations are explained by the incapacity of the mutual companies to raise funds to extend their activities and to diversify and by the existence of differences in agency costs. The first difficulty is managed by the French mutual banks thanks to the purchase of stock commercial banks. The more significant agency costs in the mutual banks, which materialize primarily through expense preference behaviours of the managers, can constitute a concern for the French co-operative banks. So, a comparison of the agency costs of the two types of banks is important, although the demutualisation is an operation which is not culturally well accepted in France since currently, the English demutualisation (conversion of a mutual company into a joint stock company) is prohibited.

In this paper, we use the stochastic frontier approach in order to determine the cost inefficiencies of the banks of our sample. The findings show that in France and on average, the mutual banks are not less cost efficient than the joint-stock banks. Then, this paper examines the relationship between the terms of cost inefficiencies obtained and some variables characterizing the financial performance, the size, the balance-sheet composition and the ownership structure of the banks. The results of the regression reveal a positive correlation between the inefficiency and the size, which translates the presence of diseconomies of scale, and a positive correlation between the inefficiency and the statute of joint stock company, which shows that the mutual banks are not faced to more agency problems than the joint stock banks.

The first section of this contribution consists in presenting the existing differences between the structure of mutual companies and that of joint stock companies, followed by a presentation of the French banking system. The method of estimation of the cost inefficiencies and of the determinants of the inefficiencies is exposed in the second section. The third section is devoted to the analysis of the results.

■ I. Ownership Structures and AGENCY problems in the French banking sector

I.1. DIFFERENCES OF OWNERSHIP STRUCTURES BETWEEN MUTUAL COMPANIES AND JOINT STOCK COMPANIES IN THE BANKING SECTOR

The financial institutions can have different legal statutes. The most current statutes in the industry of the banking services are the joint stock companies (SA) and the mutual or co-operative companies.

A mutual company is the property of its customers. The ownership rights, obtained through the opening of an account, imply a share in the distribution of the surplus and a voting right when electing the board of directors: these rights are non negotiable and not liquid. The ownership rights disappear as soon as the customers close their accounts. The owners of the financial mutual companies have an ownership right that is not proportional to the size of their deposits since the co-operation articulates around the principle "a member = a voting right". Moreover, with the opening of their account, these owners customers have the possibility to give proxies of their voting rights to the administrators. The managers are then free to manage the company, sometimes at the expense of the legal owners and without fear of any takeover.

In the stock companies, the customers and the owners are two completely different groups of people. The owners or shareholders hold shares whose value depends on the profits of the company, and enjoy limited liabilities with respect to the activities of the company. The financial interest of the shareholders on the effectiveness of the managers is proportional to the shares they own; it is direct since the value of the shares depends on the profits perceived by the company.

The agency theory, which studies the conflicts of interests or agency problems within a firm as well as the agency costs while resulting, stipulates that the separation of the functions of owners and managers is not without problems (Jensen and Meckling, 1976; Fama, 1980a and 1980b; Fama and Jensen, 1983a and 1983b): up to what point are the managers likely to privilege their own interests to the detriment of those of the holders of capital? They could be tempted to have a counterproductive behaviour, while agreeing, for example, of immoderate advantages, by adopting a too off-hand attitude or by accumulating much more funds than necessary.

The form of a company can either attenuate, or on the contrary, worsen the conflicts of interest.

The mutual companies are not listed on Stock Exchanges; they do not have the possibility of issuing shares or options in order to align the interests of their managers on those of their members. Their general meetings are

announced without much publicity and hardly attract crowd. The majority of the members, little with the fact of finance, cannot judge if their mutual company is well managed. Moreover, the managers are not exposed to the risk of takeover. Lastly, the regulation often requires for the mutual companies a presentation of the financial statements less detailed and precise than that necessary for the limited companies. Thus, the principle of "a member, a voting right", characteristic of the co-operative operating mode, can leave a too great autonomy to the management and lead to anti-economic decisions.

On the other hand, since its shares are listed on Stock Exchanges, the performances of a joint stock company can be measured according to a transparent and relevant economic criterion. For the mutual companies, one does not have such a reference. In addition, the shareholding constitutes a good way of motivating the managers and the employees occupying a strategic position. The shares and the stock-options of the company can, indeed, reward some employees having contributed, by their decisions, to increase the shareholders value added. Lastly, the risk of takeover obliges the managers to always take the full measurement of their responsibilities. To compensate the fact that they cannot distribute shares, numbers of great mutual companies used to set up gratification systems aiming to reward their personnel in an equivalent way. However, it remains difficult for mutuals to measure their performances and to make converge the interests of their managers and those of their members.

By using French data, this paper tries to bring some replies to the current debate on the superiority of the structure of joint stock companies over the structure of mutual companies, in terms of management of agency problems.

I.2. THE FRENCH BANKING SECTOR

The French banking system is a system in which coexist mutual and stock companies, which face the same regulation since the 1984 banking law. Given the great numbers of demutualisations in the Anglo-Saxon countries, several authors start to question the perennity of the French mutualist structure.

The flotation of the central body of the Crédit Agricole, and the purchase of stock commercial banks by the large mutualist groups, make re-appear the mutual vs. stock company debate. Some claim with the superiority of the mutual structure through the values it defends. They justify the reconciliation towards the traditional banks by the need to adapt to their environment. Others claim that the mutual structure is a structure of the past, and that its reconciliation towards stock banks represents only one preliminary stage with their demutualisation.

The mutual banks in France are four: the Crédit Agricole which join together 43 mutual regional offices or *caisses*, the Banques Populaires which join together 20 mutual regional offices and which purchased the Crédit Coopératif in 2003, the Crédit Mutuel which joins together 19 mutual regional offices, and the Caisses d'Epargne, mutualized since 2002. In 2004, the French mutual banks had about 15 000 counters and employed 40% of the agents of the sector, that is to say approximately 180 000 employees. They collect 30% of the deposits and manage 35% of the credits.[2]

These last years, the French banks face a universe of markets globalisation and of increasing sophistication of the financial products, an intensification of the competition and a race to the critical size, in which the realization of scale economies becomes crucial. In order to adapt, the mutual French banks must be as competitive as the joint-stock ones, in particular with regard to the management of their agency problems. This paper is thus interested in testing the existence of a relation between the organisational structure of the banks and their agency problems resulting from the conflicts of interest and materialized by an excessive use of the inputs by the managers.

II. EXISTENCE AND ESTIMATION OF THE AGENCY PROBLEMS

The existence of agency problems shows a weakness in the control of the management. This weakness could lead the managers to have an expense preference behaviour, opposite with the shareholders value maximization. This behaviour leads then to a non optimal management of the company, in other words, a management which would not allow to reduce the costs or to maximize the profits. This non optimality of management is regarded as a source of cost inefficiency.

The notion and the study of the inefficiency were introduced by Farrell (1957). He defines the inefficiency as the deviation of a behaviour from its optimal level. The efficiency frontier gathers the optimal benchmarks from which the gaps are calculated.

The inefficiency measures the level of excessive cost that a bank could support to produce a certain level of output, and the difference between the level of output produced by this bank and that of an efficient bank. The concept of X inefficiency, introduced by Leibenstein (1966), and which gathers the cost inefficiency and the profit inefficiency, is founded on the observation that the organizations don't exploit their resources in an optimal way. This method consists in estimating the best practice cost or profit function which represents the cost or profit function of the most efficient bank and to measure the deviation or the inefficiency from this frontier.

As the management control is regarded as being weaker in the mutual companies compared to the stocks, a comparison of the cost inefficiencies of these two forms of banks could inform us about the existence of more agency problems (materialized primarily by the existence of expense preference behaviours) in the mutual companies compared to the joint stock ones.

This paper tests the assumption of expense preference, which stipulates that the mutual companies don't manage to minimize their cost because of the existence of unresolved conflicts of interests; the mutual companies should be less efficient than the stocks.

II.1. METHODOLOGICAL APPROACH TO ESTIMATING COST INEFFICIENCY

We use the parametric approach of the stochastic frontier, used by Mester (1993) and Hasan and Lozano-Vivas (2002), to estimate the cost inefficiency of the French banks (this inefficiency gathers the technical and the allocative inefficiency according to various authors as Berger and Humphrey, 1997; Altunbas *and al.*, 2000 ;...).

To this end, a stochastic cost frontier is constructed in order to consider a theoretical least cost function of the industry, which will be attributed as the efficient cost function that belongs to the best practice bank. Accordingly, the best practice bank is said to employ the minimum amount of inputs to produce a given level of outputs.

According to this approach, the cost frontier is estimated by the maximum likelihood methodology by using a statistical procedure that decomposes the error term into two parts:

- the first term v is the statistical noise that represents random fluctuations due to measurement errors and luck factors; it is normally distributed and is believed to be independently distributed with zero mean and σ_v^2 variance,
- the second term u is the inefficiency term which is supposed to result from mistakes in the choice of input mix that are specific to the firm's practice; this term is half normally distributed. It is assumed to be a non negative error term and to be distributed independently of v term. This inefficiency could result from a weakness in the management.

We specify a transcendental logarithmic or translog cost function for the French banks to estimate the inefficiency. The Fourier flexible model is considered as a preferred approach since our sample presents banks of different sizes. However, such a specification supposes the existence of a great number of observations, because of the great number of parameters to be estimated: this is not our case. In addition, the aim of our study is to compare the inefficiencies of the mutual banks with those of the stock ones, and not to seek information on the inefficiency of each group of banks. Moreover, several works as those of Berger and Mester (1997), Hasan and Lozano-Vivas (2002), Altunbas and Chakravarty (2001)... showed that the use of the Fourier or the Translog functional form gave similar results.

We consider that the French banks adopt the intermediation approach[3] which, according to Sealey and Lindley (1977), stresses the financial dimension of banking. In other words, the banks use the inputs labour, capital and deposits to produce loans and securities (or financial investment). Following Mester (1996), Berger and Mester (1997) and Altunbas *and al.* (2000), we include a *netput* variable (PROV) to control for the output quality of the banks[4].

The cost function of the bank i at the date t is then:

$$LogCT_{it} = a_0 + \sum_{l=1}^{2} a_l Logy_{lit} + \sum_{j=1}^{3} b_j Log\, w_{jit} + 1/2 \sum_{l=1}^{2}\sum_{p=1}^{2} s_{lp} Log\, y_{lit}\, Log\, y_{pit} + 1/2 \sum_{j=1}^{3}\sum_{h=1}^{3} g_{jh} Log\, w_{jit}\, Log\, w_{hit} + \sum_{l=1}^{2}\sum_{j=1}^{3} d_{lj} Log\, y_{lit}\, Log\, w_{jit} + \alpha\, Log\, PROV_{it} + u_{it} + v_{it}$$

Since the duality theorem requires that the cost function must be linearly homogeneous in input prices, the following restrictions have to be imposed on the parameter of the cost function:[5]

$$\sum_{j=1}^{3} b_j = 1$$

$$\sum_{h=1}^{3} g_{jh} = 0 \qquad j = 1,2,3$$

$$\sum_{j=1}^{3} d_{lj} = 0 \qquad l = 1,2,3$$

Furthermore, the second order parameters must be symmetric, so:[6]

$s_{lp} = s_{pl}$

$g_{jh} = g_{hj}$

Where **CT** is the total operating cost, **Y** is a vector of outputs which is composed of the loans to the customers and to the credit institutions, and of the financial investments[7], **W** is the input prices vector which include the cost of the labour factor (personnel costs/staff), the cost of the capital factor (Other operating expenses[8]/total assets), the cost of the deposits of the customers and the credit institutions (interests payable and similar charges from transactions with customers and credit institutions/ amounts owed to customers and to credit institutions) and the cost of the negotiable debt instruments (interests payable and similar charges from debt securities and other fixed income securities/negotiable debts[9]), **PROV** is the *netput* variable measured by the ratio (loan loss reserves/ total assets), and $\mathbf{u_{it}}$ is an error term which represents the inefficiency[10], and corresponds to the absolute values of a variable which has a normal distribution $N(\mu, \sigma_u^2)$[11], independently distributed of v_{it}, and $\mathbf{v_{it}}$ is an error term which represents the statistical noises and is normally distributed $\Pi N(0, \sigma_v^2)$.[12]

The table below summarizes our inputs and outputs:

The total cost is CT = Personnel costs + Other operating expenses + Interest expenses

Table 1. Inputs and outputs used in the cost efficiency model

Outputs	Inputs	Unit cost of the inputs
C: loans to customers + interbank loans	L: staff or number of employees	FP: personnel costs/L
T: securities or financial investments	capital	OP: other operating expenses/total assets
	F: Interbank deposits + deposits from customers + negotiable debt instruments	I: Interest expenses (interests paid)/F

The translog cost function homogenized and estimated is then:[13]

$$\begin{aligned}\text{Log } CT_{it}/I_{it} = {} & c + a_1 \text{ Log } FP_{it}/I_{it} + a_2 \text{ Log } OP_{it}/I_{it} + a_3 \text{ Log } T_{it} + a_4 \text{ Log } C_{it} \\ & + a_5 (\text{Log } FP_{it}/I_{it})^2 + a_6 (\text{Log } OP_{it}/I_{it})^2 + a_7 (\text{Log } T_{it})^2 \\ & + a_8 (\text{Log } C_{it})^2 \\ & + a_9 \text{ Log } FP_{it}/I_{it} \text{ Log } OP_{it}/I_{it} + a_{10} \text{ Log } FP_{it}/I_{it} \text{ Log } T_{it} \\ & + a_{11} \text{ Log } FP_{it}/I_{it} \text{ Log } C_{it} \\ & + a_{12} \text{ Log } OP_{it}/I_{it} \text{ Log } T_{it} + a_{13} \text{ Log } OP_{it}/I_{it} \text{ Log } C_{it} \\ & + a_{14} \text{ Log } T_{it} \text{ Log } C_{it} + a_{15} \text{ Log } PROV_{it} + u_{it} + v_{it}\end{aligned}$$

The inefficiency term u gathers the technical inefficiency (which occurs when a bank employs more inputs than necessary to produce a certain level of output) and the allocative inefficiency (which occurs when a bank is unable to react optimally to relative prices of inputs). We exclude factor share equations as they embody Shepard's Lemma restrictions, since the estimate of these equations supposes the non existence of allocative inefficiency (Berger and Mester, 1997).

We consider that the mutual banks and the stock ones have different cost functions in order to avoid confusing technologies used, which could be different between mutuals and stocks, and the agency problems (Mester 1993 and 1996; Hasan and Lozano-Vivas, 2002). In spite of the various studies which confirm such a result, we then compare the results obtained with those derived from a sample combining the two ownership structure, using the maximum likelihood ratio test.

We estimate the cost functions using the maximum likelihood estimation. The results of the regression of the translog cost functions would make it possible to obtain, according to Aigner *and al.* (1977), Jondrow *and al.* (1982), Mester (1993)..., measurements of cost inefficiency for each bank:

$\hat{u}_{it} = E(u_{it}/u_{it} + v_{it})$, u_{it} being the measurement of the inefficiency of the bank i at the date t.

The cost efficiency score is obtained according to Berger and Mester (1997) by:

$$\text{Cost efficiency score} = \frac{\widehat{C}^{\min}}{\widehat{C}} = \frac{\exp\left[\widehat{f}(w,y,z,v)\right] \times \exp[\widehat{u}^{\min}]}{\exp\left[\widehat{f}(w,y,z,v)\right] \times \exp[\widehat{u}]} = \frac{\exp[\widehat{u}^{\min}]}{\exp[\widehat{u}]}$$

II.2. THE COST INEFFICIENCY DETERMINANTS

In order to specify the cost inefficiency determinants of the French banks and to check the assumption of expense preference behaviour of the managers, we regress the cost inefficiency terms obtained for each bank, which correspond to u_{it} ($u_{it} = E(u_{it}/u_{it} + v_{it})$), on some variables specific to the banks, and which could have an influence on the inefficiency levels, for a panel data.

Most of these variables have been used in studies such as those of Mester (1996), Guarda and Rouabah (1999), Altunbas *and al.* (2001) and Mohamed and Molyneux (2003) and depend on the availability of the data[14]:

- **SP:** the ownership structure of the bank: a dummy variable which takes value 1 if the bank is a stock one, and value 0 if it is mutual.
- **KP:** the ratio stockholders' equity/total assets: regarded as an indicator of the financial health of the bank and thus of its risk level.
- **ROA:** the ratio net income/total assets: regarded as an indicator of the profitability of the bank.
- **VI:** the ratio fixed (tangible and intangible) assets/total assets: which is an indicator of the balance-sheet mix.
- **AT:** the logarithm of total assets or the total balance-sheet of the bank: which informs about the bank size and thus about his market power.
- **CRE**: the ratio loans to customers/total assets: which is an indicator of the balance-sheet mix.
- **DEP:** the ratio deposits from customers / total assets: which is an indicator of the balance-sheet mix and of the financing strategy of the bank as decided by its managers (it is the traditional financing source of the banks).

Besides those variables, we include two other variables to control for the differences in the bank activities (intermediation vs other activities):

- **R**: the ratio interest revenues/operating revenues: the interest revenues are the revenues derived from the traditional intermediation activities of the banks; Thus, this ratio is a proxy of the share of the intermediation activities of the bank.
- **RSP:** it's the variable R*SP: this variable control for the bank activities considering its ownership structure. As the SP variable takes value 1 for the stock banks and 0 for the mutual banks, the RSP variable control for the stock bank activities.

Basically, the authors of various studies (Mester, 1996; Altunbas *and al.*, 2000) believe that the factors of risk are important variables determining the inefficiency levels. Accordingly, our inefficiency determinants model mainly includes the ratio KP, used as proxies for risk, and the ratio ROA used as proxy of performance.

The efficient banks are regarded as having a lower risk and a greater capacity to generate profits that help in accumulating more retained earning added to the financial capital of the bank. The sign of KP is expected then to be negative; the sign of ROA should be negative (since the least efficient banks should employ their inputs in non productive outputs that earn low returns).

Moreover, since we wish to compare the inefficiency of the mutual companies with that of stocks, we include the dummy variable SP. The larger inefficiency of a structure compared to the other would allow us to conclude about the possible existence of significant agency problems.

The variables R and RSP are introduced to control for the bank activities: the differences in cost inefficiencies may be due to the difference in the banks activities, particularly for the stock banks which are more diversified than the mutual ones.

Other variables are also considered in order to capture additional characteristics of the banks. In fact, the variables CRE, VI and DEP control the balance-sheet mix and the variable AT control for the bank size.

Table 2. Descriptive statistics of the variables used in the efficiency frontier model for the 22 stock banks

Variable	Obs	Mean	St. devia.	Min	Max
CT	154	3165,314	6961,212	39,77	39848
FP	154	0,0562	0,01121	0,0422	0,1162
OP	154	0,0187	0,01316	0,0011	0,1308
I	154	0,0413	0,0176	0,0153	0,1001
T	154	10553,13	25216,35	20,3	128743
C	154	29101,91	64400,22	324,2	399978

Source: Bankscope and calculations of the author.

Table 3. Descriptive statistics of the variables used in the efficiency frontier model for the 49 mutual banks

Variable	Obs	Mean	St. Devia.	Min	Max
CT	343	213,4586	161,3144	21,5	923,8
FP	343	0,0484	0,0068	0,036	0,1008
OP	343	0,0193	0,0067	0,0069	0,0735
I	343	0,0373	0,0131	0,0132	0,1740
T	343	220,5609	200,7524	5,8	1094,9
C	343	2644,587	2060,884	234,4	15072,7

Source: Bankscope and calculations of the author.

We then propose to consider the following model, in panel data, in order to present the determinants of the cost inefficiency of the French banks:
Ineff = F (SP, KP, ROA, VI, AT, CRE, DEP, R, RSP)

$$u_{it} = b_o + b_1 SP_{it} + b_2 KP_{it} + b_3 ROA_{it} + b_4 VI_{it} + b_5 AT_{it} + b_6 CRE_{it} + b_7 DEP_{it} + b_8 R_{it} + b_9 RSP_{it} + e_{it}$$

Where u_{it} is the cost inefficiency of bank i at the period t and e_{it} an error term.

II.3. DATA AND VARIABLES

a. Data

Our sample includes some regional *caisses* of the Crédit Agricole[15], the Banques Populaires and the Crédit Mutuel, which are mutual companies (49 mutuals, which constitute approximately 30% of the total assets of the French mutual banks[16]), and the commercial French stock banks (22 banks, which constitute approximately 50% of the total assets of the commercial banks in France[17]) over one period going from 1995 to 2001.

The choice of our sample of banks results from the availability of the data on *the Bankscope* database. This database gathers some 600 French banks. However, several banks are present in double in the database according to the consolidation of their balance-sheet (consolidated balance-sheet and balance-sheet unconsolidated), or of their different name (such as for example the caisse régionale du Crédit Agricole de l'Ouest and the Crédit Agricole de l'Ouest which indicate the same bank). Moreover, several balance-sheets of banks are inalienable over all the period 1995-2001, or inalienable for certain years of this studied period.

In addition, since we will study the French stock and mutual banks, and as the mutuals are retail banks, we

Table 4. Descriptive statistics of the inefficiency determinants for the stocks

Variable	Obs.	Mean	St. devia.	Min	Max
KP	154	0,0355	0,0205	– 0,1062	0,0851
ROA	154	0,0026	0,0127	– 0,1356	0,0170
VI	154	0,0089	0,0057	0,0005	0,0343
AT	154	154	8,8083	1,8952	5,9784
CRE	154	0,5231	0,1731	0,1416	0,8161
DEP	154	0,5276	0,2036	0,0459	0,8554
R	154	0,5526	0,1208	0,0958	0,8674

Source: Bankscope and calculations of the author.

Table 5. Descriptive statistics of the inefficiency determinants for the mutuals

Variable	Obs.	Mean	St. devia.	Min	Max
KP	343	0,0633	0,0218	– 0,0713	0,151
ROA	343	0,0046	0,0044	– 0,0327	0,0116
VI	343	0,0105	0,0046	0,0027	0,0296
AT	343	7,7757	0,7034	5,6507	9,7496
CRE	343	0,6974	0,1027	0,3617	0,8920
DEP	343	0,5333	0,2533	0,1502	0,8990
R	343	0,6283	0,0752	0,3809	0,8607

Source: Bankscope and calculations of the author.

cannot compare an investment bank or a foreign bank established in France, with a French mutual retail bank. However, several banks available in the *Bankscope* database are investment banks, assets management banks, and foreign banks established in France or held by foreigners.

So, for our sample of stock banks, we retained only the French commercial banks whose principal activity is the collect of deposits and the granting of loans; we did not take account of the foreign banks established in France or held by foreigners, neither the investment bank, nor the banks which practise the assets management as principal activity. We also eliminated the banks for which the data are inalienable during the period 1995-2001. Moreover, since the balance-sheets available for the mutual banks are unconsolidated balance-sheets, we retained only the stock banks which have an unconsolidated balance-sheet.

For the mutual banks, we retained all the regional *caisses* of the mutual groups which are on the *Bankscope* database, and whose unconsolidated balance-sheets are available over all the period 1995-2001[18].

b. Variables

The tables 2 and 3 summarize the whole variables used in the cost functions.

We present in the tables 4 and 5 the descriptive statistics of the different variables used in the linear model of the inefficiency determinants, for each group of banks separately.

All these variables are given along with their descriptive statistics including sample means and standard deviations.

■ III. ESTIMATION RESULTS

III.1. COST INEFFICIENCY ESTIMATION

We used the STATA Version 8 software to estimate the inefficiencies, using the random effects panel data approach.

The estimation results of the stochastic cost frontier model, considering that the inefficiency terms are half normally distributed, gave the results below (Tables 6 and 7).

We carried out the cost inefficiency estimation considering that the inefficiency terms u_{it} are time varying, according to the method of Battese and Coelli (1992).

According to these authors, the inefficiency term u_{it} is modelled as a truncated normal random variable multiplied by a specific function of time:

$$u_{it} = u_i \star \exp[\theta\star (t - T)]$$

Where **T** corresponds to the last time period in each panel, **t** is the year considered, θ is the decay parameter to be estimated and u_i are assumed to have $N(\mu, \sigma_u^2)$ distribution truncated at zero.

The estimation results of a model with time varying inefficiency terms, considering separate cost frontiers for the mutual banks and the stock banks[19], gave a θ which is very near to zero, significant for the mutuals and for the stocks. These results show that the inefficiency terms are time varying for the mutuals and for the stocks[20].

With regard to the choice of the functional form, the translog form is tested against the Cobb Douglas model[21]. The Fisher test shows that the hypothesis that the Cobb Douglas model is valid was rejected at 1% significance level for the cost function of the mutuals and of the stocks.

The table 6 below summarizes the time varying inefficiency terms $u_{it} = E(u_{it}/u_{it} + v_{it})$ for the stock and the mutual banks (each ownership structure, stock and mutual, having its own cost frontier)[22] obtained by the STATA software:

The efficiency scores are calculated, according to Berger and Mester (1997), as being:

$$\text{Efficiency score} = \frac{\exp[\widehat{u}_{it}^{\min}]}{\exp[\widehat{u}_{it}]}$$

They are summarized in the table 7:

An efficiency score of 0,49 indicates that the bank is efficient at 49%; in other words, it has 51% more costs compared to the most efficient bank in the sample for the same production level.

Table 6. Cost inefficiency terms

Banks	Variable	Obs.	Mean	St. deviation	Min	Max
Stocks	$u_{it} = E(u_{it}/u_{it} + v_{it})$	154	0,3875	0,1772	0,0310	0,7325
Mutuals	$u_{it} = E(u_{it}/u_{it} + v_{it})$	343	0,1536	0,0409	0,0495	0,2358

Table 7. Cost efficiency scores

Banks	Variable	Obs.	Mean	St. deviation	Min	Max
Stocks	$Score = \exp(u_{itMin}) / \exp(u_{it})$	154	0,7113	0,1294	0,4958	1
Mutuals	$Score = \exp(u_{itMin}) / \exp(u_{it})$	343	0,902	0,0371	0,8299	1

The observation of these results shows that, in average, the cost inefficiency of the mutual banks is less than that of the stock banks and that the efficiency score of the mutuals is higher than that of the stocks. We can say that the mutual banks are more cost efficient than the stock ones.

We tested the difference in average of the inefficiency terms between mutual and stock banks. The results show that the difference in average is significant at 1% significance level[23], and that the inefficiency of the stock banks is, on average (0,38), higher than that of the mutual banks (0,15).[24]

This first result shows that, in the French case and in average, the mutual banks are more efficient than the stock ones, and can better control their costs. This greater aptitude could indicate that the mutual banks are as well managed as the stocks; so they are less subjected to the opportunistic behaviours of the managers as compared to the stock banks.

III.2. THE INEFFICIENCY DETERMINANTS

Given that we are estimating a model using panel data, and since the White test rejected the null hypothesis of homoskedasticicty and the Wooldridge test rejected the null hypothesis of absence of order 1 autocorrelation, we use the Generalized Least Squares to estimate the inefficiency determinants model.

The results of this regression are shown in table 8:

The estimation results show that the coefficients of the variables ROA, VI, CRE, R and RSP are not significant. Thus, the profitability and the kind of bank activities are not correlated with the bank cost inefficiency.

The sign of KP coefficient is negative indicating that the more inefficient bank have more risk that may be attributed to inadequate capital maintained in their operations. Thus, our estimation results confirm previous findings on this variable (Dietsch and Lozano-Vivas (2000), Mohamed and Molyneux (2003))

The coefficient of the AT variable is positive and significant. This result translates the existence of diseconomy of scale in the French banks. In other words, the more the bank is large, and has agencies, the more it has difficulties in managing its costs and less it is efficient. Indeed, the bank strategy to extend its activities, in particular through the opening of agencies, could reduce the control to which the managers are subjected; so, they could misusing this freedom by some expense preference behaviours. This result is comparable to that of Hasan and Lozano-Vivas (2002) on the Spanish banks, that of Berger and Mester (1997) and Hermalin and Wallace (1994) on the American banks and that of Bonin *and al.* (2005) on the Eastern Europe countries banks.

The coefficient of DEP variable is positive and significant. This result may indicate that French banks face a diseconomy of scale in collecting deposits.

The variable which is most important for us is the variable SP which is positive and significant at 1% level. This result shows that the French mutual banks are more cost efficient than the stock banks, contrary with that of Mester (1993) who had found that the joint-stock American banks were more efficient than the mutual ones. The agency problems of the mutual banks, in France, are not higher than those of the plc, and the assumption of a bad management related to opportunistic behaviours of their managers does not appear. The cost inefficiency of the mutual banks is weaker than that of the plc, considered as being subjected to more rigorous control mechanisms. This result agrees with that found when comparing the averages of cost inefficiency terms and allows us to

Table 8. Results of the regression of the cost inefficiency determinants

u_{it}	Coefficient	St. deviation	t-Student	P > t
SP	0,195***	0,0120	16,23	0
KP	– 0,1577***	0,0291	– 5,43	0
ROA	0,0033	0,1431	0,02	0,982
VI	0,0766	0,1523	0,50	0,615
AT	0,0431***	0,0019	23,11	0
CRE	– 0,0116	0,0077	– 1,50	0,134
DEP	0,1074***	0,0055	19,45	0
R	0,0001	0,00008	1,44	0,151
RSP	– 0,0002	0,0002	– 0,99	0,321
Constant term	– 0,2269***	0,0179	– 12,70	0

***: significant at 1 % level

Estimation by GLS considering the heteroskedasticity of the errors highlighted by the White test and the autocorrelation of the errors highlighted by the Wooldridge test. The explanatory variables are not correlated. The model thus estimated is globally significant according to the Wald test.

confirm the absence of opportunistic behaviours of the managers in the French mutual banks.

So the assumption according to which the conversion of the mutual banks into plc is due mainly to the existence of significant agency problems in the mutuals, does not apply to the French case. Indeed, the French mutual banks are more efficient than the joint stock banks. Thus, the *expense preference* hypothesis is not applicable to the French case.

IV. Conclusion

The mutual-stock comparison enables us to conclude that the expense preference behaviour of the managers of the mutual companies is non-existent in the French banking sector. A larger cost inefficiency is observed in stock banks; it could be explained by a higher probability to make errors of decisions and management because of more complex and more diversified activities.

Various reasons can explain this observation:

- Being local banks, the mutual banks limit the asymmetry of information on the customers, which would justify the least cost inefficiency observed.
- This result could also be explained by weaker diversification activities by the mutual banks and a weaker risk comparing to plc's.
- As the management control by the external shareholders and by the market doesn't exist in the mutual banks, another explanation is provided by the pressure exerted on the managers by an internal discipline relating to mergers between co-operative groups, or of reorganizations within the same group. This discipline leads to the disappearance of the failing *caisses* and the absorption of the least effective entities to carry out economies of scale. It can follow regroupings or removals of post, changes of management, a questioning of the advantages acquired... This threat weighted on the personnel and the management is thus concrete and constitutes a force of permanent recall.

The principal reason which pushed a number of Anglo-Saxon mutual banks to demutualise, namely a weak control of the managers which enables them to act for their own interests, does not exist in the French mutual banks.

The French mutual banks do not face more agency problems than the stock banks: so, there is not pressing reason to demutualise, except the access to the capital market.

Moreover, the study of the French banking structure shows a wave of mutualisation, contrary to the majority of the Anglo-Saxon countries (the mutualisation of the Caisses d'Epargne, the purchase of stock commercial banks by the mutualist groups) and a considerable importance of the mutual sector. This phenomenon could be explained, through our study, by a better control of the costs on behalf of the mutual banks by comparison to the stock banks.

For the access to the capital market, the incapacity to raise funds which characterizes the Anglo-Saxon mutual banks, is circumvented by the French mutual banks by a policy of purchase of stock subsidiaries: Thus, the Crédit Agricole repurchased Indosuez[25] in 1996 and Sofinco[26] in 1997, and lastly the Crédit Lyonnais in 2003; the Crédit Mutuel took the control of the Crédit Industriel et Commercial (CIC) in 1998; the Banques Populaires control Natexis since 1998; the Crédit Coopératif took the control of Finindus in 1997...

So, rather than to change internally, the French banks practise an active external growth toward the capitalist sector, in order to be able to have access to the capital market. ■

1 Verbrugge and Jahera (1981), Gropper and Beard (1995), Gropper and Oswald (1996), Mester (1991), Hasan and Lozano-Vivas (2002)...

2 Source: Annual reports of the Commission Bancaire and the CECEI of 2004.

3 The other approach, that of production, consider that the deposits are outputs, and use the number of deposit accounts and the number of loans, data which are inalienable for us. According to the existing literature on the banks efficiency, the two approaches give the same conclusions concerning the cost structures of the financial institutions (Sealey and Lindley, 1977; Mester, 1993; Cebenoyan *and al*., 1993).

4 Berger and Mester (1997) argue that this variable (loan loss reserves divided by customer loans) may be a function of management efficiency, efficient banks will be better monitors and hence will have lower losses, and hence it is endogenous, not exogenous. Our referee also suggested to include it in the banks' cost functions.

5 Any cost function must be homogeneous degree one in input prices. Thus, a proportional increase in all the prices increases the total cost in the same proportion, without affecting the factors demand: this is the homogeneity condition. The constraints of homogeneity are imposed by dividing the total cost, and the price of the two inputs by the price of the third input. The choice of this last input is without incidence on the results since the estimators are obtained by the maximum likelihood estimation.

6 The Hessian of the cost function can't be symmetrical only if the equality $d^2CT/dx_i dx_j = d^2CT/dx_j dx_i$ is satisfied for any pair of the variables x_i and xj: this is the assumption of symmetry.

7 The financial investments are composed by the fixed income debt securities, the variable-yield shares, the investments in non consolidated subsidiaries and the treasury bills and similar bills.

8 The other operating expenses are the non interest expenses – personnel costs. The input price is obtained by dividing the other operating expenses on total assets, because these expenses are relative to all of the bank activities. We use this input cost instead of the fixed capital cost because it's more general since it includes all of the bank other operating costs except the interest costs and the personnel costs, which are the input prices of labour and deposits.

9 The negotiable debts are the deposit notes, the negotiable debt, the other debt evidenced by certificates, the negotiable debt instruments, and the bonds.

10 The cost inefficiency u_i gathers the technical inefficiency and the allocative inefficiency.

11 Berger and DeYoung (1997) showed that the truncated normal distribution of the inefficiency term for the banks leads to a weaker average inefficiency than the half normal distribution; However, the order of classification of the banks according to their inefficiency remains the same one. Altunbas and Molyneux (1994) showed that the estimates of inefficiency are insensitive to the distribution chosen for the inefficiency term, since all the distributions (half normal, truncated normal, gamma, exponential normal) give similar levels of inefficiency for the German banks.

12 According to Aigner, Lovell and Shmidt (1977), the error term v is random and can take positive or negative values according to the nature of luck and factors out of management control that affect bank performance.

13 We homogenized the total cost and the price of capital and labour by the interest costs. This choice is without incidence on the results since the estimators are obtained by the maximum likelihood methodology.

14 We did not include the ratio PROV = Loan loss reserves/Customers loans, as an inefficiency determinant, since we control for this in the cost model from which our inefficiency measures are derived.

15 Although the central body of the Crédit Agricole became a joint stock company listed on Stock Exchange in 2001, the regional *caisses* remain mutual.

16 Except the Caisses d'Epargne which were mutualised in 2002.

17 The commercial banks in France are the AFB banks which include the French banks as well as the foreign banks established in France and the banks held by foreigners.

18 It is true that the size of our sample as well as the number of years considered could constitute a limit for our analysis. However, we were constrained to limit us because of a lack of data, particularly for the regional caisses of the mutual banks. Indeed, to our knowledge, and in spite of our many research, it proved that the database *Bankscope* is the only database which contains such information, and it keeps only the data relating to seven years.

19 The likelihood ratio test rejected the common frontier at 1% significance level. This result corroborates the assumption of Mester (1993) according to which the mutuals and the stocks have different production technologies, each one specializing in certain activities.

20 The value of θ is – 0,0154 for 22 SA with a t-student of – 3,31, therefore significant at 1% level. It is 0,000161 for the 49 mutuals, with a t-student of 6,38, therefore significant at 1% level.

21 The advantage of a translog function compared to a Cobb Douglas is that it is adapted to a several outputs model, and that it can model any cost function (Kumbhakar and Lovell, 2000).

22 The Park Glesjer test was used to test for heteroskedasticity: we regress the square of the error term on all the explanatory variables. If the coefficients estimated are not significant, then there is no problem of heteroskedasticity. In our case, all the estimated coefficients are non significant for the mutual and for the stock banks; so, there is no problem of heteroskedasticity in our model.

23 The null hypothesis of equality of the averages is rejected at 1% significance level according to the nonparametric test of Mann Whitney (proba = 0).

24 We also estimated the cost inefficiency of the stock banks without considering the three bigs: Société Générale, BNP, Crédit Lyonnais, because of the possible existence of biases due to the diversity of the activities of these big banks. The same results are obtained: the mutual banks are more cost efficient than the stock banks.

25 French investment bank.

26 Private bank specialized in the granting of the consumer credits.

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