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Common Ownership in the CAC40

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Resumo

O objetivo desta dissertação é verificar se a propriedade comum é significativa no CAC40, e se está correlacionada com os retornos das empresas neste índice. Na presença de uma estrutura acionista caracterizada pela coexistência de acionistas com e sem participações em empresas rivais, o gestor não irá procurar maximizar o lucro da empresa, mas uma média ponderada do retorno dos seus acionistas, por forma a gerir o potencial conflito de interesses entre estes. Tal implica atribuir, na tomada de decisão do gestor, um peso ao lucro das empresas rivais em que os acionistas detêm participações. Esta dissertação quantifica este peso para as empresas constituintes do CAC40 e avalia, utilizando o modelo de três fatores de Fama-French, se existe uma ligação entre os retornos das empresas e aquele peso. Os resultados obtidos sugerem que a propriedade comum é pouco significativa no CAC40, mas que existem empresas para as quais o peso atribuído ao lucro dos rivais influencia o retorno.

Palavras-chave: *Common Onwership*, CAC40, Retornos

Abstract

The objective of this dissertation is to verify whether common ownership is significant in the CAC40, and whether it is correlated with the returns of companies in this index. In the presence of a shareholder structure characterized by the coexistence of shareholders with and without shares in rival companies, the manager will not seek to maximize the company's profit, but a weighted average of the return of its shareholders, in order to manage the potential conflict of interests between them. This implies assigning, in the manager's decision making, a weight to the profit of rival companies in which the shareholders hold stakes. This dissertation quantifies this weight for the CAC40 companies and evaluates, using the Fama-French three-factor model, whether there is a link between companies' returns and this weight. The results obtained suggest that common ownership is not very significant in CAC40, but that there are companies for which the weight assigned to rivals' profit influences returns.

Keywords: Common Ownership, CAC40, Returns

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Introduction

Common ownership occurs when a set of shareholders from a company owns partial financial rights in other companies (Brito, Elhauge, Ribeiro, & Vasconcelos, 2019). Common ownership has becoming widespread in both US and European markets, which raises competition issues (Fichtner, Heemskerk, & Garcia-Bernardo, 2017; Seldeslachts, Newham, & Banal-Estanol, 2017; Newham, Seldeslachts, & Banal-Estanol, 2019; Schmalz, 2018) . The reasons lie in the fact that common ownership introduces a conflict of interest among the shareholders of a company. A shareholder that has stakes in other companies wants the manager to take into consideration the returns of her portfolio (and for as a consequence wants the manager to smooth competition), while a shareholder that only has stakes in the company wants the manager to maximize own-profit. In order to weigh these different interests, the manager will weigh shareholders returns according to the voting rights of each shareholder.[1] This implies that the manager (when taking decisions) will assign a weight to the profit of rival companies in which common shareholders have a stake. In this sense, the weight that managers assign to rival companies can be used to quantify the magnitude of common ownership.

Under common ownership, therefore, the manager will not maximize own-profit, but take into account also the profit of rivals. This may lead to softer competition so as not to harm the rival company's profit, which in turn impact prices and consequently, company returns. Azar, Schmalz, & Tecu (2018) and Azar, Raina, & Schmalz (2019) show there is a link between common ownership

[1] Voting rights are the right of a shareholder to vote on company matters.

and higher prices while Antón & Polk (2014) show that common ownership influences the returns.

However, the literature is very much focused only on institutional owners and mostly in US markets. This dissertation contributes to the literature by (i) focusing on the French market (by examining the CAC40 index), (ii) taking into account all the company's shareholders, both institutional and non-institutional, (iii) examining the relationship between common ownership and returns for the CAC40 companies.

The data in this dissertation has a time window from 1997Q1 to 2020Q2 and was extracted from Thomson Reuters the list of companies which compose the CAC40, the shareholders of that companies and their financial rights, market capitalisation, NACE code (*nomenclature statistique des activités économiques dans la Communauté européenne*) and total returns. I supplemented this data with data from the Fama French official website on the variables required to compute the Fama-French three factor model.

I used this data to compute the weight that managers assign to profit of each rival of the same industry and estimate, by OLS regression, the Fama-French three factor model, with an additional factor: the average weight that the manager of each company assigns to the profit of their rivals.

The results suggest that the average weight that managers assign to the profit of other CAC40 companies, when considering all shareholders was around 0.50 in 1997 and 0.15 in 2020. However, when considering only institutional shareholders, this average weight was around 0.80 in 1997 and 0.59 in 2020. This implies that considering only institutional shareholders may lead to skewed results. In order to make an accurate quantification of common ownership, it is necessary to consider all shareholders.

The results also suggest that while common ownership does not impact returns for the vast majority of companies, an impact is found for a subset of

companies. Alcatel Lucent, Total Holdings, Total, Casino, Dexia, Dassault System and E.D.F. exhibit a positive relationship between common ownership and returns, while Société Générale and Gemalto exhibit the opposite effect.

This dissertation is organized the following manner: Chapter 2 provides the review literature, Chapter 3 presents the theoretical framework, Chapter 4 describes the theoretical hypothesis, Chapter 5 presents the data and discusses the results, and Chapter 6 concludes.

2. Review Literature

In the presence of common ownership, companies may have two types of shareholders: (i) common shareholders, who hold shares in more than one company and (ii) non-common shareholders who only hold shares in one company. Non-common shareholders want managers to maximize own-profits. In contrast, common shareholders want managers to maximize their portfolio. Consider the following example, with two companies, Company A and Company B, which are active on a particular industry. Consider that Company A has two sets of shareholders: a set of non-common shareholders, who only hold shares in Company A, and a set of common shareholders, whose portfolio consists of Company A and Company B. Non-common shareholders only get large returns if the manager of company A maximizes own-profit. On the other hand, common shareholders want the manager of company A to maximize their portfolio. With this example it is possible to observe a conflict of interest between these two sets of shareholders.

How should the manager weigh this conflict? One possible approach, which is in line with Rotemberg (1984) and O'Brien & Salop (2000), is for the manager to weigh shareholder returns using control rights.[2] Azar (2012) and Azar (2017) show that one of the effective approaches to measure control rights is using voting rights.

[2] Control rights is the right to make decisions that will affect the company.

As such, the manager will give more weight to the return of shareholders with greater voting rights. This implies that the manager will, when taking decisions, weigh the profit of other companies in which common shareholders have shares.

In a theoretical approach, common ownership may lead to a decrease in competition among companies in the sector (Schmalz, 2018). In the situation where competition decreases and prices increase (so not to affect the profit of rivals and not harm common shareholders), it can lead to the affectation of profitability. Common ownership can also create barriers to entry if (and only if) common shareholders have shares in the companies in the industry and in the company that intends to enter the industry. The manager of that company will not enter the industry so as not to harm common shareholders, because this new entry into the industry will lower prices and thus influence the profit of rival companies, harming common shareholders. Finally, according to the previous reasoning, by affecting profitability, common ownership can also affect returns.

In an empirical approach, Backus, Conlon, & Sinkinson (in press) compute the weight that managers assign to other companies in the S&P 500 to measure common ownership in this index (although using only institutional shareholders). They found that common ownership increases over time: in 1980 the average weight was 0.20 while in 2017 it was almost 0.70, suggesting that common ownership is becoming economically significant in the US market (Backus et al., in press).

In the following paragraphs, I will present empirical evidence of the effects of common ownership. I begin with the impact on prices for two different industries, which were studied by Kennedy, O'Brien, Song, & Waehrer (2017), Azar et al. (2018) and Azar et al. (2019).

Azar et al. (2018) examine the relationship between common ownership and prices for the US domestic airline industry. They chose this industry because of the availability of data. In addition to this, they also chose this industry for the

considerable magnitude of common ownership and the fact that each route can be considered as a separate market, which would limit potential problems about the results found. Azar et al. (2018) observe that common ownership concentration is linked to product prices 10% to 12% higher. Kennedy, O'Brien, Song, & Waehrer (2017) have a different opinion about the relation between the airline prices and the common ownership. In their work, they use the same data as Azar et al. (2018) and find no evidence between common ownership and airline prices.

Azar et al. (2019) focus on the US bank industry. Banks have been one of the most important economic agents for a long time, and the quantification of banks concentrations and its consequences has been a major focus of financial Economists (Azar et al., 2019). The authors noted that this industry exhibits both common and cross-ownership[3]. They find that this ownership is correlated with banking products, affecting their fees and interest rates.

I now examine the empirical evidence regarding the impact of common ownership on profitability and barriers to entry. He & Huang (2017) conclude that common ownership has a positive impact on companies profitability. Newham et al. (2019) observe that in the US pharmaceutical industry, the high levels of common ownership create barriers to entry, which make the entry of generic products less profitable.

Finally, I examine the empirical evidence regarding the impact of common ownership on returns. Antón & Polk (2014), Lattanzio (2020), Gao, Moulton, & Ng (2017) and Yegen (2019), have focused on the impact on returns, using data from institutional shareholders. They use the Fama-French three factors model, the Carhart four factors model and the Fama-French five factors model (Fama & French, 1993; Carhart, 1997; Fama & French, 2015). Antón & Polk (2014), Lattanzio (2020), Gao et al. (2017) and Yegen (2019) use data from Thomson

[3] Cross-Ownership is when companies own directly other companies.

Reuters 13F. In particular, Antón & Polk (2014) concluded that common ownership generates annual abnormal returns of 9%, which is supported by Lattanzio (2020) who also states that common ownership generates annual abnormal returns between 6% and 8%. On the other hand Yegen (2019), Gao et al. (2017) and Chuang (2020) conclude that common ownership has no impact on returns or are negatively correlated.

3. Theoretical Frameworks

In this section, I will present a simple framework to understand the approach to measure the common ownership using the weight that managers assign to the profit of rivals.

Consider that there are θ shareholders, indexed by k , and ϑ companies, indexed by i. The profit and the strategy choice of a company i depends on their competitor's choice (Backus et al., in press).

Based on the formulation of O'Brien & Salop (2000) and Brito, Osório, Ribeiro, & Vasconcelos (2018), I assume that the expected return of each shareholder is provided by the sum of financial rights times the expected profit of each company in their portfolio of investments:

$$\mathrm{E}[R_k] = \sum_{\forall i} \Phi_{ki}\pi_i,$$

where R_k denotes the return of shareholder k, Φ_{ki} denotes the financial rights that shareholder k has in company i, π_i denotes the profit of company i. Besides obtaining the objective function of the company, it is possible derive the weight that the manager of company i places on its opponent's profit as follows:

$$\max \sum_{k\epsilon\theta} \gamma_{ki} E\,[R_k] = \sum_{k\epsilon\theta} \gamma_{ki}\Phi_{ki}E[\pi_i] + \sum_{f\in\vartheta, f\neq i}(\sum_{k\epsilon\theta} \gamma_{ki}\Phi_{kf})\; E[\pi_f],$$

where γ_{ki} denotes the voting rights that shareholder k has in company i , π_f denote the profit of company f. When normalizing the previous expression so that the weight of the expected own-profit is one, we obtain:

$$max\ E[\pi_i] + \sum_{f \in \vartheta, f \neq i} \underbrace{\frac{\sum_{k \epsilon \theta_i} \gamma_{ki} \Phi_{kf}}{\sum_{k \epsilon \theta_i} \gamma_{ki} \Phi_{ki}}}_{\omega_{if}} E[\pi_f].$$

When ω_{if} has the value of zero corresponds to a world where exists perfect competition. When it assumes the value of one, it is like the company has merged with the other company, equivalently to full collusion (Backus et al., in press).

4. Common Ownership Hypothesis

In this section, the hypothesis of study of this dissertation will be presented, but first the reasons that led to the choice of this hypothesis will be explained. The manager, when her company has common shareholders, will assign a weight to the profit of the rival companies in which common shareholders have shares, which will increase with the voting rights of common shareholders. In this case, the manager will try to avoid harming common shareholders and, as such, she will implement strategies not to harm the rival's profit, which consequently, might reflect on the company's returns. As such, similar to Antón & Polk (2014), I will consider the following hypothesis:

***Hypothesis**: There is a link between the return and the weighted profit of the companies.*

In order to analyse this hypothesis I chose the Fama-French three factors model, for the following reasons: (i) it is a model used to explain the returns

(Fama & French, 1993), (ii) it is a good model to explain the industry returns (Fama & French, 1996), (iii) it is a widely studied model, (iv) it is the base of multiple models such as the Carhart four factors model and the Fama-French five factors model (Carhart, 1997; Fama & French, 2015) - I did not choose those models because Fama-French three factor model is more simple to use than Carhart four factors model and the Fama-French five factors model has the problem of being unable to capture low returns on small stocks (Fama & French, 2015), (v) is simple to apply, (vi) the official website of Fama French has the data to different continents and is constantly updated.

Therefore, to examine the common ownership hypothesis, I propose the following equation based on the empirical literature:

$$R_{it} - \mathrm{RF}_t = \alpha_i + \lambda_i \bar{\omega}_{it} + \beta_i(\mathrm{RM}_t - \mathrm{RF}_t) + s_i\,\mathrm{SMB}_t + h_i\,\mathrm{HML}_t + \varepsilon_{it},$$

where R_{it} is the total return of company i in quarter t, $\bar{\omega}_{it}$ is the mean of the profit weight that company i has in other companies in the same industry on quarter t: $\bar{\omega}_{it} = \frac{\sum_{f \in \vartheta, f \neq i} \omega_{ift}}{N_{it}}$, where N_{it} is the number of companies in the industry of company i in quarter t, RM_t is the return rate of the market portfolio in quarter t, RF_t is the risk-free rate in quarter t, SMB_t is the return rate of a portfolio with small stocks minus a portfolio with big stocks in quarter t and HML_t is the return rate of a portfolio with high-book-to-market stocks minus a portfolio with low-book-to-market stocks in quarter t.

I consider only the companies in the same industry because if two companies in different industries weigh their profits, I do not expect any significance impact on prices. In the other hand, if they are in the same industry, I expect a change in prices.

5. Empirical Application

5.1. Data Description

The resource collected for this dissertation is covered in two core sources of information: (i) from Thomson Reuters was collected the market capitalization, the NACE code of each company and shareholder, the financial rights, and the quarter total returns, (ii) from the Fama French official website was gathered the data of the excess return of market portfolio, the risk-free rate, the SMB and the HML.

The data gathered from Thomson Reuters was found to have some problems: (i) some companies did not have information about financial rights, total returns, or market capitalization - as such these companies were removed from the data, (ii) some companies had a sum of the stakes of shareholders higher than 100%, so I did a ratio to obtain 100%, (iii) some shareholders were duplicated in the same company, so I removed them from the data. All these corrections can be seen with more detail in the appendix 1.

5.2. Data Description on Common Ownership

In the Thomson Reuters data, I extracted the composition of CAC40, the NACE code of each company and shareholder, the set of shareholders of each company has, as well as the percentage of his financial rights, and the quarterly total returns of each company. I did so for 94 quarters, beginning in the first quarter of 1997 (1997Q1) and ending in the second quarter of 2020 (2020Q2).

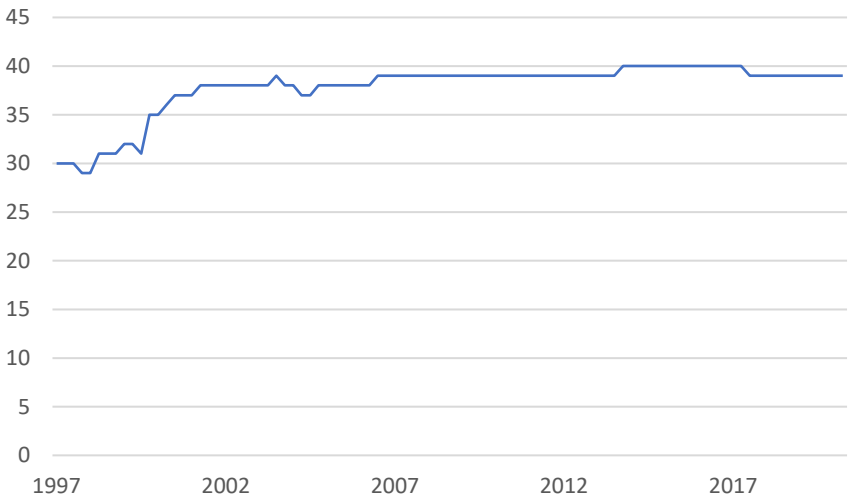

Figure 1 – Number of Companies in the CAC40 Sample.

Figure 1 highlights that I do not have 40 companies in all quarters. In the first quarter of 1997, information is only available for about 30 companies, but the number increases over time.

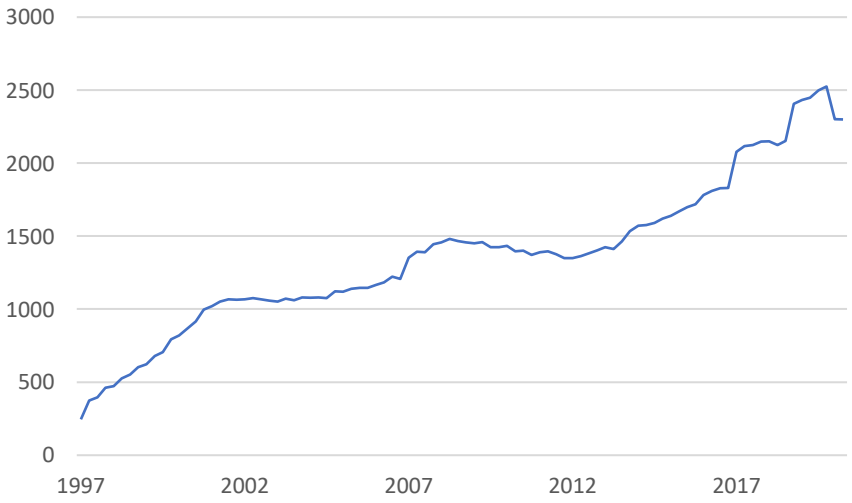

Figure 2 - Number of Shareholder in CAC40 Constituents.

Figure 3 - Percentage of shares that shareholders have in the CAC40.

Figure 2 illustrates the number of shareholders over the different quarters. It shows, in general, a continuous increase in total shareholders until 2019Q4, but posterior there is a sharp decrease. Figure 3 shows the percentage of shares that shareholders own in the companies of CAC40. The percentage that is owned by shareholders exhibits a sharp increase in 1997Q1 until 1998Q4, and after that quarter, the percentages stabilize between 46% and 64%.

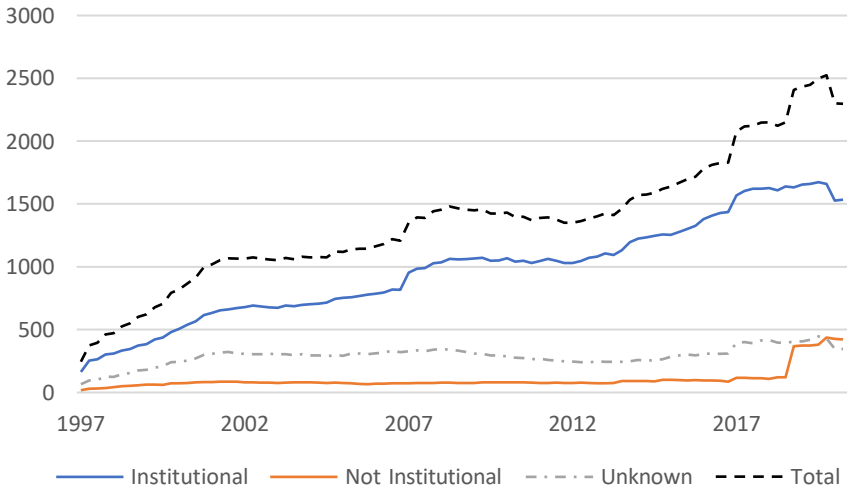

Figure 4 - Composition of the shareholders in the CAC40.

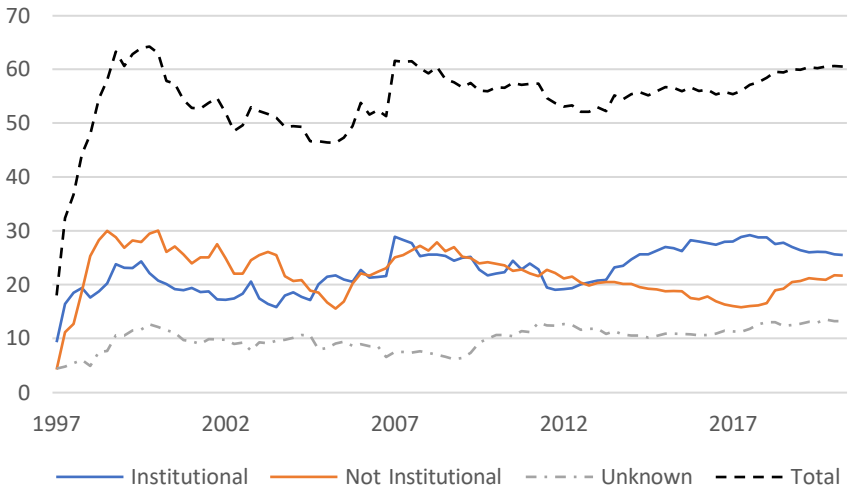

Figure 5 - Percentage of shares in the different types of shareholders in the CAC40.

Figures 4 and 5 represent the same information as Figures 2 and 3, respectively, but introducing a distinction between institutional and not institutional shareholders. In Figure 4, the number of institutional shareholders raises over the different quarters while the number of non-institutional shareholders remain constant until 2017 (then from 2018Q2 there is an increase in the number of non-institutional shareholders). However, although the number of institutional shareholders is greater, their holdings is relatively similar to those of non-institutional shareholders. This implies that, in contrast to Backus et al. (in press), it is important to consider also non-institutional shareholders. Otherwise, the results may be biased. The unknow line in both figures represents the shareholders for whom it was not possible to identify the respective NACE code. Their number and magnitude remain relatively constant over the period.

5.3. Profit Weights

Figures 6 and 7 illustrate the average weight that managers assign to the profit of other companies over the different quarters. As mentioned in chapter 3, this weight is calculated as follows: $\omega_{if} = \sum_{f \in \vartheta, f \neq i} \frac{\sum_{k \epsilon \theta_i} \gamma_{ki} \Phi_{kf}}{\sum_{k \epsilon \theta} \gamma \Phi_{ki}}$ Because it was not possible to gather information on voting rights, I make the assumption, based on the literature, that $\gamma_{ki} = \Phi_{ki}$.

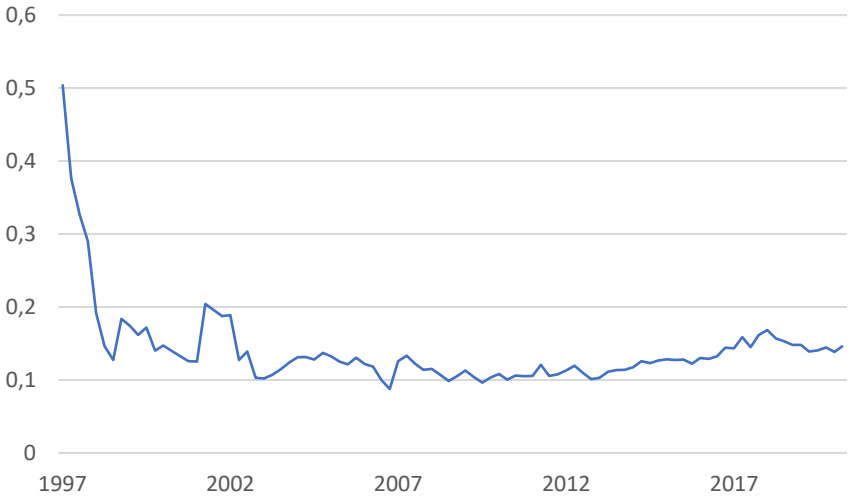

Figure 6 – The mean of the weighted profit of the companies, without any specification, over the quarters.

Figure 6 illustrates the average profit weight without any constraint, i.e., I do discriminate across different sectors or shareholders. It suggests that in the beginning of the period (1997Q1) the average profit weight was around 0.50 and quickly decrease to 0.13 (1998Q3). In the following quarters, this weight ranged

between 0.10 and 0.20. In general, Figure 6 shows that common ownership does not seem highly significant in the CAC40.

Figure 7 – The mean of the weighted profit of companies over the quarters, just with institutional shareholders.

Figure 7 illustrates the average profit weight solely for institutional shareholders. It shows that from the beginning of the period (1997Q1) until 2006Q1 this average profit weight was almost always greater than 0.45. In the next quarters it exhibited a slowly increase until the last quarter (2020Q2) with a weight of around 0.58.

Figures 6 and 7 are very important because they show how significant it is to consider also non-institutional shareholders. Considering only institutional shareholders, as in Backus et al. (in press), can lead to skewed values.

5.4. Data Description on Returns

From the official website of Fama-French I extracted the risk-free rate, the excess return of market portfolio, SMB and HML variables. I used the same period as in the data from Thomson Reuters. In this website the information is currently updated to different levels. The information on these variables can be to a global level or a regional level: European, American and Asian. For this dissertation, I considered the European information. The European data may not be the most correct choice, because this data is for European countries and not just France, but it was not possible to gather updated information about the French market.

I added to the Fama-French three factors, an additional variable. The average of the profit weights of the companies in the same industry. Figure 8 illustrates this new factor.

Figure 8 – The mean of the weighted profit of companies in the same industries over the quarters.

Figure 8 shows that the average profit weight in 1997Q1 was around to 0.40, but in the next quarter had a sharp decline to approximately 0.12. Over the quarters this average ranges between 0.02 and 0.38, which are the minimum and the second greatest values and correspond to 1998Q2 and 2015Q3, respectively. Figure 8 suggests that after 2005Q3 until 2015Q3, the average profit weight has increased significantly, but after that it starts to decrease, which is in line with what Lattanzio (2020) affirm: common ownership effects tend not to last very long. Currently, the average profit weight is around 0.21 which is a small value.

I examined the impact of this average profit weight on returns for the companies for which this weight exhibited variation over time (otherwise, I would face a collinearity problem): 27 companies, which means that it was possible to estimate 27 OLS regressions.

Table 1 represents the summary statistics the data for these 27 companies (in 94 quarters totalling 1626 observations):

	Mean	Median	Std. Dev.	Minimum	Maximum
$\bar{\omega}$	0.4047	0.0235	0.9325	0.0000	6.1893
R – RF	2.3707	2.5450	18.811	-66.7630	157.1400
RM – RF	0.4107	0.6800	5.1634	-15.4400	11.5600
SMB	-0.2336	-0.0400	1.9976	-5.2500	3.7700
HML	0.3524	0.4700	2.3289	-11.3000	6.2100

Table 1 - Summary statistic table of the variables from equation.
Note: The statistics presented are computed across 1626 observations.

The results suggest that the median company, in the median year, has an average profit weight of 0.02% on rival companies, has an excess return of 2.55%, the median market excess is 0.68%, the median big company of the portfolio minus the median small company of the portfolio is equal to -0.04% and in the

same portfolio the median high book-to-market company minus the median low book-to-market company has a ratio of 0.47%.

5.5. Impacts of Common Ownership on Returns

Table 2 presents the OLS estimation results of the equation described in common ownership hypothesis chapter, using 1626 observations and HAC standard errors,[4] in line with Bank & Insam (2019), Liu & Gao (2019), Horváth & Wang (2020) and Ali & Ülkü (2020).

	OLS	# 10% of significance*
$\bar{\omega}$	105.7237	9
	(152.8105)	
RM - RF	1.2982	21
	(0.6183)	
SMB	0.9377	10
	(1.2417)	
HML	-0.0224	10
	(1.1670)	
R^2	0.1733	
VIF	3.7190	

Table 2 – Results from the OLS regression.
Notes: The values displayed are the mean values of the results of 27 regression models, except the VIF, which is the maximum value found, and in the parenthesis is the standard deviation. *Number of times it was at least 10% of significance.

The results in Table 2 are an average of the results of the 27 OLS regressions (i.e., I did a regression for each company that do not presented problems of

[4] HAC is the heteroscedasticity and autocorrelation consistent estimator, based on (Newey & West, 1987). It was used the Gretl program and by default the lag is computed by the following equation: $lag = 0{,}75 \times N^{\frac{1}{3}}$

collinearity), with the exception of the Variance Inflation Factor (VIF) that is the maximum value which was found in the 27 regressions.

The variable $\bar{\omega}$ was significant at 10% significance level for 9 companies (18 companies exhibited no significance). Alcatel Lucent, Total Holdings, Total, Casino, Dexia, Dassault System and E.D.F. exhibited a positive relationship between returns and the average profit weight, while Société Générale and Gemalto exhibited opposite effects. The variable RM-RF was significant at 10% for 21 companies (6 exhibited no significance). The variables SMB and HML were significant at 10% for 10 companies (17 exhibited no significance). Because the maximum VIF values in the different regressions is below 10, no collinearity problem exists. The average R2 is 0.17, which is a bit low and suggests that on average, this model does not predict well returns.

In sum, Table 2 suggests that the average profit weight of each company does not, in general, influence the returns, such as suggested by Gao et al. (2017) and Yegen (2019), as there were very few companies that showed significance at 10%. In the appendix 2, it is possible to see the detail of each regression.

6. Conclusion

This dissertation analyses common ownership in CAC40 and studies the relationship between common ownership and returns, in which was considered the set of companies of CAC40 from the first quarter of 1997 to the second quarter of 2020.

The results suggest that the average weight that managers assign to the profit of other CAC40 companies when considering all shareholders was around 0.50 in 1997 and 0.15 in 2020 (data from Figure 6). However, when considering only

institutional shareholders, this average weight was around 0.80 in 1997 and 0.59 in 2020 (data from Figure 7). Therefore, considering only institutional shareholders, as in Backus et al. (in press), can lead to skewed results. So, to make an accurate quantification of common ownership, it is necessary to consider all shareholders.

The results also suggest that while common ownership does not impact returns for the vast majority of companies (it only has significant at 10% significance level for 9 companies in 27 companies) which goes in line with Gao et al. (2017) and Yegen (2019), an impact is found for a subset of companies. Alcatel Lucent, Total Holdings, Total, Casino, Dexia, Dassault System and E.D.F. exhibit a positive relationship between common ownership and returns, while Société Générale and Gemalto exhibit the opposite effect.

This dissertation contributes to introducing this issue to the French market, but further efforts may be beneficial if more shareholder industry codes are identified, thus ensuring a larger sample size, and if the Fama-French model variables are updated and adapted for the French market.

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Appendix

Appendix 1

In this appendix, I present in detail which companies and in which quarters were removed and their reasons for being removed.

I removed the following shareholders in the corresponding companies: DAST.PA since 2001Q1 until 2002Q2 was removed the Groupe Industriel Marcel Dassault S.A. because belongs to Dassault family; EXHO.PA since 1998Q2 until 2004Q4 was removed the Bellon (Pierre) because belongs to Bellon (Pierre & Family); LVMH.PA since 1999Q4 until 2002Q3 was removed Groupe Arnault SAS because belongs to Arnault family and in the same company since 2002Q4 until 2009Q2 was removed in the reverse way; PRTP.PA since 1997Q1 until 2009Q3 was removed the Artemis SAS because belongs to Pinault family.

All the following companies were removed from the data because do not present market capitalization: CBCP.PA^C00, CRLP.PA^H03, DEXF.PA^C00, EQUT.PA^H05, FBSP.PA^F01, PARI.PA^A00, PMOD.PA^I00, SOFP.PA^E99, STM.PA and SUZF.PA^L98. The company CCFP.PA^H01 was removed because do not present returns.

The following list of companies were required to calculate a ratio so that the sum of shareholders' financial rights would be 100% and no more: in 1997Q2 and 1997Q3 was the VIV.PA; in 1997Q4 and 1998Q1 were BNPP.PA, SGOB.PA and VIV.PA; in 1998Q2 were BNPP.PA and VIV.PA; 1998Q3 were BNPP.PA, SGOB.PA and VIV.PA; in 1998Q4, 1999Q1 and 1999Q2 were BNPP.PA,

EXHO.PA, OREP.PA, SGOB.PA and VIV.PA; in 1999Q3 and 1999Q4 were BNPP.PA, OREP.PA and SGOB.PA; in 2000Q1 were OREP.PA and SGOB.PA; in 2000Q2 was SGOB.PA; in 2000Q3 were ORAN.PA and SGOB.PA; in 2000Q4, 2001Q1, 2001Q2, 2001Q3, 2001Q4 and 2002Q1 was SGOB.PA; in 2003Q1 was CAGR.PA; in 2006Q3, 2006Q4 and 2007Q1 was MT.AS; in 2015Q4 was ALUA.PA^K16.

In the following list the shareholder Fortis Asset Management Japan Co., Ltd._NLE appears duplicated in some companies: in 2000Q4 and 2001Q1 were the following companies: AVEP.PA^J05, CARR.PA, AXAF.PA, ALUA.PA^K16 and ORAN.PA; in 2001Q2 and 2001Q3 were the following companies: VIV.PA, TOTF.PA, LYOE.PA^F10, AVEP.PA^J05, PEUP.PA, LVMH.PA, OREP.PA, DANO.PA, SGOB.PA, CARR.PA, BNPP.PA, AXAF.PA, ALUA.PA^K16, ORAN.PA, EXHO.PA, DEXI.BR^L19, DAST.PA and ORA.PA^D04; in 2001Q4 were the following companies: VIV.PA, TOTF.PA, LYOE.PA^F10, AVEP.PA^J05, PEUP.PA, LVMH.PA, OREP.PA, DANO.PA, SGOB.PA, CARR.PA, BNPP.PA, AXAF.PA, ALUA.PA^K16, SOGN.PA, ORAN.PA, EXHO.PA, SASY.PA, DEXI.BR^L19, DAST.PA and ORA.PA^D04; in 2002Q1 were the following companies: VIV.PA, TOTF.PA, LYOE.PA^F10, AVEP.PA^J05, PEUP.PA, LVMH.PA, OREP.PA, DANO.PA, SGOB.PA, CARR.PA, BNPP.PA, AXAF.PA, ALUA.PA^K16, SOGN.PA, ORAN.PA, SASY.PA, DEXI.BR^L19, DAST.PA and ORA.PA^D04; in 2002Q2 were the following companies: VIV.PA, TOTF.PA, LYOE.PA^F10, AVEP.PA^J05, PEUP.PA, LVMH.PA, OREP.PA, DANO.PA, SGOB.PA, CARR.PA, BNPP.PA, AXAF.PA, ALUA.PA^K16, ACCP.PA, SOGN.PA, ORAN.PA, SASY.PA, DEXI.BR^L19, DAST.PA and ORA.PA^D04; in 2002Q3, 2002Q4 and 2003Q1 were the following companies: VIV.PA, TOTF.PA, LYOE.PA^F10, AVEP.PA^J05, PEUP.PA, LVMH.PA, OREP.PA, DANO.PA, SGOB.PA, CARR.PA, BNPP.PA, AXAF.PA, ALUA.PA^K16, ACCP.PA, SOGN.PA, ORAN.PA, SASY.PA, DEXI.BR^L19 and ORA.PA^D04; in 2003Q2

and 2003Q3 were the following companies: VIV.PA, TOTF.PA, LYOE.PA^F10, AVEP.PA^J05, PEUP.PA, LVMH.PA, OREP.PA, DANO.PA, SGOB.PA, CARR.PA, BNPP.PA, AXAF.PA, ALUA.PA^K16, ACCP.PA, SASY.PA, DEXI.BR^L19 and ORA.PA^D04; in 2003Q4 and 2004Q1 were the following companies: VIV.PA, TOTF.PA, LYOE.PA^F10, AVEP.PA^J05, PEUP.PA, LVMH.PA, LAFP.PA^J15, OREP.PA, DANO.PA, SGOB.PA, CARR.PA, BNPP.PA, AXAF.PA, ALUA.PA^K16, ACCP.PA, CAPP.PA, SASY.PA and DEXI.BR^L19.

Appendix 2

In the following tables is shows the results of each regression estimation.

		coefficient	*VIF*
Alcatel Lucent	$\bar{\omega}$	11.9161***	1.0390
		(3.6375)	
	RM - RF	2.4790***	1.0310
		(0.6912)	
	SMB	3.6476**	1.0440
		(1.7969)	
	HML	-2.5117	1.0570
		(1.6696)	
	R2	0.1686	
Axa SA	$\bar{\omega}$	-24.9126	1.0620
		(76.3471)	
	RM - RF	1.2099**	1.1130
		(0.5536)	
	SMB	1.1877	1.0110
		(0.9892)	
	HML	0.1990	1.1600
		(0.6124)	
	R2	0.0988	
BNP Paribas	$\bar{\omega}$	-0.2663	1.0210

		(3.6265)	
	RM - RF	1.1656**	1.1080
		(0.4973)	
	SMB	0.5848	1.0060
		(0.7813)	
	HML	1.5339***	1.1230
		(0.5496)	
	R2	0.1563	
Bouygues	$\bar{\omega}$	-91.0848	1.0870
		(70.8036)	
	RM - RF	1.9349***	1.0880
		(0.5141)	
	SMB	0.0635	1.0270
		(1.3837)	
	HML	-1.6765	1.1570
		(1.2860)	
	R2	0.2437	
Carrefour	$\bar{\omega}$	-4.9153	1.1710
		(32.9108)	
	RM - RF	0.7254***	1.2000
		(0.2325)	
	SMB	0.7655	1.0140
		(0.6069)	
	HML	-0.5434	1.2280
		(0.4635)	
	R2	0.0540	
Edition Canal	$\bar{\omega}$	2 137.0700	1.4800
		(2 640.9000)	
	RM - RF	3.0651	1.5800
		(2.8649)	
	SMB	-6.1787	1.5080
		(5.0575)	
	HML	-8.5717*	1.2150
		(4.0367)	
	R2	0.2720	
Total Holdings	$\bar{\omega}$	5.2183**	1.0400
		(1.6079)	
	RM - RF	1.3318	3.7190

		(2.6809)	
	SMB	0.4326	1.5140
		(2.5985)	
	HML	2.2914	3.2090
		(4.5856)	
	R2	-0.0063	
Suez	$\bar{\omega}$	26.3059	1.0180
		(41.5648)	
	RM - RF	1.5177***	1.0750
		(0.3874)	
	SMB	-0.0968	1.0640
		(0.6378)	
	HML	1.6352*	1.0230
		(0.8534)	
	R2	0.2215	
Peugeot	$\bar{\omega}$	8.1305	1.0070
		(5.5911)	
	RM - RF	1.3829***	1.0920
		(0.3367)	
	SMB	1.1752	1.0040
		(0.7895)	
	HML	1.1798	1.0890
		(0.8094)	
	R2	0.1937	
Renault	$\bar{\omega}$	2.7540	1.0170
		(5.7047)	
	RM - RF	1.3554***	1.1030
		(0.3771)	
	SMB	3.2975***	1.0100
		(0.8612)	
	HML	0.8397	1.1140
		(0.7686)	
	R2	0.1656	
Société Générale	$\bar{\omega}$	-4.6722*	1.0200
		(2.6704)	
	RM - RF	1.4722***	1.1100
		(0.5352)	
	SMB	1.7401*	1.0100

		(0.9564)	
	HML	1.7500***	1.1140
		(0.5227)	
	R2	0.2340	
Thales	$\bar{\omega}$	-1.1130	1.2330
		(4.3636)	
	RM - RF	1.2979***	1.1260
		(0.3769)	
	SMB	-1.0215	1.1800
		(0.7950)	
	HML	0.9868	1.1210
		(0.6661)	
	R2	0.1570	
Total	$\bar{\omega}$	4.3821***	1.0050
		(0.6142)	
	RM - RF	0.6965***	1.1030
		(0.1578)	
	SMB	0.0448	1.0060
		(0.5273)	
	HML	0.6062*	1.1040
		(0.3631)	
	R2	0.1348	
Capgemini	$\bar{\omega}$	1.4791	1.0320
		(6.6478)	
	RM - RF	1.8174***	1.0920
		(0.5483)	
	SMB	0.9089	1.0090
		(1.2595)	
	HML	-1.6462*	1.1200
		(0.9121)	
	R2	0.1520	
Casino	$\bar{\omega}$	200.4040**	3.2620
		(88.2227)	
	RM - RF	1.2033**	1.6310
		(0.5419)	
	SMB	3.2823***	1.7750
		(0.9003)	
	HML	-1.2463	1.8360

		(1.4147)	
	R2	0.1738	
Sanofi	$\bar{\omega}$	-82.5262	1.0400
		(133.8010)	
	RM - RF	0.2009	1.0950
		(0.1724)	
	SMB	-0.6226	1.0040
		(0.5080)	
	HML	0.8863***	1.1130
		(0.3260)	
	R2	0.0242	
Airbus	$\bar{\omega}$	-0.2296	1.0880
		(1.7938)	
	RM - RF	1.4349***	1.0770
		(0.4349)	
	SMB	2.2958**	1.0160
		(0.9234)	
	HML	-0.3014	1.1610
		(0.9111)	
	R2	0.1664	
Dexia	$\bar{\omega}$	6.2414*	1.1080
		(3.4329)	
	RM - RF	1.2932*	1.0290
		(0.6795)	
	SMB	3.4647**	1.0110
		(1.6986)	
	HML	0.5343	1.1150
		(2.1076)	
	R2	0.0886	
TF1	$\bar{\omega}$	-139.5630	1.0920
		(297.4410)	
	RM - RF	2.0037***	1.0300
		(0.4631)	
	SMB	1.5276	1.1100
		(1.8401)	
	HML	-0.9423	1.1780
		(1.4425)	
	R2	0.2514	

Dassault System	$\bar{\omega}$	657.9320*	1.2810
		(314.5840)	
	RM - RF	2.2724**	1.8010
		(0.8258)	
	SMB	-2.3284	1.7110
		(2.1612)	
	HML	-1.6886***	1.2740
		(0.4458)	
	R2	0.1467	
Vinci	$\bar{\omega}$	-2.0844	1.0400
		(4.8865)	
	RM - RF	1.1533***	1.3700
		(0.2614)	
	SMB	1.7389***	1.0500
		(0.5370)	
	HML	-0.5706	1.4070
		(0.6634)	
	R2	0.2878	
Credit Agricole	$\bar{\omega}$	271.2360	1.1750
		(338.2870)	
	RM - RF	1.3116**	1.4360
		(0.5617)	
	SMB	2.4462*	1.1540
		(1.3904)	
	HML	1.6285*	1.4450
		(0.8888)	
	R2	0.2180	
Engie	$\bar{\omega}$	-0.5356	1.0100
		(0.4284)	
	RM - RF	0.2476	1.4680
		(0.2438)	
	SMB	1.4768*	1.0330
		(0.7491)	
	HML	1.1471	1.4550
		(0.7288)	
	R2	0.1256	
E.D.F.	$\bar{\omega}$	8.4299**	1.0330

		(3.9669)	
	RM - RF	0.4139	1.2810
		(0.3711)	
	SMB	2.4289	1.0590
		(1.6626)	
	HML	0.4400	1.3630
		(1.6492)	
	R2	0.0670	
Unibail Rod West	$\bar{\omega}$	-1.4015	1.0290
		(1.2614)	
	RM - RF	0.7266*	1.4530
		(0.3813)	
	SMB	2.7625***	1.0450
		(0.5918)	
	HML	1.2732	1.4450
		(1.0984)	
	R2	0.3383	
Safran	$\bar{\omega}$	-1.0364	1.0160
		(2.3293)	
	RM - RF	1.0239*	2.0530
		(0.5227)	
	SMB	0.3098	1.0530
		(0.8491)	
	HML	0.8695	2.1150
		(1.1316)	
	R2	0.1993	
Gemalto	$\bar{\omega}$	-132.6190**	1.2490
		(38.4576)	
	RM - RF	0.3154	1.8900
		(0.4802)	
	SMB	-0.0162	1.0110
		(0.6737)	
	HML	1.2939*	1.8680
		(0.6016)	
	R2	0.3456	

Table A 1 - the results of each of the 27 regressions estimation.

* With significance of 10%

** With significance of 5%

*** With significance of 1%

The values displayed in the parentheses correspond to the standard errors.