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Market responses to S&P exclusions: Evidence from the 2010-2019 period

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Abstract

This study investigates the impact of S&P downgrades and deletions on the cumulative abnormal returns (CARs) of affected firms. The results show that the market does not view a company's downgrade as a negative event in the short term, and even perceives it as a positive event in the long-term. In addition, the significant negative impacts on the event day for deletion firms are fully reversed within 20 days. Our study shows that the short-term CARs are dependent on whether it is a downgrading or deletion event, market volatility, and the duration of the company's listing on the S&P. Interestingly, these factors do not exhibit any significant correlations with the long-term CARs.

1. Introduction

Long-term investing has been shaped by two forces that have been strengthening each other. One force has been the rise of institutional investing fueled by a shift from benefit-based retirement plans (i.e., pensions) to contribution-based retirement accounts (i.e., 401k plans). The other that has gained momentum in the wake of the financial crisis of 2008 has been a passive investment management style sentiment borne by excessive fees charged by actively managed funds that resulted in mediocre performance. Those two forces have worked together to make passively managed index funds the preferred option inside tax-advantaged investment accounts designed to meet a variety of long-term financial goals.

The adoption of index funds by investors, encompassing well-known benchmarks such as the esteemed S&P 500 Large-Cap Index, as well as the relatively lesser-known S&P 400 Mid-Cap and S&P 600 Small-Cap Indices, exerts a significant influence on the valuation of index constituents. Although S&P only relies on publicly available information[1] to determine a company's index eligibility, earlier literature has indicated a positive price impact associated with index inclusion (e.g., Shleifer 1986; Harris and Gurel 1986; Beneish and Whaley 1996; Lynch and Mendenhall 1997; Wurgler and Zhuravskaya 2002; Petaijsto 2011), and conversely, a negative impact for index exclusion (e.g., Beneish and Gardner 1995; Lynch and Mendenhall 1997; Mase 2007).

Recent research, centering on data from the post-2000 era, has discerned a notable shift in this pattern. Specifically, the market no longer exhibits a positive reaction to S&P index additions (Bennett, Stulz, and Wang 2020; Patel and Welch 2017). While most of this string of literature has primarily centered on the effects of index additions, it becomes pertinent to investigate whether index downward alterations undergo similar transformations. Consequently, our research endeavors to bridge this gap by investigating the market effects of S&P exclusion on stock prices, in the context of the growing popularity of passive investment strategies after the 2008 financial crisis. Our analysis discerns two distinctive levels of index exclusions: index downgrades, characterized as relatively moderate modifications involving exclusion from the current index while maintaining inclusion within the broader S&P universe, and index deletions, which signify more substantial shifts, resulting in complete exclusion from the S&P universe.

We examine 300 cases of S&P downgrades and deletions that occurred between 2010 and 2019. We found that most firms (89.09%) were initially moved to a lower index before being deleted, with most of them being part of the S&P 600, which is the lowest market capitalization index. Our event study revealed that downgraded firms did not experience a significant decrease in price at the announcement, but instead, they experienced significant gains in the weeks after the downgrade. Conversely, deleted firms experienced a significant drop in price at announcement, which was fully reversed within 20 days. We further conducted a multivariate analysis on CARs, and our findings suggest that CARs around the adjustment announcement are lower for deleted firms, when market volatility is low, and when the company has been listed on the S&P for a

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[1] S&P relies on publicly available information to calculate eligibility factors for index consideration, which include domicile, exchange listing, organizational structure, share types, investable weight factor, liquidity, and financial viability.

longer period. Notably, these relationships are transitory, as they do not persist in the long term, where CARs are unrelated to these factors.

The remainder of the paper is organized as follows. Section 2 describes the sample. Section 3 summarizes the results, and Section 4 concludes.

2. Sample Description

Data on exclusions from the S&P indices spanning the 2010-2019 period were acquired from Index Constituents, a subcomponent of COMPUSTAT. Date and reason for each deletion were researched in the Index Announcements section of the S&P Dow Jones Indices website and in the press releases carried by *BusinessWire* or *PR Newswire*. During the period investigated, 1,629 deletions have been identified. We drop 1,282 deletions attributed to mergers and acquisitions. Of the remaining 347 deletions, 47 are triggered by the following actions: bankruptcy (10 cases), spinoffs (16 cases), exchange delisting (4 cases), violation of NASDAQ listing standards (5 cases), conversion into business development company (2 cases), asset sale (2 cases), split into two companies (1 case), multiple class share structure (1 case), low stock price (1 case), common stock reclassification (1 case), conversion into closed-end fund (1 case), preferred stock conversion (1 case), partial buyout (1 case), and low public float (1 case).

Table 1: Sample occurrences by index

Old Index	New Index		
	S&P 400	S&P 600	Deletion
S&P 500	77	1	0
S&P 400	-	112	12
S&P 600	-	-	98
Total	77	113	110

Table 2: Sample occurrences by year

Year	Deletions	Downgrades
2010	4	9
2011	10	19
2012	10	10
2013	11	20
2014	13	24
2015	17	19
2016	10	16
2017	11	26
2018	7	23
2019	17	24
Total	110	190

Table 1 shows the breakdown of the sample by index. Our sample includes 300 cases in total, including 110 deletion cases and 190 downgrade cases. Among the 300 cases, 78 comes from the S&P 500 Index, 124 from the S&P 400 Index, and 98 from the S&P 600 Index. 77 out of 78 firms downgraded from S&P 500 were first moved to the S&P 400 middle cap index, and none of those firms were deleted directly. Similarly, 112 out of 124 firms downgraded from the S&P 400 were moved to the S&P 600 small cap index before deletion, with only 12 firms deleted directly from the S&P 400. This result suggests that most firms were first moved to a lower index before being deleted, which is different from S&P addition, where a non-S&P indexed firm can be added to S&P 500 index directly. Table 2 displays the final sample broken down into occurrences by year from 2010-2019.

3. Results

3.1 Stock Price Reaction to S&P Downgrading or Deletion

If the market is efficient, then market prices can swiftly and accurately react to new public information about a firm's prospects. In this section, we conduct an event study (Fama *et al.* 1969) and examine the market price reaction to the announcement of S&P downgrading and deletion, and whether the price reaction would remain in the long run.

We use the trading day following the announcement of S&P 500 additions as the event day (Day 0), since these announcements are made at 05:15 PM Eastern Time. The stock price reaction on Day t is the abnormal return at that period, which is defined as:

$$AR_{i,t} = R_{i,t} - ER_{i,t} \qquad (1)$$

where $R_{i,t}$ is the realized return of security i at Day t, and $ER_{i,t}$ is the expected return of security i at Day t if the event does not occur. Ideally, if $ER_{i,t}$ could be estimated without bias, $AR_{i,t}$ would be the difference between the return conditional on the event and the unconditional return, and therefore would capture the impact of the event on firm valuation. We estimate four widely used benchmarks as a proxy for $ER_{i,t}$:

The expected return of a stock based on the Fama and French (1993) 3-Factor Model (FF3):

$$ER_{i,t} = \alpha_i + \beta_i R_{M,t} + s_i SMB_t + h_i HML_t \qquad (2)$$

The expected return of a stock based on the Cahart (1997) 4-Factor Model (FF3 + UMS):

$$ER_{i,t} = \alpha_i + \beta_i R_{M,t} + s_i SMB_t + h_i HML_t + u_i UMD_t \qquad (3)$$

The expected return of a stock based on the market model (MM):

$$ER_{i,t} = \alpha_i + \beta_i R_{M,t} \qquad (4)$$

The expected return of a stock based on the market model (MMG) with GARCH (1,1), which accounts for time-varying volatility.

where i indexes firms and t indexes event Day; $R_{M,t}$ is the market risk premium at Day t; SMB_t is the return on the small-minus-big portfolio at Day t to capture the firm size effect; HML_t is the return on the high-minus-low portfolio at Day t to capture the value effect; UMD_t is the return on the up-minus-down portfolio at Day t to capture the momentum effect. rf_t is the risk-free rate at Day t.

We employ a regression model to estimate all parameters for model 2-4. This is achieved by utilizing historical daily returns for each individual stock as the dependent variable within a defined window of [-322, -70][2] trading days relative to event day 0. Consistent with the approach outlined by Bennett, Stulz, and Wang (2020), we maintain a minimum requirement of 200 trading days for each case.

Table 3: Stock Price Reaction to S&P Downgrading

Event day/interval	Cumulative Abnormal Returns (CARs)			
	FF3 + UMD	FF3	MM	MMG
Short-term CARs:				
0	-0.07%	-0.16%	0.04%	0.07%
[0, 1]	0.05%	-0.06%	0.40%	0.42%*
[0, 5]	1.68%***	1.47%**	2.19%***	2.32%***
Long-term CARs:				
[0, 10]	1.13%**	0.96%*	1.27%**	1.51%**
[0, 20]	1.29%*	1.16%	1.02%	1.16%
[0, 30]	2.93%***	2.40%**	2.58%**	2.76%**

***, ** and * indicate significance at 1%, 5% and 10% respectively.

Table 3 shows CARs for 190 S&P downgrading firms. We find that CARs are not statistically significant at the event day or in the [0, 1] window. When the window extends to [0, 5], CARs increase to a range between 1.47% and 2.32%, and become significant at least at the 5% level. To further explore the long-term impact of the S&P downgrade, we calculated the abnormal returns up to 30 trading days after the announcement. We continue to find positive and significant abnormal returns, and their values are slightly higher in the [0, 30] window. This result suggests that, in the short term, the market does not view a company's downgrade as a negative event, and even perceives it as a positive event in the long-term.

Table 4: Stock Price Reaction to S&P Deletion

Event day/interval	Cumulative Abnormal Returns (CARs)			
	FF3 + UMD	FF3	MM	MMG
Short-term CARs:				
0	-6.87%***	-6.93%***	-6.51%***	-6.51%***
[0, 1]	-7.39%***	-7.18%***	-6.77%***	-6.75%***

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[2] It is possible that stock prices can reflect upcoming index reconstitution events before actual exclusion occurrences. As the S&P Index reconstitution occurs once a quarter, we set our estimation window to conclude 70 trading days before the official announcement of an exclusion for each case, to exclude all trading days since the last announcement.

[0, 5]	-7.68%***	-8.35%***	-7.46%***	-7.65%***
Long-term CARs:				
[0, 10]	-3.81%***	-4.65%***	-3.69%***	-3.44%***
[0, 20]	-1.02%	-1.69%	-1.78%	-1.54%
[0, 30]	2.64%	0.59%	0.33%	0.17%

***, ** and * indicate significance at 1%, 5% and 10% respectively.

Table 4 displays the CARs for 110 S&P deletion firms. The results show that on the day of the event, the CARs are negative and statistically significant at the 1% level. Specifically, the abnormal returns range from -6.51% to -6.93%. When the window is extended to [0, 1] or [0, 5], these results remain largely unchanged. In the long run, however, a reversal of CARs is observed for deletion firms. Tests conducted with a window extending more than 20 days after the announcement fail to detect any statistically significant CARs, regardless of the model used to generate the expected returns.

Our research suggests that the market does not view downgrading and deletion in an index as a negative development, which is consistent with recent index-inclusion studies which used post-2008 financial crisis data (Bennett, Stulz, and Wang 2020; Patel and Welch 2017). Furthermore, we observed statistically significant positive abnormal returns for firms that were downgraded in the long run, implying that the effect of being downgraded from an index may be permanent. This result contradicts the temporary price pressure hypothesis which claims that stock prices should be restored to their pre-announcement levels after a shift in the composition of the S&P 500 Index is completed - we posit that such a change could be related to a non-transitory shift in investors' view towards stock indexes and passive investments after the 2008 financial crisis.

3.2 Analysis of Cumulative Abnormal Returns

In this section, we examine factors that could influence the magnitude of the cumulative abnormal returns for S&P downgrading and deletion firms. The following multivariate model is applied to the test:

$$CAR_{it} = \alpha_i + \beta_1 Delist_{it} + \beta_2 VIX_{it} + \beta_3 EndCrisis_{it} + \beta_4 NYSE_{it} + \beta_5 Risk_{it} + \beta_6 Length_{it} + \beta_7 Assets_{it} + \beta_8 BEME_{it} + \beta_9 ROE_{it} + \beta_{10} Dividend_{it} + \beta_{11} Leverages_{it} + YR + IND + \varepsilon_i \tag{5}$$

where *i* represents case id, *t* represents year, *YR* represents year fixed effect to control for time-varying unobserved factors, *IND* represents industry fixed effect to control for unobserved industrial-level heterogeneity, CAR is the cumulative abnormal return in percentage at given event window based on Cahart (1997) 4-Factor Model[3], and ε is the error term.

Deletion is a dummy variable which equals 1 if a case is a deletion, and 0 if it is a downgrade. *VIX* and *EndCrisis* are our proxies for market volatility. *VIX* is a measure of the market risk, which is the implied volatility of the S&P 500 Index options on the announcement day. *EndCrisis* is the time passed since the 2008 financial crisis. *NYSE* is a dummy variable which equals 1 if a company

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[3] Our results are robust when we use the CARs calculated based on Fama and French (1993) 3-Factor Model (FF3) and the Market Model (MM).

is listed on the NYSE, and 0 otherwise. *Risk* is a measure of a firm's total risk, which is the standard deviation of a firm's daily stock return over the [-252, -1] period. *Length* is the number of years a firm has been included in the S&P universe. We also include 5 accounting-based firm characteristics: *Assets* is the ln value of total assets (in $million). *BEME* is the book-to-market ratio (winsorized at 5% level). *ROE* is return on equity. *Dividend* is a dummy variable which equals 1 if a firm paid dividend in the event year, and 0 otherwise. *Leverages* is total liabilities divided by total assets.

Table 5: Multivariate Analysis of Price Effects

VARIABLES	Dependent Variable: CARs					
	[0]	[0, 1]	[0, 5]	[0, 10]	[0, 20]	[0, 30]
	(1)	(2)	(3)	(4)	(5)	(6)
Deletion	-6.156***	-6.907***	-10.277***	-5.482**	-3.221	-5.358
	(-7.251)	(-6.385)	(-4.407)	(-2.354)	(-0.975)	(-1.203)
VIX	0.149**	0.033	-0.038	-0.156	0.055	-0.198
	(2.087)	(0.361)	(-0.196)	(-0.797)	(0.198)	(-0.529)
EndCrisis	2.072	3.504	2.310	0.478	7.902	22.619
	(0.608)	(0.807)	(0.247)	(0.051)	(0.596)	(1.265)
NYSE	0.680	0.592	1.580	0.933	3.078	3.548
	(1.239)	(0.847)	(1.048)	(0.620)	(1.441)	(1.233)
Risk	-19.824	-21.353	-37.196	-63.073	-110.997	-134.497
	(-1.111)	(-0.940)	(-0.759)	(-1.289)	(-1.599)	(-1.438)
Length	-0.704***	-0.940***	-0.958	-0.010	-0.677	0.134
	(-2.606)	(-2.730)	(-1.291)	(-0.014)	(-0.644)	(0.094)
Assets	0.341	0.189	0.022	-0.139	-1.102	-2.397*
	(1.262)	(0.548)	(0.029)	(-0.187)	(-1.047)	(-1.690)
BEME	0.235	-0.479	0.762	1.172	0.840	3.525*
	(0.681)	(-1.088)	(0.803)	(1.236)	(0.624)	(1.945)
ROE	-0.169	0.072	-2.021*	-1.379	-2.459	-4.267*
	(-0.401)	(0.135)	(-1.743)	(-1.191)	(-1.497)	(-1.928)
Dividend	-0.718	-0.710	-1.917	-2.397	-1.528	-5.818**
	(-1.306)	(-1.013)	(-1.268)	(-1.588)	(-0.713)	(-2.016)
Leverages	2.065	1.108	5.507	4.482	2.631	3.262
	(1.431)	(0.603)	(1.389)	(1.132)	(0.468)	(0.431)
Constant	-13.437	-17.173	-6.468	3.752	-35.567	-125.322
	(-0.619)	(-0.621)	(-0.108)	(0.063)	(-0.421)	(-1.101)
Observations	300	300	300	300	300	300
R-squared	0.462	0.392	0.217	0.134	0.075	0.107
Year & Industry FE	Y	Y	Y	Y	Y	Y

t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The results of the multivariate analysis on price effects in both short-term and long-term are presented in Table 5. In Model 1, the coefficient of *Deletion* is negative and statistically significant at the 1% level. This indicates that, on the event day, the CARs of deleted firms were 6.156% lower than those of downgraded firms. However, the significance of *Deletion* decreases as we extend the event window from short-term to long-term, as observed in Model 2-3, and becomes insignificant in Model 5-6. This suggests that although the CARs of deleted firms were more pronounced in the short term, the effect was only temporary.

Our result reveals that the impact of *VIX* on CARs is significant on the event day, which is in line with previous research showing that the market typically responds less vigorously to negative news in bad times (e.g., McQueen and Roley 1993; Flannery and Protopapadakis 2002; Andersen *et al.* 2003; Conrad, Cornell, and Landsman 2002). However, our findings demonstrate that the coefficients of *VIX* are not significant in the other models, indicating that the effect of market uncertainty on CARs is transitory.

Lastly, investor sentiment has been shown to have a systematic and significant impact on asset prices (e.g., Baker and Wurgler 2006; Han 2008; Stambaugh, Yu, and Yuan 2012). According to Barberis, Shleifer, and Vishny (1998), investors tend to exhibit conservatism bias by outweighing their prior beliefs. Our analysis shows a negative and significant relationship between *Length* and CARs in models 1 and 2, implying that if a company has been listed on the S&P for a prolonged period, investors may underreact to negative information. However, this effect is temporary and becomes insignificant within five days of the announcement.

To assess the robustness of our results, we rerun all 6 models in Table 5 while excluding the 5 accounting-based firm characteristics variables. Our results remain consistent after this adjustment.

4. Conclusions

Index investing has gained significant traction after the 2008 financial crisis, with its share in the U.S. fund industry surpassing 50 percent in 2019 (Wigglesworth 2022). Our study aims to shed light on whether the market's perception of exclusion from an index fund has transformed alongside the proliferation of index investing over the last decade. Specifically, our findings indicate a noteworthy shift: the market no longer perceives a company's S&P downgrade as a short-term negative event; instead, it is viewed as a positive event in the long run. Such a change could be related to a non-transitory shift in investors' view towards stock indexes and passive investments after a severe financial crisis (such as during the post-2008 financial crisis period analyzed in this paper), which merits further examination in future research. Additionally, we observed that the significant negative impacts of deletion events on the day of announcement were completely reversed within a span of 20 days. Our analysis further revealed that the short-term CARs were influenced by several factors, such as the nature of the event (downgrading or deletion), market volatility, and the duration of the company's listing on the S&P. Conversely, we found that long-term CARs exhibited no significant correlations with these factors. In essence, our study provides insights into the evolving nature of investor sentiment and reactions to alterations in index composition, particularly in the context of the changing landscape of investment strategies.

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