Index providers and governance: The impact of an announcement of FTSE Russell on stock prices

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Department Finance
Tilburg School of Economics and Management, Tilburg University

Student name: Tom Custers

Student number: 1266334

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Name supervisor: Dr. Jasmin Gider

Name second reader: Dr. Jac Kragt

Abstract

In July 2017, FTSE Russell announced that they planned to exclude firms with less than 5% of their voting rights in the hands of public shareholders from its indices. In order to determine whether they imposed a sufficient sanction on those firms, this thesis examines the impact on stock returns of listed firms around this announcement. A short-term event study is implemented to investigate how stock prices of listed firms react to this announcement. In addition, a cross-sectional analysis is used to determine whether this reaction differs among firms. The results of the event study show that the announcement caused a significant negative cumulative abnormal return for firms that do not meet the new threshold of 5%. The results of the cross-sectional analysis enhance these results and show that firms that do not meet the new threshold experience stronger negative abnormal returns than other listed firms. These results suggest that the certainty of being listed on an index is perceived as important and that a regulatory announcements of an index provider has impact on firms that do not meet the new requirements of this regulation. However, to determine whether FTSE Russell actually imposed a sufficient sanction on listed firms with no or low voting rights in the hands of the public, additional research is needed.

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1. Introduction

On Wednesday July 26, 2017, Financial Times Stock Exchange (FTSE) Russell announced that in the fall of 2017 it was planning to exclude firms, with low, or no, public voting rights from its indices. This new rule was a reaction to the rise in opposition among institutional investors and the SEC against non- and low-voting public shares. They determined that there should be a minimum hurdle rate of 5% for a firm's voting rights in the hands of non-restricted or "free float"/public shareholders (FTSE Russell, 2017). FTSE Russell noted that enforcing such a minimum threshold would ensure that minority investors would have some minimum degree of control over the firm. For potential new constituents, the rule became effective as from October 2017. For existing constituents, the rule will take effect starting in September 2022, allowing constituents to change their capital structure (FTSE Russell, 2017). This means that when a constituent does not meet the new requirement in 2022, it will be deleted and excluded from the Russell indices.

A large number of papers investigate the impact of index deletions on stock prices. While one might not expect that an announcement of deletion from a stock index will affect its share prices, significant effects have been identified by several studies (e.g., Chang, Hong and Liskovich, 2014; Lynch and Mendenhall, 1997). Both Chang et al. (2014) and Mase (2007) investigated the impact on stocks that are announced to be deleted from Russell indices. They both find significant negative effects for those stocks. The overall conclusion of the papers that investigated the index effect is that being part of an index increases the overall exposure of a firm. I.e., index funds, which are a big part of the investing industry, will not buy a firm's stock if it is not part of an index. This lower exposure might in its turn cause the lower stock prices.

By threatening firms that do not meet the new requirement with deletion/exclusion from its indices, FTSE Russell tries to discourage public firms to have a voting right structure with almost no voting rights in the hands of the public. In order to determine whether FTSE Russell imposed a sufficient sanction on listed firms with such voting right structures the following research question is formulated:

What is the impact of the announcement of the new requirement of FTSE Russell, regarding the minimum voting right threshold, on the share price of firms listed on their index?

The study measures this impact by examining the short-term (cumulative) abnormal stock returns of a sample of 2810 firms that are either listed on the Russell 3000 or a US Russell microcap index. Multiple event window durations are tested to account for possible information

leakage and effects lasting longer than one day. The sample of 2810 firms is separated in three subsamples based on the firms' voting right structures. The first subsample includes firms that do not meet the new threshold. These are the firms that have less than 5% of its voting rights in the hands of free-float shareholders. The second sample includes firms that do meet the new requirements, but have a relatively low percentage (between 5% and 25%) of their voting rights in public ownership. The third subsample includes the remaining firms that are listed on the Russell 3000. This last subsample consists of the firms that have more than 25% of their voting rights in public ownership and hence meet the new requirements spaciously. Furthermore, a cross-sectional regression analysis is used to explore whether these abnormal returns diverge between the different subsamples and to explore whether there are several firm characteristics that affect the cumulative abnormal returns around the announcement.

This research is relevant in the first place, because it increases the overall understanding of the importance of stock indexes for firms. Other studies only focus on announcements that firms will be deleted from an index within a few weeks' time. My study contributes to these studies by observing whether firms are affected by an announcement that they will potentially be deleted from stock indices within a few years' time. By investigating this, one will be able to suggest whether next to being listed on an index is important, it is important to have certainty about staying listed on an index. Besides that, it shows to what extent FTSE Russell imposed a sufficient sanction on firms with low voting rights in hands of the public.

Moreover, the results of this study will be useful to discover whether corporate governance regulation, introduced by an index provider, affects stock prices. As an Index provider acting as a policymaker is a new phenomenon, the impact on stock price performance has not been studied yet. Several other studies (e.g. Larcker, Ormazabal & Taylor, 2011) document the impact on stock prices of announcements of governance rules introduced by governments or the SEC. However, according to Hirst and Kastiel (2019), index providers acting as regulators could be an important shift in the corporate governance landscape. According to Barbara Novick (2017), Vice chairman of Blackrock, it is the task of policymakers and not index providers, to set corporate governance standards. She believes that the role of an Index Provider is to reflect the investable Universe. By examining the short-term impact of the announcement, one will be able to show how investors and stock prices react to changes in regulations of index providers. This information could be useful for investors, as they might will be able to use it for future investment decisions.

Firstly, the results of this study show that the announcement of FTSE Russell has significant negative impact on the stock returns of all firms listed on US Russell indexes. However, after controlling for event-induced variance and cross-sectional correlation the results show that the announcement of FTSE Russell only significantly affects the stock prices of firms that do not meet the new threshold of having at least 5% of voting rights in the hands of public shareholders. These results are not in with the results of Winden and Baker (2018). They do not document any significant abnormal returns around the announcement of S&P Dow Jones to exclude firms with dual class shares. This is probably due to the fact that existing constituents of an S&P Dow Jones index are grandfathered from the new rules of the index provider. The results of the cross-sectional analysis show significant evidence that firms that do not meet the new requirement experience stronger negative stock returns than firms that do meet the new requirement. For firms with more than 5%, but less than 25% of their voting rights in hands of public shareholder, this stronger negative stock returns cannot be found. Several firm characteristics (ROA and market-to-book ratio) do have significant impact on the cumulative abnormal returns around the announcement of FTSE Russell. However, for the market-to-book ratio the coefficient is very small and almost negligible.

One can conclude that an announcement of new regulation about the permission of being listed on an index have no impact on the stock prices of the listed firms in general, but only on firms that do not meet those new regulation. By observing this, one can conclude that the certainty of being listed on an index is important. The results furthermore suggest that FTSE Russell might imposed a sufficient sanction on firms with less than 5% of its voting rights in the hands public shareholders, by threatening those firms with index exclusion. However, conclusions about whether the new rules of FTSE Russell actually discourage firms to use certain voting right structures cannot be drawn from the results of this study, as longer-term analyses have to be taken into account.

The remainder of this thesis is organized as follows. Section 2 provides an overview of the current literature to show more theoretical background about the topic. Section 3 describes the lists of sources of data and the type of datasets that will be used. Furthermore, section 3 provides descriptive statistics on all the variables which will be used in the empirical analyses. The empirical model is described in section 4 and the results of this study are presented and discussed in section 5. Finally, section 6 provides the conclusion, limitations and some propositions for future research.

2. Literature review

The literature review is separated in four sections. In the first section, literature about unequal voting right structures is presented. Research papers that discuss the impact of being included or excluded from an index are discussed in section 2.2. The third section describes papers that discuss Index providers as policymakers and the impact of regulatory announcements on stock returns. Eventually, part 3.4 contains the hypotheses development.

2.1 Unequal voting right structures

One of the most long-standing debates in corporate governance is whether public firms should be permitted to use multi-class stock structures with unequal voting rights. In the 1920's, there was a rise in regulatory concerns about dual-class shares. Eventually, this led the New York Stock Exchange to restrict the use of dual-class share structures in 1940 (Gilson, 1987). After 1990, they turned back this rule and firms were mostly free to deviate from the one-share, one-vote rule (Lund, 2017). Nevertheless, until 2002, only 6% of the U.S. publicly-listed firms had dual-class share structures (Gompers, Ishii & Metrick, 2009). Over the last decade, however, more than 15% of the firms that went public had multiple classes of shares. Many tech firms, including Google, Facebook and LinkedIn, have even gone public issuing only low-voting stocks to the public for the explicit purpose of keeping control of the firm in the hands of the firms' founders (Bebchuk, Kraakman & Triantis, 2000). After the increasing popularity of IPO's offering only low-voting shares, in March of 2017, Snap Inc. became the premier firm to go public offering only nonvoting shares (NY Times, 2017). This ensured the firm's founders to have perpetual control over the firm. Besides that, issuing only nonvoting shares allowed Snap Inc. to be exempted from certain disclosure obligations under federal security laws (Lund, 2017). For example, a firm does not have to hold an annual meeting or provide proxy statements to shareholders. Despite many institutional investors always opined that an unequal voting rights structure has no place in a public marketplace (Li, Ortiz-Molina & Zha, 2008), this growing use of shares with no/low-voting rights and the IPO of Snap Inc. have attracted even more debate.

2.2 Benefits of index membership

FTSE Russell announced that it will exclude certain firms from its stock indexes when they do not change their voting rights structure. Over the past couple of decades, the behavior of stock prices following announcements of index changes has experienced increased attention from researchers. As index membership does not provide any additional information on the firm's

fundamental value, one might expect that this index membership should be valuation neutral. However, previous research disproved this.

Shleifer (1986) was the first to recognize the importance of indices in the financial markets. He investigated the index effect and examined the price impact related to changes in the S&P 500 between 1966 and 1983. He shows that stocks newly included into the S&P 500 Index earned a significant positive abnormal return at the announcement of the inclusion. Furthermore, he found that this abnormal return did not disappear until at least 10 days after the inclusion. Another study, by Harris and Gurel (1986) found similar evidence of a significant stock price effect. However, both Shleifer (1986) and Harris and Gurel (1986) focused only on additions, since there were too little useful deletions from an index to do a reliable study on this.

Lynch and Mendenhall (1997) are one of the first researchers to also study the effect of index deletions on stock returns. They found negative abnormal returns for stocks that were announced to be deleted from the S&P 500 index. Multiple other studies, including Beneish and Whaley (2002), found similar results for firms that are announced to be excluded from an index. However, in contrast to inter alia, Lynch and Mendenhall (1997), Chen, Noronha and Signal (2004) did not find a significant decline for deleted firms. They conclude that the price reaction seems to be consistent with an investor recognition effect, whereby added stocks get recognized more, but this recognition does not disappear with a deletion from an index.

Even though in the first decades most studies focused on the index changes of the S&P 500, over the past two decades multiple researchers have also spectated effects of index additions/deletions of several other indices, such as Russell indices. For instance, Mase (2007) studied the impact of changes in the FTSE 100 index and found a price pressure for both additions and deletions. Furthermore, Chang et al. (2014) observed effects of addition and deletion on the Russell 1000 and Russell 2000 index. They developed a regression discontinuity design for cleaner identification. They find a positive price effect for additions and a negative price effect for deletions.

Overall, prior research has led to more or less the same outcome; stocks that are announced to be (included) deleted from an index experience (positive) negative abnormal returns. However, the causes and the duration of the abnormal returns around the deletion/addition to an index are still a much debated topic. Several hypotheses have been established that try to explain the effects of announcements of index deletions or additions. Two of the most crucial hypotheses observed in the past decades are as follows. The price pressure hypothesis, first developed by

Scholes (1972) and eventually further explained by Barberis, Shleifer and Wurgler (2005), states that a stock gets a demand shock due to indexing announcements, but that this demand shock is only temporarily. The hypothesis explains that a market friction can result in a price-pressure on stocks. The other hypothesis, introduced by Shleifer (1986), is the imperfect substitute hypothesis or the long-term download sloping demand curve. In this setting, stocks that are deleted from an index are not perfect substitutes for stocks that are not deleted from an index. According to this hypothesis, the demand shock is not temporarily, but continually. However, the overall conclusion of the papers that investigated the index effect is that being part of an index increases the overall exposure of a firm. Index funds, who are a big part of the investing industry, will not buy a firm's stock if it is not part of an index, which could lead to lower stock prices.

This study, however, does not focus on index exclusion in general and does not try to determine the arguments that explain the index effect. It will focus on a single announcement that firms will potentially be deleted from a US Russel index. The firms that do not satisfy the new rules still have until 2022 to reform their voting rights structure before they will be actually deleted from the index. Another difference with previously described studies is that this is the first time that an index provider will exclude firms based on their corporate governance structure. It is new for an index provider to act as a regulator and introduce governance policies. By observing this announcement, there can be determined whether this new phenomenon affects firms' stock returns.

2.3 Index providers as policy makers

In the last decades, the impact of announcements of governance rules on stock prices experienced increased attention from researchers (e.g. Greenstone, Oyer & Vissing-Jorgensen, 2006; Chhaochharia & Grindstein, 2007; Larcker et al., 2011). These studies all find abnormal returns around the announcement of the changes in regulations. However, these studies all focused on regulation introduced by the government or the Securities and Exchange Commission. As index providers acting as regulators is a new phenomenon, there have been done little to none academic research on the policy changes of a major index provider and its consequences on stock prices.

Although, there is some legal literature that study index providers and their new policies (Lund, 2017; Sharfman, 2018; Hirst & Kastiel, 2019). Lund (2017) studies whether nonvoting stock is beneficial or harmful for a firm. He concludes that nonvoting shares do also have important

benefits and implies that the policy changes of index providers are misguided. He believes that these policies are deterrent to firms that consider to go public. It would be better to require firms that issue nonvoting stock to also issue voting stock, so that investors have a choice.

Hirst and Kastiel (2019) study primarily the pros and cons of index providers as governance regulators. They describe that once index providers start acting as a regulator, there is a higher likelihood of federal intervention in the operations of the providers. Furthermore, they conclude that by excluding firms based on their voting rights, benchmark equity indexes, such as the Russell 1000 and Russell 2000, are no longer a good representation of the market. Therefore, it could become more difficult for index funds to invest in the market by investing in a modified index.

However, both Lund (2017) and Hirst and Kastiel (2019) did not study the consequences of the announcements on stock prices. Nevertheless, their studies could be useful, since their explained pros and cons about the new rules might determine how investors, and therefore stock prices, will react on the announcements. This study extends this legal literature in a major way by analyzing the effect of the FTSE Russel announcement on stock prices. Furthermore, this study contributes to literature on how announcements of changes in rules affect firm value.

Winden and Baker (2018) are the only researchers who study the impact of a regulation change announcement of an index provider on stock prices. They use an event study to measure the effect of the announcement of S&P Dow Jones on the trading price of firms with dual-class share structure. They separate the firms in their study in two groups; a treated group and a control group. The treated group includes firms with dual-class structures which were not yet included in the indices. The control group includes firms with dual-class structures that were already in the indices and will be grandfathered. For both groups, they do not find evidence that the announcement had impact on the stock returns. However, one criticism on the treated firm group is that they did not distinguish between larger firms that are likely to enter one of the S&P indices in the future and smaller firms for which this possibility is negligible. Therefore, it is possible that this changes the significance of their results, as small firms that are not likely to enter an index are quite unrelated to a change in regulation of an index provider. Thus, despite the fact that Winden and Baker (2018) find no evidence that these new rules affect stock prices, it is still valuable to test whether other results can be found for the announcement of FTSE Russell.

2.4 Hypotheses development

2.4.1 Affected firms (<5% of voting rights in hands of public)

The minimum hurdle rate set by FTSE Russell is 5%. This means that firms with less than 5% of its voting rights in the hands of free-float shareholders do not meet the new rules announced by FTSE Russell. Therefore, these firms will be deleted from their indices if they do not change their voting rights structure before 2022. In section 2.2, there is explained that previous research (e,g., Mase, 2007; Chang et al., 2014) observed a negative effect for firms that are announced to be deleted from a Russell index. Their overall suggestion is that being part of an index increases the overall exposure of a firm. Based on the results of these studies, it could be possible that negative abnormal returns are also found for firms that are threatened with index deletion based on their voting right structure. Apart from this, according to Li et al. (2008) and Matos and Xu (2018), many institutional investors have a strong aversion against firms with low voting rights in public hands. By announcing the new rules, FTSE Russel exhibited that their opinion about those firms, with such voting right structures, is in line with the opinion of institutional investors. Such standards could create a negative view on firms that do not meet those requirements. Based on this threat of being excluded in combination with the rising opposition against firms with this particular voting right structure, the first hypothesis is formulated:

H1: *The announcement of FTSE Russel to exclude firms has a negative effect on stock prices of firms that have less than 5% of its voting rights in the hands of free-float shareholders*

2.4.2 Potentially affected firms (Between 5% and 25% of voting rights in hands of public)

Besides the rule that it will exclude firms with less than 5% of its voting rights in public hands, FTSE Russel also announced that it intends to review the voting rights threshold annually and will adjust the requirements if appropriate (FTSE Russell, 2017). As a majority thought that the minimum hurdle rate should be set at 25%, instead of 5%, it might be possible that the hurdle rate will be augmented in the future. Moreover, as described in part 2.4.1, the new rules can be considered as a sanction of index providers against public firms with low voting rights in the hands of free-float shareholders. Based on this, the second hypothesis is formulated:

H2: *The announcement of FTSE Russell to exclude firms has a negative effect on the stock prices of constituents with between 5% and 25% of its voting rights in the hands of free-float shareholders*

2.4.3 Control group (>25% of voting rights in hands of public)

The remaining firms of the Russel 3000 Index, which have more than 25% of its voting rights in the hands of free-float shareholders, form the control group. As the role of index providers acting as a regulator is a new phenomenon (Lund, 2017), it is hard to predict whether this rule positively or negatively influences listed firms that meet the new rules spaciously. As described in the literature part, there is an increasing resistance against dual-class and nonvoting shares (Lund, 2017). Therefore, it is possible that investors are delighted by the new rules and might invest more in firms that meet the new rules spaciously. Based on this, the following hypothesis is formulated:

H3A: *The announcement of FTSE Russell to exclude firms and act as a "regulator" has a positive effect on the stock returns of constituents that meet the new rules spaciously*

On the other hand, by excluding firms based on their voting right structure, benchmark equity indexes, such as the Russell 3000, are no longer a good representation of the market (Hirst and Kastiel (2019)). Therefore, it could be possible that as a reaction on this announcement, index investors will invest more in other indices that do not plan to exclude firms. Therefore, the following hypothesis is also formulated:

H3B: *The announcement of FTSE Russell to exclude firms and act as a "regulator" has a negative effect on the stock returns of constituents that meet the new rules spaciously*

2.4.4 Differences between subsamples

As explained, firms with less than 5% of their voting rights in the hands of free-float shareholders will be excluded from the indices due to the new rules. As these firms do not meet the new requirements and are actually affected by the new rules, it can be expected that the stock prices of those firms are influenced stronger by the new rules than the stock prices of other firms. Based on this, the fourth hypothesis is formulated:

H4: *The stock returns of firms with less than 5% of its voting rights in the hands of public shareholders are affected stronger by the announcement of the new rules than the stock returns of firms that do meet the new threshold*

Furthermore, the firms with more than 5%, but less than 25% of its voting rights in the hands of public shareholders, do meet the new rules. However, if FTSE Russell would increase the minimum hurdle rate, it could be that some of the firms in this subsample do not meet the voting

right rules anymore. Therefore, it might be that the stock returns of these firms are affected stronger than those of the control group. This will be tested by the following hypothesis:

H5: *The stock returns of firms with between 5% and 25% of its voting rights in the hands of public shareholders are affected stronger by the announcement of the new rules than the stock price of firms in the control group*

3. Dataset and institutional details

3.1 Data collection and sample construction

To test the hypotheses developed in the literature review, I use a sample that consists of all constituents of the Russell 3000 index. Besides that, the sample also includes firms that have less than 25% of its voting rights in hands of free-float shareholders and are listed on the Russel US microcap indexes.

I obtain the data about the voting rights in the hands of public shareholders from an indicative list of affected securities that FTSE Russel provided on the same day as they announced their new rules. The list includes 181 firms from the United States that were listed on one of FTSE Russel's US indexes in time of the announcement. These 181 firms have less than 25% of its voting rights in the hands of free-float shareholders. FTSE Russel generally defines "free float" shares as the percentage of a firm its shares that are considered to be freely available for public purchase. The percentage of a firm's voting rights in public hands has been calculated as the number of votes in the hands of shareholders that are unrestricted, divided by the total number of votes conferred by the shares outstanding of all of the firm's voting securities. The number of votes described in the numerator are determined by the application of FTSE Russell. The denominator also includes those shares that have not been admitted to trading on a regulated venue. The Russell Firm mentioned that in some jurisdictions, it may be hard to capture all the share classes that have not been listed. In such cases, the calculation is based on the information that is publicly available.

Apart from the voting rights in hands of free-float shareholders, the list provided by FTSE Russell also contains data about the index on which the firms are listed on, e.g. Russel 1000, Russel 2000 or microcap only. A list of the firms on this list, their voting rights in the hands of public shareholders and the index the firm is listed on are included in table A in the appendix. A list of all other constituents listed on the Russell 3000 at the time of the announcement of FTSE Russell is downloaded from Beat the Market Analyzer. A page that provides tickers lists of the constituents from all US based indexes.

Thus, the full sample consists of 3023 firms. 3000 firms are listed on the Russell 1000 or Russell 2000 index. The remaining 23 firms are firms listed on a microcap only index that have less than 25% of its voting rights in the hands of free-float shareholders. As described in the hypotheses part, based on the voting rights structure, the full sample is separated in three different subsamples. The first subsample includes the firms that have less than 5% of its voting

rights in the hands of free-float shareholders. These firms do not meet the new requirement and will be excluded from the index in 2022, if they do not change their voting right structure. This group is called the affected firms. The second subsample includes firms that have between 5% and 25% of its voting rights in the hands of free-float shareholders. This group will not be excluded from the index based on their voting right structure, but still have a relatively small percentage of its voting rights in the hands of free-float shareholders. This group is called the potentially affected firms. Finally, the third sample, called the control group, includes all other constituents that are listed on the Russell 3000 index. These firms have more than 25% of its voting rights in the hands of free-float shareholders and meet the new requirements spaciously.

As described earlier, this thesis tries to examine the average stock price reaction of the different (sub) samples around the announcement of FTSE Russell. To determine those stock price reaction, the daily stock prices of all 3023 firms are downloaded. Those daily stock prices are retrieved from the Center for Research in Security Prices (CRSP) database within the Wharton Research Data services (WRDS). This is a database that provides historical stock prices of active and un-active publicly held firms. I merge this data with the data that describes on which index the firms are listed and with the data about the voting rights. For 92 firms the stock price data cannot be found on WRDS. Therefore, these firms are deleted from the sample. An overview of the firms in the sample, the index they are listed on and their voting right structure is presented in the table below:

Table 1: Overview of initial sample

	Voting rights in hands of free-float shareholders			
	Less than 5% (affected firms)	Between 5% and 25% (potentially affected)	More than 25% (control group)	Total
Big firms	7	27	927	961
Small firms	25	115	1854	1963
Total	32	142	2750	2931

Notes: This table presents an overview of the initial sample used in this study. Big firms are firms that are listed on the Russell 1000 index and small firms are firms that are listed on the Russell 2000 index or on a microcap index. The total number of firms is less than 3000, as stock price data cannot be found on WRDS for several firms.

Furthermore, in order to test hypothesis 4 and 5, firm characteristics of all firms in the remaining sample need to be collected. The data from all the financials is retrieved from the Compustat database within the Wharton Research Data Services (WRDS). Compustat is a database of financial, statistical and market information of active and inactive publicly held firms.

After obtaining all the data, several selection procedures are used to minimize biases in the data. Firstly, the firms that do not have enough stock price data available for the estimation- and/or the event- window are deleted from the sample. All firms that have stock price data available for less than 150 trading days during the estimation window of 200 trading days are deleted from the sample. This missing data is mainly due to the fact that these firms were not yet listed for a specific amount of time before the event occurred. Besides that, for some firms there is no data available of a financial firm characteristic. These firms are also deleted from the sample. In total, 121 firms are deleted from the sample due to this reasons. Thus, the remaining sample consists of 2810 firms. An overview of the remaining firms in the sample, the index they are listed on and their voting right structure is presented in the table below:

Table 2: Overview of cleaned sample

	Voting rights in hands of free-float shareholders			
	Less than 5% (affected firms)	Between 5% and 25% (potentially affected)	More than 25% (control group)	Total
Big firms	7	26	903	936
Small firms	18	99	1757	1874
Total	25	125	2660	2810

Notes: This table presents an overview of the cleaned sample used in this study, after deleting the firms from the sample that did not have enough data available. Big firms are firms that are listed on the Russell 1000 index and Small firms are firms that are listed on the Russell 2000 index or on a microcap index.

3.2 Descriptive statistics

In the cross-sectional analysis, as explained in the hypotheses part, there is mainly evaluated whether the impact of the announcement differs among the different sub samples, while controlling for different financial firm characteristics. Furthermore, the cross-sectional model shows the relationship between the cumulative abnormal returns and several firm characteristics that are used as independent variables. To get better straightforward insights of the firms in the different sub samples and their firm characteristics, some summary statistics are presented in

table 3. The summary statistics are presented for the affected firms, the potentially affected firms and the control group. The characteristics per group are presented to observe whether the firms and their characteristics diverge between the subsamples. Means, standard deviations, medians, 5% and 95% percentiles are presented, which are all measured over the second quarter of 2017, the quarter before the announcement of FTSE Russell.

To determine whether the firm characteristics diverge between the three subsamples a mean-difference test is performed. Table 4 shows the t-stats of the mean differences, that test whether the mean of the subsamples significantly diverge from each other. In table 4, t-test 1 shows the differences between the affected firms and the potentially affected firms, t-test 2 shows the differences between the affected firms and the control group, and t-test 3 shows the differences between the potentially affected firms and the control group. The table presents that the average size of the control group is significantly higher than the average size of the affected firms, as well as the potentially affected firms. Furthermore, it is observable that the average return on assets of the affected firms are significantly higher than the average return on assets of both the potentially affected firms and the control group. This means that the affected firms include more profitable firms than the other two subsamples. However, this difference is only significant at the 10% significance level.

Table 4: Results of T-tests to test mean differences between subsamples

Variable	***t-test 1***	***t-test 2***	***t-test 3***
Market cap.	-0.94	-3.90***	-6.48***
ROA	1.64*	1.64*	-0.25
Leverage	-0.22	-0.35	-0.21
Market-to-book ratio	-0.62	-0.52	0.99

Note: This table shows the results of a two-sample t-test to test the differences between the mean-values of the different subsamples. The second column presents the t-stats of the differences between mean of the affected firms and the potentially affected firms, the third column presents the t-stats of the differences between the affected firms and the control group and the fourth column presents the t-stats of the differences between the potentially affected firms and control group.

Table 3: Descriptive statistics of different subsamples

Variable	*N Obs*	*Mean*	*Std. Dev.*	*5th perc*	*Median*	*95th perc*
			Affected firms			
Size	25	13.2793	1.5427	11.4396	12.9474	16.1195
ROA	25	0.1142	0.1187	-0.0220	0.0849	0.3653
Leverage	25	0.7119	3.8820	0.0000	0.4300	2.4991
Market-to-book ratio	25	3.5592	3.4911	0.6530	2.2149	10.1620
			Potentially affected firms			
Size	125	13.5956	1.5514	11.4396	13.5705	16.4628
ROA	125	0.0543	0.1832	-0.2405	0.0811	0.2691
Leverage	125	0.8706	2.7441	0.1335	0.3869	5.2881
Market-to-book ratio	125	4.9852	8.4266	0.4772	2.0804	24.4822
			Control group			
Size	2,660	14.5266	1.5912	12.2106	14.3889	17.4955
ROA	2,660	0.0567	0.1786	-0.3231	0.0805	0.2610
Leverage	2,660	0.9245	2.7606	0.0000	0.5956	4.0553
Market-to-book ratio	2,660	4.5976	6.9353	0.8994	2.3999	16.2634

Note: The table shows descriptive statistics per subsample. Size is defined by taking the logarithm of the Market value per share times the number of shares outstanding. ROA is defined by the Net income (loss) divided by Total Assets. MTB is defined by the Market value per share divided by the book value per share. Leverage is defined by dividing the total debt by the total equity.. To control for outliers, all variables are winsorized at the 1st and 99th percentil

4. Empirical model

In this part, the methodology will be explained and described. In the first part, the event study and the different test statistics to test the significance of the abnormal returns are presented and explained. The third part describes the cross-sectional analyses.

4.1 Event study methodology

In order to study the stock market reaction around the announcement of FTSE Russel, an event study will be conducted around the date of the announcement. Event studies give the possibility to examine responses of the market to a certain event by observing the abnormal returns around the date of the event. Fama, Fisher, Jensen and Roll (1969) were one of the first researches that applied this methodology to measure stock price effects around events. They measured the abnormal returns around stock split announcements. In the last decennia, it has become the most used methodology for determining the effects of firm-specific and economy-wide events. However, as in this study, event studies are also used to measure the impact on the value of a firm of a change in the regulatory environment (Campbell, Lo & Mackinlay, 1997).

To investigate if there is any effect due to the announcement of FTSE Russel, the actual returns of a firm are compared with the normal returns predicted. At first, to predict the expected returns, it is necessary to compute the daily returns of the stocks in the sample. Those daily returns can be calculated using the following formula:

$$R_{it} = \frac{P_{i,t} - P_{i,t-1}}{P_{i,t-1}}$$

Where $P_{i,t}$ defines the adjusted closing value of stock i on day t and $P_{i,t-1}$ represents the adjusted closing index value at the end of the previous trading day. After calculating these daily returns, it is possible to calculate the normal returns, i.e. stock returns that would have occurred in the nonappearance of the event. Consistent with most event studies, the market model is used (Mackinlay, 1997) to calculate the normal returns. The normal returns in the market model are modelled as follows:

$$NR_{it} = \alpha_i + \beta_i * R_{mt} + \varepsilon_{i,t}$$

Where α_i and β_i are the regression outputs for the market model. R_{mt} represents the market return and $\varepsilon_{i,t}$ is the error term. The market return is collected from the French data library. This market return proxy is a value-weighted return on all NYSE, AMEX and NASDAQ stocks.

To determine those normal returns, the return per firm are regressed on the market portfolio over the estimation window. This estimation window is set at 200 trading days, with a gap of 30 trading days between the end of the estimation window and the event date. Thus, the estimation window is the period between t = -230 and t = -30. The returns of the days from the estimation window to the event window, called the gap, are excluded, since they might be influenced by information leakage (Aktas, de Bodt & Roll, 2004).

With the normal returns of stocks, the abnormal returns can be calculated as the difference between the actual returns over the event window minus the normal returns:

$$AR_{it} = R_{it} - (\alpha_i + \beta_i * R_{mt})$$

Or

$$AR_{it} = R_{it} - NR_{it}$$

As it is more interesting to know the overall effect of the announcement on the (sub) sample, it is useful to calculate the average of the abnormal returns for all stocks included in the (sub) sample. Furthermore, by averaging the abnormal returns over the firms, the abnormal returns may be less biased to events unrelated to the announcement of FTSE Russell. The unweighted cross-sectional average of abnormal returns is considered, which is computed as follows:

$$AAR_t = \frac{1}{N} * \sum_{i=1}^{N} AR_{it}$$

Where N represents the sample size and AR_{it} is the abnormal return for stock i at time t. The average of the abnormal returns indicate how an event effects one particular day. However, the effect of the announcement could last longer than one trading day. Therefore, it is useful to capture the abnormal returns over a certain time period, also known as a multi-day event window. The abnormal returns over the event windows are called the cumulative abnormal return (CAR). CARs are calculated by aggregating the abnormal returns over the complete event window:

$$CAR_{iT} = \sum_{t=t1}^{t2} AR_{it}$$

Where t1 is the start of the event window and t2 is the end of the event window. CAR_{iT} represents the cumulative abnormal return for stock i over event window T. Some summary statistics of these CARs for the different event windows and different subsamples are presented

in table B, C and D in the appendix. Again, similar as for the abnormal returns, CARs are aggregated over the cross-section of the firms to obtain cumulative average abnormal returns:

$$CAAR_t = \frac{1}{N} * \sum_{i=1}^{N} CAR_{it}$$

NB: the CAAR can also be obtained by summing the average abnormal returns over time:

$$CAAR_{iT} = \sum_{t=t1}^{t2} AAR_t$$

The (cumulative) (average) abnormal returns are analyzed over multiple event window durations. Only the short-term perspective is being considered in this thesis. The event-date used in this study is July 26, 2017. This is the date that FTSE Russell made the announcement. My main event window is 3 days [-1, 1]. However, also several other event windows are used: [0, 1], [0, 2], [-2, 2], [0, 3] and [-3, 3]. Where the positive and negative numerals refer to the trading days relative to the event date, t = 0. The days before and after the event day are also included to allow for information about the regulatory announcement to be leaked or have slow effect on the stock prices (Da Silva & Subrahmanyam, 2007). An overview on the timeline of the estimation window and the event window is presented in the figure below.

S&P Dow Jones also announced a change in their regulation a few days after FTSE Russell made their announcement. Therefore, no longer event-windows than 7 days [-3, 3] are included in the event study. As otherwise, firms might be affected by the new rules of S&P Dow Jones as well.

4.1.1 Standard t-test

After computing those (cumulative) (average) abnormal returns, the last step of an event study is to determine whether the abnormal returns are statistically different from zero. The hypothesis to be tested for the different subsamples over different event windows is:

$$H_0: CAAR_t = 0 \qquad \text{vs.} \qquad H_1: CAAR_t \neq 0$$

At first, the null hypothesis is tested by performing the most common test, the standard t-test:

$$TS = \sqrt{N} * \frac{CAAR_t}{s}$$

Where s is an estimator of the standard deviation, σ, of the cumulative average abnormal returns. This estimator is calculated by using the following formula:

$$s = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(CAR_{i,t} - CAAR_t)^2}$$

To perform this test, you must assume that both AR and AAR are identically and independently distributed. Furthermore, both must follow a normal distribution with a mean of zero and a variance of σ^2.

4.1.2 Standardization and event-induced variance

However, it could be possible that there could be a large variation in the average abnormal returns, which could result in a less trustworthy test statistic. To address for this large variation in the abnormal returns, standardized abnormal returns can be used (Brown & Warner, 1980). However, by using the "normal" standardized t test, one does not account for event-induced variance. Event-induced variance means that the variance of the abnormal returns in the event period is not the not the same as in non-event periods. If the variance is underestimated, the null hypothesis is rejected more frequently than it should. Therefore, the standardized cross-sectional test proposed by Boehmer, Musumeci and Poulsen (1991) is used. This standardized test allows for event-induced variance changes and it has been shown that this standardized method outperforms the traditional standardized t-test in event studies (Kolari & Pynnönen, 2005).

To execute this test designed by Boehmer et al. (1991), you first have to calculate the standardized abnormal returns in the way Brown and Warner (1980) do. At first, each abnormal return is standardized by its standard deviation:

$$SAR_{i,t} = \frac{AR_{i,t}}{S\,(AR_i)}$$

Where

$$S\,(AR_i) = \sqrt{\frac{1}{T2 - T1}\sum_{t=T1}^{T_2}(AR_{i,t} - \overline{AR}_i)^2}$$

Where T2-T1 is the estimation window and $\overline{AR}$ is the average abnormal return for firm i during the estimation period. To get the cumulative standardized abnormal returns, the SARs are summed over the event window:

$$CSAR_{iT} = \sum_{t=t1}^{t2} SAR_{it}$$

To get the cumulative average standardized abnormal returns (CASAR), the CSARs are aggregated over the cross-section of events:

$$CASAR = \frac{1}{N}\sum_{i=1}^{N} CSAR_i$$

After calculating the CASARs you can add the extension of Boehmer et al. (1991). They constructed an alternative t-test, that account for event-induces variance, by dividing the CASAR's by their estimated cross-sectional standard deviation. This yields the following test-statistic:

$$TS_{BMP} = \sqrt{N}\frac{CASAR}{S^*}$$

Where S* is calculated similar to the calculation of s in 4.1.1, only with standardized abnormal returns:

$$S^* = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(CSAR_{i,t} - CASAR_t)^2}$$

4.1.3 Event clustering

When event days are similar for the full sample or a large part of the sample, there is event-clustering. When there is event clustering, it is presumable that there is cross-sectional correlation among abnormal returns. Therefore, test statistics cannot assume independence of

the abnormal returns and the previous explained t-statistics will probably over-reject the null hypothesis (Kolari & Pynnönen, 2010). Even when cross-sectional correlation is relatively low, event clustering is still serious in over-rejecting the null hypothesis of no abnormal returns when it should not reject it. As in this study the event day is the same for all firms, it is most likely that there is correlation among abnormal returns. Therefore, the adjusted BMP test (Kolari & Pynnönen, 2005; Kolari & Pynnönen, 2010) is used, which accounts for both event-induced variance and cross-sectional correlation. This test yields the following test statistic:

$$TS_{adjusted} = TS_{BMP}\sqrt{\frac{1-\bar{r}}{1+(N-1)*\bar{r}}}$$

Where $\bar{r}$ is the average of the sample cross-correlations of the abnormal returns. This cross-sectional correlation is computed during the estimation period and you need to assume that this correlation is the same for the event period.

As seen from the equation, the severity of the correlation in the test statistics depends on the average correlation and the number of firms in the sample (N). Thus, if there is cross-correlation in my samples, it will especially be severe in the test statistic of the control group, as the number of firms in this subsample is very large (N = 2660).

4.2 Cross-sectional analyses

After obtaining whether the announcement of FTSE Russell affects the stock returns of firms, it is also interesting to know whether this effect varies amongst firms. To try to explain cross-sectional variation in the window-spanning's abnormal returns, a cross-sectional regression is estimated. A cross-sectional analysis provides insights into the relation between the sizes of the (cumulative) abnormal returns identified in the event study and characteristics specific to the event observations. This has two main advantages (Bhagat & Romano, 2002). Firstly, you are able to directly relate the cumulative abnormal returns to other variables. Secondly, you are able to estimate those relations while controlling for other variables.

The cross-sectional model used in this study is presented below:

$$CAR_{(-1,1)} = \beta_1 Affected_i + \beta_2 potential_i + \beta_3 Index_i + \beta_4 MCAP_i + \beta_5 ROA_i + \beta_6 LEV_i + \beta_7 MTB_i$$

The dependent variable in this study will be the cumulative abnormal return over the event window [-1, 1]. A list of all the variables used in the cross-sectional analysis and their explanation is presented in table 5.

By using this cross-sectional model, you are able to analyze whether there are differences in cumulative abnormal returns between the different groups that are explained in section 3.1. Hypotheses 4 (5) is tested by including the dummy variables $affected_i$ ($potential_i$). Those dummy variables equal 1 if the firm is part of the affected firms (potentially affected firms) and zero otherwise. Hence one can determine whether the stock returns of firms that do not meet the threshold of 5% or the threshold of 25% are affected more than firms that do meet these thresholds. Furthermore, the dummy variable $index_i$ is included to test whether the stock prices of firms that are listed on the Russell 1000 are affected stronger / less strong by the announcement of the new rule than the stock prices of firms that are listed on the Russell 2000 or a microcap index.

Besides those independent variables, I run the regressions using the cumulative abnormal returns against four accounting-based firm characteristics. In addition to the three dummy variables, market-to-book ratio, size ($logMCAP_i$), risk (LEV_i) and profitability (ROA_i) are included as control variables. The firm characteristics used in this study are based on the firm characteristics used in studies about the index reconstitution effect (Baran & King, 2014; Wang, Murgulov & Haman, 2015). Both previous studies found that the firm's profitability alleviates the negative abnormal returns of firms that are announced to be deleted. Therefore, it could be expected that my analysis also shows this same effect. For all the other firm characteristics, the studies show contradictory effects or both show insignificant effects. In order to eliminate the impact of outliers in the regression, the control variables have been winsorized at the 1 percent level. This refers to the transformation of data points at the end of the tails of the distribution to the next highest or lowest values within the distribution. By winsorizing, the data is cleaned from extreme values.

Table 5: Variables used in the cross-sectional analysis

Dependent variable	
$CAR_{t1,t2}$	The cumulative abnormal return over the event windows [-1, 1]
Independent variables	
$Affected_i$	A dummy variable that equals 1 if the firm has less than 5% of its voting rights in the hands of public shareholders and 0 otherwise.
$Potentially_i$	A dummy variable that equals 1 if the firm has between 5% and 25% of its voting rights in the hands of public shareholders and 0 otherwise.
$Index_i$	A dummy variable that equals 1 if the firm is listed on the Russell 1000 index and 0 otherwise.
Independent / Control variables	
$logMCAP_i$	Log transformation of the Market capitalization (Market capitalization is measured by the price per share times the number of shares outstanding).
ROA_i	Return on assets (Net income divided by the total assets) (Measure of profitability)
LEV_i	The debt-to-equity ratio. Calculated by dividing the total debt by the total equity (measure of risk/solvency)
MTB_i	Market-to-book ratio (Market capitalization divided by the Net Book value)

Notes: This table presents the dependent variable, independent variables and control variables that will be used in the cross-sectional analysis. The left column presents the names of the variables and the right column gives an explanation of the variable.

5. Results

Within this section, the results of the study are presented and discussed. This section is separated in three different parts. In the first two parts, the results of the event study and its robustness checks are presented, explained and discussed. The third part presents, explains and discusses the results of the cross-sectional analysis.

5.1 Event study

An event study is conducted in order to test whether the announcement of FTSE Russell affects the stock returns of the listed firms. Of the 2931 firms from which the data was retrieved, 2810 could be used to conduct a proper event study. To get a clearer insight in the abnormal returns around the announcement, an overview of the summary statistics of the cumulative abnormal returns for the different event windows are produced. In the appendix, tables B, C and D display those summary statistics for respectively the affected firms, the potentially affected firms and the control group.

In order to provide some insights about how the full sample reacts to the announcement, figure 1 provides a graphical presentation of the cumulative average abnormal returns over the event window [-3, 3] for the full sample. This figure shows negative abnormal returns around the event, which corresponds to the expectations. The figure also shows that these abnormal returns are especially low at the day of the event (t = 0) and the day after the event (t = 1). After t=1, the cumulative abnormal return stays more or less the same. In figure 2, the CAR over a longer event-period, [-10, 25], is presented. This figure also shows that the cumulative abnormal return drops in the days after the announcement and declines even more until 20 days after the announcement. However, such a long event window as presented in this figure will not be used to draw conclusions, as it is most likely that other factors affect the abnormal returns over a long event window. Nevertheless, by showing this figure, it becomes clearer that the abnormal returns are negative and declining around the announcement of FTSE Russell. In the appendix, the figures A, B and C include a graphical presentation of the cumulative abnormal returns over the event window [-3, 3] for respectively the affected firms, potentially affected firms and the control group.

Figure 1: Full sample CAAR [-3,3]

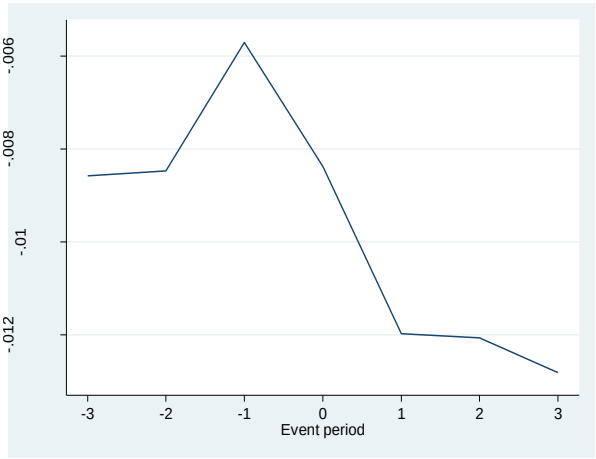
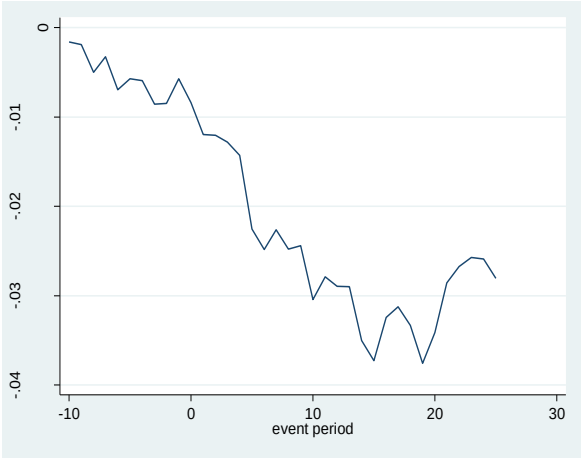


***Figure 2*:** Full sample CAAR [-10,25]



To determine whether the announcement leads to significant (cumulative) abnormal returns, an event study is conducted for different event windows. Table 6 shows the average abnormal returns per day for the event window [-1, 1] and table 7 provides the average cumulative abnormal returns for different event windows around the event. The first columns shows the results for the full sample and column 2, 3 and 4 show the CARs for the three different subsamples.

When observing the second column of table 7, it shows that the cumulative abnormal returns of the affected firms group is negative for all different event windows. The significance of the results, however, differ among the event windows. For the event windows [0, 1] and [-1, 1] the CARs are respectively -0.68% and -0.82%. The results are statistically significant at the 5% and 1% level respectively. However, the CARs for the event windows [0, 2] and [-2, 2] are not significant anymore. As one can observe in table 6, the average abnormal return per day is negative (positive) and statistically insignificant at t = -1 (t = 0). However, the drop takes place at t =1, were the average abnormal return is -0.72% and statistically significant at the 1% significance level. The negative effect on the affected firms group is in line with what is expected in hypothesis 1.

In the third column of table 7, one can observe that the cumulative abnormal returns for the potentially affected firms are also negative and statistically significant for all event windows. However, in contrast to the affected firms , the cumulative abnormal returns for subsample 2 are less negative and less significant, 5% or 10% significance level, in [0, 1] and [-1, 1]. Furthermore, it is observable that this subgroup experiences quite a large drop of almost 0.5% at t = 3, which causes the higher statistical significance of the cumulative abnormal returns for

the event windows [0, 3] and [-3, 3]. The explanation of this large drop at t = 3 cannot be found. However, there is a chance that this drop is caused by something else than the announcement and no conclusions will be drawn based on these results. Altogether, the results presented in column 3 of table 6 are in line with my expectation in hypothesis 2.

In line with the results of the first two subsamples, in the fourth column of table 7, one can observe a negative cumulative abnormal return for the control group over all different windows. The results of the control group are all highly significant. However, according to Bhagat and Romano (2002), this high significance is probably due to the very large sample in this subgroup. In contrast to the other two samples, the significance and the strength of the cumulative abnormal returns is similar over the different event windows. The cumulative abnormal return does not decrease much after t=1 and is approximately the same for [0, 1], [0, 2] and [0, 3]. The cumulative abnormal returns stay between the -0.60% and -0.70%. Altogether, this these results are in line with hypothesis 3B.

Table 6: Calculated average abnormal returns

Event time	***Full sample*** N = 2810	***Affected firms*** N = 25	***Potentially affected firms*** N = 125	***Control group*** N = 2660
	AAR	*AAR*	*AAR*	*AAR*
t = -1	*0.28%****	*-0.14%*	*0.11%*	*0.28%****
	(6.30)	*(-0.46)*	*(0.62)*	*(6.34)*
t = 0	*-0.27%****	*0.04%*	*-0.13%*	*-0.28%****
	(-6.44)	*(0.13)*	*(-0.88)*	*(-6.40)*
t = 1	*-0.35%****	*-0.72%****	*-0.36%***	*-0.35%****
	(-4.29)	*(-3.02)*	*(-2.16)*	*(-6.78)*

Notes: This table presents events study results for stock returns for different days around the announcement of FTSE Russel, where t=0 is the event day. The AAR (average abnormal return) if computed in the way which is explained in section 4.1. The values between the brackets are t-statistics *, ** and *** represent significance levels of 10%, 5% and 1% respectively

Table 7: Cumulative abnormal returns for different event windows and different (sub) samples

Event window	***Full sample*** N=2810	***Affected firms*** N=25	***Potentially affected firms*** N=125	***Control group*** N=2670
	CAAR	*CAAR*	*CAAR*	*CAAR*
(0,1)	*-0.63%****	*-0.68%***	*-0.57%***	*-0.63%****
	(-9.85)	*(-2.14)*	*(-2.39)*	*(-9.49)*
(-1,1)	*-0.35%****	*-0.82%****	*-0.48%**	*-0.34%****
	(-4.28)	*(-2.65)*	*(-1.58)*	*(-3.98)*
(0,2)	*-0.64%****	*-0.61%*	*-0.87%***	*-0.63%****
	(-8.19)	*(-1.30)*	*(-2.39)*	*(-7.80)*
(-2,2)	*-0.35%****	*-0.71%*	*-0.75%**	*-0.34%****
	(-3.73)	*(-1.28)*	*(-1.78)*	*(-3.38)*
(0,3)	*-0.71%****	*-0.70%**	*-1.20%****	*-0.69%****
	(-7.80)	*(-1.65)*	*(-3.41)*	*(-7.25)*
(-3,3)	*-0.68%****	*-1.04%***	*-1.45%****	*-0.65%****
	(-6.21)	*(-2.20)*	*(-3.51)*	*(-5.62)*

Notes: This table presents events study results for stock returns for different event periods surrounding the announcement of FTSE Russel, where t = 0 on the event day. The CAARs (cumulative average abnormal return) and the statistical significance of this CAARs are computed in the way as explained in section 4.1. The values between the brackets are t-statistics *, ** and *** represent significance levels of 10%, 5% and 1% respectively.

5.2 Robustness checks on event study results

In order to check some robustness of my results, two different approaches to calculate the standard errors of the CARs are performed. Firstly, the BMP-test, which is an event study method that uses standardized abnormal returns and accounts for event induced variance. Secondly, the adjusted BMP-test, which is an event method that uses standardized abnormal returns and accounts for both event induced variance and cross-sectional correlation. By observing the results of these tests, you can verify whether the announcement of FTSE Russell affects the financial performance of listed firms. The significance of the results of both tests are presented in table 8. Column 4 presents the t-statistics of the BMP test and column 5 presents the t-statistics of the adjusted BMP test. Column 5 also shows the average cross-sectional correlation of the abnormal returns ($\bar{r}$) per sample. This correlation is used to calculate the standard errors of the abnormal returns. The table shows that $\bar{r}$ is 0.04, 0.025 and 0.034 for respectively the affected firms, the potentially affected firms and the control group.

BMP-test

Looking at the significance of the abnormal returns of the BMP-test, there does not deviate much in comparison to the significances of the other t-test, which are presented in column 3 of table 8. Only the negative cumulative abnormal returns of the affected firms for the event windows [0, 3] and [-3, 3] are not significant anymore. Furthermore, contrary to the results presented in table 6, the standardized abnormal returns for the event windows [-1, 1] and [-2, 2] are not significant anymore for the potentially affected firms. Altogether, the same can be concluded as from the results of the standard t-test; the announcement of FTSE Russell does negatively affect the stock prices of the firms in all three subsamples. However, for the affected firms this significant effect is only of short notice.

Adjusted BMP-test

However, after controlling for both event-induced variance and cross-sectional correlation among abnormal returns, the results change. This signifies that there is indeed cross-sectional correlation among the abnormal returns. For the affected firms, nevertheless, the adjusted BMP test shows similar results as the other two tests. It still shows a negative cumulative abnormal returns at the 5% significance level for the event windows [0, 1] and [-1, 1]. For the longer event windows, after t = 1, this significant effect abandons. Altogether, the null hypothesis of hypothesis 1 can be rejected and there can be concluded that the announcement of FTSE Russel to exclude firms has a negative effect on the stock returns of firms with less than 5% of its

voting rights in the hands of free-float shareholders. Nonetheless, this effect is only of short notice. This result is in line with the results of other studies (e.g. Mase, 2007; Chang, Hong and Liskovich, 2014). They find short-term significant negative effects on stock prices for firms that are announced to be deleted from a Russell index. My results suggest that these negative impact on stock prices also applies to firms that are threatened with index deletion.

On the other hand, after controlling for cross-sectional correlation, the CARs of the control group and the potentially affected firms are insignificant for every event window. The insignificant CARs suggest that the null hypothesis of H2 and H3 cannot be rejected. Therefore, it cannot be concluded that the stock price of firms with more than 5% of its voting rights in the hands of free-float shareholders is negatively affected by the announcement of FTSE Russell.

The overall results of this event study are partly in line with the results found by Winden and Baker (2018). They use an event study to measure the effect of the announcement of S&P Dow Jones on the trading price of firms with dual-class share structures. On the one hand, their results are similar to the results of this study, as they do not find a significant effect on the stock prices of firms that meet the new threshold either. On the other hand, contrary to what my results show, they do not find any significant effect of the announcement of S&P Dow Jones on stock returns of firms that do not meet the new rules. This can probably be explained by the fact that Winden and Baker (2018) focused on the announcement of S&P Dow Jones. The new rules announced by S&P Dow Jones did only apply to new potential constituents and existing constituent members would be grandfathered. Therefore, existing constituents of the S&P 500 that did not meet their new threshold are not actually going to be deleted from the index if they do not change their voting right structure.

By observing the negative impact of firms that do not meet the new threshold, one can suggest that the certainty of being listed on an index is important. Moreover, the results suggest that an announcement of corporate governance regulation, introduced by an index provider, affects the stock prices of firms that do not meet the new corporate governance standards.

Table 8: Event study analysis with different test statistics

Notes: This table presents events study results for stock returns for different event periods and different subgroups surrounding the announcement of FTSE Russel, where t = 0 on the event day. The BMP test and adjusted BMP test are performed in the way which is explained in section 4.1.2 and 4.1.3. Column 4 and 5 show the t-statistics of respectively the BMP-test and the adjusted BMP-test. *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

Affected firms (N = 25)				
Event window	CAAR	Normal t-test	BMP t-test	Adjusted BMP t-test ($\bar{r} = 0.040$)
(0, 1)	-0.68%	-2.14**	-3.13***	-2.19**
(-1, 1)	-0.82%	-2.65***	-2.84***	-1.99**
(0, 2)	-0.61%	-1.30	-1.56	-1.09
(-2, 2)	-0.71%	-1.28	-0.85	-0.60
(0, 3)	-0.70%	-1.65*	-1.60	-1.19
(-3, 3)	-1.04%	-2.20**	-1.50	-1.05
Potentially affected firms (N=125)				
Event window	CAAR	Normal t-test	BMP-test	Adjusted BMP Test ($\bar{r} = 0.025$)
(0, 1)	-0.57%	-2.39**	-2.02**	-0.97
(-1, 1)	-0.48%	-1.58*	-0.90	-0.43
(0, 2)	-0.87%	-2.39**	-2.19**	-1.06
(-2, 2)	-0.75%	-1.78*	-1.08	-0.52
(0, 3)	-1.20%	-3.41***	-3.12***	-1.50
(-3, 3)	-1.45%	-3.51***	-2.44**	-1.17
Control group (N = 2670)				
Event window	CAAR	Normal t-test	BMP-test	Adjusted BMP Test ($\bar{r} = 0.034$)
(0, 1)	-0.63%	-9.49***	-8.70***	-0.87
(-1, 1)	-0.34%	-3.98***	-3.46***	-0.36
(0, 2)	-0.63%	-7.80***	-7.37***	-0.76
(-2, 2)	-0.34%	-3.38***	-3.25***	-0.33
(0, 3)	-0.69%	-7.25***	-5.92***	-0.61
(-3, 3)	-0.65%	-5.62***	-3.89***	-0.40

5.3 Cross-sectional analysis

To try to explain cross-sectional variation amongst firms in the window-spanning's abnormal returns, an OLS regression is estimated. Table 9 shows the results of the regression with $CAR_{(-1, 1)}$ as dependent variable. The cumulative abnormal return of this event window is used as dependent variable, as these CARs are statistically significant for the firms that do not meet the threshold of five percent. In the first two columns of the table 9, there are no firm characteristics included as control variables, in the third column only firm size is included and in the last two columns some other firm characteristics are also included as control variables. In all regressions, the used standard errors are robust to heteroscedasticity.

In the first three columns of table 9, one can observe that the coefficient of the dummy variable $affected_i$ is insignificant. This implies that firms that do not meet the new threshold do not have stronger negative abnormal returns around the announcement than firms that do meet the new threshold. However, in column 4 (respectively 5), after controlling for several firm characteristics, the dummy variable $affected_i$ has a coefficient of -0.93% (respectively -0.88%), which is significant at the 5% significance level. This magnitude of the coefficient indicates that firms that do not meet the new threshold experience around 0.9% point lower cumulative abnormal returns around the announcement than the other firms, holding all other factors equal. These results are in line with the expectation described in hypothesis 4. Based on these results, there can be concluded that the null hypothesis of H4 can be rejected at the 5% significance level, after controlling for several firm characteristics. This implies that firms with less than 5% of their voting rights in public ownership, are affected stronger by the announcement than other firms in the sample. This is in line with the results found in the event study analysis and could suggest that these firms experience stronger negative abnormal returns as there are threatened with index exclusion.

The results presented in table 9 also display that the coefficient of the dummy variable $potential_i$ is very low, positive and highly insignificant in all regressions, using several different control variables. The fact that the coefficient of this dummy variable is positive and insignificant makes that the null hypothesis of H5 cannot be rejected. Therefore, it cannot be concluded that the stock prices of firms with between 5% and 25% of its voting rights in public ownership are more influenced by the new rules than stock prices of firms with more than 25% of its voting rights in the hands of the public.

The coefficient of the dummy variable $Index_i$ is positive. This means that firms that are listed on the Russell 1000 index have on average less negative abnormal returns than firms that are listed on the Russell 2000 or microcap indexes. However, in column 3 the coefficient is only significant at the 10% significance level and after controlling for several firm characteristics the coefficient becomes insignificant. This is probably due to the fact that the Index dummy is highly correlated with the size of the firm (r = 0.79) and also correlated with ROA (r = 0.23). This correlation is not surprising, as FTSE Russell bases their indexes on firm size and firm profitability. A correlation matrix of all independent and control variables can be seen in table E in the appendix. Overall, there cannot be concluded that the impact of the announcement is different for firms that are listed on the Russell 1000 index than for firms that are listed on the Russell 2000 index or a microcap index. This result is not consistent with the results of studies that focused on the index reconstitution effect of FTSE Russell (e.g. Madhavan, 2003). Madhaven (2003) found stronger negative results for firms listed on the Russell 1000 that are announced to be deleted from the index.

Firm characteristics

Looking at the coefficient of return on assets, one can observe a positive relation between the cumulative abnormal stock returns and the return on assets. This relation is significant at the 1% significance level. The magnitude of the coefficient suggests that a 1% point increase in the return on assets is associated with about 0.047% point increase in the CAR. This result is consistent with the results of Baran and King (2014) and Wang et al. (2015), who observe a positive relation between ROA and CAR for firms that are announced to be deleted from a stock index. This results can possibly be due to the fact that higher profitable firms are less vulnerable for a negative shock, as their business conditions are better.

Looking at the coefficient of the leverage and market-to-book ratio, one can observe a significant relation between the cumulative abnormal returns and the firm characteristics. The coefficient of the leverage is positive and the coefficient of the market-to-book ratio is negative. However, the magnitudes of the coefficient of leverage and market-to-book ratio are quite low, respectively 0.0011 and -0.0005, which implies that the impact of those firm characteristics on the abnormal returns is minimal and almost negligible.

Eventually, the coefficient of size is very low and highly insignificant. This suggests that the size of a firm does not have any influence on the cumulative abnormal return around the announcement of FTSE Russell.

Table 9: Multivariate analyses for dependent variable CAR (-1, 1)

	Reg #1	Reg #2	Reg #3	Reg #4	Reg #5
Variable					
Constant	-0.0034***	-0.0045***	-0.0078	0.0046	-0.0048***
	(0.0009)	(0.0011)	(0.0112)	(0.0113)	(0.0012)
Affected	-0.0048	-0.0046	-0.0044	-0.0093***	-0.0088**
	(0.0032)	(0.0031)	(0.0033)	(0.0035)	(0.0034)
Potential	-0.0003	0.0001	0.0002	-0.0007	-0.0001
	(0.0030)	(0.0030)	(0.0031)	(0.0026)	(0.0029)
Index		0.0031*	0.0023	0.0015	-0.0004
		(0.0016)	(0.0027)	(0.0026)	(0.0016)
Size			0.0002	-0.0008	
			(0.0008)	(0.0009)	
ROA				0.0475***	0.0466***
				(0.0061)	(0.0059)
Leverage				0.0008	0.0009*
				(0.0005)	(0.0005)
MTB				-0.0005***	-0.0005***
				(0.0002)	(0.0002)
Observations	2,810	2,810	2,810	2,810	2,810
R^2	0.0001	0.0012	0.0013	0.0475	0.0474

Note: The dependent variable in this analysis is the CAR over event window [-1, 1]. Affected is a dummy variable equal to one if the firm is part of the affected firms subsample and zero otherwise; Potential is a dummy variable equal to one if the firm is part of the potentially affected firms subsample and zero otherwise; Index is a dummy variable that is equal to one if the firm is listed on the Russell 1000 index and zero otherwise; Size is defined as the natural logarithm of the stock's market capitalization; ROA is defined as the return divided by the total assets; leverage is defined as the debt divided by the firm's equity; MTB is defined as the value of a firm's capitalization divided by the book value. This regression is performed using OLS, with the t-statistics computed using standard errors that are robust to heteroscedasticity. The table shows the coefficient of the variables and their standard errors between the brackets. *, ** and *** represent significance levels of 10%, 5% and 1% respectively.

6. Conclusion

In the past decade, many firms went public using dual-class share structures or offering only a (very) low percentage of voting rights to the public. As a reaction to those voting right structures and the rising opposition against those, FTSE Russell announced to exclude/delete firms with less than 5% of their voting rights in public hands from its indices. As several other researchers (e.g. Chang et al., 2014) find significant negative (positive) stock price effect for firms that are announced be deleted (added) to a stock index, FTSE Russell might discourage firms to use such voting right structures by threatening the firms with index exclusion. This thesis examines if and to what extent the announcement of FTSE Russell affects the stock returns of firms listed on a US Russell index.

This study measures this impact by examining the short-term cumulative abnormal stock returns around the announcement of a cleaned sample of 2810 firms, either listed on the Russell 3000 or a US Russell microcap index, using an event study. The sample is separated in three subsamples based on the voting rights structures of the firms. Firms that do not meet the new threshold of 5%. Firms that meet the new requirements, but have a relatively low percentage of voting rights in public hands and firms that meet the new requirement spaciously. Firstly, the results of the event study display to be negative and significant for all three subsamples. However, after controlling for some potential complications in testing significance of cumulative abnormal returns, the negative impact is only significant for firms that do not meet the new threshold of 5%.

Besides the event study and its robustness checks, a cross-sectional analysis is executed to explore whether these abnormal returns diverge between the different groups and to explore whether there are several important firm characteristics that affect the cumulative abnormal returns around the announcement. The results of this analysis present, as in line with the expectations and the results of the event study, that the affected firms experience stronger negative abnormal returns around the announcement than the other firms listed on the index. As several other studies (e.g. Chang et al., 2014) find significant negative stock price effects for firms that are deleted from a stock index, the threat of being excluded from the Russell indices probably explains the negative abnormal returns around the announcement for firms that do not meet the new threshold of 5%. Furthermore, the results of this regression analysis show that firms with a higher return on assets are affected less by the announcement than firms that are less profitable. The other firm characteristics do not show significance or have such a low coefficient, that the impact is negligible.

The results of this study contribute to the current literature as it increases our overall understanding about the importance of (the certainty of) being listed on an index. By observing the negative impact of firms that do not meet the new threshold, and are therefore deleted and excluded from the indices if they do not change their voting right structure, one can suggest that the certainty of being listed on an index is important. However, the impact on the stock returns is quite small and only of short notice.

Another important take-away from this thesis is that regulatory announcements of an index providers affects stock prices of firms that do not meet the new threshold of the new rule. Other researchers found significant effects on stock prices after announcements of new rules introduced by the government and the SEC. However, as index providers acting as a regulator is a new phenomenon, its effect on stock prices was not yet studied. Thus, by observing this impact on stock prices of firms, one that an index provider can have influence on the stock prices in its index by acting as regulator. This information could be useful for investors, as they might will be able to use it for future investment decisions.

Limitations and future research

An important limitation of this study is the sample size of the affected firms subsample. This small size of 25 makes it harder to identify whether the negative abnormal returns of this subsample are actually triggered by the announcement itself or by outliers within the small sample. A larger sample size could have generated results that are more accurate. Next to this, another important limitation of this study is that the announcement of FTSE Russell was already rumored before the actual announcement occurred. FTSE Russell already announced earlier that it would take consequences against firms with low-voting rights in hands of public shareholders. The price movements of the earlier announcements about the new regulations are not taken into consideration in this study. Therefore, it could be useful for future research to obtain dates where some spectate abnormal returns around those dates.

Eventually, some other limitation of this study is that it only investigates the short-term effects of the announcement. As the constituents with less than 5% of its voting rights in the hands of public shareholders are grandfathered until 2022, these firms are not actually excluded from the index yet. Therefore, it might be interesting for future research to observe whether these firms changed their voting rights structure in the few years after the announcement and whether this affected their stock prices too. One could also study whether the number of firms going public with low or no voting rights for the public decreased after the implementation of the new rules.

By studying this, one might can determine better whether FTSE Russell imposed a sufficient sanction to discourage firms to have particular voting right structures.

Eventually, it can be interesting for future research to observe the impact on the index in general over a larger amount of time. As explained by Hirst and Kastiel (2019), by excluding firms solely based on their voting rights structure, the Russell 3000 is no longer a good representation of the market. This could lead to index investors investing more in other indices that do reflect the market better. This might lead to less investments and lower trading volumes in the Russell 3000. This effect is not observable in the short-term, but this might be better observable over a longer term.

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Appendix

Table A: List of securities of firms that have less than 25% of its voting rights in the hands of public shareholders.

Ticker	Constituent name	Index	Voting Power
BL	BLACKLINE INC	R2000	21.18%
CWH	CAMPING WORLD HOLDINGS	R2000	14.14%
JAG	JAGGED PEAK ENERGY INC	R2000	19.52%
LAUR	LAUREATE EDUCATION INC	R2000	2.59%
SND	SMART SAND INC	R2000	12.87%
VVV	VALVOLINE INC	R1000	16.81%
WRD	WILDHORSE RESOURCE DEV	R2000	22.46%
APTI	APPTIO INC	R2000	9.39%
DVMT	DELL TECHNOLOGIES	R1000	3.57%
HOME	AT HOME GROUP INC	R2000	8.35%
MEDP	MEDPACE HOLDINGS INC	R2000	17.88%
NCIT	NCI INC	R2000	12.70%
NTNX	NUTANIX INC	R2000	7.09%
TTD	THE TRADE DESK INC	R2000	9.03%
AAME	ATLANTIC AMERN CORP	Microcap Only	20.72%
AC	ASSOCIATED CAPITAL GROUP	R2000	2.52%
AGR	AVANGRID INC	R1000	18.26%
AMC	AMC ENTERTAINMENT	R2000	19.33%
AMRC	AMERESCO INC	R2000	15.74%
APPF	APPFOLIO INC	R2000	3.47%
ARL	AMERICAN RLTY INVS INC	Microcap Only	12.57%
BBGI	BEASLEY BROADCAST GROUP	R2000	2.70%
BKFS	BLACK KNIGHT FINL SVCS	R1000	18.48%
BOX	BOX INC	R2000	13.25%
BRC	BRADY CORP	R2000	0.00%
BRID	BRIDGFORD FOODS CORP	Microcap Only	18.46%
CBS	CBS CORPORATION	R1000	20.23%
CCO	CLEAR CHANNEL OUTDOOR	R2000	0.56%
CDOR	CONDOR HOSPITALITY TRUST	Microcap Only	6.71%
CFNB	CALIFORNIA FIRST NATL	R2000	21.28%
CIX	COMPX INTERNATIONAL INC	R2000	13.16%
CLR	CONTINENTAL RESOURCES	R1000	23.13%
CNA	CNA FINANCIAL CORP	R1000	9.93%
CNBKA	CENTURY BANCORP INC	R2000	0.00%
COKE	COCA COLA BOTTLING	R2000	9.13%
CVI	CVR ENERGY INC	R2000	18.00%
DATA	TABLEAU SOFTWARE INC	R1000	24.79%
DDE	DOVER DOWNS GAMING & ENT	Microcap Only	9.70%
DGICA	DONEGAL GROUP INC	R2000	20.80%
DISH	DISH NETWORK CORP	R1000	8.42%
DLTH	DULUTH HOLDINGS INC	R2000	15.16%

DVD	DOVER MOTORSPORTS INC	Microcap Only	7.79%
EEI	ECOLOGY & ENVIRONMENT	Microcap Only	15.31%
EL	ESTEE LAUDER FIRMS	R1000	13.08%
EPE	EP ENERGY CORPORATION	R2000	14.94%
ERIE	ERIE INDEMNITY CO	R1000	0.00%
EROS	EROS INTL PLC	R2000	8.07%
EV	Eaton Vance	R1000	0.00%
EZPW	EZCORP INC	R2000	0.00%
FDC	FIRST DATA CORPORATION	R1000	6.33%
FGL	FIDELITY & GUARANTY	R2000	19.18%
FI	FRANK'S INTERNATIONAL	R2000	22.13%
FIBK	FIRST INTST BANCSYSTEM	R2000	14.81%
FII	FEDERATED INVESTORS INC	R1000	0.00%
FIZZ	NATIONAL BEVERAGE CORP	R2000	24.96%
FLWS	1-800 FLOWERS COM	R2000	7.71%
FSAM	FIFTH STREET ASSET MGMT	R2000	3.74%
GAIA	GAIA INC	R2000	13.61%
GBL	GAMCO INVESTORS INC	R2000	2.24%
GBLI	GLOBAL INDEMNITY LTD	R2000	14.96%
GEN	GENESIS HEALTHCARE INC	R2000	23.86%
GLBL	TERRAFORM GLOBAL INC	R2000	1.41%
GMED	GLOBUS MEDICAL INC	R2000	22.45%
GNE	GENIE ENERGY LTD	R2000	18.39%
GNK	GENCO SHIPPING & TRADING	R2000	22.10%
GPRO	GOPRO INC	R2000	22.29%
GRIF	GRIFFIN INDUSTRIAL RLTY	R2000	13.77%
GWGH	GWG HLDGS INC	Microcap Only	10.26%
HLI	HOULIHAN LOKEY INC	R2000	5.11%
HMTV	HEMISPHERE MEDIA GROUP	R2000	6.72%
HNH	HANDY & HARMAN HLDGS LTD	R2000	23.88%
HSY	HERSHEY FIRM	R1000	18.32%
HY	HYSTER-YALE MATERIALS	R2000	19.77%
HZO	MARINEMAX INC	R2000	22.15%
IBKR	INTERACTIVE BROKERS GRP	R1000	16.04%
IMKTA	INGLES MARKETS INC	R2000	18.36%
INOV	INOVALON HOLDINGS INC	R2000	6.97%
ISCA	INTERNATIONAL SPEEDWAY	R2000	19.77%
JBSS	SANFILIPPO JOHN B & SON	R2000	24.49%
JOUT	JOHNSON OUTDOORS INC	R2000	22.91%
JTPY	JETPAY CORP	Microcap Only	24.77%
KELYA	KELLY SERVICES INC	R2000	6.45%
KRO	KRONOS WORLDWIDE INC	R2000	19.38%
MANT	MANTECH INTERNATIONAL	R2000	16.19%
MAYS	JW MAYS INC	Microcap Only	19.89%
MC	MOELIS & CO	R2000	8.73%
MCHX	MARCHEX INC	Microcap Only	20.65%

MDLY	MEDLEY MANAGEMENT INC	R2000	2.24%
MJCO	MAJESCO	R2000	15.07%
MLVF	MALVERN BANCORP INC	R2000	21.24%
MMI	MARCUS & MILLICHAP	R2000	17.45%
MNI	MCCLATCHY CO	Microcap Only	16.39%
MOV	MOVADO GROUP INC	R2000	22.01%
MTCH	MATCH GROUP INC	R1000	1.70%
NH	NANTHEALTH INC	R2000	14.51%
NL	NL INDUSTRIES INC	R2000	16.98%
NNI	NELNET INC	R2000	13.57%
NYNY	EMPIRE RESORTS INC	R2000	10.81%
OB	ONEBEACON INSURANCE GRP	R2000	2.70%
OCX	ONCOCYTE CORPORATION	R2000	12.13%
ODC	OIL DRI CORP OF AMERICA	R2000	18.39%
OFED	OCONEE FEDERAL FINANCIAL	R2000	21.34%
OPY	OPPENHEIMER HOLDINGS INC	R2000	0.00%
PAHC	PHIBRO ANIMAL HEALTH	R2000	8.24%
PANL	PANGAEA LOGS SOLUTIONS	Microcap Only	12.83%
PCO	PENDRELL CORP	R2000	16.24%
PNRG	PRIMEENERGY CORP	Microcap Only	23.67%
PPC	PILGRIMS PRIDE CORP	R1000	21.19%
PRTY	PARTY CITY HOLDCO INC	R2000	22.76%
PSTG	PURE STORAGE INC	R2000	7.49%
PTHN	PATHEON NV	R1000	23.17%
PZN	PZENA INVESTMENT MGMT	R2000	6.12%
QUAD	QUAD / GRAPHICS INC	R2000	17.28%
RBCAA	REPUBLIC BANCORP INC KY	R2000	23.23%
RDI	READING INTERNATIONAL	R2000	15.68%
RETA	REATE PHARMACEUTICALS	R2000	21.54%
REV	REVLON INC	R2000	22.23%
RL	RALPH LAUREN CORP	R1000	17.56%
RMR	RMR GROUP INC	R2000	3.97%
RRR	RED ROCKS RESORTS INC	R2000	12.83%
S	SPRINT CORP	R1000	15.73%
SAH	SONIC AUTOMOTIVE INC	R2000	17.23%
SALM	SALEM MEDIA GROUP INC	R2000	15.12%
SATS	ECHOSTAR CORP	R1000	8.95%
SBGI	SINCLAIR BROADCAST GROUP	R2000	21.43%
SCCO	SOUTHERN COPPER CORP	R1000	10.56%
SCWX	SECUREWORKS CORP	R2000	1.15%
SEB	SEABOARD CORP	R1000	22.28%
SHLD	SEARS HOLDINGS CORP	R2000	10.98%
SIEB	SIEBERT FINANCIAL CORP	Microcap Only	10.00%
SNFCA	SECURITY NATL FINL CORP	Microcap Only	21.94%
SQ	SQUARE INC	R1000	13.23%
TCI	TRANSCONTINENTAL REALTY	R2000	19.05%

TFSL	TFS FINL CORP	R1000	18.51%
TLYS	TILLYS INC	R2000	7.83%
TR	TOOTSIE ROLL INDUSTRIES	R2000	5.82%
TSQ	TOWNSQUARE MEDIA INC	R2000	19.77%
TWLO	TWILIO INC	R2000	17.62%
TWMC	TRANS WORLD ENTMT CORP	Microcap Only	23.87%
UBA	URSTADT BIDDLE PPTYS INS	R2000	13.11%
UHS	UNIVERSAL HEALTH SVCS	R1000	10.52%
UNF	UNIFIRST CORP MASS	R2000	23.62%
USM	UNITED STATES CELLULAR	R1000	3.65%
VALU	VALUE LINE INC	R2000	11.18%
VHI	VALHI INC	R2000	7.38%
VIA	VIACOM INC CL A	R1000	20.20%
VIAB	VIACOM INC CL B	R1000	20.20%
VICR	VICOR CORP	R2000	11.44%
VIRT	VIRTU FINL INC	R2000	2.85%
VMW	VMWARE INC	R1000	2.27%
VSLR	VIVINT SOLAR INC	R2000	23.31%
VTVT	VTV THERAPEAUTICS INC	R2000	21.39%
W	WAYFAIR INC	R1000	9.53%
WDAY	WORKDAY INC	R1000	14.79%
WK	WORKIVA INC	R2000	17.69%
WWE	WORLD WRESTLING ENTMNT	R2000	9.06%
XBKS	XENITH BANKSHARES INC	R2000	21.94%
ZAIS	ZAIS GROUP HLDGS INC	Microcap Only	1.52%
APEN	APOLLO ENDOSURGERY INC	Microcap Only	9.97%
AQB	AQUABOUNTY TECHNOLOGIES	Microcap Only	20.48%
KALV	KALVISTA PHARMACEUTICALS	Microcap Only	24.89%
ARD	ARDAGH GROUP SA	R1000	0.84%
AYX	ALTERYX INC	R2000	2.11%
CADE	CADENCE BANCORP	R2000	10.31%
CATS	CATASYS INC	Microcap Only	11.60%
CVNA	CARVANA CO	R2000	1.27%
EEX	EMERALD EXPOSITIONS	R2000	24.85%
FND	FLOOR & DECOR HOLDINGS	R1000	13.88%
MULE	MULESOFT INC	R2000	1.30%
NCSM	NCS MULTISTAGE HOLD	R2000	23.49%
OKTA	OKTA INC	R2000	1.61%
PSDO	PRESIDIO INC	R2000	23.75%
SNDR	SCHNEIDER NATIONAL INC	R2000	4.48%
SOI	SOLARIS OILFIELD	R2000	23.55%
UONEK	URBAN ONE INC	Microcap Only	3.30%
VLRX	VALERITAS HOLDINGS INC	Microcap Only	23.56%
WTTR	SELECT ENERGY SERVICES	R2000	18.48%
HLNE	HAMILTON LANE INC	R2000	4.68%
NBEV	NEW AGE BEVERAGES CORP	Microcap Only	12.21%

Table B: Summary statistics cumulative abnormal returns – firms with less than 5% of its voting rights in the hands of public shareholders

Affected firms						
CAR	***N Obs***	***Mean***	***Std. Dev.***	***Min***	***Median***	***Max***
(0, 1)	25	-0.0068	0.0159	-0.0304	-0.0034	0.0250
(-1, 1)	25	-0.0082	0.0155	-0.0560	-0.0073	0.0177
(0, 2)	25	-0.0061	0.0236	-0.0777	0.0007	0.0285
(-2, 2)	25	-0.0071	0.0273	-0.0747	-0.0029	0.0513
(0, 3)	25	-0.0070	0.0213	-0.0627	-0.0055	0.0355
(-3, 3)	25	-0.0104	0.0236	-0.0778	-0.0072	0.0352

Table C: Summary statistics cumulative abnormal returns – firms with between 5% and 25% of its voting rights in the hands of public shareholders

Potentially affected firms						
CAR	***N Obs***	***Mean***	***Std. Dev.***	***Min***	***Median***	***Max***
(0, 1)	125	-0.0049	0.0255	-0.1126	-0.0025	0.0665
(-1, 1)	125	-0.0037	0.0323	-0.1204	-0.0048	0.1130
(0, 2)	125	-0.0074	0.0387	-0.1828	-0.0033	0.1241
(-2, 2)	125	-0.0056	0.0432	-0.1831	-0.0033	0.1674
(0, 3)	125	-0.0120	0.0399	-0.2553	-0.0076	0.0505
(-3, 3)	125	-0.0145	0.0470	-0.2578	-0.0098	0.0951

Table D: Summary statistics cumulative abnormal returns – firms with more than 25% of its voting rights in the hands of public shareholders

Control group						
CAR	***N Obs***	***Mean***	***Std. Dev.***	***Min***	***Median***	***Max***
(0, 1)	2660	-0.0062	0.0355	-0.2604	-0.0061	0.2884
(-1, 1)	2660	-0.0034	0.0441	-0.4076	-0.0034	0.2991
(0, 2)	2660	-0.0063	0.0472	-0.3254	-0.0044	0.2924
(-2, 2)	2660	-0.0034	0.0512	-0.4518	-0.0024	0.3808
(0, 3)	2660	-0.0068	0.0489	-0.3808	-0.0039	0.6739
(-3, 3)	2660	-0.0065	0.0594	-0.4379	-0.0022	0.7158

Figure A: A graphical presentation of the cumulative abnormal return of the affected firms for event window (-3, 3)

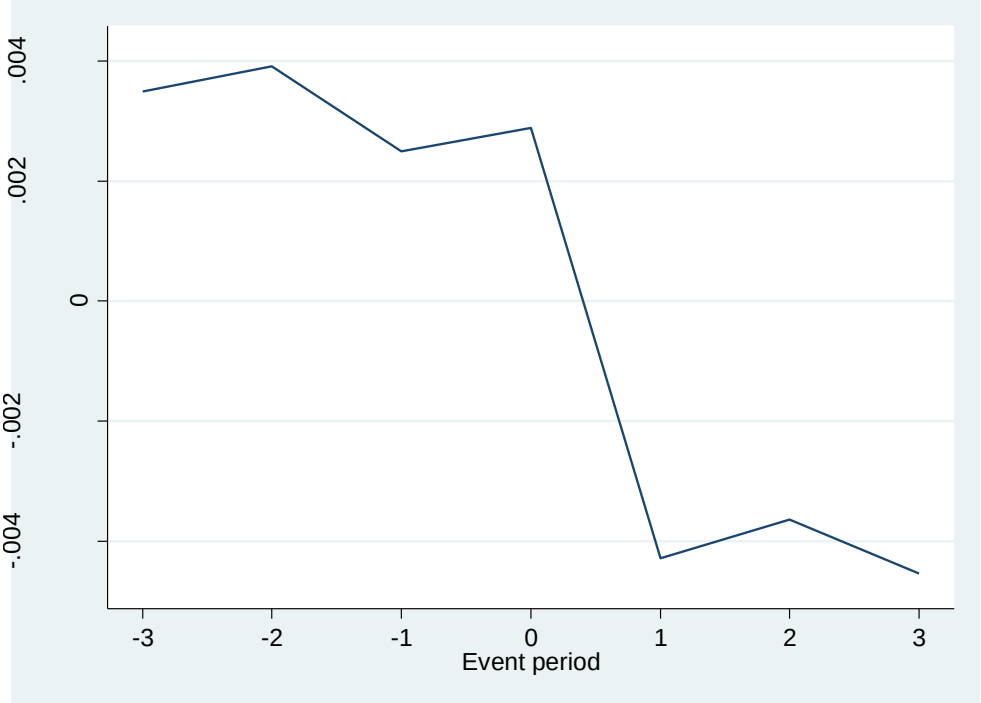

Figure B: A graphical presentation of the cumulative abnormal return of the potentially affected firms for event window (-3, 3)

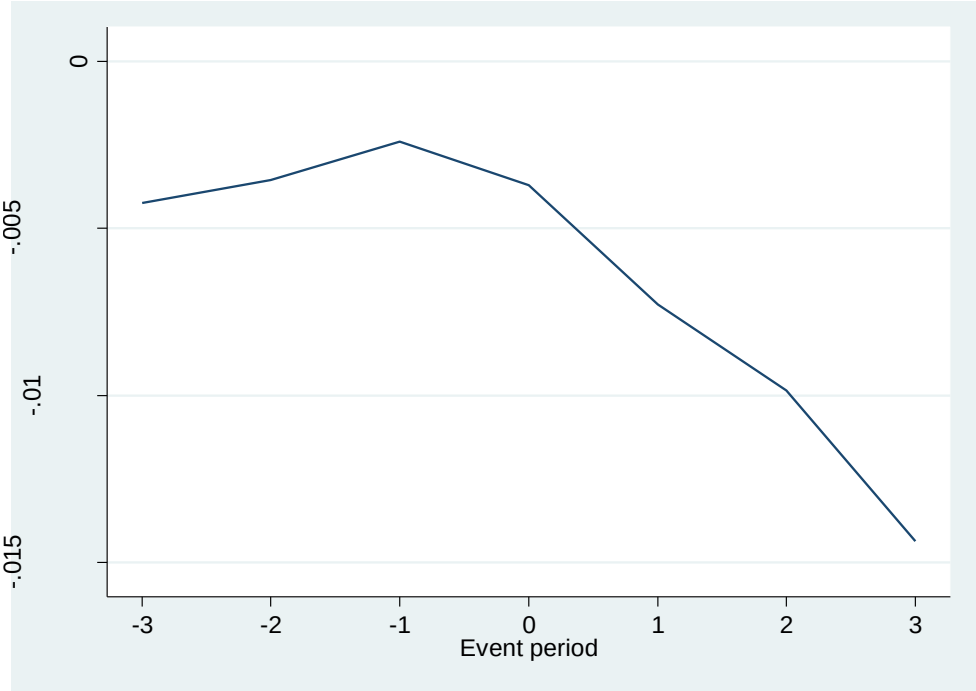

Figure C: A graphical presentation of the cumulative abnormal return of the control group for event window (-3, 3)

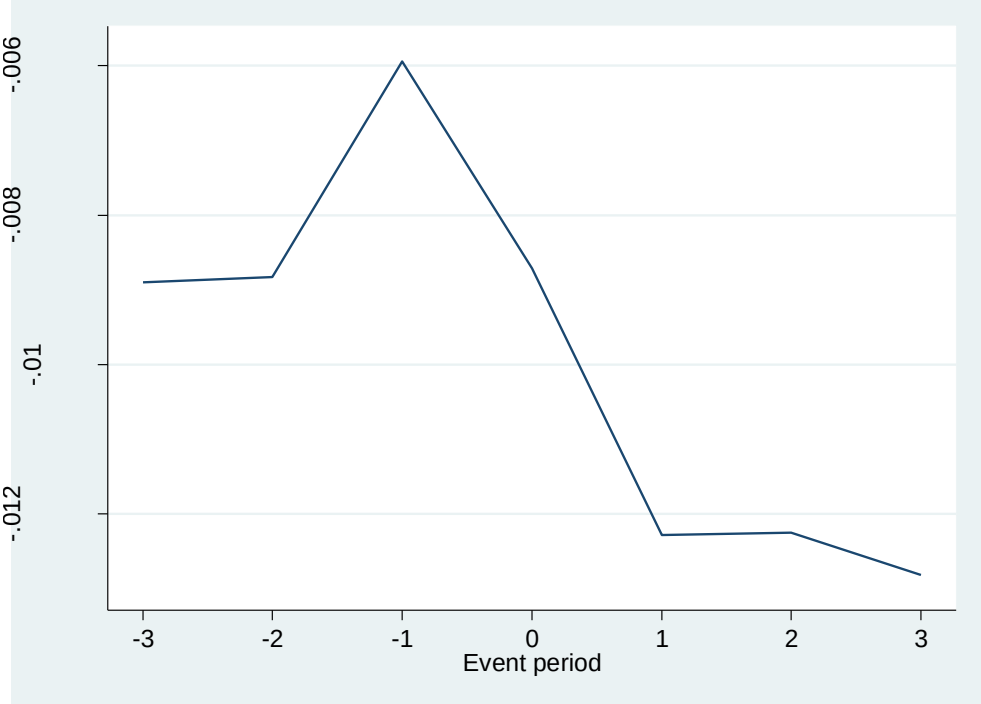

Table E: Correlation matrix of the independent and control variables

	AFFEC	POTEN	INDEX	SIZE	ROA	LEV	MTB
AFFEC	1						
POTEN	-0.0194	1					
INDEX	-0.0102	-0.0654	1				
SIZE	-0.0709	-0.1258	0.7885	1			
ROA	0.0354	-0.0093	0.2241	0.2773	1		
LEV	0.0237	0.0041	0.0567	0.0554	0.0499	1	
MTB	-0.0106	0.0121	0.0738	0.1330	-0.1531	0,4961	1

Note: Size is measured as the natural logarithm of the market capitalization