Institutional Investment Horizon and the S&P 500 Index Addition

by

Bruno Tremblay

A research project submitted in partial fulfillment of the requirements for the degree of Master of Finance

Saint-Mary's University

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Written for MFIN 6692.0 under the direction of Dr. Najah Attig

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Date: **September 05, 2013**

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Abstract

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September 4, 2013

This paper aims to examine the effect of institutional investment horizon on the stock response to S&P500 index additions. The study argues that institutional investors with a longer investment horizon will monitor more closely the investee firm, which will likely lead to a better stock response to index addition. The results show that long-term institutional investors improve the stock response to index addition on an event window of 120 days. This evidence suggests that when we look at the different roles of the institutional investors, it is important to account for institutional heterogeneity.

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Chapter 1: Introduction

This paper aims to examine the effect of institutional investment horizon on stock response to the S&P500 index addition.

Recent finance literature posits that institutional investors with longer-term horizon tend to be associated with good corporate governance, since they are able to exert effective monitoring on firm managers more closely and actively. It is debated that the increased monitoring of corporate governance positively impacts firm performance (Elyasiani and Jia, 2008; Chen et al., 2007) Previous studies show that longer-term institutional investors may provide either a positive or a negative influence on corporate governance (Attig et al., 2012).

On the other hand, Chen et al. (2007) report that many studies showed little evidence of long-term change in stock performance as a result of monitoring. According to Attig et al. (2013), empirical evidence on the economic impact of institutional ownership has been inconclusive. This statement supports the relevance to continue analyzing the informational and monitoring role of institutional investor investment horizon (IIIH). This study contributes to this timely line of inquiry by investigating the extent to which the investment horizon of institutional investors alters the stock response to the S&P 500 index

additions.

Index[1] additions are a good vehicle to better understand the role of the investment horizon of institutional investors. Studies show that a change in the S&P 500 index could convey information to investors about a stock's investment appeal and may create a price pressure (Jain, 1987). Erwin and Miller (1998) also stated that the inclusion of a stock to the S&P 500 index creates an increase in price and volume. Furthermore, index addition leads to greater scrutiny and improved performance firm wide (Denis et al., 2003).

Finance literature suggests that it is relevant to study the relationship between institutional investor investment horizon and index addition. This paper will therefore examine if there is an effect of institutional investment horizon on stock response to the S&P500 index addition.

The remainder of this paper is organized in the following fashion. Section two will review related literature and state the hypothesis. Section three discusses methodology, sample design and the empirical design. Section four presents and discusses results and the limitations of the study. Finally, section five concludes.

[1] Index makes reference to the S&P 500 index.

Chapter 2: Literature Review

This paper is based on two research branches: investment horizon of institutional investors and additions to the Index. Here is a review of relevant studies that have been done on those research topics.

2.1 Institutional investor investment horizon

Through the last decades, institutional investors have become the largest investor group in the United States. Indeed, according to the Federal Reserve Board's Flow of Funds report, institutions owned 51% of US equity in 2004, up from approximately 7% in 1950 (Chen et al., 2007). Institutional investors do not have all the same goals and strategies, which leads them to be heterogeneous. A main difference that causes heterogeneity across institutional investors is their investment horizon. Demographics, liquidity needs and client base are factors that could lead to a difference in the investment horizon of institutional investors (Gaspar et al., 2005).

Depending on their investment horizon, institutions will play a different monitoring role of the investee company or a different informational role. Institutions will go through a cost-benefit analysis of monitoring versus trading and only the long-term investors will opt to monitor rather than trade (Attig et al., 2012). Long-term horizon investors will have greater incentives to efficiently

monitor the investee firm.

Attig et al. (2012) documented that long-term investors outnumber short-term investors and their dominance in the size of their ownership stake. Long-term investors (over one year) (Chen et al., 2007) will have a tendency to use activism rather than selling their ownership in the company to align the management's interests with the shareholders' (Attig et al., 2012). This activism could be caused by the larger stakes owned by long-term institutional investors, which restricts them from selling off a large block holding without affecting the price. This price effect creates a high exit cost for short-term investors when trying to sell off their positions (Hirschman, 1970).

Index addition is a long-run event, which suits the longer-term institutional investors who tend to be indexers. Index funds are funds established to track the movement of an index, in this case, the S&P 500. Index funds will have a large and diversified stake in all the firms present in the Index, thus diminishing the will to trade frequently (Attig et al., 2013). Therefore the shareholder is tied with the investee for the long haul (Attig et al., 2012).

The long-term investor behavior leads to improved corporate governance as, on average, the positive influences surpass the negative influences (Attig et al., 2012) for example when decreasing the sensitivity to cash-flows and

decreases the cost of equity (Attig et al., 2012; Attig et al., 2013) and improving merger success rate and post merger performance (Gaspar et al., 2005).

With their extensive research resources and increased monitoring of senior management, an institutional investor with a long-term horizon can mitigate the information asymmetry and agency problem, which should lead to a decrease in capital market imperfections (Attig et al., 2012). On the other hand, it is argued that short-term investors who trade more frequently are better informed since their trading activities are positively related to future stock returns and earning surprises (Yan and Zhang, 2009).

Short-term investors are interested in short-term gains and myopically put too much emphasis on short-term performance. Bushee (2001) shows that short-term horizon institutional investors prefer short-term returns and tend to overweight near-term expected earnings. When a firm is poorly managed and short-term goals are not achieved, short-term horizon institutional investors will tend to take the exit strategy rather than actively monitor (Attig et al., 2013).

Short-term investors may also trade on noise and on imperfect short-term informational signals (Yan and Zhang, 2009). This results into weaker bargaining power position in acquisitions (Gaspar et al., 2005) and the presence of short-term horizon investors degrades the quality of financial information, as reflected by higher discretionary accruals (Burns et al., 2010).

2.2 Index Addition

In past literature, the addition of a stock to the S&P 500 has been associated with statistically significant increase in price and volume (Erwin and Miller, 1998). Jain (1987) finds that stocks added to the index will on average yield an abnormal return of 3.07% and that the price reaction on the event day is not merely temporary. Another study finds that there is a cumulative abnormal return of 3.807% from the announcement date of the addition to the effective date of addition with a significant negative abnormal return following the addition itself, which demonstrates a price reversal pattern (Lynch and Mendenhall, 1995).

There are many reasons to explain these phenomena. One reason could be that since stocks added to the S&P 500 index are chosen by a committee, there could be an informational effect. The decision of including a stock could be seen as an informational signal since the people at S&P might know things investors don't. This could change the general investment perception of the general public towards a stock (Jain, 1987).

When a stock is added to the index, a price pressure effect could arise from the increased demand from index fund managers or the managers that are restricted to invest in stocks that are part of the index. Jain (1987) does not find evidence of price pressure in his study. Jain (1987) runs a price pressure test

where he compares post addition performances of a control group versus the S&P 500. He claims that when a stock would be added to the control group, there would not be an increased demand from the money managers. Therefore, if both stocks added to the control group and the Index react the same way, it does not support the price pressure hypothesis. The difference in excess return for both groups on the event day is 0.14% and is not significant, thus not supporting the price pressure hypothesis. On the other hand, the price reversal pattern found by Lynch and Mendenhall (1995) indicates temporary stock-price effect. This is consistent with heavy indexing by money managers and supports the price pressure hypothesis.

The above discussion suggests that a longer-term institutional investor may provide a positive influence on the management of the investee firm. However, there is also the possibility that long-term horizon institutional investors could also exert a negative impact on management, as they could be loyal to incumbent management or present a less credible threat to exit (Attig et al., 2012). The main focus of this paper is to examine the effect of institutional investors investment horizon on the stock response to index addition. The hypothesis is as follow:

> H1: Institutional investors with a longer investment horizon will monitor more closely the investee firm, which will likely lead to a better stock response to index addition.

Chapter 3: Methodology

To empirically analyze the relationship between institutional investor investment horizon and the post addition stock performance, this paper uses index addition data from 1989 to 2000. It is a sample of the dataset used by Chen et al. (2004) where the firms added to the index in this period were matched with the available data on institutional ownership for the same period. This data comes from CRSP (Center for Research in Security Prices at the University of Chicago). The date of a change is announced by Standard and Poor's after the market closes on the announcement date and the change takes place at the close of the effective day. The period between announcement day and effective day varies from one day to about one month (Chen et al, 2004)

To construct our proxies of institutional investment horizon this study follows Attig et al. (2012; 2013). The institutional ownership data on U.S. firms was obtained from *CDA/Spectrum*. Financial firms (two-digit SIC code between 60 and 69) and firms with missing observations on key variables were omitted.

The churn rate is used to distinguish between short-horizon and long-horizon institutional investors. The "churn rate" is calculated following the methodology in Gaspar et al. (2005), which measures institutional investors' average turnover rate of stock holdings. The churn rate measures the frequency with which an institutional investor alters its position in the firm's stock.

Therefore, a higher churn rate indicates a shorter investment horizon. The quarterly churn rate of institutional investor *k* at quarter *t*:

$$CR_{k,t} = \frac{\sum_{i=1}^{N_{k,t}} \left| S_{k,i,t} P_{i,t} - S_{k,i,t-1} P_{i,t-1} - S_{k,i,t-1} \Delta P_{i,t} \right|}{\sum_{i=1}^{N_{k,t}} \frac{S_{k,i,t} P_{i,t} + S_{k,i,t-1} P_{i,t-1}}{2}} \quad (1)$$

where $N_{k,t}$ is the number of firms included in institutional investor *k*'s portfolio at quarter *t*; $S_{k,i,t}$ is the number of firm's *i* shares held by institutional investor *k* at quarter *t*; and $P_{i,t}$ is firm's *i* share price at quarter *t*.

The average churn rate over the past four quarters of institutional investor *k*'s is calculated as follows:

$$AVG\_CR_{k,t} = \frac{1}{4} \sum_{r=1}^{4} CR_{k,t-r+1} \quad (2)$$

The proxy of choice for IIIH is the weighted average of the firm's institutional investors' churn rates (i.e., across all of the firm's institutional investors):

$$WACR_{j,t} = \sum_{k=1}^{M_{j,t}} w_{k,j,t} \, AVG\_CR_{k,t} \quad (3)$$

where $w_{k,j,t}$ is the percentage ownership of institutional investor *k* in firm *j*; and

$M_{j,t}$ is the number of institutional investors in firm j.

The second proxy of IIIH used in this paper is based on the firm's preponderance of long-term (*IOTLL1*) and short-term (*IOSTT1*) institutional investors. A firm is considered to have long-term investment horizon when its percentage of IOTLL1 is greater than the percentage of IOSTT1. This is represented by the dummy variable Horizon. All of the variables are described as follow:

IOT1	Fraction of firm's shares held by institutional investors
WCR1	Value weighted average of institutional investors' churn rates
Horizon	Dummy variable set equal to 1 if institutional ownership by long-term investors is higher than institutional ownership by short-term investors
IOLTT1	Long-term institutional ownership
IOSTT1	Short-term institutional ownership

Using the *CDA/Spectrum* database, which compiles the 13F filings, proxies of IIIH were calculated. Institutional investors with more than $100

million in equity securities are required to report their quarter-end holdings in 13F filings with the Securities and Exchange Commission.

To analyze the effect of IIIH on the stock response to index addition announcement, this analysis runs an event study around the announcement date of the addition of a stock to the S&P500. The event study is ran following this equation:

$$R_{predicted} = a_i + b_{est} \times SP500 \quad (4)$$

where $R_{predicted}$ is the predicted return of the stock, α_i is the abnormal return, β_{est} is the estimated beta over the estimation period and SP500 is the return of the S&P 500 index. Cumulative abnormal returns are calculated for every stock by summing the abnormal returns:

$$CAR = \sum_{1}^{n} a_i \quad (5)$$

where n is the number of days in the event window.

Daily stock closing prices were obtained from Compustat Monthly Update – Security Daily and the S&P 500 index level was obtained from Yahoo! Finance. This paper uses a market model procedure with a capitalization-weighted index and market parameters are estimated using the period of 120

days before the announcement date. Each stock's parameters were estimated during an estimation period of 120 days prior to the event date. The stock performance was then predicted using the estimated stock parameters and the index return over different event windows, ranging from 30 days to 120 days after the event date. Risk adjusted abnormal returns and cumulative abnormal returns were then calculated over the event window. The abnormal return is the difference between the actual return and the predicted return of the stock. The predicted return of the stock was calculated by multiplying the market return by the 120-day beta estimate of the stock.

Cumulative abnormal return could be generated by IIIH or other variables such as the institutional ownership, the age and the size of the firm, market to book value, research and development expense, return on assets, and leverage. An OLS regression is ran to highlight the effect of the horizon of institutional investors on the cumulative abnormal return, while controlling for the other stated variables.

First, the churn rate proxy is used:

$$CAR = b_0 + b_1 wcr1 + b_2 iot1 + b_3 roa + b_4 mb + b_5 \log age + b_5 \log mcap + b_6 rd + b_7 lev + e_i \quad (6)$$

The second proxy, the horizon dummy variable is then used:

$$CAR = b_0 + b_1 Horizon + b_2 iot1 + b_3 roa + b_4 mb + b_5 \log age + b_5 \log mcap + b_6 rd + b_7 lev + e_i \quad (7)$$

Chapter 4: Results

Table 1 provides key descriptive statistics of the event study that was ran to obtain the cumulative abnormal return values used to examine the effect of institutional investor investment horizon on the stock response to index addition. In this table, a horizon dummy with the value of 1 shows a preponderance of long-term institutional investors over the short-term institutional investors. When the horizon dummy takes the value 0, it indicates that there is a preponderance of short-term institutional investors over long-term institutional investors. When the horizon dummy equals 1, the cumulative abnormal returns are positive except for the event window of 60 days. On the contrary, when the horizon dummy is 0, the cumulative abnormal return is negative except for the 30-day event window.

Table 1: Event Study Cumulative Abnormal Return Description

	CAR		
Event Window	**Whole Sample**	**Horizon Dummy = 1**	**Horizon Dummy = 0**
30-day	1.52%	0.90%	1.59%
60-day	-4.96%	-3.94%	-5.08%
90-day	-10.71%	0.18%	-11.97%
120-day	-12.16%	8.65%	-14.58%
Number of firms	96	10	86

Tables 2-5 (see pp. 15-18) present the results of the two main regressions (6) and (7) throughout different event windows. Table 2 has an event window of 30 days, Table 3, 60 days, Table 4, 90 days while Table 5 has a 120-day event window. Each table has four columns. Column 1 regresses the churn rate and the institutional ownership on the cumulative abnormal return while column 2 represents equation (6). Column 3 regresses the horizon dummy and the institutional ownership on the cumulative abnormal return while column 4 represents equation (7).

In column 1 of Table 2 (equation (6) without control variables), the churn

rate has a positive sign while institutional ownership has a negative sign. This seems contradicts our hypothesis, as the shorter-term horizon the investor has, the higher the cumulative abnormal return. Nevertheless, the variables are not statistically significant. In the first column of tables 2,3 and 4, the coefficients for column 1 have the expected signs, which is negative for the churn rate and positive for institutional ownership. A negative sign for the churn rate is wanted, as the higher the churn rate, the shorter-term horizon the investor is. This represents the inverse relationship between short-term horizon institutional investors and cumulative abnormal returns or the hypothesis of longer-term horizon investor leads to a higher cumulative abnormal return.

A positive coefficient on institutional ownership is also expected as a higher proportion of institutional investors leads to a better monitoring of the firm and thus a higher cumulative abnormal return. Once again, the coefficients are statistically insignificant. This is in line with the theory as longer-term institutional investors are looking to monitor the investee firm and make returns on the long run. The undistinguished effect of IIIH on stock response to the announcement of index addition can be explained by market efficiency. The presence of long-term institutional investors may also signal good performing stocks. Thus, it could forecast a possible index addition, which could offset any unexpected effect due to index addition.

In tables 2-5, the regression in the second column controls for variables

that could impact cumulative abnormal return. In these four tables, the churn rate has a negative sign, which is desirable as explained above. The churn rate is not statistically significant in the first 3 tables. Finally, the churn rate becomes statistically significant at a 5% level in table 5. This would be logical, since long-term institutional investors will look to monitor more closely firms, which takes times, and seek returns in the long run. In the second line of column 2, institutional ownership has a negative sign in the 30-day event window, which is not expected, but has a positive sign in the other event windows. Market-to-book and leverage are the only two control variables that are statistically significant at a 5% level with an event window of 30 days. With a 60-day window, only leverage is statistically significant. For a 90-day event window, age, research and development and leverage are significant and for a 120-day window, only leverage is significant.

In column 3 of table 1, the signs for institutional ownership and the IIIH proxy, the horizon dummy, are again the opposite of what is expected, which seems contradicts theory. The coefficients are on the other hand statistically insignificant. The sign of these two coefficients become positive in the 3 other tables as the event window widens and the coefficient of the horizon variable becomes significant at a 10% level in the 120-day event window. This goes in the same line as what was observed with the churn rate.

In column 4 of table 1, institutional ownership, once again, has a negative

coefficient but the horizon dummy had a positive coefficient, none of which are significant. Like in column 2, market-to-book and leverage are significant at a 5% level, but as the event window expands, only leverage stays significant.

The first fact to observe is the significance of the churn rate in regression (6) with a 120-day event window. This is evidence for the hypothesis that institutional investors with a longer investment horizon will monitor more closely the investee firm, which leads to higher cumulative abnormal return, 120 days after index addition.

This means that the presence of long-term institutional investors improves the stock response to index addition. In column 1 of table 4, the churn rate is not significant. When the control variables are added, the churn rate becomes statistically significant at a 5% level, which leads to believe that the addition of control variables reduce the noise around the IIIH variable even though the control variables are not all statistically significant. The regression explains around 15% of cumulative abnormal return as it has an R^2 value of 0.154. The alternative IIIH proxy, the horizon dummy, which had a positive coefficient and is statistically significant at a 10% level in column 3 of the 120-day event window, supports this evidence.

The second fact observed, even though the coefficients are not statistically significant, is the negative coefficients for institutional ownership in

all four regressions of table 2. This indicates that on a short period of time, institutional ownership, either short or long term has a negative effect on cumulative abnormal returns after the event date.

A plausible explanation for this could be the anticipation of index addition by institutional investors. Even though a committee makes the addition of a stock to the S&P 500, the criteria are well known. Institutional investors could try to buy the stock before the announcement of its addition to take advantage of the increased price and demand at the announcement date. This would cause a premature increase demand and could lead to a price reversal following the announcement or the addition date, which leads to lower cumulative abnormal returns.

Table 2: 30-day event window

	(1) cumulative~n	(2) cumulative~n	(3) cumulative~n	(4) cumulative~n
wcr1	0.421	−0.334		
	(0.70)	(−0.49)		
iot1	−0.0967	−0.0702	−0.0848	−0.0765
	(−0.61)	(−0.46)	(−0.56)	(−0.54)
roa		0.128		0.120
		(0.58)		(0.56)
mb		0.00471*		0.00459*
		(2.53)		(2.56)
logage		−0.0510		−0.0470
		(−1.53)		(−1.46)
logmcap		0.00439		0.00264
		(0.16)		(0.10)
rd		0.727		0.689
		(1.78)		(1.68)
lev		0.522*		0.519*
		(2.56)		(2.48)
horizon			−0.0151	0.0228
			(−0.32)	(0.38)
_cons	−0.0126	0.0592	0.0704	0.000533
	(−0.11)	(0.23)	(0.72)	(0.00)
N	96	94	96	94
R-sq	0.009	0.160	0.005	0.159

t statistics in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Table 3: 60-day event window

	(1) cumulative~n	(2) cumulative~n	(3) cumulative~n	(4) cumulative~n
wcr1	−0.503	−1.834		
	(−0.46)	(−1.28)		
iot1	0.0935	0.0989	0.0796	0.0435
	(0.44)	(0.44)	(0.38)	(0.21)
roa		0.153		0.118
		(0.36)		(0.27)
mb		0.00137		0.000659
		(0.32)		(0.16)
logage		−0.0831		−0.0530
		(−1.48)		(−0.94)
logmcap		0.0498		0.0402
		(1.18)		(0.99)
rd		1.183		0.981
		(1.52)		(1.27)
lev		0.761**		0.730**
		(2.80)		(2.73)
horizon			0.0191	0.0631
			(0.21)	(0.56)
_cons	−0.00257	−0.154	−0.102	−0.474
	(−0.01)	(−0.34)	(−0.78)	(−1.12)
N	96	94	96	94
R-sq	0.004	0.108	0.002	0.091

t statistics in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Table 4: 90-day event window

	(1) cumulative~n	(2) cumulative~n	(3) cumulative~n	(4) cumulative~n
wcr1	-1.306	-2.572		
	(-0.97)	(-1.47)		
iot1	0.236	0.160	0.227	0.108
	(0.94)	(0.67)	(0.91)	(0.47)
roa		0.238		0.177
		(0.46)		(0.35)
mb		-0.00239		-0.00328
		(-0.48)		(-0.66)
logage		-0.0439		-0.0115
		(-0.60)		(-0.17)
logmcap		0.105*		0.0912
		(2.11)		(1.83)
rd		1.979*		1.691
		(2.15)		(1.85)
lev		1.087***		1.063***
		(3.64)		(3.51)
horizon			0.143	0.164
			(1.20)	(1.08)
_cons	0.0193	-0.743	-0.265	-1.194*
	(0.07)	(-1.31)	(-1.65)	(-2.49)
N	96	94	96	94
R-sq	0.016	0.164	0.016	0.151

t statistics in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Table 5: 120-day event window

	(1) cumulative~n	(2) cumulative~n	(3) cumulative~n	(4) cumulative~n
wcr1	-2.721	-4.452*		
	(-1.71)	(-2.07)		
iot1	0.271	0.276	0.239	0.176
	(0.89)	(0.85)	(0.81)	(0.58)
roa		0.809		0.708
		(1.12)		(1.01)
mb		0.000741		-0.000845
		(0.08)		(-0.09)
logage		-0.0502		0.00974
		(-0.54)		(0.11)
logmcap		0.105		0.0821
		(1.82)		(1.40)
rd		2.019		1.522
		(1.92)		(1.43)
lev		1.111**		1.063**
		(3.21)		(2.92)
horizon			0.255	0.254
			(1.86)	(1.51)
_cons	0.281	-0.570	-0.299	-1.350*
	(0.91)	(-0.84)	(-1.55)	(-2.27)
N	96	94	96	94
R-sq	0.034	0.154	0.026	0.122

t statistics in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Chapter 5: Conclusion

This paper examines how the presence of institutional investors with long-term investment horizon affects the performance of a stock after its addition to the S&P 500 Index. This study argues that institutional investors with a longer investment horizon will monitor more closely the investee firm, which should lead to a better stock performance after the index addition.

The results provide evidence that supports the hypothesis that longer-horizon institutional investors will positively affect post addition performance of a stock. Institutional inventors with a longer horizon will have a tendency to monitor the investee firm and align the management's interest with the shareholders', hence leading to better long run performance.

The study has limitations. The small sample size of only 94 firms is restrictive. This comes from a limited time period to choose additions from (1987-2000) and the availability of data on institutional investment horizon for the appropriate sample of added firms. The estimation and event window are also a limitation. The length of the estimation window could affect the results just as much as the length of the event window, hence why it is kept constant at 120 days. Furthermore, 120 days is a relatively long period for the sake of this study but it could be considered very long or very short for real life investors. Compared to day traders, 120-day event window is extremely long, while for

longer-term horizon investors, 120 days is a short period of time.

Finally, this paper provides evidence on the role of institutional investors and the importance to recognize the heterogeneity amongst them. There is room for further research in this field, mainly through updating the sample size of firms to include the most recent index additions. It would also be interesting to look at the influence of institutional ownership in the very-short run around the addition of a stock to keep on exploring this institutional investor heterogeneity puzzle.

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