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DISCRETIONARY DELETIONS FROM THE S&P 500 INDEX: EVIDENCE ON FORECASTED AND REALIZED EARNINGS

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ABSTRACT

The literature in the area of index changes finds evidence that index changes are information free events. However, Denis, McConnell, Ovtchinnikov and Yu (2003) find evidence contrary to this theory. This study extends the work of Denis, McConnell, Ovtchinnikov and Yu (2003) in an attempt to complete the assessment of the information hypothesis of index changes. Denis, McConnell, Ovtchinnikov and Yu (2003) address only index additions and do not examine index deletions in their study. Our contribution is in filling this void in the literature by examining forecasted and realized earnings of firms discretionary deleted from the S&P 500 index in the period October 1989 – December 2007. The study finds that contrary to the prediction of the information hypothesis the earnings forecasts and actual earnings of firms discretionary removed from the S&P 500 index on average increase.

JEL: G12; G14

KEYWORDS: S&P 500 discretionary deletions, S&P 500 changes, earnings forecasts

INTRODUCTION

There are more than \$1 trillion invested in assets indexed to the S&P 500 index. Most of these assets are held in index mutual funds and exchange traded funds (ETFs). Naturally, when there are S&P 500 index changes because of the large trading activity associated with the portfolio rebalancing of index funds and ETFs there will be significant price pressures on the added or deleted from the index firms' stock prices. The widely accepted theory in the area of index changes is that the changes lack information content, as suggested by Shleifer (1986) among others. This theory stems from the S&P U.S. Indexes committee's statement that if a firm is selected for inclusion in an index, the firm does not necessarily have an "investment merit." The information hypothesis suggests that the addition to an index is not an information free event and should result in a permanent increase in the stock price of the added firm. The reason is the increased exposure of the added firm to monitoring by the capital markets which results in better performance of the added firm. Denis, McConnell, Ovtchinnikov and Yu (2003) provide evidence of improved performance by firms included in the S&P 500 index. However, if true this hypothesis must hold not only for added firms but also for deleted from the index firms. If a company is removed its exposure to capital markets monitoring diminishes and management should have a smaller motivation to keep up the good performance. Therefore, if the information hypothesis holds and a firm is removed from the S&P 500 index the firm's forecasted and actual earnings should decrease.

Denis et al. (2003) address only index additions and do not examine index deletions in their study. Our contribution is in filling this void in the literature by examining forecasted and realized earnings of firms discretionary deleted from the S&P 500 index in the period October 1989 – December 2007. This study extends the work of Denis et al. (2003) in an attempt to complete the assessment of the information hypothesis of index changes. This study finds that the number of firms with analyst following diminishes after removal from the index indicating decreased monitoring. The study also finds that contrary to the prediction of the information hypothesis the earnings forecasts and actual earnings of firms discretionary removed from the S&P 500 index on average increase.

The paper is organized as follows: in the next section a brief review of the literature is provided, followed by discussion of the data and methodology used in the paper. After analysis of results the paper concludes.

LITERATURE REVIEW

The literature in the area of index changes finds evidence in support of the theory of index changes being information free events. The major studies in the area are by Shleifer (1986), Harris and Gurel (1986), Dhillon and Johnson (1991), Beneish and Whaley (1996), Lynch and Mendenhall (1997) and Wurgler and Zhuravskaya (2002). Shleifer (1986) performs an event study of S&P 500 index additions by comparing the announcement period excess stock return to the added firm's bond rating. The author finds no information content of the additions. And so do Harris and Gurel (1986), and Lynch and Mendenhall (1997) who find that the initial price increase is reversed within a month of the firm's addition which is inconsistent with the information content theory. If additions have information content the increase should have had a permanent effect on the stock price. Dhillon and Johnson (1991), Beneish and Whaley (1996), and Wurgler and Zhuravskaya (2002) are the studies which suggest that additions might have information content but do not perform formal tests.

Contrary to these findings of additions lacking information content, Denis et al. (2003) provide evidence in support of the information content of index changes. The authors find that firms newly added to the S&P 500 index in the period 1987 through 1999 experience an increase in realized earnings per share and forecasted earnings per share. Denis et al. (2003) measure improved performance by the added firm pre and post addition and relative to a benchmark firm. Denis et al. (2003) use two benchmark companies in their analysis. The first benchmark consists of all firms that can be identified from the Institutional Brokers' Estimates System International, Inc. (I/B/E/S) database to have a current and one-year ahead median EPS forecast for the same pre-announcement period and the same post-announcement period as for the firm of interest. The second benchmark consists of firms selected based on the "industry, size, and liquidity (ISL) matched companies" framework. The authors take the whole I/B/E/S database and sort it by using the 12 Fama-French industry portfolios. They divide each industry portfolio into three other portfolios based on market capitalization, and an additional division into three other portfolios based on liquidity.

Denis et al. (2003) reasoning is that it might be possible that when a firm is added to the S&P 500 index the firm's operation and performance are exposed to greater scrutiny by the investment community and management respectively improves performance. This response can be explained with the greater cost to the manager's reputational capital if she allows for S&P 500 firm to perform poorly. The authors find improvement in the performance of firms added to the S&P 500 index and suggest that another possible explanation is that the S&P 500 index committee might be selecting firms with superior potential to be included in the index. This is contrary to the committee's statement that if a firm is selected for inclusion in the index, the firm does not necessarily have an "investment merit". Denis et al. (2003) findings support the information hypothesis of the price reaction to index additions.

However, if true the information hypothesis must hold not only for added firms but also for deleted from the index firms. If a company is removed from the index its exposure to capital markets monitoring should diminish and management should have a smaller motivation to keep up the good performance. Therefore, if the information hypothesis holds and a firm is removed from the S&P 500 index the firm's forecasted and actual earnings should decrease. Dash (2002) finds temporary effects in the returns of firms discretionary deleted from the S&P 500 index. Dash studies S&P 500 index deletions in the period January 1, 1998 to June 25, 2002. He finds that within six days of the effective deletion of a firm from the S&P 500 index the negative returns reverse. Similarly, Chen, Noronha, and Singal (2006a, b) find a temporary (3 months) effect due to a deletion from the index. These findings have some support for the

price pressure hypothesis and might have implications for our analysis. Naturally, it is expected to see permanent deterioration in the earnings forecasts and actual earnings by these firms if the information hypothesis holds. However, if there is a reversal in the price of the discretionary deleted firms then the negative return is due only to supply and demand imbalances and not to changes in the fundamentals of the firm that is deleted. Therefore, there should not be any changes in the earnings expectations and realized earnings of deleted firms.

DATA AND METHODOLOGY

The Institutional Brokers' Estimates System International, Inc. (I/B/E/S) database is utilized to identify earnings forecasts and realized quarterly earnings of discretionary deleted firms. Compustat provided the annual accounting information of firms discretionary deleted from the S&P 500 index.

Table 1: Descriptive Statistics of Discretionary Deleted Firms in the Period October 1989 – December 2007 Two Years before Deletion from the S&P 500 Index, in the Year of the Deletion from the Index, and Two Years After Deletion from the S&P 500 Index (Annual Data)

		mean	median	stdev	min	max
2 years before deletion	TA	3276.14	1531.18	6197.56	97.61	36680.50
	Debt	729.75	265.10	1427.51	0.00	9834.00
	Employees	18.68	10.60	23.00	0.65	112.50
	EPS	0.62	0.57	2.78	-11.43	12.56
	Price	27.50	20.31	26.29	0.81	170.06
	Leverage	0.21	0.21	0.19	0.00	0.94
Deletion year	TA	3329.81	1411.59	7527.81	74.55	44320.40
	Debt	941.22	287.50	2462.65	0.00	15916.00
	Employees	17.60	9.00	22.23	0.80	96.40
	EPS	-0.92	0.02	3.38	-15.23	4.63
	Price	14.86	11.98	12.66	0.56	64.88
	Leverage	0.24	0.24	0.19	0.00	0.92
2 years after deletion	TA	4213.99	1388.00	13172.93	78.34	97161.00
	Debt	998.30	259.00	2873.04	0.00	21011.00
	Employees	15.95	9.00	19.30	0.13	88.40
	EPS	-0.39	0.49	5.47	-38.25	15.51
	Price	16.58	12.19	16.57	0.07	107.00
	Leverage	0.24	0.22	0.20	0.00	0.96

This table shows the mean, median, standard deviation, minimum and maximum of the total assets, debt, number of employees earnings per share (EPS), stock price, and leverage for the sample of 77 discretionary deleted firms, two years before deletion, in the deletion year, and two years after deletion. EPS for 2 years after deletion data has a significant outlier, Armstrong Holdings Inc. has \$-38.25 of EPS. The outlier is replaced with the sample mean.

Table 1 presents descriptive statistics for firms discretionary deleted from the S&P 500 index in the period October 1989 – December 2007. The table includes information of discretionary deleted firms' average total assets, leverage, market price at fiscal year end, earnings per share (EPS) and number of employees. The following items from Compustat are used in the analysis: Data6 – Total Assets, Data9 - LT Debt, Leverage computed as Data9/Data6, Data199 - Price-Fiscal Year – Close, Data58 - EPS (Basic) Exclude Extraordinary Items (Annual), Data29 - Number of Employees. The descriptive statistics are for

variables at the time of the discretionary deletion, two years prior to deletion and two years after deletion from the S&P 500 index.

Only 77 firms out of 118 discretionary deleted firms have complete data for the deletion year, two years before and two years after deletion. For comparison, 99 firms out of 118 discretionary deleted firms have complete current and two years before data. The table exhibits deterioration of all parameters of the discretionary deleted firms in the two year period before the firms' deletion from the S&P 500 index on annual basis. However, the only item which deteriorates two years after the deletion is the number of employees. The rest of the firms' characteristics improve two years after the firms' deletion from the S&P 500 index.

This study examines earnings forecasts and actual earnings of firms discretionary deleted from the S&P 500 index by using methodology similar to Denis et al. (2003). Discretionary deleted firms are removed from the index because they do not meet one or several of the S&P 500 index criteria. The index criteria set requirements for share price, liquidity, market capitalization, earnings and others for a company to be selected for inclusion in the index. There are non-discretionary deletions due to merger, acquisition, bankruptcy, spin-off or other company specific event which might cause a firm to cease to exist. Similar to Chen, Noronha, and Singal (2006a, b) firms with anticipated major corporate event which might cause a firm to be discretionary deleted are excluded from the analysis. For example, Enron and WorldCom which were removed from the index because of anticipation by investors that these firms will go bankrupt are excluded from the sample. Indeed, within two months of deletion from the S&P 500 these firms filed for bankruptcy. This study is derived from on-going concern firms engaged in discretionary deletion from the S&P 500 index. Dash (2002) finds that large proportion of the discretionary deleted firms is shifted into the S&P MidCap 400 or S&P SmallCap 600 indexes.

Only discretionary deletions are examined in this study. A company can be removed from the S&P 500 index because of a certain company event which will cause the firm to cease to exist. Examples of such deletions are mergers, acquisitions or bankruptcies or anticipated such major corporate events. Alternatively, a firm might be removed from the index because it does not meet one or more of the seven criteria necessary for a firm to be in the S&P 500 index. The seven criteria are: U.S. domicile, corporate form of organization, positive earnings, market capitalization, price level, public float and sector classification. The decision for removal of a firm from the S&P 500 index is made by the S&P U.S. Indexes Committee. The committee consists of Standard and Poor employees who meet regularly to decide on additions and deletions from the S&P indexes. In this study our focus is on discretionary deletions only because the rest of the deletions are clearly affected by fundamentals changes.

To a certain extent Denis et al. (2003) methodology is followed in this study. Denis et al. (2003) do not attempt to find the causality relation of whether a firm is included in the index because it has a superior potential, or it gets superior performance after it joins the index in result of higher monitoring standards. Similarly, this paper does not attempt to find the causality relation of whether a firm is discretionary removed from the index because it has the inferior performance or it gets inferior performance after it is removed from the index. Also, Livnat and Mendenhall (2006) methodology is used for the computation of earnings forecasts. Unadjusted earnings forecasts are used and matched with actual earnings while controlling for stock – splits and day-of-the-week effects. After the adjustments the median analyst earnings per share (EPS) forecast, 90 days prior to the EPS announcement is used.

The analysis focuses on the period October 1989 – December 2007 because in October 1989 the S&P started pre-announcing index changes. The consensus in the literature is that this date represents a major structural change in the S&P 500 index methodology (Chen, Noronha, and Singal, 2006a, b). Naturally, there are other changes to the index methodology, such as the regular revision of the minimum required level of market capitalization for a firm to be included in the index, the change in the composition of the

S&P U.S. indexes committee to name a few. Thus, to strengthen our conclusions several robustness tests are performed. A separate sample, only of firms identified by S&P (via Lexis-Nexis) of being moved from the S&P 500 into the S&P MidCap 400 or S&P SmallCap 600 indexes is examined. Additionally, a matching exercise to check whether our findings hold only for the deleted firms or are true for all firms similar to Denis et al. (2003) methodology is performed. However, the matching framework in this study differs with Denis et al. (2003) in that plus or minus 40% of market capitalization and two digits Standard Industry Classification (SIC) code is used to identify the matching firms sample.

ANALYSIS

Only 50 discretionary deleted firms have complete data in the I/B/E/S database two years after discretionary deletion on both actual and analyst median forecasted EPS. For comparison, 70 firms have data for both analyst estimates and actual EPS in the year of deletion from the S&P 500 index. Compare these numbers to the 77 firms that have data for EPS on Compustat. This suggests that 77 firms are fully operational after deletion. These facts can be explained with the decrease in analyst following after firms are removed from the S&P 500 index.

Table 2 displays average analyst median estimates and actual EPS for the sample of 50 discretionary deleted firms. Clearly, the average analyst forecast of discretionary deleted firms earnings estimates deteriorate two years after deletion. However, it appears that the actual performance of the deleted firms improves.

Table 2: Average Median Estimate and Actual Quarterly EPS for Firms Discretionary Deleted from the S&P 500 Index

		mean	median	stdev	min	max
2 years before deletion	medest EPS	0.51	0.35	0.79	-1.95	3.35
	actual EPS	0.23	0.25	0.63	-3.40	1.53
Deletion year	medest EPS	0.40	0.21	0.59	-0.62	2.45
	actual EPS	0.13	0.16	0.68	-3.39	1.38
2 years after deletion	medest EPS	0.32	0.14	0.67	-0.52	3.90
	actual EPS	0.20	0.14	0.33	-0.58	0.80

This table shows the mean, median, standard deviation, minimum and maximum of the average analyst median estimates and actual EPS for the sample of 50 discretionary deleted firms, two years before deletion, in the deletion year, and two years after deletion. American Airlines Inc. has an analyst forecast of \$-13 which is an outlier. It is replaced with the sample mean.

Robustness tests are performed by matching discretionary deleted firms with firms that are still in the S&P 500 index similar to Denis et al. (2003) methodology. The matching framework in this study differs with Denis et al. (2003) in that plus or minus 40% of market capitalization and two digits SIC code is used to identify the matching firms which are still in the S&P 500 index. The rapid loss of analyst following caused the matching of discretionary deleted firms and firms that are still in the S&P 500 index to become problematic. Our attempt to perform matching resulted in less than ten matching pairs which are not sufficient for generalization of results in this section of our analysis.

The following regression equations are estimated to identify the determinants of the median quarterly earnings forecast (Medest) and the actual earnings (Actual):

$$\text{Medest} = \alpha + \beta_1(\text{Time}) + \beta_2(\text{After}) + \beta_3(\text{AfterTime}) + \beta_4(\text{Moved}), \quad (1)$$

$$\text{Actual} = \alpha + \beta_1(\text{Time}) + \beta_2(\text{After}) + \beta_3(\text{AfterTime}) + \beta_4(\text{Moved}), \quad (2)$$

where variable Time is number of days after deletion from the S&P 500 index, variable After is a dummy variable identifying observations after deletion (the number one identifies the observations after deletion, zero otherwise), variable AfterTime is an interaction variable computed as the product of dummy variable identifying after deletion observations and time after deletion, and variable Moved is a dummy variable identifying observations for companies that are moved to a lower capitalization S&P index. Ordinary Least Squares estimates are obtained. The results presented in Table 3.

Table 3: Multivariate Analysis of Median Estimate and Actual Quarterly EPS for Firms Discretionary Deleted from the S&P 500 Index

	before deletion models		after deletion models		combined before and after models	
	medest	actual	medest	actual	medest	actual
Intercept	0.4257***	0.2018***	0.2655***	0.1250***	0.3710***	0.1477***
Time	-0.0001***	-0.0001***	0.0001***	0.0001***	-0.0001***	-0.0001***
After					-0.1712***	-0.0878**
Aftertime					0.0002***	0.0001***
Moved					0.1075***	0.1064***
Adj R-sq	0.0252	0.0175	0.0099	0.0157	0.0409	0.0305
Number of observations	3905	3905	1378	1378	5283	5283

This table shows the regression estimates of the equations:

$$\text{Medest} = \alpha + \beta_1(\text{Time}) + \beta_2(\text{After}) + \beta_3(\text{AfterTime}) + \beta_4(\text{Moved}),$$

$$\text{Actual} = \alpha + \beta_1(\text{Time}) + \beta_2(\text{After}) + \beta_3(\text{AfterTime}) + \beta_4(\text{Moved})$$

*The first column shows results for median estimate and actual EPS regressions prior to deletion, the second column shows results after deletion and the third column combined data before and after deletion. The figure in each cell is the regression coefficient. Significant difference from zero at the 10 percent, 5 percent and 1 percent level is denoted with *, ** and ***, respectively.*

The analysis suggests that before deletion from the index the consensus among the analysts following the companies is that the earnings will deteriorate which they do, suggested by the significant negative regression coefficient. In contrast, the companies that still have analyst following after deletion from the S&P 500 index on average improve their actual earnings, suggested by the significant positive regression coefficient. There are fewer firms with forecasted earnings expressed in the fewer observations for the After Deletion Models in the analysis. The improvement in actual earnings is accompanied with an increase in the expected earnings for these companies. This is contrary to the information hypothesis prediction of deterioration of both forecasted and actual earnings of companies deleted from the S&P 500 index. The moved variable suggests that results are similar for firms discretionary deleted and moved to another S&P index.

Another approach to the analysis of the information hypothesis is to examine the behavior of the difference between the median estimate and actual EPS and standardized earnings surprises and earnings revisions for firms discretionary deleted from the index around the event of deletion. The following regression equations are estimated to identify the determinants of the difference between the median estimate and actual EPS (Diff) and standardized earnings surprises (Sue3):

$$\text{Diff} = \alpha + \beta_1(\text{Time}) + \beta_2(\text{After}) + \beta_3(\text{AfterTime}) + \beta_4(\text{Moved}), \tag{3}$$

$$\text{Sue3} = \alpha + \beta_1(\text{Time}) + \beta_2(\text{After}) + \beta_3(\text{AfterTime}) + \beta_4(\text{Moved}), \tag{4}$$

where variables are as discussed above with the addition of variable Match which is a dummy variable indicating matching firms. The standardized earnings surprises (sue3) are defined by Livnat and Mendenhall (2006) as the difference between the actual and median earnings estimates multiplied by the

quarterly adjustment factor and divided by the end of quarter stock price. Not all firms have available data for the adjustment factors and that is why the sample sizes are smaller relative to the earlier analysis.

Ordinary Least Squares estimates are obtained. Results of the multivariate analysis of the two earnings surprises measures are presented in Table 4, column Earnings Surprises. The results for the time variable suggest that as time goes by analysts tend to provide lower estimates for the difference between median EPS estimates and actual EPS for all firms, at the same time the standardized earnings surprises tend to increase for all firms. However, the results for aftertime are significant and show increase in the difference between expected and actual earnings for discretionary deleted firms but decrease in standardized earnings surprises. These findings are again in contrast to the information hypothesis which suggests that both expected and actual earnings should diminish so there should not have been any significant earnings surprises. Our attempt to perform matching robustness tests resulted in less than ten matching pairs which are not sufficient for generalization of results for earnings surprises.

Table 4: Multivariate Analysis of Difference between Median Estimate and Actual Quarterly EPS (diff), and Standardized Earnings Surprises (sue3), and Revisions for Firms Discretionary Deleted from the S&P 500 Index

	Earnings Surprises		Revisions		Revisions (Match)	
	diff	sue3	revision	revisionp	revision	revisionp
Intercept	0.2233***	-0.0031	48.2437***	160.9786***	17.1523***	3.6163**
Time	-0.00005***	0.000009***	0.0095**	0.0231	-0.0004	-0.0007**
After	-0.0834	-0.0062	-113.1326***	83.5163	-2.1779	2.7895*
Aftertime	0.0001***	-0.000009**	-0.0067	-0.0595	-0.0010	-0.0005
Moved	0.0011	0.0009	-2.5809	-70.3621*	-14.6648***	-2.1835*
Match					-3.6421**	-0.5664
Adj r-sq	0.0118	0.0156	0.0004	0.0001	0.0032	0.0003
Number of observations	5283	3007	75701	75701	14886	14886

This table shows the regression estimates of the equations:

$$\text{Diff} = \alpha + \beta_1(\text{Time}) + \beta_2(\text{After}) + \beta_3(\text{AfterTime}) + \beta_4(\text{Moved}) ,$$

$$\text{Sue3} = \alpha + \beta_1(\text{Time}) + \beta_2(\text{After}) + \beta_3(\text{AfterTime}) + \beta_4(\text{Moved}) ,$$

$$\text{Revision} = \alpha + \beta_1(\text{Time}) + \beta_2(\text{After}) + \beta_3(\text{AfterTime}) + \beta_4(\text{Moved}) + \beta_5(\text{Match}),$$

$$\text{RevisionP} = \alpha + \beta_1(\text{Time}) + \beta_2(\text{After}) + \beta_3(\text{AfterTime}) + \beta_4(\text{Moved}) + \beta_5(\text{Match}).$$

The first column shows results for earnings surprises, the second column shows results for revisions and the third column for revisions with matched sample of firms. The figure in each cell is the regression coefficient. Significant difference from zero at the 10 percent, 5 percent and 1 percent level is denoted with *, ** and ***, respectively.

Next, the behavior of EPS forecasts revisions is examined. Revision is defined as the difference between current EPS estimate and the previous EPS estimate. The following regression equations are estimated to identify the determinants of the revisions for firms discretionary deleted from the index around the event of deletion (Revision) and the standardized revision variable (RevisionP):

$$\text{Revision} = \alpha + \beta_1(\text{Time}) + \beta_2(\text{After}) + \beta_3(\text{AfterTime}) + \beta_4(\text{Moved}) + \beta_5(\text{Match}), \tag{5}$$

$$\text{RevisionP} = \alpha + \beta_1(\text{Time}) + \beta_2(\text{After}) + \beta_3(\text{AfterTime}) + \beta_4(\text{Moved}) + \beta_5(\text{Match}), \tag{6}$$

where independent variables are discussed above. Revision is the difference between current and previous EPS estimate. Revisionp is the ratio of the difference between current EPS estimate and the previous EPS estimate and the previous EPS estimate. Ordinary Least Squares estimates are obtained. Results for all discretionary deleted firms are presented in Table 4, column Revisions. The results suggest that the fewer

analysts following removed firms tend to revise their earnings estimates more often in negative direction for the deleted firms, suggested by the significant negative coefficient for the after variable.

Robustness tests focus on a sample of matching firms and moved to another index firms. The matching firms are selected based on current and three years prior plus minus 40% market capitalization and same two digits SIC code. The results are presented in Table 4, column Revisions (Match). These results suggest that both the removed firms and the matching firms which are still S&P 500 index members experience increase in earnings revisions in negative direction which means that the information hypothesis does not hold. If the information hypothesis held the results should have been in opposite direction to what is found in this study since the information hypothesis suggests that firms in the S&P 500 index tend to perform better because of the capital markets monitoring.

CONCLUSION

This study extends the work of Denis et al. (2003) in an attempt to complete the assessment of the information hypothesis. A realized and forecasted earnings per share of firms discretionary deleted from the S&P 500 index in the period October 1989 – December 2007 are examined. The performance of the deleted firms prior to deletion is compared to the performance of the firms after the deletion. Also, the performance of the deleted firms is compared to the performance of a matching sample of firms. The matching firms are identified by taking all S&P 500 firms on the deletion day using current and three years prior plus or minus 40% of market capitalization and two digits SIC code. The results suggest that the number of firms with analyst following diminishes significantly in the two year period after removal from the S&P 500 index. Also, firms with analyst following after deletion from the S&P 500 index experience an increase in earnings forecasts and actual earnings, contrary to the prediction of the information hypothesis. The small number of observations in the earnings surprises analysis posed a limitation to our study. In a future research, when more observations will be available the analysis will be extended. Another natural extension of this study is examining the characteristics and behavior of the analysts who end covering a deleted firm and the behavior of analysts who continue following a deleted firm.

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