Laboratoire
de Recherche
en Gestion
& Economie

LARGE

LARGE

Papier

Papier

n° 2008-04

# The Effects of Concentration on Competition and Efficiency : Some Evidence from the French Audit Market

Géraldine Broye , Laurent Weill

Février 2008

Faculté des
sciences économiques
et de gestion

PEGE
61, avenue de la Forêt Noire
67085 STRASBOURG Cedex
Tél. : (33) 03 90 24 21 52
Fax : (33) 03 90 24 20 64
www-ulp.u-strasbg.fr/large

Institut d'Etudes Politiques
47, avenue de la Forêt Noire
67082 STRASBOURG Cedex

# The Effects of Concentration on Competition and Efficiency: Some Evidence from the French Audit Market[+]


Géraldine Broye[i]

*CESAG, Université Robert Schuman, Institut d'Administration des Entreprises*

*61 avenue de la Forêt-Noire, 67000 Strasbourg, France.*

Laurent Weill[ii]

*LARGE, Université Robert Schuman, Institut d'Etudes Politiques,*

*47 avenue de la Forêt-Noire, 67000 Strasbourg, France.*



[+] We would like to thank the participants of the 28th Congress of the European Accounting Association in Göteborg (May 2005) for their remarks.



[i] Tel: 33-3-90-41-43-32, fax: 33-3-90-41-43-44; e-mail: geraldine.broye@urs.u-strasbg.fr

[ii] Tel : 33-3-88-41-77-21 ; fax : 33-3-88-41-77-78 ; e-mail : laurent.weill@urs.u-strasbg.fr

# The Effects of Concentration on Competition and Efficiency: Some Evidence from the French Audit Market

**Abstract:**

This paper aims at investigating the effects of concentration on competition and cost efficiency of the French audit market. Competition is measured with the Rosse-Panzar model, while cost efficiency is estimated with stochastic frontier approach. Cost efficiency levels are estimated at around 75% with greater efficiency for Big-Four firms, while the nature of competition appears to be monopolistic competition. Dynamic analysis shows a reduction in competition, and a decrease in cost efficiency for Big-Four and non-Big-Four firms between 1999 and 2003. We therefore provide support to a negative impact of concentration on competition and cost efficiency.

*Keywords:* auditing, audit market, competition, efficiency.

JEL Classification: L1, M4.

## 1. Introduction

There is widespread evidence in favour of a high and increasing level of concentration on European audit markets (e.g. Buijink et al., 1998; Choi and Zéghal, 1999; Pong, 1999; Beattie et al., 2003; Willekens and Achmadi, 2003). While concentration on audit markets has been widely investigated, analyses of the effects of concentration on competition, and especially on cost efficiency, remain scarce. Nonetheless, what matters in terms of consumers' welfare is less concentration than competition and cost efficiency, as these both characteristics directly affect prices.

Conventionally, following the structural theory of industrial organisation (Bain, 1951), it is argued that concentration stands for a direct determinant of competition on the market. Rising concentration is expected to increase the likelihood of major firms' anti-competitive behaviour, and should thus trigger off higher prices for clients. However, empirical studies on audit markets do not corroborate this assertion. They rather provide evidence of a positive effect of concentration on competition (e.g. Wootton et al., 1994; Ivancevich and Zardkoohi, 2000). Besides, it can be argued that high concentration implies cost efficiency through of economies of scale, economies of scope, the exit or the purchase of the least efficient firms… This phenomenon should in turn lead to a reduction in prices (Demsetz, 1973). Alternatively, reduced competition may allow firm managers to relax their efforts to control costs, which may limit the favourable implications of competition on prices (Hicks, 1935).

This research assesses the effects of concentration on competition and cost efficiency by examining the structure of the French audit market. This market is very interesting to investigate given the specificities of the French auditing environment. First, firms publishing consolidated financial statements are required to select at least two auditors. This joint-auditing requirement may favour competition by allowing national audit firms to challenge international networks (Piot, 2007). Second, the auditors are appointed for a six-year commitment, which can be interpreted as an important barrier to entry. Third, the French audit market is characterised by an increasing merger activity among the main suppliers. This concentration is giving rise to concerns about reduced competition in the French audit market. A recent survey[1] reveals that 86% of 65 CFOs, issued from large French firms, consider that the audit

[1] *Option Finance*, n°877, 3/04/2006.

market is too concentrated . Their major concerns lie on the risk of higher audit fees and dependence towards auditors. These concerns are all the more important as the wave of concentration is expected to increase in the upcoming years, as illustrated by the very recent mergers of KPMG and Deloitte with two major domestic firms (respectively RSM Salustro Reydel and BDO Marque & Gendrot).

Our results should provide some keys on the possible consequences of such mergers on market structure characteristics. The key issue is to determine if the increasing concentration induces a reduction in competition and in cost efficiency. Such reduction would lead to an increase in the level of audit fees, and a deterioration of audited companies' welfare.

Our empirical tests are based on sophisticated measures assessing market structure characteristics. Competition in the market for accounting services is usually assessed with concentration ratios or Herfindahl indices (e.g. Minyard and Tabor, 1991; Wootton et al., 1994). In our work, we measure competition with the Rosse-Panzar model which takes into account the actual pricing behaviour of the firm, instead of using information on market structure. Cost efficiency is measured using the methodology of frontier efficiency techniques. Commonly applied in the banking industry or public utilities, these methods provide relative and synthetic measures of performance, the cost efficiency scores, which assess managerial performance to control costs.

The investigation of competition and cost efficiency may offer new perspectives of research for the analysis of audit markets. Furthermore, our results may provide implications for the regulator to assess whether concentration should be promoted or not on the audit market.

The structure of the paper is as follows. Section 2 presents the empirical background and describes the French audit market. Section 3 presents the methodologies and variables chosen to test competition and cost efficiency. Section 4 outlines the empirical results. Finally, we provide some concluding remarks in section 5.

## 2. Prior literature

### 2.1 Empirical literature

In an environment of growing merger activity among accounting firms, there has been a rising concern regarding the effect of increasing concentration on competition. It is commonly argued that rising levels of concentration result in an increase in market power, which can lead to anti-competitive behaviour and consequently to higher fees for clients. Several prior empirical studies examined the implications of rising concentration on competition. These works measure competition using concentration ratios, which report the share of a given metric of the largest suppliers (e.g. number of audits, clients' revenue), and Herfindhal indices, or examine the changes in audit fees following the mergers.

In contrast to the common belief, US studies tend to support a positive link between concentration and competition. According to Minyard and Tabor (1991), Tonge and Wootton (1991) and Wootton et al. (1994), greater concentration does not necessarily lead to lower competition. They document that the 1989 megamergers induced greater competition among the major accounting firms. Moreover, Ivancevich and Zardkoohi (2000) provide evidence of a decrease in prices driven by mergers, both for the merged firms and their direct rivals. Pearson and Trompeter (1994) also find a negative relationship between concentration and audit fees, which is consistent with the view that higher concentration leads to greater price competition.

The findings are similar in Europe. Choi and Zéghal (1999) show evidence that in some European countries, the performance of large audit firms, based on revenue per employee, was superior to that of small firms in the pre-merger and post-merger period, which is consistent with a reduced competition. However the performance of large and small firms does not significantly differ in several other countries, which indicates that high levels of concentration do not necessarily spark off reduced competition. Examining the German and Dutch audit market structure between 1970 and 1994, Buijink et al. (1998) also conclude that high levels of concentration do not indicate limited competition. In the UK, Iyer and Iyer (1996) find no evidence that the mergers set off a significant increase in audit fees. Similarly, Willekens and Achmadi (2003) show that price competition increased between 1989 and 1997 in Belgium, in a context of increasing concentration. To our knowledge, the only study supporting the market power hypothesis was drawn by Lee (2005). He observes that the 1989 mergers in Hong Kong favoured an increase in audit fees for the merged accounting firms.

To complete the debate on the relationship between concentration and market power, a few empirical studies chew over the efficiency consequences of concentration on the audit market. Many efficiency benefits are argued to come to light from mergers, as a result of economies of scale, economies of scope, the strategic use of complementary resources, the improvement in production techniques… Two studies examine the effects of the 1989 megamergers on the US audit market on cost performance (Ivancevich and Zardkoohi, 2000; Sullivan, 2002). Their results conjure up the positive impact of mergers on efficiency within the accounting market. Ivancevich and Zardkoohi (2000) provide evidence of an overall decline in audit price during the post-merger period, and a decrease in factor costs for the merged firms relative to their close rivals[2]. Sullivan (2002) examines the outcomes of auctions for corporate audit clients who switched auditors. She finds out that merged firms were more successful in competing for large clients, suggesting a reduction in the costs of auditing these specific clients. Based on a more recent period (1995-1999), Banker et al. (2003) analyse the relationship between the total revenue of the top 100 accounting firms in the US and three human resources inputs (number of partners, number of other professionals and number of other employees). They stumble on an improvement in average productivity over the four years.

## 2.2 The French audit market

We observe high concentration in the French audit market, as in other European countries. Piot (2005) and Broye (2007) provide evidence that concentration ratios in France are equivalent to those observed in the UK or the US. The Big Four audit firms dominate the market with 85% of the audit fees of the CAC 40 firms[3] in 2003.

[2] Measures of factor costs include: number of offices occupied by audit firms per billion dollars of assets audited, number of professional staff employed per billion dollars of assets audited, number of partners, and number of offices per 1000 professional staff.

[3] *(Le Monde*, February 25th 2005). CAC 40 is the stock market index including 40 of the largest companies listed on the French stock markets.

However the French audit market is also characterized by a group of large national networks, owning significant market shares among listed companies.

The domination of the "Big" emerged in the 1980s, and strengthened during the last 20 years as the result of important merger activity. The mergers primarily took place among the "Big". As we know, the *Big Eight* became the *Big Six* between 1987 and 1989, and finally the *Big Four* emerged in 2002. The 1990s were also characterized by significant mergers between Big Four firms and large national networks (for example Price Waterhouse and Befec in 1989, Deloitte Touche Tohmatsu and Calan Ramolino in 1997, KPMG and CCAS in 1997).

A wave of mergers also occurred among the domestic second-tier firms (for example Mazars and Guerard Viala in 1995, Amyot and Exco in 1997, Amyot Exco and Fidulor in 2001 to form Grant Thornton, Fiducial and E3C in 2001). As a consequence, the number of main suppliers significantly reduced over this period of time, giving rise to concerns about reduced competition.

According to Piot (2007), the joint-auditing requirement may preserve market competition in France. This author studied the joint-audit interconnections of the main audit networks over the period 1997-2003. He finds that increasing concentration did not result in abnormally frequent collaborations between the main audit firms. Our research proposes to investigate directly the effect of concentration on competition, but also on cost efficiency.

## 3. Methodology

### 3.1 Measurement of competition

The usual measures of competition in the audit market are structural measures of concentration, i.e. concentration ratios or the Herfindahl index (e.g. Wootton et al., 1994). The main limitation of these measures is their inference of the competition degree from indirect proxies such as market structure or market shares. They consequently ignore how accounting firms determine their price according to their underlying costs, and the potential competition on the market (i.e. potential new entries). Other studies resort to audit fees to measure competition, as lower audit fees are interpreted as evidence of greater competition (e.g. Pearson and Trompeter, 1994;

Iyer and Iyer, 1996; Ivancevich and Zardkoohi, 2000; Lee, 2005). However in these studies, if audit fees are to inform on the evolution of competition, they can not provide information on the degree of competition as they are not relied to firm costs.

This research proposes to measure competition by computing the Rosse-Panzar model (Rosse and Panzar, 1977; Panzar and Rosse, 1987). This model has been widely applied in banking (e.g. Bikker and Haaf, 2002; Weill, 2004) but also in other industries (e.g. Fischer and Kamerschen, 2003). The Rosse-Panzar model is a non-structural test, meaning that it assesses the competitive behaviour of firms without using information on market structure. Furthermore, it does not require information on output prices, which is particularly interesting to study the audit industry where output prices are a thorny case of evaluation.

This test is based upon the estimation of the H-statistic, which aggregates the elasticities of total revenues with respect to the input prices. This statistic indicates the extent to which the firms pass a variation in input prices on their fees. In a perfect competition environment, any change in input prices is expected to be entirely passed on fees. The H-statistic then determines the nature of the market structure as following:

| | |
|---|---|
| $H \leq 0$ | Monopoly |
| $0 < H < 1$ | Monopolistic competition |
| $H = 1$ | Perfect competition |

The major advantage of such a test, in comparison to structural measures of competition such as the concentration ratio C5 or the Herfindahl index, is that it weighs up the actual pricing behaviour of the accounting firm by including contestability. Contestability supposes that firms' behaviour is not only related to market structure, but also to the barriers to entry influencing the likelihood of new competitors' entry, and therefore the behaviour of incumbents who are forecasting such an entry (Baumol et al., 1982). As observed by Claessens and Laeven (2004) in banking, the actual behaviour of a firm is not only related to market structure, but also to the barriers to entry. These barriers, influencing the likelihood of new competitors' entry, naturally affect the behaviour of incumbents forecasting such an entry.

Our aim is to provide a measure of competition for each year to assess the evolution of competition in the French audit market. Therefore, we need to run separately the Rosse-Panzar model for each year. We then estimate the following equation for the measurement of Rosse-Panzar statistic :

$$ln\ TURNOVER = \alpha_0 + \alpha_1 \ln p_L + \alpha_2 \ln p_K + \alpha_3 \ln ASSETS + \varepsilon \qquad (1)$$

where *TURNOVER* represents total turnover, $p_L$ price of labour, $p_K$ price of physical capital, and *ASSETS* total assets. This last variable takes differences in size into account, as applied in Bikker and Haaf (2002) and Weill (2004). As it aggregates the elasticities of total revenues to input prices, the H-statistic is defined as the sum of the coefficients $\alpha_1$ and $\alpha_2$.

### 3.2 Measurement of efficiency

Cost efficiency is measured using the methodology of frontier efficiency techniques. These methods provide sophisticated measures of performance - the cost efficiency scores - which assess managerial performance to control costs. These measures present two major advantages in comparison with traditional performance indicators used in the accounting literature, such as measures of single factor productivity (Ivancevich and Zardkoohi, 2000), or profitability indicators (Choi and Zéghal, 1999). First, frontier efficiency techniques provide synthetic measures of performance. Indeed, unlike basic productivity ratios which report one input at a time, efficiency scores allow to include several input dimensions in the evaluation of performance. Second, efficiency scores are relative measures of performance. Namely, a cost frontier is estimated to enable the comparison of each firm to the best-practice firms. It then directly provides a relative measure of performance.

Graph 1 provides an illustration of the frontier efficiency methodology. A cost frontier is estimated, providing a benchmark for each firm for a given output. This is the “best practice” frontier allowing comparisons among the firms within the industry. The measure of cost efficiency indicates how close to the optimal cost that should have been supported for producing the same bundle of outputs a firm’s cost is. It then provides information on wastes in the production process and on the optimality of the chosen mix of inputs. The efficiency score is computed by comparing the optimal cost with the observed cost.

**INSERT GRAPH 1 HERE**

Several techniques exist to estimate the cost frontier. We use the stochastic frontier approach (SFA) to estimate the cost efficiency scores (Aigner et al., 1977). This approach is frequently applied in banking (Berger and Humphrey, 1997), but also in other industries such as public services or airlines. The basic model assumes that the total cost of the firm is a function of its output and the input prices. Total cost deviates from the optimal cost by a random disturbance, $v$, and an inefficiency term, $u$. Thus the cost function is $TC = f(Y, P) + \varepsilon$ where $TC$ represents total cost, $Y$ is the vector of outputs, $P$ the vector of input prices and $\varepsilon$ the error term which is the sum of $u$ and $v$. $u$ is a one-sided component representing cost inefficiencies, meaning the degree of weakness of managerial performance. $v$ is a two-sided component representing random disturbances, reflecting luck or measurement errors. $u$ and $v$ are independently distributed. $v$ is assumed to have a normal distribution with zero mean and variance $\sigma^2$. Several distributions have been proposed in the literature for the inefficiency component $u$: half-normal, truncated normal, gamma, exponential. We assume a gamma distribution for inefficiency terms following Greene (1990)[4].

We estimate yearly frontiers rather than one common frontier for the complete period to allow the coefficients of the cost frontier to vary over time. We estimate a system of equations composed of a translog cost function and its associated input cost share equations, derived using Shepard's lemma.[5] Estimation of this system adds degrees of freedom and results in more efficient estimates than the mere single-equation cost function. Since the share equations sum to unity, we solve the problem of singularity of the disturbance covariance matrix of the share equations by omitting one input cost share equation from the estimated system of equations. Standard symmetry constraints and homogeneity conditions are imposed. Thus, the complete model is the following:

[4] According to Jondrow et al. (1982), firm-specific estimates of inefficiency terms can be calculated by using the distribution of the inefficiency term conditional to the estimate of the composite error term. Greene (1990) has then provided the estimate of the cost inefficiency term with a gamma distribution. See Kumbhakar and Lovell (2000) for further details on stochastic frontier approach.

[5] Previous studies estimating production and cost functions for accounting firms also adopt a translog form (Cheng et al., 2000b, to estimate economies of scale and scope, and Banker et al., 2003, to estimate a production function and a production frontier).

$$\ln TC = \alpha_0 + \alpha_1 \ln \mathrm{y} + \alpha_2 (\ln y)^2 + \beta_1 \ln p_K + \beta_2 \ln p_L + ½\ \delta_1 (\ln p_K)^2 + ½\ \delta_2 (\ln p_L)^2 + \delta_3 (\ln p_L)(\ln p_K) + \gamma_1 (\ln y)(\ln p_K) + \gamma_2 (\ln y)(\ln p_L) + \varepsilon \quad (2)$$

$$S = \mathrm{d} \ln TC \,/\, \mathrm{d} \ln p_L = \beta_2 + \delta_2 \ln p_L + \delta_3 \ln p_K + \gamma_2 \ln y + \eta \quad (3)$$

where $TC$ represents total cost, $y$ turnover, $p_L$ price of labour, $p_K$ price of physical capital, $S$ labour cost share[6], $\eta$ error term ($\eta$ independent from $\varepsilon$). The system of equations is estimated using Iterative Seemingly Unrelated Regression (ITSUR) estimation technique.

To our knowledge, SFA has only been applied once in the market for accounting services by Banker et al. (2003). However this research is allusive regarding the application of efficiency frontiers, as it focuses on the estimation of a production function and only mentions the use of this technique. An alternative technique, Data Envelopment Analysis (DEA), has been proposed by Cheng et al. (2000a) to evaluate Taiwanese accounting firms' technical efficiency in 1994. While SFA is based on econometric techniques, DEA uses linear programming tools to estimate efficiency scores. We prefer applying SFA in this work to compute efficiency scores rather than DEA. Indeed DEA considers the whole distance from the frontier as inefficiency, resulting in a possible overestimation of inefficiencies and a high sensitivity of efficiency scores to outliers. In comparison, SFA presents the major advantage of disentangling the distance from the frontier between efficiency and a statistical noise taking exogenous events into account in the error term, avoiding the drawbacks of DEA.

[6] $S$ is equal to the personnel expenses divided by total cost.

### 3.3 Data and variables

Data for accounting firms were gathered from the "Diane" database edited by Bureau Van Dijk, which contains financial information for more than 400 000 firms. We limit our analysis to the largest accounting firms, i.e. with revenues greater than 4 millions of euros[7]. We then use an unbalanced panel during the period 1999-2003[8]. This period was marked by the emergence of the Big Four group, with the merger between Coopers & Lybrand and Price Waterhouse in July 1998 and the collapse of Arthur Andersen in 2002. A key issue is the extent to which these events have resulted in important changes in competition and cost efficiency.

As a measure of output, we use total turnover to compute the cost frontier. The inputs, whose prices are used to estimate the cost efficiency frontier and the Rosse-Panzar statistic, include labour and physical capital. The price of labour is measured by the ratio of personnel expenses to the number of employees. The price of physical capital is defined as the ratio of depreciation to fixed assets. Total costs requested in the cost frontier are the sum of personnel expenses, measuring labour costs, and depreciation, measuring physical capital costs.

Table 1 presents summary statistics for our sample. We observe that mean turnover augmented between 1999 and 2003, which is in accordance with increased concentration for the period of study. Mean price of labour considerably soared between 1999 and 2003 (+32.86%). This result might also be explained by an increased concentration if we suppose that larger firms, characterised by higher price of labour, absorbed smaller accounting firms. Mean price of physical capital remained relatively constant between 1999 and 2003.

**INSERT TABLE 1 HERE**

[7] Accounting firms are all firms characterised by the NAF Industry Code 741C, i.e. “Accounting and bookkeeping activities”.

[8] We choose an unbalanced panel rather than a balanced panel, to take firms gone into bankrupt or those being absorbed into account. Indeed the use of a balanced panel may overestimate cost efficiency as it ignores these firms, which may be less efficient on average.

# 4. Results

## 4.1. The estimation of competition

The estimation results of the Rosse-Panzar model for each year are reported in table 2. Based upon the value of the adjusted $R^2$ statistic, the fit of the equations is very satisfactory. The results on the competition measure, the H-statistic, are displayed for each year in table 3. Several conclusions come to the front.

First, the values of the H-statistic are included between 0 and 1 for all years, meaning a monopolistic competition structure on the French audit market. This result is hard to weigh against former empirical studies in other countries, as these studies only provide structural information on concentration, or else give figures on audit fees, without relying fees to marginal costs.

Second, the H-statistic regularly decreased from 0.4618 in 1999 to 0.0365 in 2003. Following Bikker and Haaf (2002) and Claessens and Laeven (2004), we consider the H-statistic as a continuous measure of competition. Therefore, our findings suggest a considerable reduction of competition during the period of study.

These results should be linked with the observation of a high concentration still increasing on the French audit market. Indeed the computation of the Herfindahl index and the C4 index of concentration on our sample respectively show an increase of concentration from 5.05% to 5.46% and from 35.68% to 39.10% between 1999 and 2003. Therefore our findings support the intuitive view that higher concentration is associated with lower competition. They contrast with those of previous studies, which conclude to a positive relationship between concentration and competition. Besides, these results indicate that the joint-auditing requirement does not seem to preserve competition in a context of increasing concentration.

Nevertheless, our results are so far not sufficient to assess the impact of concentration on consumer welfare. Namely, while accounting firms may have increased their market power through the recent mergers, clients may have not undergone an increase in prices. This would be the case if mergers had contributed to decrease costs so that this cost reduction offsets the increase in margins resulting from a higher market power. We therefore turn to the estimation of cost efficiency to complete the analysis.

**INSERT TABLE 2 HERE**

**INSERT TABLE 3 HERE**

### 4.2. The estimation of efficiency

We now turn to the results regarding the efficiency scores. The ITSUR estimation of the cost function system for each year is displayed in table 4. Based on the individual t-statistics and the value of the adjusted $R^2$ on the OLS equation, the fit of the equations is satisfactory for all yearly estimations. The mean efficiency scores by year and by group of accounting firms are presented in table 5. Indeed we deemed the existence of significant differences in cost efficiency between Big-Four and non-Big-Four firms worth of analysis.

First, we compute the level of cost inefficiencies of French accounting firms. Our analysis shows yearly mean efficiency levels ranging from 73.52% to 78.44%. This shows that accounting firms produce approximately three quarters of the optimal production they could produce with the same level of costs. This result is rather similar to the level of inefficiencies observed in other industries, such as banking (Berger and Humphrey, 1997). The only work providing efficiency scores of accounting firms exhibits a mean efficiency score of 72.2% for Taiwanese accounting firms in 1994, meaning a similar order of magnitude (Cheng et al., 2000a).

Second, we investigate the evolution of cost efficiency between 1999 and 2003. Indeed, one may wonder how cost efficiency was affected by increased concentration and reduced competition. There is a commonly accepted view that competition favours efficiency. This intuitive idea was theoretically justified by Hicks (1935) considering that monopoly power allows to relax efforts. This “quiet life” assumption hints at the idea that monopoly power allows managers to grab a share of the monopoly rents through discretionary expenses or a reduction of their effort. However Demsetz (1973) suggested a positive relationship between concentration and cost efficiency, as the most efficient firms benefit from lower costs and therefore higher market shares, which leads to a higher level of concentration.

**INSERT TABLE 4 HERE**

Our results show a reduction in cost efficiency of 4.92 points between 1999 and 2003. This evolution is regular along the period, with the exception of a slight increase between 2000 and 2001. When confronted with the reduction of competition during the same period, this result tends to support the view that lower competition has hampered cost efficiency of French accounting firms, in accordance with the intuitive positive link between competition and cost efficiency.

**INSERT TABLE 5 HERE**

Third, we compare cost efficiency of Big-Four firms and non-Big-Four firms over time. This is an issue of considerable interest, chiefly to get information on the better ability of the leading accounting firms to control costs. Besides, as Big-Four firms have been outstandingly concerned by the recent mergers, we are interested to know whether Big-Four firms have undergone a different evolution in terms of cost efficiency than non-Big-Four firms.

The static analysis shows that Big-Four firms are more cost efficient than non-Big-Four firms, supporting the view of a better ability of Big-Four firms to control costs. However we have performed a t-test to assess the significance of the difference between mean efficiency scores of each group of firms. This test showed that the advantage in cost efficiency for Big-Four firms is not significant for each year of the study, if we except 2000 where this advantage is significant at the 10% level.

In terms of evolution of cost efficiency, we point out that both groups of accounting firms suffered from a reduction in cost efficiency between 1999 and 2003, with a slightly greater fall for Big-Four firms (-4.99 points) than for non-Big-Four firms (-4.87 points). The parallel reduction in cost efficiency for both groups of accounting firms is a major result. It props up the view that increased concentration, which has particularly affected Big-Four firms, has an overall negative impact on cost efficiency.

As a consequence, our results suggest that increased concentration and reduced competition hamper cost efficiency for French accounting firms. First, we provide evidence of significant cost inefficiencies which may be put into parallel with the degree of competition observed above. Second, cost efficiency decreased between 1999 and 2003 at the same pace than competition. Third, Big-Four firms, despite their better ability to control costs, also suffered from a reduction in cost efficiency. Therefore, we support the view that increased concentration hampers cost efficiency in accordance with the “quiet life” hypothesis provided by Hicks (1935). This is a major finding for the normative implications of concentration on the audit market. Indeed the awkward effects of concentration on cost efficiency are in favour of a restrictive regulatory policy of mergers between accounting firms.

## 5. Concluding remarks

This research has provided new evidence on competition and cost performance of accounting firms by introducing refined methodologies in this industry, with an application on the French audit market over a period of rising concentration.

We have performed a non-structural test of competition, the Rosse-Panzar model, which provided evidence of monopolistic competition on this market and of reduced competition between 1999 and 2003. Stochastic frontier approach was also applied to estimate cost efficiency of accounting firms. We show that cost efficiency lies around 75%, supporting the view of significant potential gains in reduction of costs in the French accounting industry. We furthermore observe a reduction in cost efficiency between 1999 and 2003 for Big-Four and non-Big-Four firms.

All these results tend to convey the idea that increased concentration has been associated with lower competition and lower cost efficiency through the period of this study. As we consequently suggest that greater concentration triggers off a social loss, the normative implications of this work are rather in favour of a limitation of concentration on the French audit market. Our results should however be considered with care as this issue needs further analysis using similar methodologies to assess their relevance.

## REFERENCES


Aigner, D., C.A.K. Lovell and P. Schmidt (1977), 'Formulation and Estimation of Stochastic Frontier Production Function Models', *Journal of Econometrics*, 6, pp. 21-37.

Bain J. (1951), 'Relation of Profit Rate to Industry Concentration', *Quarterly Journal of Economics*, 65, pp. 293-324.

Banker, R., H. Chang and R. Cunningham (2003), 'The Public Accounting Industry Production Function', *Journal of Accounting and Economics*, 35, pp. 255-281.

Baumol, W., J. Panzar and R. Willig (1982), *Contestable Markets and the Theory of Industry Structure*, Harcourt Brace Jovanovitch.

Beattie, V., A. Goodacre and S. Fearnley (2003), "And There Were Four: A Study of UK Audit Market Concentration – Causes, Consequences and the Scope for Market Adjustment", *Journal of Financial Regulation and Compliance*, 11, 3, pp. 250-265.

Berger, A. and D. Humphrey (1997), 'Efficiency of Financial Institutions: International Survey and Directions for Future Research', *European Journal of Operational Research*, 98, pp. 175-212.

Bikker, J. and K. Haaf (2002), 'Competition, Concentration and their Relationship: An Empirical Analysis of the Banking Industry', Journal of Banking and Finance, 26, pp. 2191-2214.

Broye G. (2007), 'Concentration du marché de l'audit en France : un état des lieux' , *Revue Française de comptabilité*, May, pp.34-37.

Buijink, W., S. Maijorr S. and R. Meuwissen (1998), 'Competition in Auditing: Evidence from Entry, Exit, and Market Share Mobility in Germany versus The Netherlands', *Contemporary Accounting Research*, 15, 3, pp. 385-404.

Cheng, T., K. Wang and C. Weng (2000a), 'A Study of Technical Efficiencies of CPA Firms in Taiwan', *Review of Pacific Basin Financial Markets and Policies*, 3, 1, pp. 27-44.

Cheng, T., K. Wang and C. Weng (2000b), 'Economies of Scale and Scope in Taiwan's CPA Service Industry Study', *Applied Economics Letters*, 37, pp. 409-414.

Choi, M.S. and D Zeghal (1999), "The Effect of Accounting Firm Mergers on International Markets for Accounting Services", *Journal of International Accounting Auditing & Taxation*, 8, 1, pp. 1-22.

Claessens, S. and L. Laeven (2004), 'What Drives Bank Competition? Some International Evidence ', *Journal of Money, Credit and Banking*, 36, 3, pp. 563-583.

Demsetz, H. (1973), 'Industry Structure, Market Rivalry and Public Policy', *Journal of Law and Economics*, 16, pp. 1-9.

Fischer, T. and D. Kamerschen (2003), 'Measuring Competition in the U.S. Airline Industry Using the Rosse-Panzar Test and Cross-Sectional Regression Analysis', *Journal of Applied Economics*, 6, 1, pp. 73-93.

Greene, W.H. (1990), 'A Gamma-Distributed Stochastic Frontier Model', *Journal of Econometrics*, 46, pp. 141-163.

Hicks, J. (1935), 'The Theory of Monopoly', *Econometrica*, 3, pp. 1-20.

Ivancevich, S.H. and A. Zardkoohi (2000), 'An Exploratory Analysis of the 1989 Accounting Firm Megamergers', *Accounting Horizons*, 14, 4, pp. 389-401.

Iyer, V.M. and G.S. Iyer (1996), 'Effect of Big 8 Mergers on Audit Fees: Evidence from the United Kingdom', *Auditing: A Journal of Practice and Theory*, 15, pp. 123-132.

Jondrow, J., C.A.K.Lovell, I. Materov and P. Schmidt (1982), 'On the Estimation of Technical Inefficiency in the Stochastic Frontier Production Function Model', *Journal of Econometrics*, 19, pp. 233-238.

Kumbhakar, S. and C.A.K. Lovell (2000), *Stochastic Frontier Analysis*, Cambridge University Press.

Lee, D.S. (2005), 'The Impact of the Big 8 Mergers on Market Power: Evidence from the Hong Kong Market', *Journal of International Financial Management and Accounting*, 16, 1, pp. 69-96.

Minyard, D.H. and R.H. Tabor (1991), 'The effect of Big 8 Mergers on Auditor Concentration', *Accounting Horizons*, 5, pp. 79-90.

Panzar, J.C. and J.N. Rosse (1987), 'Testing for Monopoly equilibrium', *Journal of Industrial Economics*, 35, pp. 443-456.

Pearson, T. and G. Trompeter (1994), 'Competition in the Market for Audit Services: the Effect of Supplier Concentration on Audit Fees', *Contemporary Accounting Research*, Summer, pp. 115-135.

Piot, C. (2005), 'Concentration et spécialisation sectorielle des cabinets d'audit sur le marché des sociétés cotées en 1997/1998', *Comptabilité-Contrôle-Audit*, 11, 2, pp. 149-173.

Piot, C. (2007), 'Auditor concentration in a joint-auditing environment : the French market 1997-2003', *Managerial Auditing Journal*, 22,2, pp.161-176.

Pong, C. (1999), 'Auditor Concentration : A Replication and Extension for the UK Audit Market 1991-1995', *Journal of Business, Finance and Accounting*, April/May, pp. 451-475.

Rosse, J.N. and J.C. Panzar (1977), 'Chamberlin vs Robinson: An Empirical Study for Monopoly Rents', *Bell Laboratories Economic Discussion Paper.*

Sullivan, M.W. (2002), "The Effect of the Big Eight Accounting Firm Mergers on the Market for Audit Services", *Journal of Law and Economics*, October, pp. 375-399.

Tonge, S.D. and C.W. Wootton (1991), 'Auditor Concentration and Competition among the Large Public Accounting Firms: Post-Merger Status and Future Implications', *Journal of Accounting and Public Policy*, Summer, pp. 157-172.

Weill, L. (2004), 'On the Relationship Between Competition and Efficiency in the EU Banking Sectors', *Kredit und Kapital*, 37, 3, pp. 329-352.

Willekens, M. and C. Achmadi (2003), 'Pricing and Supplier Concentration in the Private Client Segment of the Audit Market: Market Power or Competition?', *The International Journal of Accounting*, 38, pp. 431-455.

Wootton, C.W., S.D. Tonge and C.M. Wolk (1994), 'Pre and Post Big 8 Mergers: Comparison of Auditor Concentration', *Accounting Horizons*, 8, 3, pp. 58-74.

**Table 1: Descriptive statistics for variables**

This table presents the mean values for each item by year. Standard deviations are in brackets. Turnover, total assets and total cost are in thousand euros.

| | N | Output | Input prices | | Other characteristics | | |
|---|---|---|---|---|---|---|---|
| | | Turnover | Price of labour | Price of physical capital | Total assets | Total cost | Number of employees |
| **1999** | 117 | 17,435 | 54.29 | 0.0544 | 13,855 | 10,352 | 190.82 |
| | | *(45,178)* | *(24.44)* | *(0.0454)* | *(27,609)* | *(30251)* | *(534.90)* |
| **2000** | 119 | 19,018 | 55.66 | 0.0534 | 15,683 | 10,996 | 197.08 |
| | | *(49,657)* | *(28.61)* | *(0.0431)* | *(33,033)* | *(32,301)* | *(547.27)* |
| **2001** | 125 | 21,101 | 55.49 | 0.0614 | 17,097 | 11,893 | 207.38 |
| | | *(56,573)* | *(27.75)* | *(0.0839)* | *(34,891)* | *(35,146)* | *(570.47)* |
| **2002** | 127 | 22,364 | 59.20 | 0.0511 | 18,268 | 12,491 | 217.06 |
| | | *(59,061)* | *(35.78)* | *(0.0443)* | *(39,690)* | *(36,967)* | *(609.97)* |
| **2003** | 143 | 23,388 | 72.13 | 0.0533 | 18,957 | 12,471 | 197.91 |
| | | *(62,374)* | *(65.46)* | *(0.0493)* | *(41,099)* | *(36,772)* | *(580.16)* |

**Table 2: Estimation of the Rosse-Panzar model by year**

$ln\ TURNOVER = \alpha_0 + \alpha_1 \ln p_L + \alpha_2 \ln p_K + \alpha_3 \ln ASSETS + \varepsilon$

*TURNOVER* = total turnover ; $p_L$ = price of labour ; $p_K$ = price of physical capital ; *ASSETS* = total assets.

| | **Variable** | **Coefficient** | **t-statistic** |
|---|---|---|---|
| **1999** | Intercept | 0.1980 | 0.31 |
| | Price of labour | 0.3403** | 2.32 |
| | Price of physical capital | 0.1215*** | 6.50 |
| | Assets | 0.8852*** | 20.15 |
| | Adjusted $R^2$ | 0.7867 | |
| **2000** | Intercept | 0.3539 | 0.56 |
| | Price of labour | 0.2385 | 1.60 |
| | Price of physical capital | 0.1034*** | 4.57 |
| | Assets | 0.9004*** | 19.32 |
| | Adjusted $R^2$ | 0.7720 | |
| **2001** | Intercept | 0.4140 | 0.75 |
| | Price of labour | 0.2433* | 1.88 |
| | Price of physical capital | 0.1346*** | 6.23 |
| | Assets | 0.9039*** | 22.27 |
| | Adjusted $R^2$ | 0.8174 | |
| **2002** | Intercept | 0.7863 | 1.55 |
| | Price of labour | 0.0994 | 0.88 |
| | Price of physical capital | 0.1355*** | 6.30 |
| | Assets | 0.9290*** | 22.24 |
| | Adjusted $R^2$ | 0.8085 | |
| **2003** | Intercept | 0.9474*** | 2.64 |
| | Price of labour | 0.0090 | 0.13 |
| | Price of physical capital | 0.0276* | 1.71 |
| | Assets | 0.9139*** | 26.49 |
| | Adjusted $R^2$ | 0.8568 | |

*, **, *** denote an estimate significantly different from 0 at the 10%, 5% or 1% level.

**Table 3: H-statistic by year**

H-statistic is obtained with the Rosse-Panzar model. It aggregates the elasticities of total revenues with respect to the input prices.

| | 1999 | 2000 | 2001 | 2002 | 2003 | Evolution |
|---|---|---|---|---|---|---|
| **N** | 117 | 119 | 125 | 127 | 143 | |
| **H-statistic** | 0.4618 | 0.3418 | 0.3780 | 0.2349 | 0.0365 | -0.4253 |

## Table 4: ITSUR estimation of cost function system by year

$\ln TC = \alpha_0 + \alpha_1 \ln y + \alpha_2 (\ln y)^2 + \beta_1 \ln p_K + \beta_2 \ln p_L + ½\ \delta_1 (\ln p_K)^2$
$+ ½\ \delta_2 (\ln p_L)^2 + \delta_3 (\ln p_L)(\ln p_K) + \gamma_1 (\ln y)(\ln p_K) + \gamma_2 (\ln y)(\ln p_L) + \varepsilon$

$TC$ = total cost ; $y$ = turnover ; $p_L$ = price of labour ; $p_K$ = price of physical capital.

| **Parameter** | **1999** | **2000** | **2001** | **2002** | **2003** |
|---|---|---|---|---|---|
| Intercept | -4.626** | -2.972 | -3.805* | -4.098* | -6.707* |
| ln y | 1.177*** | 0.853* | 1.057** | 1.080** | 1.605** |
| $(\ln y)^2$ | -0.028 | 0.002 | -0.021 | -0.020 | -0.074 |
| $\ln p_L$ | 0.931*** | 0.905*** | 0.916*** | 0.941*** | 0.968*** |
| $(\ln p_L)^2$ | 0.003*** | 0.003*** | 0.004*** | 0.004*** | 0.005*** |
| $\ln p_K$ | 0.069*** | 0.095*** | 0.084*** | 0.059*** | 0.032* |
| $(\ln p_K)^2$ | 0.003*** | 0.003*** | 0.004*** | 0.004*** | 0.005*** |
| $(\ln p_L)(\ln p_K)$ | -0.003*** | -0.003*** | -0.004*** | -0.004*** | -0.005*** |
| $(\ln y)(\ln p_L)$ | 0.002 | 0.004** | 0.002 | $-0.365^{E}$-3 | -0.004* |
| $(\ln y)(\ln p_K)$ | -0.002 | -0.004** | -0.002 | $0.365^{E}$-3 | 0.004* |
| Adjusted $R^2$ on OLS equation | 0.8175 | 0.7954 | 0.7751 | 0.7528 | 0.6461 |
| Function converged at iteration | 8 | 11 | 7 | 8 | 6 |

*, **, *** denote an estimate significantly different from 0 at the 10%, 5% or 1% level.

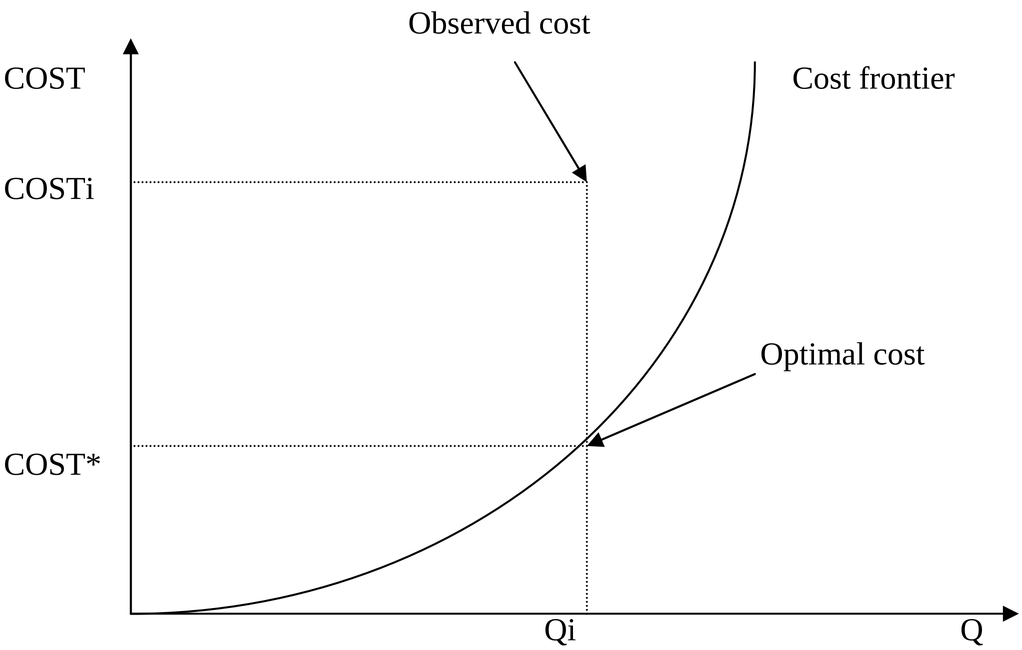
**Table 5: Mean efficiency scores by year**

Cost efficiency scores are obtained with stochastic frontier approach. Cost efficiency measures how close a bank's cost is to what a best-practice bank's cost would be for producing the same bundle of outputs.

| | **1999** | **2000** | **2001** | **2002** | **2003** | **Evolution** |
|---|---|---|---|---|---|---|
| N | 117 | 119 | 125 | 127 | 143 | |
| All | 78.44 | 77.22 | 77.95 | 76.98 | 73.52 | -4.92 |
| | (11.16) | (11.65) | (10.33) | (10.49) | (10.70) | |
| Big Four | 83.43 | 86.57 | 84.89 | 82.75 | 78.44 | -4.99 |
| | (12.62) | (11.48) | (13.58) | (14.53) | (17.83) | |
| Non | 78.02 | 76.55 | 77.42 | 76.48 | 73.15 | -4.87 |
| Big-Four | (10.99) | (11.42) | (9.90) | (10.00) | (9.98) | |

All scores are in percentage. Standard deviation is in brackets.

**Graph 1: The efficiency frontier**




Q represents the output, COST the total cost

# *PAPIERS*

### *Laboratoire de Recherche en Gestion & Economie*
### (LARGE)

---

| | |
|---|---|
| D.R. n° 1 | "Bertrand Oligopoly with decreasing returns to scale", J. Thépot, décembre 1993 |
| D.R. n° 2 | "Sur quelques méthodes d'estimation directe de la structure par terme des taux d'intérêt", P. Roger - N. Rossiensky, janvier 1994 |
| D.R. n° 3 | "Towards a Monopoly Theory in a Managerial Perspective", J. Thépot, mai 1993 |
| D.R. n° 4 | "Bounded Rationality in Microeconomics", J. Thépot, mai 1993 |
| D.R. n° 5 | "Apprentissage Théorique et Expérience Professionnelle", J. Thépot, décembre 1993 |
| D.R. n° 6 | "Stratégic Consumers in a Duable-Goods Monopoly", J. Thépot, avril 1994 |
| D.R. n° 7 | "Vendre ou louer ; un apport de la théorie des jeux", J. Thépot, avril 1994 |
| D.R. n° 8 | "Default Risk Insurance and Incomplete Markets", Ph. Artzner - FF. Delbaen, juin 1994 |
| D.R. n° 9 | "Les actions à réinvestissement optionnel du dividende", C. Marie-Jeanne - P. Roger, janvier 1995 |
| D.R. n° 10 | "Forme optimale des contrats d'assurance en présence de coûts administratifs pour l'assureur", S. Spaeter, février 1995 |
| D.R. n° 11 | "Une procédure de codage numérique des articles", J. Jeunet, février 1995 |
| D.R. n° 12 | Stabilité d'un diagnostic concurrentiel fondé sur une approche markovienne du comportement de rachat du consommateur", N. Schall, octobre 1995 |
| D.R. n° 13 | "A direct proof of the coase conjecture", J. Thépot, octobre 1995 |
| D.R. n° 14 | "Invitation à la stratégie", J. Thépot, décembre 1995 |
| D.R. n° 15 | "Charity and economic efficiency", J. Thépot, mai 1996 |

D.R. n° 16 "Princing anomalies in financial markets and non linear pricing rules", P. Roger, mars 1996

D.R. n° 17 "Non linéarité des coûts de l'assureur, comportement de prudence de l'assuré et contrats optimaux", S. Spaeter, avril 1996

D.R. n° 18 "La valeur ajoutée d'un partage de risque et l'optimum de Pareto : une note", L. Eeckhoudt - P. Roger, juin 1996

D.R. n° 19 "Evaluation of Lot-Sizing Techniques : A robustess and Cost Effectiveness Analysis", J. Jeunet, mars 1996

D.R. n° 20 "Entry accommodation with idle capacity", J. Thépot, septembre 1996

D.R. n° 21 "Différences culturelles et satisfaction des vendeurs : Une comparaison internationale", E. Vauquois-Mathevet - J.Cl. Usunier, novembre 1996

D.R. n° 22 "Evaluation des obligations convertibles et options d'échange", A. Schmitt - F. Home, décembre 1996

D.R n° 23 "Réduction d'un programme d'optimisation globale des coûts et diminution du temps de calcul, J. Jeunet, décembre 1996

D.R. n° 24 "Incertitude, vérifiabilité et observabilité : Une relecture de la théorie de l'agence", J. Thépot, janvier 1997

D.R. n° 25 "Financement par augmentation de capital avec asymétrie d'information : l'apport du paiement du dividende en actions", C. Marie-Jeanne, février 1997

D.R. n° 26 "Paiement du dividende en actions et théorie du signal", C. Marie-Jeanne, février 1997

D.R. n° 27 "Risk aversion and the bid-ask spread", L. Eeckhoudt - P. Roger, avril 1997

D.R. n° 28 "De l'utilité de la contrainte d'assurance dans les modèles à un risque et à deux risques", S. Spaeter, septembre 1997

D.R. n° 29 "Robustness and cost-effectiveness of lot-sizing techniques under revised demand forecasts", J. Jeunet, juillet 1997

D.R. n° 30 "Efficience du marché et comparaison de produits à l'aide des méthodes d'enveloppe (Data envelopment analysis)", S. Chabi, septembre 1997

D.R. n° 31 "Qualités de la main-d'œuvre et subventions à l'emploi : Approche microéconomique", J. Calaza - P. Roger, février 1998

D.R n° 32 "Probabilité de défaut et spread de taux : Etude empirique du marché français", M. Merli - P. Roger, février 1998

D.R. n° 33 "Confiance et Performance : La thèse de Fukuyama", J.Cl. Usunier - P. Roger, avril 1998

D.R. n° 34 "Measuring the performance of lot-sizing techniques in uncertain environments", J. Jeunet - N. Jonard, janvier 1998

D.R. n° 35 "Mobilité et décison de consommation : premiers résultas dans un cadre monopolistique", Ph. Lapp, octobre 1998

D.R. n° 36 "Impact du paiement du dividende en actions sur le transfert de richesse et la dilution du bénéfice par action", C. Marie-Jeanne, octobre 1998

D.R. n° 37 "Maximum resale-price-maintenance as Nash condition", J. Thépot, novembre 1998

D.R. n° 38 "Properties of bid and ask prices in the rank dependent expected utility model", P. Roger, décembre 1998

D.R. n° 39 "Sur la structure par termes des spreads de défaut des obligations », Maxime Merli / Patrick Roger, septembre 1998

D.R. n° 40 "Le risque de défaut des obligations : un modèle de défaut temporaire de l'émetteur", Maxime Merli, octobre 1998

D.R. n° 41 "The Economics of Doping in Sports", Nicolas Eber / Jacques Thépot, février 1999

D.R. n° 42 "Solving large unconstrained multilevel lot-sizing problems using a hybrid genetic algorithm", Jully Jeunet, mars 1999

D.R n° 43 "Niveau général des taux et spreads de rendement", Maxime Merli, mars 1999

D.R. n° 44 "Doping in Sport and Competition Design", Nicolas Eber / Jacques Thépot, septembre 1999

D.R. n° 45 "Interactions dans les canaux de distribution", Jacques Thépot, novembre 1999

D.R. n° 46 "What sort of balanced scorecard for hospital", Thierry Nobre, novembre 1999

D.R. n° 47 "Le contrôle de gestion dans les PME", Thierry Nobre, mars 2000

D.R. n° 48 ″Stock timing using genetic algorithms", Jerzy Korczak – Patrick Roger, avril 2000

D.R. n° 49 "On the long run risk in stocks : A west-side story", Patrick Roger, mai 2000

D.R. n° 50 "Estimation des coûts de transaction sur un marché gouverné par les ordres : Le cas des composantes du CAC40", Laurent Deville, avril 2001

D.R. n° 51 "Sur une mesure d'efficience relative dans la théorie du portefeuille de Markowitz", Patrick Roger / Maxime Merli, septembre 2001

D.R. n° 52 "Impact de l'introduction du tracker Master Share CAC 40 sur la relation de parité call-put", Laurent Deville, mars 2002

D.R. n° 53 "Market-making, inventories and martingale pricing", Patrick Roger / Christian At / Laurent Flochel, mai 2002

D.R. n° 54 "Tarification au coût complet en concurrence imparfaite", Jean-Luc Netzer / Jacques Thépot, juillet 2002

D.R. n° 55 "Is time-diversification efficient for a loss averse investor ?", Patrick Roger, janvier 2003

D.R. n° 56 "Dégradations de notations du leader et effets de contagion", Maxime Merli / Alain Schatt, avril 2003

D.R. n° 57 "Subjective evaluation, ambiguity and relational contracts", Brigitte Godbillon, juillet 2003

D.R. n° 58 "A View of the European Union as an Evolving Country Portfolio", Pierre-Guillaume Méon / Laurent Weill, juillet 2003

D.R. n° 59 "Can Mergers in Europe Help Banks Hedge Against Macroeconomic Risk ?", Pierre-Guillaume Méon / Laurent Weill, septembre 2003

D.R. n° 60 "Monetary policy in the presence of asymmetric wage indexation", Giuseppe Diana / Pierre-Guillaume Méon, juillet 2003

D.R. n° 61 "Concurrence bancaire et taille des conventions de services", Corentine Le Roy, novembre 2003

D.R. n° 62 "Le petit monde du CAC 40", Sylvie Chabi / Jérôme Maati

D.R. n° 63 "Are Athletes Different ? An Experimental Study Based on the Ultimatum Game", Nicolas Eber / Marc Willinger

D.R. n° 64 "Le rôle de l'environnement réglementaire, légal et institutionnel dans la défaillance des banques : Le cas des pays émergents", Christophe Godlewski, janvier 2004

D.R. n° 65 "Etude de la cohérence des ratings de banques avec la probabilité de défaillance bancaire dans les pays émergents", Christophe Godlewski, Mars 2004

D.R. n° 66 "Le comportement des étudiants sur le marché du téléphone mobile : Inertie, captivité ou fidélité ?", Corentine Le Roy, Mai 2004

D.R. n° 67 "Insurance and Financial Hedging of Oil Pollution Risks", André Schmitt / Sandrine Spaeter, September, 2004

D.R. n° 68 "On the Backwardness in Macroeconomic Performance of European Socialist Economies", Laurent Weill, September, 2004

D.R. n° 69 "Majority voting with stochastic preferences : The whims of a committee are smaller than the whims of its members", Pierre-Guillaume Méon, September, 2004

D.R. n° 70 “Modélisation de la prévision de défaillance de la banque : Une application aux banques des pays émergents”, Christophe J. Godlewski, octobre 2004

D.R. n° 71 “Can bankruptcy law discriminate between heterogeneous firms when information is incomplete ? The case of legal sanctions”, Régis Blazy, october 2004

D.R. n° 72 “La performance économique et financière des jeunes entreprises”, Régis Blazy/Bertrand Chopard, octobre 2004

D.R. n° 73 “*Ex Post* Efficiency of bankruptcy procedures : A general normative framework”, Régis Blazy / Bertrand Chopard, novembre 2004

D.R. n° 74 “Full cost pricing and organizational structure”, Jacques Thépot, décembre 2004

D.R. n° 75 “Prices as strategic substitutes in the Hotelling duopoly”, Jacques Thépot, décembre 2004

D.R. n° 76 “Réflexions sur l’extension récente de la statistique de prix et de production à la santé et à l’enseignement”, Damien Broussolle, mars 2005

D. R. n° 77 “Gestion du risque de crédit dans la banque : Information hard, information soft et manipulation ”, Brigitte Godbillon-Camus / Christophe J. Godlewski

D.R. n° 78 “Which Optimal Design For LLDAs”, Marie Pfiffelmann

D.R. n° 79 “Jensen and Meckling 30 years after : A game theoretic view”, Jacques Thépot

D.R. n° 80 “Organisation artistique et dépendance à l’égard des ressources”, Odile Paulus, novembre 2006

D.R. n° 81 “Does collateral help mitigate adverse selection ? A cross-country analysis”, Laurent Weill –Christophe J. Godlewski, novembre 2006

D.R. n° 82 “Why do banks ask for collateral and which ones ?”, Régis Blazy - Laurent Weill, décembre 2006

D.R. n° 83 “The peace of work agreement : The emergence and enforcement of a swiss labour market institution”, D. Broussolle, janvier 2006.

D.R. n° 84 “The new approach to international trade in services in view of services specificities : Economic and regulation issues”, D. Broussolle, septembre 2006.

D.R. n° 85 “Does the consciousness of the disposition effect increase the equity premium” ?, P. Roger, juin 2007

D.R. n° 86 “Les déterminants de la décision de syndication bancaire en France”, Ch. J. Godlewski

D.R. n° 87 “Syndicated loans in emerging markets”, Ch. J. Godlewski / L. Weill, mars 2007

D.R. n° 88 “Hawks and loves in segmented markets : A formal approach to competitive aggressiveness", Claude d'Aspremont / R. Dos Santos Ferreira / J. Thépot, mai 2007

D.R. n° 89 "On the optimality of the full cost pricing", J. Thépot, février 2007

D.R. n° 90 "SME's main bank choice and organizational structure : Evidence from France", H. El Hajj Chehade / L. Vigneron, octobre 2007

D.R n° 91 "How to solve St Petersburg Paradox in Rank-Dependent Models" ?, M. Pfiffelmann, octobre 2007

D.R. n° 92 "Full market opening in the postal services facing the social and territorial cohesion goal in France", D. Broussolle, novembre 2007

D.R. n° 2008-01 A behavioural Approach to financial puzzles, M.H. Broihanne, M. Merli, P. Roger, janvier 2008

D.R. n° 2008-02 What drives the arrangement timetable of bank loan syndication ?, Ch. J. Godlewski, février 2008

D.R. n° 2008-03 Financial intermediation and macroeconomic efficiency, Y. Kuhry, L. Weill, février 2008

D.R. n° 2008-04 The effects of concentration on competition and efficiency : Some evidence from the french audit market, G. Broye, L. Weill, février 2008

D.R. n° 2008-05 Does financial intermediation matter for macroeconomic efficiency?, P.G. Méon, L. Weill, février 2008

D.R. n° 2008-06 Is corruption an efficient grease ?, P.G. Méon, L. Weill, février 2008

D.R. n° 2008-07 Convergence in banking efficiency across european countries, L. Weill, Février 2008.