Accounting information uncertainty: Evidence from company fiscal year changes

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ABSTRACT

By utilizing a sample of companies that have changed fiscal year ending, the author provides evidence on the existence of fiscal year based seasonality induced by accounting information uncertainty. Specifically, the author finds increased (decreased) stock returns during the month following the new (old) fiscal year ending after the fiscal year change among small companies. The evidence is stronger in small companies with higher earnings volatility and without analyst coverage.

Keywords: Accounting information uncertainty, January effect, fiscal year change

INTRODUCTION

Rozeff and Kinney (1976) are among the first to systematically document the seasonal behavior in U.S. stock returns. Along with other hypotheses based on calendar year cycle such as tax loss selling, Rozeff and Kinney (1976) point out an accounting information hypothesis that is based on a company's fiscal year cycle as a possible source of the January effect. Since most U.S. companies (66 percent as of 2004) end their fiscal year in December, January is associated with significant information uncertainly due to the impending information release of the previous fiscal year's accounting results. The increased information uncertainty may induce higher stock returns in January.

However, while subsequent studies offer extensive evidence regarding calendar-year based seasonality related to tax-loss selling or window dressing, research on the possible fiscal-year based seasonality is sparse. Reinganum and Gangopadhyay (1991) and Chen and Singal (2004) are among the few studies addressing this issue. While their results appear to suggest that fiscal-year based seasonality does not exist, they are also consistent with the coexistence of both calendar-year and fiscal-year based seasonality with the former dominating the latter. Since calendar year cycle and fiscal year cycle coincide for most companies, calendar-year based seasonality and fiscal-year based seasonality are often intertwined. As a result, it is difficult to detect any fiscal-year based seasonality if calendar-year based seasonality is strong and dominating. Therefore, whether fiscal-year based seasonality exists might still be an open question.

In this paper, the author successfully disentangles the two types of seasonality by taking advantage of a sample of companies who changed their fiscal year ending month. Specifically, the author compares the stock returns during the month following the old (new) fiscal year ending month around the fiscal year changes. If there is no fiscal-year based seasonality, there should not be any change. However, if fiscal year closing induces higher stock returns as proposed by Rozeff and Kinney (1976), there should be increased (decreased) stock returns during the month following the new (old) fiscal year ending after the fiscal year change.

The author finds evidence in line with the existence of fiscal-year based seasonality, but only among small firm. The different result between small and large firms is consistent with Keim (1983)'s argument that the gradual dissemination of information during January may have a greater impact on the prices of small firms relative to large firms. Further study dividing the sample by earnings volatility shows that only small firms with high earnings volatility exhibit fiscal seasonality. Meanwhile, small firms with analyst coverage exhibit little fiscal year seasonality despite high earnings volatility. However, small-sized high earning volatility firms without analyst coverage continue to exhibit fiscal year seasonality. These findings further confirm the notion that information uncertainty induces fiscal year based seasonality. Overall, this paper finds evidence of the existence of fiscal-year based seasonality due to information uncertainty. While not a primary driver, fiscal year-based seasonality contributes to the well-documented January effect.

LITERATURE REVIEW

Existence of Stock Return Seasonality

The seasonal behavior in stock returns is well documented in the literature. Rozeff and Kinney (1976) are among the first to illustrate the existence of seasonality in U.S. stock returns. In particular, they report higher means of January returns compared with most other months, which is later well known as the "January effect" or "turn of the year effect". They point out several possible sources of the seasonal behavior in stock returns such as the tax-selling hypothesis, the accounting information hypothesis, and the stochastic cash demand hypothesis. Keim (1983) and Reinganum (1983) further note that the January effect is a small company phenomenon. Recent studies suggest that the January effect is persistent. For example, Haug and Hirschey (2006) report that the abnormally high rates of return on small firms continue to be observed during the month of January.

Sources of Stock Return Seasonality

Prior studies propose various sources of stock return seasonality, which can be classified into two broad categories. The first category is based on seasonal behavior of investors around calendar year, such as the tax loss selling of individual investors and the window dressing of institutional investors. The second category is based on the seasonal patterns around a company's fiscal year. Companies' information environment changes around their fiscal year due to periodic accounting release. As suggested by Keim (1984), the month after fiscal year closing marks significant information uncertainty, and this uncertainty may induce higher stock returns.

Previous research generally lends support to calendar-year based seasonality. For example, regarding institutional investors' window dressing, Ng and Wang (2004) document that institutions sell more loser small stocks in the last quarter of the year, but buy more small stocks, winners and losers, in the first quarter. They further show that institutional buying (selling) of loser stocks at year-end weakens (strengthens) the turn-of-the-year effect. Regarding individual investors' tax loss selling, researchers utilize changes in personal income tax and capital gains tax provisions to study the January effect, and generally find supporting evidence (e.g., Reinganum and Shapiro (1987); Bolster, Lindsey, and Mitrusi (1989); Jones, Lee, and Apenbrink (1991); Bhabra, Dhillon, and Ramirez (1999)). Since tax loss selling is only limited to individual investors, another thread of literature takes advantage of companies with different investor base. Starks, Yong, and Zheng (2006) find a January effect for municipal bond closed-end funds, which are held mostly by tax-sensitive individual investors, but not for the funds' underlying assets, lending direct support to the tax-loss selling hypothesis. Sias and Starks (1997) use the differences between securities dominated by individual investors and those dominated by institutional investors to evaluate the tax loss selling hypothesis against the window dressing hypothesis, and find results more consistent with the tax loss selling hypothesis. Consistently, evaluating the various causes of January effect including tax loss selling, window dressing, information, and bid-ask spread, Chen

and Singal (2004) conclude that tax-related selling is the most important cause, outweighing other explanations.

Regarding fiscal-year based seasonality, previous studies generally find no support for the information release hypothesis as a driver for the January effect. For example, Reinganum and Gangopadhyay (1991) offer two important pieces of counter-evidence. First, they show that small firms with non-December fiscal year endings do not experience higher abnormal returns in the month following fiscal year ends. Second, they demonstrate that all small firms, regardless of their fiscal year ending month, have exceptionally large January returns. In another study examining the various causes of January effect including tax loss selling, window dressing, information, and bid-ask spread, Chen and Singal (2004) find no support for the information release hypothesis based on the following three sets of findings: (1) although June is the second popular month for companies to end their fiscal year, returns are not higher for small stocks in July relative to large stocks; (2) there is no distinct pattern in returns by the number of analysts following the firm, a proxy for the quantity of information production; (3) trading volume of small stocks is higher in December than January. Kim (2006) also includes some simple tests on the information hypothesis and finds results seemingly inconsistent with this hypothesis (p.2135). In particular, Kim (2006) divides firms into 12 groups according to their fiscal year end months, and finds that only February, April, October, and December fiscal year endings have higher returns in the next month after fiscal year end month than in the fiscal year end month.

However, these previous studies do not provide conclusive evidence against the existence of seasonality around fiscal years. It is true that their results may prevail when there is no fiscal year based seasonality. However, their results may also prevail when fiscal year based seasonality is weak and overshadowed by stronger calendar-year based seasonality. For example, Reinganum and Gangopadhyay (1991) show that small firms with non-December fiscal year endings do not experience higher abnormal returns in the month following fiscal year ends. However, if there is strong calendar year based seasonality, such as the abnormally higher January returns, it may be difficult to find returns in the months following fiscal year endings significantly higher. Reinganum and Gangopadhyay (1991)'s second piece of finding that all small firms, regardless of their fiscal year ending month, have exceptionally large January returns, may also be consistent with calendar year based seasonality dominating fiscal year based seasonality.

Overall, when fiscal and calendar year based seasonality coexist, researchers need to first extract any calendar-year based seasonality from stock returns to examine fiscal year based seasonality. Since calendar year cycle and fiscal year cycle coincide for most companies, calendar-year based seasonality and fiscal-year based seasonality are intertwined. It is therefore difficult to detect any fiscal-year based seasonality if the calendar-year based seasonality is strong and dominating. Whether fiscal-year based seasonality exists might still be an open question.

FISCAL YEAR CHANGE AND HYPOTHESES DEVELOPMENT

Fiscal Year Change: Background

Companies are required to report their annual financial results over a 12-month period, which is often referred to as a "fiscal year". A majority of companies in the U.S. choose to end their fiscal year in December. However, the fiscal year does not have to coincide with the calendar year. Companies choose their calendar year end based on their own need. For example, retail companies often avoid ending their calendar year in December because of the holiday shopping season.

At the same time, companies may change their fiscal year. To do so, companies need to report the decision to SEC in a timely manner and follow SEC guidelines to report transition period operating results (see Porter, Swanson, Wilkins, and Holder-Webb (2000)). Specifically, companies must file a Form 8-K with SEC within 15 days of the decision to change fiscal year, as long as the decision is not previously disclosed in either Form 10-Q or Form 10-K. Companies need to specify the date the change decision is made, the date of the new fiscal year end, and how they plans to file transition period results. Managers have several options for the transition report depending on the length of the transition period. For example, if the transition period is six month or longer, firms must file audited transition period results on a separate Form 10-K within 90 days.

Companies have various reasons to change the month to end their fiscal year. Although they are not required to provide the reason for the change, many companies voluntarily do so in the announcements. First, some companies change fiscal year to align financial reporting with the majority of publicly-held corporations in the U.S. or the company's peer groups to make financial comparison easier. For example, SatCom Technology Corporation changed their fiscal year end from September to December in 1998 to align reporting cycle with peers. On May 12, 2006, Refac Optical Group announced change of calendar year end from December to January "in order to make the timing of the release of information consistent with the retail industry". There are also companies who change fiscal year to better reflect the company's business cycle. For example, USEC, an energy company, changed the company's fiscal year end from June 30 to December 31 and stated that "Changing USEC's fiscal year to a calendar basis enables us to better align our financial reporting with the way we manage and operate our business." On June 2, 2004, Elizabeth Arden, Inc.'s board of directors approved a fiscal year-end change from January 31 to June 30 and stated that "this change was implemented to better reflect the Company's business cycle and to enhance business planning relative to the retail calendar of the Company's customers."

Hypotheses Development and Research Design

Fiscal year changes provide a natural laboratory to examine fiscal-year based seasonality. The calendar year cycle from January to December is unchangeable. When the author compares the seasonal behavior of stock returns before the fiscal year change with that after the fiscal year change, calendar-year based seasonality cancels out, with only fiscal-year based seasonality remaining. Therefore, the research design enables the author to disentangle calendar-year based seasonality and fiscal-year based seasonality.

Specifically, if fiscal year based seasonality does not exist, there should be no change in the seasonal behavior of stock returns around the calendar year cycle after companies changed their fiscal year ending, and vise versa.

In particular, this paper compares the difference in monthly stock returns of the months that follow the new and old fiscal year ending around the fiscal year changes. For example, a company changes its fiscal year ending from July to December. With accounting information uncertainty following the fiscal year end month, the author expects lower August returns and higher January returns after the change. Consequently, if the author uses January monthly return minus August monthly return, the author should find increased difference after the change if fiscal year ending induces higher stock returns.

Furthermore, since fiscal year based seasonality ties closely to a company's reporting cycle and the resulting changes in the company's information environment, small companies with more volatile earnings should be more likely to demonstrate fiscal year based seasonality. Meanwhile, analyst coverage should reduce earnings uncertainty, and thus reduce fiscal-year based seasonality.

DATA AND SAMPLE

From the Compustat database, the author identifies fiscal year ending changes over the 1980-2004 period, and merge the sample with the CRSP database, yielding 1,898 fiscal year changes. To be in the sample, we require companies to have at least one year of returns both before and after the transition year, which is defined as the 12-month period starting at the month following the last fiscal year that adopts the old fiscal year ends. For example, if a company changes its fiscal year end from October to December for fiscal year 1999. The transition year would be from October 1999 to September 2000. To assess the impact of fiscal year changes and examine the existence of fiscal year based seasonality, the author compares the stock returns of the same calendar month for the pre-change year (October 1998-September 1999) and the post-change year (October 2000-Sepertember 2001). To be in the sample, companies need to have returns available for both the pre-change year and the post-change year.

To avoid the influence of bid-ask spread (e.g., see Keim (1989)), the author deletes stocks with at least one month-end price less than $5 during the one-year period before or after the transition year. This process leaves 425 fiscal year changes involving 413 companies. There are twelve companies who have changed their fiscal year ending twice. For example, Burlington Coat Factory first changed their fiscal year ending from October to June in 1989, and then changed it from June to May in 1998. To avoid overlapping return observations, the author manually inspects the lapse between the two changes by the same company and deletes changes made by four companies who changed their fiscal year endings less than three years after they previously changed them. The four companies deleted are Keyspan Corp, Morgan Stanley, Sport Supply Group Inc, and West Point-Pepperell. The other eight companies who have changed their fiscal year twice remain in the sample. The final sample thus includes 417 fiscal year changes involving 407 companies.

Table I Panel A presents the occurrence of fiscal year changes by year. Year 1980, 1982, and 1992 witness the fewest fiscal year changes, while year 1996 and 1997 witness

the most fiscal year changes. Overall, with the exception of the years listed above, the occurrences of fiscal year change distribute evenly over the sample period. On average, there are 33 fiscal year changes per year.

Table I Panel B lists the industry representation of the sample firms. The banking industry and the retail industry have the highest number of fiscal year changes (38 and 32, respectively). The industries of wholesale, trading, business services, pharmaceutical also have a large number of instances of fiscal year changing events. However, the sample firms do not concentrate on a few industries. 45 of the Fama-French 49 industries (see Fama and French (1997)) appear in the sample.

The transformation table of fiscal year ending months is in Table I Panel C. December is the most popular month for companies to move their fiscal year ending month to. It is not surprising given that the majority of companies adopt December as their fiscal year ending month. Among the 417 fiscal year changing events, 276 change the fiscal year end from other months to December, 28 to September, 27 to January, and 25 to March. On the other hand, June is the most popular months for companies to move their fiscal year from. Of the 417 fiscal year ending changes, 91 move from June, 60 from September, 57 from March, and 56 from December to other months.

Characteristics of the firms in the sample at the end of the fiscal year after the change are illustrated in Table I Panel D. There is a large variation among sample companies in terms of size, book to market ratio, and return on asset. Overall, the median company in the sample has an inflation adjusted market value (the authors collect the historical annual average consumer price index from the Federal Reserve Bank of Minneapolis' website and use the 1980 dollar to measure market value) of 142.72 million, a book to market ratio of 0.57, return on assets of 3%.

THE EFFECT OF CALENDAR YEAR CHANGES ON STOCK RETURNS

Seasonal Behavior in Sample Firms

In this section, the author verifies the existence of seasonal behavior using the stock returns of the sample firms one year before and one year after the transition year. Since previous studies show that January effect is mostly a small-firm phenomenon, the author divides the sample into two groups by firm size. Specifically, firms with the inflation adjusted market value greater than 142.73 million (the median) at the end of the transition year are classified as big companies, and the rest as small companies.

The author calculates average monthly returns by calendar month for all the companies, the big companies, and the small companies one year before and one year after the transition period. Figure I demonstrates the results. January is associated with the largest monthly returns for small companies. Specifically, the average January monthly return is 3.53%, while the average return of the rest of months from February to December is 1.62%. However, for the combined sample and big companies, January does not have the largest monthly returns. Instead, the month of December boasts the highest returns. Overall, the results for the sample firms are largely consistent with previous results suggesting that the January effect is primarily limited to small firms.

The author then runs two regressions in the spirit of Reinganum and Gangopadhyay (1991). Firstly, with a sample of 10,008 observations including 24

monthly returns each for all the 417 companies, the author regresses monthly stock returns on a dummy variable indicating whether it is a month following fiscal year ending. Table II Panel A reports the results from an OLS regression with robust standard errors. The author omits the coefficients for the constant terms to reserve space. For both the combined companies and the companies with December fiscal year ending, there is evidence of higher returns during the month following fiscal year ending for small firms. However, when the author excludes companies with December fiscal year endings, the coefficients on the month after fiscal year end dummy are insignificant regardless of the size of the firm. Overall, consistent with Reinganum and Gangopadhyay (1991), the results appear to contradict a fiscal year effect in stock returns.

As the second set of tests, the author regresses monthly returns on a January dummy using OLS and report out results in Table II Panel B. As in Reinganum and Gangopadhyay (1991), the author documents significantly positive coefficients for the January dummy for small firms regardless of the company's fiscal year ending.

Taken together, the author confirms Reinganum and Gangopadhyay (1991)'s findings using the sample firms. While the results may appear to contradict the existence of fiscal-year based seasonality, the author notes that these results may also be driven by stronger and dominating calendar-year based factors. Due to the possible intervention of strong calendar-year based seasonality, the research design in this section has limited ability to draw precise conclusions on the existence of fiscal-year based seasonality.

Is There Fiscal-year Based Seasonality?

In this section, the author takes advantage of the fiscal year changing events to investigate fiscal-year based seasonality. Since calendar year cycle is unchangeable, when the author compares the seasonal behavior of stock returns before the fiscal year change with that after the fiscal year change, calendar-year based seasonality automatically cancels out, with only fiscal-year based seasonality remaining. Therefore, this research design enables the author to disentangle calendar-year based seasonality and fiscal-year based seasonality.

The author compares the stock returns during the month following the old (new) fiscal year closing before and after the fiscal year changes. If there is no fiscal-year based seasonality, the author should detect no change. However, if fiscal year closing induces higher stock returns as proposed by previous studies, the author should find increased (decreased) stock returns during the month following the new (old) fiscal year ending after the change. To exclude the possibility that the results are driven by changes in market conditions that coincide with company fiscal year changes, the author adopts market adjusted returns, measured as the monthly raw return of the stock minus the market return over the same period. Specifically, the author defines Ret_{dif} as Ret_{new} minus Ret_{old}, where Ret_{new} (Ret_{old}) is the monthly market adjusted stock return for the month following the new (old) fiscal year ending month. Since previous studies suggest that the months after fiscal year endings are associated with higher stock returns due to higher uncertainty. The author expects larger Ret_{dif} and Ret_{new}, but smaller Ret_{old} following fiscal year changes. The author first conducts a series of univaiate tests, and then tests the hypotheses in a multivariate fixed-effect framework.

Table III Panel A contains the results from the univariate tests. For small companies, the market adjusted return for the month following the old fiscal year ending decreases 1.72% after the fiscal year change, while the market adjusted return for the month following the new fiscal year ending month increases 2.74%. The combined effect of reduced Ret_{old} and increased Ret_{new} results in a 4.47% increase in Ret_{dif}, which is defined as Ret_{new} minus $Ret_{old.}$ All the differences between the pre-change and post-change months are statistically significant. However, big companies do not exhibit any significant changes. The result is consistent with the expectation that big companies suffer less from accounting uncertainty following fiscal year closings.

Panel B of Table III tests the hypotheses using a fixed effect model with firm effect fixed. *Post* is a dummy variable that equals one if the return occurs after fiscal year changes, and zero otherwise. It is possible that changes in firm characteristics such as firm size or performance over time induce changes in return patterns. To exclude this possibility, the author introduces three control variables. First, S*ize* is the inflation adjusted market capitalization at the end of the corresponding fiscal year. *B/M* is the book to market ratio at the end of the corresponding fiscal year. Finally, *ROA* is measured as earnings before extraordinary items scaled by total assets for the corresponding fiscal year.

The results indicate a strong fiscal year end change effect on the return patterns of small companies. Consistent with the author's hypothesis, the coefficient of *Post* is significantly negative for Ret_{old} , but significantly positive for Ret_{dif} and $Ret_{new,}$ suggesting that the fiscal year change boosts the return of the month following the new fiscal year ending, but reduces the return of the month following the old fiscal year ending. The results thus support the existence of fiscal year based seasonality. The author does not find consistent evidence in large firms in the sample. Since small firms are more likely to suffer high uncertainty regarding their annual financial outcome, the different finding suggests that accounting uncertainty induces fiscal year based seasonality.

Accounting Earnings Volatility and Analyst Coverage

In the above studies, the author adopts firm size to proxy for a company's information environment. The level of uncertainty prior to fiscal year accounting information release should also be positively related to the company's past earnings volatility. The author thus further partitions the sample according to past earnings volatility. The author measures earnings volatility as the standard deviation of earnings over the five-year period before the fiscal year changes scaled by the absolute value of average earnings over the same period. The author deletes observations with less than three years of fiscal earnings data available. The author adopts the media earnings volatility (0.572) as the cutoff point to distinguish low-volatility and high-volatility companies. The author reruns tests in Table III Panel B using the following four subsamples: big companies with high earnings volatility, big companies with low earnings volatility, small companies with high earnings volatility, and small companies with low earnings volatility. The dependent variables are Ret_{dif}, Ret_{new}, and Ret_{old} , respectively. The independent variables are *Post*, *Size*, *B/M* and *ROA* as defined in the previous section. Table IV reports the results. To reserve space, the author only reports

the coefficients and the *t*-statistics based on the robust standard error on *Post* for each regression.

Consistent with the expectation, the author detects fiscal year based seasonalities only in small companies with high earnings volatility. Specifically, the market adjusted return following the old fiscal year ending month is significantly lower after the change, while the market adjusted return following the new fiscal year ending month is significantly higher after the change. The coefficient of Ret_{dif} is significantly positive. However, for the other three subsamples, including small companies with low earnings volatility and big companies with high earnings volatility, they do not exhibit expected changes consistently in the returns after the old and new fiscal year endings. To summarize, the results in Table IV further confirm the existence of fiscal-year ending seasonality for companies with higher earnings information uncertainty.

Further, analyst coverage is viewed as a means of reducing accounting information uncertainty. The author thus examines whether analyst coverage mitigates fiscal-year based seasonality by reducing the information uncertainty before earnings release. In Table V, the author collects analyst coverage information from I/B/E/S, and partition the sample further by whether the company has analyst coverage. Table V demonstrates the results. Even though small companies with high earnings volatility as a whole exhibit higher returns following fiscal year ending, the author finds that such companies with analyst coverage do not. In other word, only small high earnings volatility companies without analyst coverage experience higher returns following their fiscal year ending, and therefore experience lower returns following the old fiscal year ending month, and higher returns following the new fiscal year ending month after the fiscal year change. To sum up, the author finds evidence that analyst coverage mitigate information uncertainty following fiscal year ending, and therefore fiscal-year seasonality.

CONCLUSION

Rozeff and Kinney (1976) propose accounting information uncertainty as one of the potential causes of higher January returns, but later studies lend no support to this hypothesis. The author argues that the intertwining of calendar based seasonality and fiscal based seasonality make it almost impossible to detect the latter if the former is dominating and strong. The author takes advantage of a natural laboratory setting where companies change their fiscal year ending to disentangle the calendar effect out. The results confirm the existence of calendar year based seasonality. Specifically, companies experience decreased return for the month after the old fiscal year ending month, and increased return for the month after the new fiscal year ending, after they switch their fiscal year ending month.

Further, the results are consistent with the notion that information uncertainty drives higher returns in the month following the fiscal year ending. The author finds evidence of fiscal year based seasonality only among small companies, whose information environment is more uncertain than that of large companies. In addition, among the small companies, only companies with higher prior earnings volatility show fiscal seasonality. Analyst coverage mitigates information uncertainty. The paper shows that small high-volatility companies with analyst coverage do not show fiscal year seasonality, but those without analyst coverage do.

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APPENDIX

Table I. Fiscal year changes and firm characteristics (1980-2004)

Table I summarizes the sample fiscal year changes over the period from 1980-2004 as identified in Compustat. Panel A presents the occurrence of fiscal year changes by year. Specifically, the author group firms with the inflation adjusted market value greater than 142.73 million (the median) at the end of the transition year as big companies, and the rest as small companies. Panel B lists the industry representation of the sample firms. The number in parentheses indicates the number of sample companies

in the particular industry. Panel C presents the transformation table of fiscal year ending months. Panel D summarizes characteristics of the firms in the sample at the end of the fiscal year after the change. The author collects the historical annual average consumer price index from the Federal Reserve Bank of Minneapolis' website and uses the 1980 dollar to measure market value. Book to market ratio is calculated as the company's book equity divided by market value at the end of the fiscal year after the change. Return on asset is measured as net income before extraordinary items divided by total assets.

Panel A: Occurrence of fiscal year changes by year

Year	Combined	Big companies	Small companies
1980	6	1	5
1981	13	6	7
1982	4	1	3
1983	10	4	6
1984	13	6	7
1985	13	2	11
1986	15	5	10
1987	18	8	10
1988	20	8	12
1989	16	8	8
1990	19	10	9
1991	10	4	6
1992	6	3	3
1993	21	10	11
1994	20	9	11
1995	22	12	10
1996	33	13	20
1997	26	14	12
1998	28	18	10
1999	19	12	7
2000	27	19	8
2001	16	11	5
2002	15	9	6
2003	15	10	5
2004	12	6	6

Panel B: Occurrence of fiscal year change by industry

Fiscal year changes	Fama-French 49 Industry
>30	Banking (38), Retail (32)
20-30	Wholesale (26), Trading (25), Business Services (22), Pharmaceutical Products (20)
15-20	Petroleum and Natural Gas (17), Utilities (15), Computer Software (15)
10-15	Transportation (13), Machinery (13), Automobiles and Trucks(13), Measuring and Control Equipment (11), Entertainment (11), Communication (11), Electronic Equipment (10), Consumer Goods (10)
5-10	Construction (9), Insurance (8), Chemicals (8), Recreation (7), Healthcare (7), Food Product (7), Business Supplies (7), Computer Hardware (6), Textiles (5), Real Estate (5), Non-Metallic and Industrial Metal Mining (5), Electrical Equipment (5), Agriculture (5)
<=5	Personal Services (4), Steel Works (4), Beer & Liquor (4), medical Equipment (4), Apparel (4), Precious Metal (3), Almost Nothing (2), Tobacco (2), Shipbuilding and Railroad Equipment (2), Rubber and Plastic Product (2), Printing and Publishing (2), Fabricated Products (2), Coal (2), Aircraft (1), Restaurants (1)

Panel C: Transformation table of fiscal year changes

After Before:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Jan	-	0	0	1	0	2	0	0	1	0	0	14	18
Feb	3	-	2		0	0	0	0	0	1	0	11	17
Mar	1	2	-	3	0	3	0	0	1	0	0	47	57
Apr	3	0		-			0	0	0	1	0	12	16
May	0	1	0		-	1	0	1	0	0	1	15	19
Jun	2		6	2	1	-	1	0	3	0	1	75	91
Jul	5	1	1	0	0	2	-	0	0	2	0	14	25
Aug	0	2	0	0	0	2	1	-	3	0	0	14	22
Sep	0	1	3	1	1	1	0	1	-	3	0	49	60
Oct	2	0	2	0	0	1	0	0	1	-	0	13	19
Nov	0	0	3	0	1	0	0	0	1	0	-	12	17
Dec	11	1	8	0	2	10	1	4	18	0	1	-	56
Total	27	8	25	7	5	22	3	6	28	7	3	276	417

Panel D: Firm characteristics

	Mean	Min	25%	Median	75%	Max
Market Cap	1083.59	3.31	43.03	142.72	511.54	68033.74
B/M	0.60	-5.58	0.34	0.57	0.82	2.71
ROA	0.02	-0.96	0.00	0.03	0.06	0.52

Table II. A replication in the spirit of Reinganum and Gangopadhyay (1991)

This table examines the seasonal behavior in the sample firms using the stock returns of one year before and one year after the transition year. Specifically, the sample includes 10,008 observations for all the 417 companies, with 24 monthly returns for each company. The author divides the sample into two groups by firm size, with firms with the inflation adjusted market value greater than 142.73 million (the median) at the end of the transition year as big companies, and the other as small companies. The author runs two sets of regressions in the spirit of Reinganum and Gangopadhyay (1991). In Panel A, the author regresses monthly stock returns on a dummy variable indicating whether it is a month following fiscal year ending. In Panel B, the author regresses monthly returns on a January dummy. For both, the author reports the results from an OLS regression with robust standard errors. The author omits the coefficients for the constant terms to reserve space.

y=Monthly stock returns	All		Big		Small	
	Coefficient(%) (t)	*n*	*Coefficient(%) (t)*	*n*	*Coefficient(%) (t)*	*n*
Panel A: x = Month after fiscal year end dummy						
All	0.247 (0.54)	10,008	-0.795 (-1.21)	5,016	1.294 (2.06)	4,992
December	0.485 (0.67)	3,984	-1.567 (-1.63)	2,004	2.562 (2.41)	1,980
Non-December	0.089 (0.15)	6,024	-0.282 (-0.32)	3,012	0.460 (0.60)	3,012
Panel B: x= January dummy						
All	0.788 (1.70)	10,008	-0.327 (-0.53)	5,016	1.908 (2.78)	4,992
December	0.485 (0.67)	3,984	-1.567 (-1.63)	2,004	2.562 (2.41)	1,980
Non-December	0.988 (1.64)	6,024	0.498 (0.62)	3,012	1.477 (1.65)	3,012

Table III. Is there fiscal year based seasonality? Evidence using fiscal year changes

This table compares the stock returns during the month following the old (new) fiscal year closing before and after the fiscal year changes. The author expects no change if there is no fiscal-year based seasonality. However, if fiscal year closing induces higher stock returns as proposed by previous studies, the author expects increased (decreased) stock returns during the month following the new (old) fiscal year ending after the change. Market adjusted returns are measured as the monthly raw return of the stock minus the market return over the same period to exclude the possibility that the results are driven by changes in market conditions that coincide with company fiscal year changes. Specifically, the author defines Ret_{dif} as Ret_{new} minus Ret_{old}, where Ret_{new} (Ret_{old}) is the monthly market adjusted stock return for the month following the new (old) fiscal year ending month. The author conducts a series of univaiate tests in Panel A. In panel B, the author tests the hypotheses in a multivariate fixed-effect framework with firm effect fixed. *Post* is a dummy variable that equals one if the return occurs after fiscal year changes, and zero otherwise. It is possible that changes in firm characteristics such as firm size or performance induce changes in return patterns. To exclude this possibility, the author introduces three control variables. First, *Size* is the inflation adjusted market capitalization at the end of the corresponding fiscal year. *B/M* is the book to market ratio at the end of the corresponding fiscal year. Finally, *ROA* is measured as earnings before extraordinary items scaled by total assets for the corresponding fiscal year. The author reports the *coefficient (%)* and *t*-statistics based on the robust standard error for each regression.

Panel A: Univariate tests

	All	Big	Small
Sample size	417	209	208
Ret_{dif} (%)			
Before	-1.42	-1.36	-1.49
After	-0.46	-3.88	2.98
Diff=After-Before	0.96	-2.52	4.47
p-value (diff>0)	0.2073	0.9321	0.0032
Ret_{old} (%)			
Before	1.50	2.11	0.89
After	0.48	1.78	-0.83
Diff=After-Before	-1.02	0.33	-1.72
p-value (diff>0)	0.1054	0.3918	0.0604
Ret_{new} (%)			
Before	0.08	0.75	-0.60
After	0.02	-2.10	2.14
Diff=After-Before	-0.06	-2.85	2.74
p-value (diff<0)	0.5281	0.9928	0.0123

Panel B: Fixed effect models

	All		Big		Small	
	Coefficient (%)	*t*	*Coefficient (%)*	*t*	*Coefficient (%)*	*t*
$y = Ret_{dif}$ (%)						
Post	1.47	1.19	-1.02	-0.59	5.24	2.91
Size	0.00	-2.54	0.00	-3.38	-0.03	-1.20
B/M	0.87	0.51	0.86	0.15	1.89	1.10
Roa	-3.55	-0.50	23.82	1.92	-12.98	-2.16
Constant	-0.15	-0.09	1.08	0.32	-0.93	-0.38
Overall R-square	0.0009		0.0002		0.0123	
$y = Ret_{old}$ (%)						
Post	-1.59	-1.88	-1.06	-0.82	-2.31	-1.97
Size	0.00	2.63	0.00	2.50	0.02	1.25
B/M	-1.58	-1.49	-1.72	-0.63	-1.57	-1.42
Roa	-2.56	-0.32	-4.03	-0.44	-2.46	-0.23
Constant	1.10	1.04	0.26	0.13	1.24	0.84
Overall R-square	0.0007		0.0000		0.041	
$y = Ret_{new}$ (%)						
Post	-0.12	-0.14	-2.08	-1.77	2.93	2.18
Size	0.00	-0.38	0.00	-1.06	-0.02	-0.50
B/M	-0.70	-0.51	-0.87	-0.23	0.32	0.24
Roa	-6.11	-0.66	19.79	3.02	-15.43	-2.36
Constant	0.95	0.78	1.34	0.54	0.31	0.14
Overall R-square	0.0015		0.0017		0.0101	
Sample size	834		418		416	

Table IV. Fiscal year based seasonality and earnings volatility

This table examines accounting earnings volatility and fiscal-year based seasonality. The author measures earnings volatility as the standard deviation of earnings over the five-year period before the fiscal year changes scaled by the absolute value of average earnings over the same period. Observations with less than three years of fiscal earnings data available are deleted. The media earnings volatility (0.572) is adopted as the cutoff point to distinguish low-volatility and high-volatility companies. The author adopts fixed effect models with firm effect fixed, and runs the tests using the following four subsamples respectively: big companies with high earnings volatility, big companies with low earnings volatility, small companies with high earnings volatility, and small companies with low earnings volatility. The dependent variables are Ret_{dif}, Ret_{new}, and Ret_{old}, respectively. Ret_{dif} is defined as Ret_{new} minus Ret_{old}, where Ret_{new} (Ret_{old}) is the monthly market adjusted stock return for the month following the new (old) fiscal year ending month. *Post* is a dummy variable that equals one if the return occurs after fiscal year changes, and zero otherwise. The author introduces the following three control variables to control for the changes in firm characteristics over time. S*ize* is the inflation

adjusted market capitalization at the end of the corresponding fiscal year. *B/M* is the book to market ratio at the end of the corresponding fiscal year. Finally, *ROA* is measured as earnings before extraordinary items scaled by total assets for the corresponding fiscal year. To reserve space, the author only reports the *coefficients* and the *t*-statistics based on the robust standard error on *Post* for each regression.

	Big		Small	
	Coefficient (%)	*t*	*Coefficient (%)*	*t*
High earnings volatility	192		207	
$y = Ret_{dif}$ (%)	0.38	0.12	**6.44**	**2.56**
$y = Ret_{old}$ (%)	**-4.33**	**-1.94**	**-2.90**	**-1.90**
$y = Ret_{new}$ (%)	**-3.95**	**-2.02**	**3.54**	**1.75**
Low earnings volatility	213		189	
$y = Ret_{dif}$ (%)	-2.95	-1.44	3.14	1.30
$y = Ret_{old}$ (%)	2.18	1.48	-2.03	-1.19
$y = Ret_{new}$ (%)	-0.77	-0.53	1.11	0.64

Table V. Fiscal year based seasonality and analyst coverage

This table examines whether analyst coverage mitigates fiscal-year based seasonality by reducing the information uncertainty before earnings release. The author collects analyst coverage information from I/B/E/S, and partition the sample further by whether the company has analyst coverage. The author adopts fixed effect models with firm effect fixed. The dependent variables are Ret_{dif}, Ret_{new}, and Ret_{old}, respectively. The author defines Ret_{dif} as Ret_{new} minus Ret_{old}, where Ret_{new} (Ret_{old}) is the monthly market adjusted stock return for the month following the new (old) fiscal year ending month. *Post* is a dummy variable that equals one if the return occurs after fiscal year changes, and zero otherwise. The author introduces the following three control variables to control for the changes in firm characteristics over time. S*ize* is the inflation adjusted market capitalization at the end of the corresponding fiscal year. *B/M* is the book to market ratio at the end of the corresponding fiscal year. Finally, *ROA* is measured as earnings before extraordinary items scaled by total assets for the corresponding fiscal year. To reserve space, the author only reports the coefficients and the t-statistics based on the robust standard error on *Post* for each regression.

Panel A: companies without analyst coverage

	Big		Small	
	Coefficient (%)	*t*	*Coefficient (%)*	*t*
High earnings volatility	54		97	
$y = Ret_{dif}$ (%)	-2.59	-0.53	**14.30**	**3.38**
$y = Ret_{old}$ (%)	0.50	-0.14	**-5.84**	**-2.37**
$y = Ret_{new}$ (%)	-3.09	-1.04	**8.45**	**2.41**

Low earnings volatility	53		101	
$y = Ret_{dif}$ (%)	-3.04	-0.50	3.07	0.83
$y = Ret_{old}$ (%)	0.86	0.24	-2.91	-0.91
$y = Ret_{new}$ (%)	-2.17	-0.51	0.16	0.06

Panel B. companies with analyst coverage

	Big		Small	
	Coefficient (%)	*t*	*Coefficient (%)*	*t*
High earnings volatility	138		110	
$y = Ret_{dif}$ (%)	-0.38	-0.09	3.62	0.93
$y = Ret_{old}$ (%)	-4.39	-1.56	-2.39	-0.79
$y = Ret_{new}$ (%)	**-4.77**	**-1.70**	1.23	0.39
Low earnings volatility	160		88	
$y = Ret_{dif}$ (%)	-2.42	-1.00	3.53	0.55
$y = Ret_{old}$ (%)	2.18	1.08	0.46	0.11
$y = Ret_{new}$ (%)	-0.24	-0.13	3.99	1.27

Figure I. Average monthly stock returns by calendar month for sample firms around fiscal year changes

The author plots average monthly returns by calendar month for all the sample companies, the big companies, and the small companies one year before and one year after the transition year. Specifically, the author groups firms with the inflation adjusted market value greater than 142.73 million (the median) at the end of the transition year as big companies, and the rest as small companies.