

**INSTITUTIONAL OWNERSHIP, FIRM SIZE AND EXCESS RETURN**

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# Approval

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## **Abstract**

The objective of this study is to analyze the effect of the level of institutional ownership on firms' stock returns regardless of firm size from 1981 to 2018. We find that higher institutional ownership is associated with higher out-of-sample abnormal returns after we control for possible size effects. Stocks with low levels of institutional ownership underperform compared to those with higher levels.

**Keywords:** Institutional Ownership Level; Firm Size; Excess Return

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## **Glossary**

- CAPM.** The Capital Asset Pricing Model (CAPM) describes the relationship between systematic risk and expected return for assets, particularly stocks.
- CARHART** The Cahart Fama French four-factor model is a refinement of the three-factor model for pricing assets developed by Eugene Fama and Kenneth French. As the name suggests, it adds a fourth factor to the three that they identified: market risk, value and size.



## **1: Introduction**

In the 1950s, most investors in the equity market were individuals, with institutional investors representing only 8% of the market (Lander, 2013). However, more recently, institutional investors represent above 70% of the ownership in the stock market and play an essential role in investing in and governing public companies (McGrath, 2017). This change in stock ownership raises the question of whether there exists a relationship between the level of institutional ownership and returns. For instance, Gompers and Metricks (2001) find that the pattern of US equity ownership has changed over time, with institutional investors participating in the stock market more actively during the 1980s and 1990s than before. This compositional shift led to a change in investors' preferences from small companies to large companies. Subsequently, this demand shift also affected stock market prices and returns. Analyzing these two relationships with regression, Gompers and Metricks (2001) provide evidence that this compositional shift partially accounts for the price appreciation of large companies' stocks relative to small companies' stocks. While their study indicates that institutional ownership trading is related to returns, there is hitherto no clear understanding of whether institutions can choose better firms and whether investing in firms with higher institutional ownership leads to higher returns for all firm sizes.

To address this literature gap and test whether there exists a relationship between the overall institutional ownership level and returns, regardless of firm size, we analyze the institutional ownership levels and the corresponding firms' excess returns utilizing

four methods. The analysis is out-of-sample and allows us to determine whether causality runs from institutions buying stocks or whether the institutions can predict returns. As such, our research is partially complementary to the study of Gompers and Metricks (2001). Through analysis of the results in four methodologies, we conclude that the positive relationship between institutional ownership level and alpha does exist. We also find that investors could invest in firms with higher institutional ownership level to yield higher returns.

## 2: Literature Review

In the literature, smaller firms are known to lead to higher returns (Berk, 1995). Another question is whether institutional investors can generate higher yields compared to other types of investors. The literature on mutual funds partially addresses this problem. Jensen (1968) provides evidence that, from 1945 to 1964, 115 mutual funds could predict stock prices well enough to outperform the market. The paper analyzes mutual funds' returns under different asset pricing models by either excluding expenses or gross of costs and considers the effects of different degrees of risk on portfolio returns. Malkiel (1995) finds that mutual funds underperform their benchmark by utilizing a unique dataset of returns from all equity mutual funds from 1971 to 1991. However, the study does not find consistent fund returns during the 1980s, although fund returns persist during the 1970s.

Fama (2010) considers underperforming mutual funds from a different perspective as follows. After adding costs to the fund expense ratios, Fama (2010) finds evidence of inferior and superior performance (nonzero real excess returns) in the extreme tails of the cross-section of mutual fund excess return estimates. In other words, before expenses, if there are active mutual funds with true positive alphas, they are balanced by the active funds with negative alpha. However, after expenses, the returns realized by overall institutional investors are negative. The difference from the above-cited studies is that Fama (2010) finds strong evidence of fund managers' skills, which can be negative as well as positive.

However, these three studies all consider only mutual funds, while our study considers all institutions, namely mutual funds, pension funds, private equity, hedge

funds, and other firms. Most studies from this literature stream before 1990 argue that mutual funds cannot outperform the market on average. However, after 1990, most studies find institutions are, on average, able to outperform their benchmarks.

Cornett (2007) finds a significant relationship between a firm's operating cash flow returns and both the percentage of institutional stock ownership and the number of institutional stockholders. However, this relationship is valid only for institutions that do not have a relationship with the companies they will invest in subsequently. Yan (2007) utilizes the portfolio method to examine the relationship between institutions' investment horizons and their information roles in the stock market. The results show that short-term institutional trading forecasts future stock returns, which does not hold in the long run and more applies to small and growth stocks. Sias (2006) further develops a method that exploits covariance linearity to generate higher frequency estimates and uses this method to evaluate the monthly, weekly, and daily relationships between returns and the changes in institutional ownership.

However, all these studies are particular to a mechanism that examines the implications of the level of institutional ownership on performance and thus do not provide a clear answer on whether sorting portfolios based on institutional ownership may be a profitable trading strategy. Moreover, these studies are only applicable to firms within a specific size range, while our study considers all firm sizes.

### **3: Data and Variables**

All public stocks traded in the American equity market are included in this thesis. CUSIP, year, price, share outstanding, institutional ownership percentage (Inst), and lowinst are the primary data adopted as raw data for the research. The data are in the year range from 1980 to 2019, as downloaded from WRDS. After processing data, the data displayed is yearly data with implied month. CUSIP, which stands for the Committee on Uniform Securities Identification Procedures, is a code of firm to find registered stock or bonds in the financial market. Price is the stock price of each public firm in the equity market. The dummy variable (lowinst) indicates the institutional ownership level of firms. Lowinst, equalled to zero, represents the high institutional ownership level, and that equalled with one refers to the low institutional ownership level.

Several data(variables) are adopted in this study to gain insights into the logic behind, instead of this study's focus. Stock name (Stkname) and ticker symbol (Ticker) help identify different firms and avoid a firm with repeated data. File date (Rdate) is employed to generate a variable year. Some other data (e.g., the critical five institutional ownership size, total ownership by institutional block holders) are a summary of a range of characteristics of institutional ownership.

## 4. Method and Results

We do not include public firms with a market value below USD 50 million in the analysis to avoid small-firm bias. We also cover all firms in each industry and sector to prevent selection bias because the performances of firms differ by industry and sector. Subsequently, in terms of the market value calculated by price times outstanding shares, we separate the market values of all public firms and the percentage of institutional ownership of all public firms into quintiles. We then create joint terms of the two variables groups (Size and Inst). As a result, we construct a portfolio of size 25 (5\*5 matrix) based on the different levels of institutional ownership and market values of public firms. Size is the market value of public firms, and Inst is the percentage of ownership by institutions. The numbers from 1 to 5 represent the magnitude, from small to large, respectively. In our study, firms without institutional investors and without data on market value are not included in the analysis.

The method of the paper is to create the 25 portfolios in year T, and then analyze their out-of-sample performance in year T+1. Descriptive statistics can be used to differentiate between the different portfolios, as shown in Table 1. Hence, this study distinguishes between returns and their determinants.

We calculate each average raw return in Table 2 for each institutional ownership level. We then intuitively measure the mean differences between every two groups to test if there exists a correlation between the return and institutional ownership level. The mean differences are significant between high and low institutional ownership levels. Therefore, there exists a potential positive correlation between the average raw return and

the institutional ownership level. However, a raw return is not a good indicator of the relationship with the institutional ownership level because it can be affected by several factors due to being volatile. Therefore, we concentrate on the regressed alpha to examine the relationship between excess returns and the institutional ownership level.

Alpha is calculated as follows: Two models, namely, the Capital Asset Pricing Model and Fama-French-Carhart Four-Factor Model, are employed for regression analysis. The models are expressed below.

$$EXR_{i,t} = \alpha_i + \beta_i^{mkt}MKT_{i,t} + \sigma_{i,t} \quad (1)$$

$$EXR_{i,t} = \alpha_i + \beta_i^{mkt}MKT_{i,t} + \beta_i^{HML}HML_{i,t} + \beta_i^{SMB}SMB_{i,t} + \beta_i^{UMD}UMD_{i,t} + \sigma_{i,t} \quad (2)$$

Where  $EXR_{i,t}$  denotes the excess return of the asset  $i$  at month  $t$ ;  $\alpha$  refers to the intercept;  $\beta$  indicates the asset coefficient with specific factor;  $MKT_{i,t}$  represents the market risk premium at year  $t$ ;  $HML_{i,t}$  represents the return difference between high book-to-market value stocks and low book-to-market value stocks;  $SMB_{i,t}$  denotes the return difference between small market capitalization stock and large market capitalization stock;  $UMD_{i,t}$  refers to the return difference between the previous 12-month return winner stock and the last 12-month return loser stocks;  $\sigma_{i,t}$  indicates the random error with expectation 0 and variance  $\sigma^2$ .

As a first method, we employ two regression models to examine the alphas for different firm sizes. The alphas are regressed monthly for each portfolio in Table 3. Using horizontal analysis, we cannot identify a clear relationship between the alphas and institutional ownership levels. Using vertical analysis, for each market size of public

firms, the correlation of excess returns is overall increasing, with low levels of institutional ownership underperforming. Nevertheless, the results are not accurate for the market factor considered, and most results of the mean differences are significant only at the 10% level. In other words, we cannot accurately conclude there is a potential positive relationship between excess returns and institutional ownership levels. For this reason, the Fama–French–Carhart four-factor model is adopted to regress the alpha.

From Table 3, the alphas based on the four-factor model differ with the institutional ownership levels. The mean differences between the highest and lowest institutional levels for each firm size are, for the most part, significant at the 1% level. For a higher institutional ownership level, which is represented by Size 4, the mean difference is not significant under the four-factor model but is still higher than that under the market model. Additionally, the alphas are increasing from the lower to the higher institutional ownership levels. We can thus conclude there exists a positive correlation between the institutional ownership level and excess returns. However, as shown in Table 1, Panel B, when a firm has a significant institutional ownership level, alpha decreases. The range for the increase in alpha with the institutional ownership level is from 1% to 92.87%. Therefore, we conclude that, within a specific range, the alpha has a positive correlation with the increase in institutional ownership level.

The second methodology does not consider the size effect because, under different firm sizes, the alphas show positive correlations with the increase in institutional ownership levels. Therefore, we concentrate more on the average regressed alpha at each institutional ownership level to determine whether there exists a relation between the regressed alpha and institutional ownership. Additionally, the alphas generated in the



previous measurement are not significant in the market model and are calculated by taking the size effect into account. We thus remove the size factor and re-estimate the alphas using the four-factor model and taking the average of regressed alphas based on each institutional ownership level in Table 4. The results show an identically positive correlation, where low levels of institutional ownership are underperforming compared to the higher ones.

The third approach examines the relationship in-depth with a dummy variable being used to distinguish between the two types of institutional ownership (high and low levels). We add one more variable (*lowinst*) to the Fama–French–Carhart four-factor model to verify whether this variable is significant when generating an accurate alpha under each institutional ownership level. Then, a five-variable regression is used. The alphas are generated using the same regression method, and we take the average alphas for low and high institutional ownership levels for all public firms. The results are shown in Table 5. The alpha is significantly affected by the dummy variable, as the t-stat is always higher than/lower than  $+2/-2$ . The mean difference between the two alphas of the lower and higher institutional ownership levels is significant at the 1% level<sup>1</sup>. This shows that a higher institutional ownership level can yield higher excess returns. Therefore, we conclude that, within a specific range of the percentage of institutional ownership, there exists a positive correlation between the alphas and the institutional ownership levels regardless of the size effect. This conclusion possibly and implicitly reflects that investors can invest in stocks that yield higher returns based on the institutional ownership level.

The final method examines whether investors can invest in stocks that yield higher returns under the higher institutional ownership level. The alphas (in %) of the monthly value- or equal-weighted portfolio excess returns regressed on the market factor and the Fama–French–Carhart four-factor are shown in Table 6. Two weighted methods are employed to determine the alphas under various models in each portfolio. A range of weighted approaches implicitly covers the market value (size). Equal-weighting gives the same weight to each stock in a portfolio (Plyakha et al., 2016). The value-weighted portfolio considers a range of weights for each stock based on the market and total market value of the portfolio. The equal-weighted method is riskier since it gives identical weights to each stock in the portfolio. Investors can gain higher returns on growth stocks when the small stocks exhibit higher performance. However, investors can be subject to difficulties when small stocks generate significant losses (Plyakha et al., 2016). Investors are thus safer when using the value-weighted method by reducing risk, since investment targets more stable firms. Nevertheless, under the value-weighted method, investors probably lose opportunities to gain higher returns from small stock. Additionally, the value-weighted method is considered as a passive investment strategy; however, the equal-weighted method is considered an active investment strategy.

We generate alphas by regression analysis to examine which methodology yields the most feasible investment strategy. Using the value-weighted method, alphas are mostly insignificant because only large firms are considered, and the excess returns under respective institutional ownership levels in the market and the four-factor models are lower than those in the equal-weighted method. Therefore, firms with higher institutional

ownership levels are critical to generating excess returns in the portfolios. Subsequently, based on the relationship between the institutional ownership level and excess returns, a long-short strategy of investment is adopted. Intuitively, we long the stocks with higher institutional ownership levels and short those with lower institutional ownership levels. As a result, positive excess returns of 0.36% and 0.17% are obtained under the market and four-factor models, respectively; alphas are statistically significant at the 1% and 10% levels. Therefore, we can conclude that investors invest in stocks that yield higher excess returns based on a higher institutional ownership level.

## **5. Conclusion**

This thesis introduces and discovers a significant relation between institutional ownership level and excess return under each size of firms. We create quintiles of institutional ownership and market value(size) of the firm and construct 25 portfolios. Using several regression models, we provide some evidence that makes future research worthwhile. We conclude that first, there is a positive correlation between institutional ownership levels and excess returns regardless of the size effect. Second, we find that investors can invest in stocks and yield higher returns based on the higher institutional ownership levels.

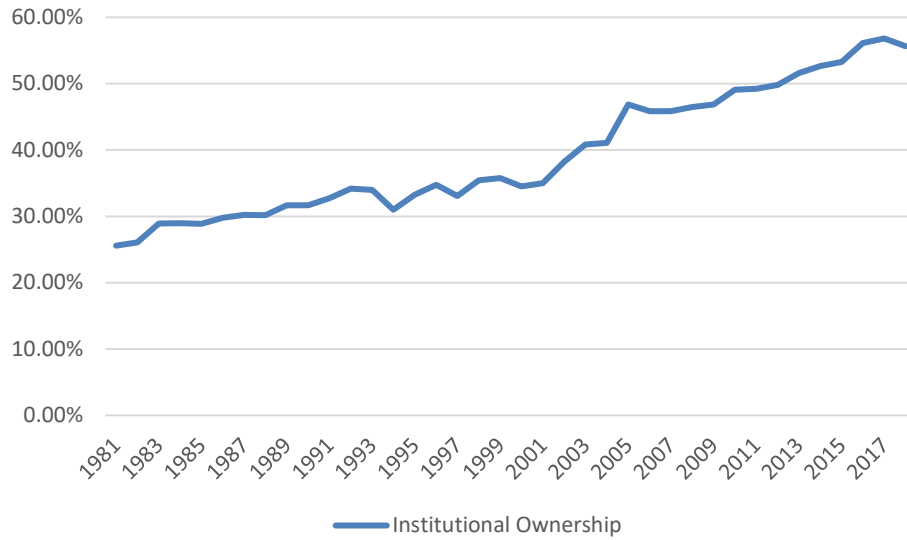


Figure 1 **Institutional Ownership Movement over Time**. .....13

This figure illustrates the overall trend of institutional ownership movement during the time period 1981-2018 for all available companies in the United States, excluding company without data.

**Table 1 Construction of a 5\*5-portfolio by Inst and Size.....14**

The data covers 1980-2019 and is downloaded from WRDS. Market value and institutional ownership are the variables used to construct a 5\*5 portfolio to test the relationship between the percentage of institutional ownership and the return of companies in the following year. Market value is price times shares outstanding. We drop companies with market value of less than \$50 million to avoid small firm bias. We also include firms within different industries and sectors to avoid selection bias. We construct quintiles of institutional ownership (Inst levels) which are dependent on quintiles of the company's size (hence, size levels). Hence, these are dependent sorts, where each size quintile has 5 levels of institutional ownership. These dependent sorts are done at the end of each month. Size is the market value of the firm. Inst is the percentage of ownership of institutions. The table provides the market value and institutional ownership percentage in different panels. 1 and 5 represent the lowest and highest levels, respectively.

**Panel A Descriptive Statistics for Size Group**

	Market Value Range (in millions \$)	Mean of Market Value Range (in millions \$)	Observation (in numbers)
size 1	50 -- 151.5	70.74	313306
size 2	68.45 -- 451.46	159.12	313177
size 3	118.28 -- 1276.79	370.88	313196
size 4	230.39 -- 4629.91	1055.91	313066
size 5	609.24 -- 768224.3	12407.97	312919

**Panel B Descriptive Statistics for Inst Group**

	Institutional Ownership percentage of outstanding shares (in %)	Mean of Institutional Ownership Percentage (in %)	Observation (in numbers)
Inst 1	6.38e-06 -- 56.02	9.60	314193
Inst 2	2.65e-05 -- 72.47	21.97	72515
Inst 3	20.62 -- 83.95	27.71	313168
Inst 4	67.24 -- 92.87	42.44	313154
Inst 5	11.91-- 99.99	56.18	313110

**Table 2 Mean Returns in Percentage (%) And Mean Differences Between Groups for Five Groups of Institutional Ownership Level Based on All Year .....15**

In the table, average monthly raw returns (in %) in the following calendar year are presented in the first row. The table also provides the mean difference between each two-level of institutional ownership. t-statistics are calculated; \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels, respectively.

	Inst 1	Inst 2	Inst 3	Inst 4	Inst 5
Inst Alone	0.61	0.92	1.08	1.17	1.21
Inst 1	0	0.31*	0.47***	0.56***	0.61***
Inst 2	-0.31*	0	0.16*	0.25*	0.29***
Inst 3	-0.47***	-0.16*	0	0.09	0.13
Inst 4	-0.56***	-0.25*	-0.09	0	0.04**
Inst 5	-0.61***	-0.29***	-0.13	-0.04**	0

**Table 3 Abnormal Return Based on Inst and Size under Different Models .....16**

The table provides monthly alphas (in %) for portfolios formed based on Inst 1-to-5 and Size 1-to-5 parameters defined in Table 3. Inst is the percentage of ownership of institutions. Size is the market value of each public company in the market. Level 1 to 5 is the level from small to large. The table reports the alphas (intercepts) of the monthly excess returns based on the size of the market value of each public company regressed on the market factor and the Fama-French-Carhart four-factor, as indicated. The models used are  $EXR_{i,t} = \alpha_i + \beta_i^{mkt}MKT_{i,t} + \sigma_{i,t}$  and  $EXR_{i,t} = \alpha_i + \beta_i^{mkt}MKT_{i,t} + \beta_i^{HML}HML_{i,t} + \beta_i^{SMB}SMB_{i,t} + \beta_i^{UMD}UMD_{i,t} + \sigma_{i,t}$ .  $EXR_{i,t}$  is the excess return of the institutions. The bottom line provides the mean-difference between the monthly alpha of Inst 5 and Inst 1. t-statistics are calculated; \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels, respectively.

	Size 1		Size 2		Size 3		Size 4		Size 5	
	capm	4factor	capm	4factor	capm	4factor	capm	4factor	capm	4factor
Inst 1	0.04	-0.08	-0.03	-0.3	-0.03	-0.19	-0.04	-0.11	0.05	-0.18
Inst 2	0.20	-0.08	0.13	0.09	0.13	0.01	0.15	0.08	0.17	0.19
Inst 3	0.55	0.62	0.11	0.50	0.05	-0.06	0.22	0.13	0.26	0.23
Inst 4	0.64	0.13	0.21	0.46	0.06	0.44	0.19	0.41	0.21	0.22
Inst 5	0.43	0.30	0.18	0.23	0.25	0.26	0.04	0.09	0.25	0.29
Inst5-Inst 1	0.39** *	0.38** *	0.21*	0.58** *	0.28*	0.45** *	0.08	0.20	0.20*	0.48** *



**Table 4 Relationship between the Alpha and the Institutional Ownership.....17**

The table reports the monthly alpha based on the level of the percentage ownership of institutional investors of each public company regressed on the Fama-French-Carhart four-factor model, as indicated. The numbers of observations of Inst 1 and Inst 5 are different from that of Inst 2 to Inst 4, but the sample sizes (>30) are sufficient.

	<i>Inst 1</i>	<i>Inst 2</i>	<i>Inst 3</i>	<i>Inst 4</i>	<i>Inst 5</i>
<b>Alpha (%)</b>	-0.51**	-0.14	0.21**	0.30***	0.05*
<b>Number of Observation</b>	6572	8421	8723	8009	6441

**Table 5 Average Regressed Alpha in Percentage (%) And Mean Differences Between Large Groups and Low Groups of Institutional Ownership Levels Based on All Year .....18**

The table reports the monthly alpha (in %) based on two different groups of institutional ownership levels. The regression model used here is the Fama-French-Carhart four-factor model. The regression model expression is  $EXR_{i,t} = \alpha_i + \beta_i^{mkt}MKT_{i,t} + \beta_i^{HML}HML_{i,t} + \beta_i^{SMB}SMB_{i,t} + \beta_i^{UMD}UMD_{i,t} + \sigma_{i,t}$ . t-statistics are calculated; \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels, respectively.

	<i>Low Inst (Inst&lt;3)</i>	<i>High Inst (Inst&gt;3)</i>	<i>Mean-Difference</i>	<i>T-Stat</i>
Alpha( $\alpha$ )	0.004%	0.496%	0.492%***	2.57

**Table 6 Alphas for Equal Weighted and Value Weighted Portfolio By Inst.....19**

The table reports the alphas (in %) of the monthly value- or equal-weighted portfolio excess returns regressed on the market factor and the Fama-French-Carhart four factors, as indicated. The models used are  $EXR_{i,t} = \alpha_i + \beta_i^{mkt}MKT_{i,t} + \sigma_{i,t}$  and  $EXR_{i,t} = \alpha_i + \beta_i^{mkt}MKT_{i,t} + \beta_i^{HML}HML_{i,t} + \beta_i^{SMB}SMB_{i,t} + \beta_i^{UMD}UMD_{i,t} + \sigma_{i,t}$ .  $EXR_{i,t}$  is the excess return of the institutions.  $MKT_{i,t-1}$  is the market risk premium. Inst is the percentage ownership of institutions. Firms are divided into low percentage of institutional ownership and high percentage of institutional ownership. Long (5)-Short (1) is the long-short strategy made by the difference between long the Inst 5 and short the Inst 1. The difference in return of long-short strategy is 1% significance under the CAPM model. The differences in return of long-short strategy are in 10% significance level under the Fama-French-Carhart four-factor model in the equal-weighted method. There is no significance of return's difference of value-weighted method under the two models. t-statistics are calculated; \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels, respectively.

	<i>Equal Weighted</i>		<i>Value Weighted</i>	
	<b>CAPM</b>	<b>4 Factor</b>	<b>CAPM</b>	<b>4 Factor</b>
<b>Inst 1</b>	-0.24***	-0.04	-0.15**	-0.02
<b>Inst 2</b>	-0.02	0.19**	0.03	0.17**
<b>Inst 3</b>	0.12	0.20***	0.09	0.14***
<b>Inst 4</b>	0.19*	0.24***	0.09	0.16***
<b>Inst 5</b>	0.11	0.13*	-0.03	-0.01
<b>Long (5)-Short (1)</b>	0.36***	0.17*	0.12	0.01

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