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Abstract

The paper shows that the post earnings announcement drift is stronger for conglomerates, despite conglomerates being larger, more liquid, and more actively researched by investors. We attribute this finding to slower information processing about complex firms and show that the post earnings announcement drift is positively related to measures of conglomerate complexity. We also find that the post earnings announcement drift is stronger for new conglomerates than it is for existing conglomerates and that investors are most confused about complicated firms that expand from within rather than firms that diversify into new business segments via mergers and acquisitions.

JEL Classification: D83, G12, G14, M40

Keywords: post-earnings-announcement drift, conglomerates, mispricing, limits to arbitrage, complicated firms

1 Introduction

In a recent paper, Cohen and Lou (2012) find that investors take longer to process value-relevant information about conglomerates. In particular, Cohen and Lou find that pseudo-conglomerate returns significantly predict the returns to the real conglomerates one month ahead, which indicates that conglomerates take an extra month to incorporate industry-wide shocks into their prices.[2]

We take a different approach in relating firm complexity to the speed of information processing by considering complexity as a limits-to-arbitrage variable. We hypothesize that complex firms (conglomerates) should have stronger post-earnings-announcement drifts (PEAD). We use three measures of complexity - a dummy variable for conglomerates, the number of business segments, and sales concentration based on the Herfindahl index - and find in cross-sectional regressions that PEAD is twice as strong for complex firms as it is for single-segment firms.

Stronger PEAD for more complex firms is a surprising result, because firm complexity is positively related to size. Furthermore, complex firms are more liquid, are less volatile and have better coverage by financial analysts and institutions. Unless firm complexity severely hampers the ability of investors to process information, one should expect to find weaker, not stronger post-earnings-announcement drifts for complex firms, because all other firm characteristics suggest that complex firms should have lower limits to arbitrage. We verify in the data that conglomerates indeed have lower limits to arbitrage, and controlling for the relation between PEAD and limits to arbitrage, the relation between PEAD and complexity becomes even stronger.

[2] For each conglomerate firm, a pseudo-conglomerate consists of a portfolio of the conglomerate firm's segments made up using only stand-alone firms from the respective industries. For each portfolio that corresponds to a specific segment of the conglomerate firm an equal-weighted return is calculated. Returns corresponding to each segment are then value-weighted according to that segment's contribution to the conglomerate firm's total revenues in order to calculate a corresponding pseudo conglomerate return.

Further analysis of the relation between PEAD and firm complexity reveals that PEAD increases monotonically with complexity. While we observe a noticeable increase in PEAD as we go from single-segment firms to even the least complex conglomerates (the ones with one dominant segment or the ones with only two segments), PEAD increases with complexity in the conglomerate-only sample as well. PEAD in more complex conglomerates is triple that of the PEAD observed in single-segment firms.

We find that the relation between PEAD and complexity persists for at least two months. The duration of the return predictability attributable to PEAD for complex firms is longer than the duration of the return predictability documented in Cohen and Lou (2012) which lasts only for one month. We conclude that investors of complex firms have even greater trouble interpreting earnings-related information than they do interpreting industry-wide shocks.

While all proxies for limits to arbitrage we consider are negatively related to firm complexity and therefore cannot explain our finding that PEAD is stronger for complex firms, it is still possible that complexity (conglomerate status in particular) is related to a certain unknown variable that also affects the strength of PEAD. In an effort to understand if investors really have difficulty interpreting information related to more complicated firms we focus on periods during which firm complexity increases. If the level of firm complexity (conglomerate status) is related to a certain unknown variable that also drives PEAD, then new conglomerates would likely have little exposure to this variable and one would expect new conglomerates to have low levels of PEAD. Under our hypothesis, however, investors should have the greatest confusion when interpreting earnings announcements of new conglomerates, due to the significant and recent change in their complexity level.

We show that our hypothesis is correct. First, we verify that PEAD is higher for all conglomerates by showing that PEAD of existing conglomerates (firms that have been conglomerates for more than two years) is twice as strong as the PEAD of single-segment firms. Second, we show that PEAD is significantly stronger for new conglomerates than it is not only for single-segment firms but also for existing conglomerates. Specifically we find that PEAD for new conglomerates is double that of existing conglomerates and more than four times that of single-segment firms. To sum up, the increase in complexity (defined either as an increase in the number of segments or as the change in the conglomerate status) is associated with a large increase in PEAD, consistent with our hypothesis that it is firm complexity (and not any other characteristic common to conglomerates) that leads to stronger PEAD. We also find that investors are most confused about firms that expand from within (firms that expand from within are those firms that add new lines of business without being involved in M&A activity).

Turning to the potential causes of the relation between PEAD and firm complexity, we first control for the predictability of conglomerate returns documented in Cohen and Lou (2012). Indeed, if earnings announcements are pre-dated by relevant news about the industries the conglomerate operates in and vice versa, pseudo-conglomerate returns could predict the magnitude of PEAD for conglomerates, and this extra return predictability for conglomerates might lead to stronger PEADs in the conglomerate subsample. We find no evidence of overlap between our result and the Cohen and Lou result.

We also analyze the relation between the earnings announcement effect and complexity and find that the sensitivity of the earnings announcement return to earnings surprise is about 25% stronger for complex firms. We conclude that, per unit of earnings surprise, earnings announcements of complex firms have more information for investors to digest. However, the fact that for conglomerates, 25% more information at the announcement leads to twice as strong PEAD subsequently suggests that investors also have difficulty interpreting information related to complicated firms.

Finally, we compare the analyst coverage of simple and complex firms in more depth and find that firm complexity is detrimental to the quantity and quality of analyst coverage. Although on average complicated firms have more analyst coverage than single-segment firms, once we compare multi-segment firms to single-segment firms of similar size, we find that complex firms are followed by a smaller number of analysts, these analysts have less industry expertise and make larger errors in their earnings forecasts. We also document that in general lower analyst coverage and coverage of lower quality are both associated with stronger PEAD, a finding that is new to the literature to the best of our knowledge. Controlling for the relation between PEAD and analyst coverage (adjusted for size) weakens the link between PEAD and firm complexity, which suggests that lower analyst coverage could be one of the many reasons why complex firms have stronger PEADs. We document that controlling for the impact of analyst coverage on PEAD can account for at most 30% of the additional PEAD experienced by complex firms.

We show that up to a half of the additional PEAD experienced by complex firms is due to two separate but complementary reasons: First, we find that a unit of SUE carries more information for complicated firms; second the quantity and quality of the analyst coverage is much lower for complicated firms. Finally, we conclude that the remaining half of the additional PEAD experienced by complex firms seems to be purely attributable to firm complexity per se.

2 Data

We use three measures of firm complexity. The first measure, Conglo, is the conglomerate dummy, equal to 1 if the firm is a conglomerate and 0 otherwise. The firm is deemed to be a conglomerate if it has business divisions in two or more different industries, according to Compustat segment files. Industries are defined using two-digit SIC codes. The second measure of complexity, NSeg, is the number of divisions with different two-digit SIC codes. The third measure, Complexity, is a continuous variable based on sales concentration. Complexity equals 1-HHI, where HHI is the sum of sales shares of each division squared, $HHI = \sum_{i=1}^{NSeg} s_i^2$, where sales share, s_i, for each division is the fraction of total sales generated by that division. According to the third definition of complexity, a firm with sales in a single segment would have a Complexity measure of 0, whereas a firm with sales in a large number of industries could achieve a Complexity score close to 1.

Our measure of PEAD is the slope from the Fama-MacBeth (1973) regression of cumulative post-announcement returns on earnings surprises. Post-announcement cumulative abnormal returns (CARs) are cumulated between trading day 2 and trading day 60 after the earnings announcement. CARs are size and book-to-market adjusted following Daniel et al. (1997) (also known as DGTW). Earnings announcement dates are from COMPUSTAT, and daily returns are from CRSP daily files.

We measure earnings surprise as standardized unexpected earnings (SUE), defined as the difference between earnings per share in the current quarter and earnings per share in the same quarter of the previous year, scaled by the share price for the current quarter. Since we calculate SUE and PEAD values as in Livnat and Mendenhall (JAR, 2006) we use the same sample selection criteria. In doing so, we restrict the sample to firm-quarter observations with price per share greater than \$1 as of the end of quarter t in an effort to reduce noise caused by small SUE deflators. We also keep only those observations with non-negative book value of equity at the end of quarter t-1, while excluding those observations with market value of equity less than \$5 million at the end of quarter t-1 .

Our sample period is determined by the availability of the segment data and lasts from January 1977 to December 2010.

All other variables are defined in the Data Appendix.

3 Descriptive Statistics

Our paper uses firm complexity as a new proxy for limits to arbitrage. This challenges the established perception about multi-segment firms. Complex firms tend to be larger, more liquid, less volatile, and more transparent and as such they are expected to have lower limits to arbitrage. In this section, we empirically verify the relationship between firm complexity and the traditional measures of limits to arbitrage in an effort to emphasize the distinctiveness of our measure.

Panel A of Table 1 reports the full distribution of SUE, Complexity=1-HHI, and number of segments for all firms and for conglomerates only. A few numbers are particularly noteworthy. First, since our focus is "PEAD per unit of SUE", it is important to note that SUE changes by 0.139=0.064-(-0.075) between the 95th and the 5th percentiles and by 0.273=0.129-(-0.145) between the 97.5th and the 2.5th SUE percentiles. Thus "PEAD per unit of SUE" has to be divided by 7 to measure the spread in CARs between firms with SUEs in the 95th and the 5th percentiles, suggesting that the spread in CARs between firms with SUEs in the 97.5th and the 2.5th percentiles will be roughly double that.

Second, we notice that most firms in our sample are not conglomerates (the median number of segments in the full sample is 1) and most conglomerates have two segments (the median number of segments for conglomerates is 2 except for a few years early in the sample).[3] A relatively large number of conglomerates report three segments and some have four segments, whereas conglomerates with five or more segments make up less than 2.5% of the sample.

Third, the distribution of complexity suggests that there is a significant number of low-complexity firms. For example, a two-segment firm where one segment accounts for

[3]In untabulated results, we find that 27% of firms in the sample are conglomerates. This number varies from 47% in the late 1970s to 17% in the late 1990s back to 25% in the 2000s.

95% of the revenues would have a complexity measure of 0.095. This level of complexity is comparable to the 10th complexity percentile in our sample which is only 0.079. A two-segment firm where one segment accounts for 90% of sales has the complexity measure of 0.18. This level of complexity is comparable to the 25th complexity percentile in the sample of conglomerates only. These observations suggest that even small segments are reported in Compustat, and that we are not lumping together single-segment firms with conglomerates that have a lot of small segments.

The rest of Table 1 compares the firm characteristics of single-segment firms, multi-segment firms (conglomerates), and all Compustat firms. Multi-segment firms are firms that have business segments with more than one two-digit SIC code, according to Compustat segment files. Single-segment firms are those firms that are classified in Compustat segment files and operate in a single industry. "All Compustat firms" in the table does not refer to the aggregation of single-segment and multi-segment firms, but rather refers to all firms with non-missing quarterly earnings.[4]

In Panel B, we summarize earnings surprises (SUE) and announcement returns (CAR(-1;+1)) for the three types of firms specified as above. CAR(-1;+1) is size and book-to-market adjusted as in DGTW. Panel B1 reports the mean CAR values, in an attempt to assess whether conglomerates, on average, have more positive earnings surprises, and Panel B2 reports the means of absolute values of CAR(-1;+1), testing whether earnings surprises experienced by conglomerates are different in magnitude.

We find in Panel B that conglomerates experience earnings surprises that are comparable to full sample means, but significantly smaller in magnitude than the earnings surprises experienced by single-segment firms. Panel B1 reveals that SUEs and announce-

[4]The number of firms in quarterly Compustat files is about twice as large as the number of firms reported in Compustat segment files, because single-segment firms and firms with relatively small segments do not have to report segment data.

ment CARs of all three firm groups (single-segment, multi segment, all firms) are, on average, positive at 15.6 bp, 15.5 and 16 bp, respectively, and that conglomerates have somewhat more positive SUEs, but the difference is never statistically significant.

Panel B2 shows that the magnitude of the announcement CARs is significantly smaller for conglomerates than it is for single-segment firms or all Compustat firms, whereas the average absolute magnitude of SUE is similar for all three groups of firms.

Panel C summarizes the median values of several liquidity measures for single-segment firms, multi-segment firms, and all Compustat firms. The first three - the Gibbs measure (Hasbrouck, 2009), the Roll (1984) measure, and the effective spread estimate of Corwin and Schultz (2012) estimate the effective bid-ask spread. We find that the bid-ask spread of a representative conglomerate is roughly one-third to two-thirds lower than the bid-ask spread of a representative single-segment firm and roughly one-quarter to one-third lower than the bid-ask spread of a representative Compustat firm.

The fourth liquidity measure, the Amihud (2002) measure, estimates the price impact and shows that conglomerates experience 50% less price impact when compared to a representative single-segment firm and 40% less price impact when compared to a representative Compustat firm.

The last measure is a catch-all trading cost measure from Lesmond et al. (1999). This measure calculates the fraction of zero-return days in each firm-year and assumes that stocks are not traded when the trading costs are higher than the expected profit from trading. Thus, a greater fraction of zero-return days is synonymous with higher trading costs. We find that for conglomerates the median number of zero-return days is 11.8% , as opposed to 14.1% for single-segment firms and 13.7% for the full sample (all differences are statistically significant).

In summary, all liquidity measures in Panel C strongly suggest that conglomerates are significantly more liquid than single-segment firms and other firms in Compustat with missing segment files. Thus, the liquidity measures suggest that if the link between PEAD and complexity were driven by liquidity effects, then PEAD would be stronger for simpler firms, contrary to our hypothesis. This observation also suggests that, controlling for the interaction between PEAD and liquidity should make the relation between PEAD and complexity economically even more significant.

In Panel D, we consider several characteristics of the information environment. We find that conglomerates have significantly lower idiosyncratic volatility (defined as the volatility of Fama-French model residuals) when compared to single-segment firms and other firms on Compustat, and slightly lower turnover, which can also be interpreted as a measure of uncertainty. Panel D also shows that a representative conglomerate is twice the size of a representative single-segment firm, has significantly larger analyst following and also has significantly more institutional ownership.

We conclude that a representative conglomerate enjoys a more transparent information environment, receives more attention from investors and is more actively studied when compared to a representative single-segment firm. Analysis of traditional proxies for liquidity and information transparency suggest that conglomerates should have significantly lower limits to arbitrage.

4 Firm Complexity and PEAD

4.1 Complex Firms Have Stronger PEAD

Table 2 presents our main results, as we study the relation between PEAD and firm complexity. We perform Fama-MacBeth (1973) regressions with post-announcement cumulative abnormal returns (CAR(2;60)) on the left-hand side and earnings surprise (SUE) and its interaction with alternative measures of firm complexity on the right-hand side.

Our measure of PEAD is the (positive) slope on SUE. Higher values of complexity measures utilized in this study correspond to a higher degree of complexity by construction. In this context observing a stronger PEAD for complex firms is associated with finding a positive coefficient on the interaction of SUE and complexity.

A caveat is in order: our definition of PEAD is the extra drift per unit of SUE. Complex firms experience higher levels of PEAD than single-segment firms when both types of firms are exposed to the same amount of SUE. That does not necessarily imply that if we divide the sample into two sub-samples composed of simple firms and complex firms, a straight-forward trading strategy based on PEAD (buying firms in the top SUE decile while shorting firms in the bottom SUE decile) will be more profitable for complex firms, since complex firms can well have (and do have, see Panel A2 of Table 1) smaller magnitudes of earnings surprises. However, in order to understand whether investors take longer to process the same amount of information when they are confronted with more complex firms, one should compare PEAD per comparable units of earnings surprise. [5]

The literature on price momentum (see, e.g., Lee and Swaminathan, 2000, Lesmond et al., 2004, Zhang, 2006, and others) finds a puzzling absence of momentum for microcaps (stocks in the lowest NYSE/AMEX market cap quintile). Consequently, all results that momentum is stronger for firms with higher limits to arbitrage hold only in the sample with microcaps excluded. Since PEAD and price momentum are two related anomalies, we choose to exclude microcaps from our analysis as well. Another benefit of excluding microcaps is that microcaps are dominated by single-segment firms, and our regression analysis that compares PEAD for single-segment firms and conglomerates would have virtually no basis for such a comparison among microcaps.[6]

[5] A stronger PEAD per unit of SUE in cross-sectional regressions also implies a profitable trading strategy, as described in Fama (1976), who shows in Chapter 9 that slopes from Fama-MacBeth regressions are returns to tradable, albeit relatively difficult to construct portfolios.

[6] Table 3, discussed in the next subsection, presents, among other things, our main results with small

The first column in Table 2 estimates PEAD in the pairwise regression of CAR(2;60) on SUE. The regression estimates that the difference in SUE between the 95th and the 5th (97.5th and 2.5th) SUE percentiles implies a CAR of 1.64% (3.23%) in the three months following the announcement. The second column adds the Amihud measure and its interaction with SUE. We find that PEAD is significantly stronger for firms with higher values of the Amihud measure (firms with higher price impact).[7]

In the third column, we perform the first test of our main hypothesis by regressing CARs on SUE, the conglomerate dummy, and the interaction of SUE and the conglomerate dummy. The interaction of the conglomerate dummy and SUE is highly significant and suggests that for conglomerates PEAD is 2.3% (1.17%) greater per three months than it is for single-segment firms when we estimate the difference in the PEADs by using the SUE differential between the 97.5th and the 2.5th (95th and 5th) SUE percentiles.

The fourth column combines columns two and three and estimates the relation between PEAD and conglomerate status controlling for the interaction between PEAD and price impact. We find that controlling for the product of PEAD and price impact increases the loading on the interaction term between PEAD and the conglomerate dummy approximately by 25%.

Columns five and six repeat the analyses conducted in columns three and four, and replace the conglomerate dummy with the continuous complexity measure, 1-HHI. The results in columns five and six are qualitatively similar to the results in columns three and four: more complex firms have significantly stronger PEAD per unit of SUE, and this

caps included back into the sample.

[7]In untabulated results, we tried other measures of trading costs and limits to arbitrage from Panels B and C of Table 1 and could not find a reliable relation between PEAD and any of them. However, the fact that there is no relation between, say, PEAD and size in Fama-MacBeth regressions does not imply that a PEAD-based trading strategy will not be more profitable for small firms, because the regression measures PEAD as "CAR per unit of SUE", and smaller firms may well (and do) witness more extreme SUEs.

relation increases in magnitude when we control for the product of SUE and the Amihud measure. The magnitude of the coefficient on the product of SUE and complexity suggests that the effect of the interaction term on PEAD is roughly equal to the impact estimated in columns three and four: the median level of the complexity variable for conglomerates is about 0.37[8], thus the slope of 0.184 in column five would estimate the difference in PEADs of a representative single-segment firm and a representative conglomerate at 1.81% (0.94%) when the SUE differential between the 97.5th and the 2.5th (95th and 5th) percentiles is used in the estimation.

Columns seven and eight use the number of segments (with different two-digit SIC codes) as a proxy for complexity. Once again, the interaction term between PEAD and complexity is statistically significant even prior to controlling for the confounding effects of other limits to arbitrage proxies. Furthermore the economic significance of the interaction term increases after controlling for the relation between PEAD and price impact, and is qualitatively similar to the effect documented in columns three to six.

4.2 Degree of Complexity Matters

In Table 3, we test whether more complex conglomerates have stronger PEADs. While the evidence in Table 2 (columns 5 to 8) suggests that they do, we acknowledge that both Complexity=1-HHI and NSeg have a huge mass at 0 and 1, respectively, and the positive relation between those two variables and the strength of PEAD might be solely attributable to the difference between conglomerates and single-segment firms.

In Table 3, we get rid of the mass at 0 (or 1) by restricting the sample to conglomerate firms only and by re-running the regressions from Table 2 in this conglomerate only sample.

[8]Complexity of 0.37, or HHI=0.63 roughly corresponds to a two-segment firm with one segment taking slightly over 75% of sales, or to a three-segment firm with one segment taking 78% of sales and the other two taking 12% and 10% respectively.

For Table 3 only, we include the firms with market cap below the 20th NYSE/AMEX size percentile back in the sample for two reasons. First, since we are restricting our attention to conglomerates only, we are no longer worried about the fact that there are few conglomerates among small firms, a fact that makes comparing single-segment and conglomerate PEADs in Table 2 more challenging but has no relevance for Table 3. Second, the number of conglomerates is relatively small (roughly 1000 per year, or a quarter of our full sample), and the number of conglomerates with non-missing market caps above the 20th NYSE/AMEX size percentile is even smaller, and thus we need all the observations we can have to make our tests more powerful.

In column one, we re-run the regression from column five of Table 2 in the full sample with small firms included and confirm that PEAD is indeed significantly stronger for complex firms in this sample. The coefficient on the product of SUE and complexity is expectedly smaller than that in Table 2, but is still both statistically and economically significant. The regression coefficients suggest that the difference in PEADs of a representative conglomerate and a representative single-segment firm is 1.28% .

In column two, we perform the regression from column one using only conglomerates with complexity below the median. First, we observe that the slope on SUE, which now measures PEAD for conglomerates with the lowest degree of complexity, is about a third greater than the slope on SUE in column one, which measures PEAD for single-segment firms. We conclude that there is indeed a significant jump in PEAD based upon the conglomerate status: even the least complicated conglomerates have between 44 and 86 basis points stronger PEAD than single-segment firms.[9]

Second, the slope on the product of SUE and complexity in column two suggests a

[9]The estimates were obtained by multiplying the difference in the slopes in columns 2 and 1, $(0.131 - 0.099) \cdot 100\% = 3.2\%$, by the difference between the 97.5th and the 2.5th SUE percentiles (0.129-(-0.145)=0.273). Alternative values are obtained by using the spread between the 95th and the 5th SUE percentiles (0.064-(-0.075)=0.139). The spreads between SUE percentiles are from Panel A1 of Table 1.

statistically and economically significant difference between the PEADs of conglomerates with the lowest complexity and the PEADs of conglomerates with median complexity. Since the median complexity is 0.37 (see Panel A2 in Table 1), the PEAD for conglomerates with median complexity is more than twice the PEAD for conglomerates with the lowest complexity. For example, plugging in the spread in SUE between the 95th and the 5th percentiles, we estimate the PEAD for conglomerates with the lowest complexity at 1.82%, and the PEAD for conglomerates with median complexity at 4.11% (both figures are abnormal returns over three months, or 59 trading days, after the earnings announcement).

In column three, we re-estimate the same regression only for conglomerates with complexity above the median and observe that the relation between PEAD and complexity has almost the same strength in this sub-sample as in column two, which deals with low-complexity conglomerates.

In column four, we use an alternative approach to measuring the relation between PEAD and the degree of complexity. We create two dummy variables: one for conglomerates with complexity measures below the median (CompLow) and another for conglomerates with complexity measures above the median (CompHigh). The slopes on the interactions of the dummy variables with the SUE variable estimate the additional PEAD experienced by low-complexity and high-complexity conglomerates respectively as compared to single-segment firms. The coefficients suggest that PEAD is roughly 1.5% (per three months) stronger for low-complexity firms than it is for single-segment firms and an additional 1.5% stronger for high-complexity firms.

In the next three columns, we utilize the number of segments (NSeg) as an alternative measure of complexity. In the fifth column of Table 3, we repeat our baseline regression utilizing the number of segments as our measure of complexity (similar to column seven of Table 2) in the conglomerate-only sample that includes the smallest conglomerates. In the fifth column of Table 3, we observe a somewhat weaker, but still statistically and economically significant relation between the strength of PEAD and the number of segments and conclude that this relation is robust to including the smallest conglomerates into the sample.[10]

Since the median number of segments for conglomerate firms is two, we cannot analyze the interaction of PEAD and complexity separately for low- and high-complexity firms by equating complexity to the number of segments (low-complexity group would then have no variation in complexity, since all firms with the number of segments below the median have two segments). Therefore, in column six we repeat the regression from column five for all multi-segment firms. We find that the relation between PEAD and the number of segments remains economically significant, but loses statistical significance.

On the surface, column six seems to suggest that the relation between PEAD and number of segments in the full sample is attributable primarily to the fact that NSeg variable has a mass at one, and that while conglomerates are different from single-segment firms in terms of PEAD, two-segment firms are not that different from four (or more) segment firms in this regard. However, further analysis reveals that, first, the problem of "mass at the lowest value" is not alleviated by excluding single-segment firms, since two-segment conglomerates are as numerous as all other conglomerates, three-segment conglomerates are as numerous as four-and-more-segment conglomerates, etc., and second, that conglomerates with more than five segments add more noise than information.

Analysis conducted in column seven of Table 3 improves our understanding of the impact of the degree of firm complexity on PEAD in the conglomerate only sample. We

[10]The slope on the product of SUE and NSeg in column five of Table 3 suggests that PEAD increases by 0.5% to 1% per each additional segment in the conglomerate only sample which includes the smallest conglomerates. The impact of additional business segments on PEAD is smaller in the conglomerate only sample as PEAD increases between 0.67% and 1.32% for every additional segment in the sample that includes single segment firms (but excludes the smallest size quintile), as evidenced in column seven of Table 2.

construct two dummies, one for two-segment conglomerates (SegLow), and one for all other conglomerates (SegHigh). The use of these dummies eliminates the assumption that the difference in PEAD between two- and three-segment firms will be the same as the difference in PEAD between seven- and eight-segment firms. Furthermore the use of SegLow and SegHigh dummies also allows us to treat two-segment firms as a separate class, since two-segment conglomerates are as numerous as all other conglomerates put together.

The estimates in column seven provide strong evidence that single-segment firms have lower PEADs than two-segment firms, and two-segment firms have lower PEADs than firms with more than two segments, as the coefficients on the interaction terms of SUE with both dummies are economically large and statistically significant. Using the spread in SUE between the 95th and the 5th percentiles, we can use the coefficients in column seven to estimate PEAD at 1.31% (per three months) for single-segment firms, 2.32% for two-segment firms, and 3.55% for firms with more than two segments. Looking at the spread in SUE between the 97.5th and the 2.5th percentiles will roughly double those estimates.

To sum up, Table 3 presents evidence that PEAD is stronger for more complex conglomerates than for less complex conglomerates, and hence the relation between PEAD and complexity is richer than just the link between PEAD and the conglomerate status. We find that PEAD increases roughly monotonically as the complexity of a conglomerate increases.

4.3 PEAD and Complexity in Event Time

Cohen and Lou (2012) find that returns to pseudo-conglomerates, made up of single-segment firms, predict the returns to conglomerates in the next month and conclude that firm complexity slows down investors' reaction to industry-wide news. The industry-wide news is first reflected in the prices of simple firms and then the prices of complicated firms move in the same direction. Cohen and Lou find that the predictability is limited to only one month: it takes the investors in complicated firms only one extra month to process the industry-wide shocks and set the prices of conglomerates roughly right, or at least make them unpredictable using returns to single-segment firms.

As this paper shows, earnings-related information is another type of information investors in conglomerates have trouble digesting. Thus, it is interesting to find out whether reacting to earnings related information also takes investors in multi-segment firms a month, as in the related example documented in Cohen and Lou, or longer.

To this end, in Table 4 we disaggregate post-announcement CARs into three pieces - CAR(2;20), CAR(21;40), and CAR(41;60) - each approximately a month long and re-run the regressions from Table 2 for each subperiod CAR separately.

The first column of Table 4 repeats our main analysis in Table 2. The next three columns conducts the same regression, by utilizing alternative complexity measures. Each column is labeled with the complexity measure used in that column. We find that the dependence of PEAD on firm complexity stays visible for two months, being, if anything, stronger in the second month. In the third month, the interaction between SUE and complexity loses statistical significance, while remaining economically significant. On the other hand, in the third month, PEAD is insignificant for single-segment firms, too, and the (point estimate of the) ratio of PEAD for simple and complicated firms does not seem to change much with time.

We conclude therefore that it takes investors in complicated firms longer to process earnings related information than it takes them to process industry-wide shocks studied by Cohen and Lou (2012). The difference in PEADs between simple and complicated firms lasts for at least two months.

4.4 New Conglomerates Have Stronger PEAD than Old Ones

While all proxies for limits to arbitrage we considered are negatively related to complexity and therefore cannot explain our finding that PEAD is stronger for complex firms, it is still possible that complexity and conglomerate status in particular are related to a certain unknown variable that in turn affects the strength of PEAD.

In an effort to understand if investors really have difficulty interpreting information related to more complicated firms we focus on periods during which firm complexity increases. If the level of firm complexity (conglomerate status) is related to a certain unknown variable that also drives PEAD, then new conglomerates would likely have little exposure to this variable and one would expect new conglomerates to have low levels of PEAD. Under our hypothesis, however, investors should have the greatest confusion when interpreting earnings announcements of new conglomerates, due to the significant and recent change to their complexity level.

In Panel A of Table 5, we use a dummy variable for the change in the conglomerate status called NewConglo. NewConglo is set to one in the year after the firm switches from having one segment to having more than a single segment, continues to be one for another year, and becomes zero afterwards. NewConglo is also zero in all years when the firm has only one segment. In an average year, we have about 5,000 firms with segment data, about 1,300 conglomerates, and 120-200 new conglomerates, for which NewConglo is 1. Thus, new conglomerates comprise 2.5-4% of our sample and 10-15% of all conglomerates.

The first column of Panel A presents our baseline regression from column three of Table 2 (post-announcement CAR on SUE, the Conglo dummy, and the product of SUE and Conglo) with the NewConglo dummy and its interaction with SUE added. The slope on the product of SUE and NewConglo estimates the extra PEAD experienced by new conglomerates as compared to existing conglomerates, since Conglo is, by construction, always 1 when NewConglo is 1.

We make two important observations based on the analysis conducted in the first column of Panel A in Table 5. First, PEAD experienced by existing conglomerates (firms that have been conglomerates for more than two years) is more than twice the PEAD experienced by single-segment firms. The regression estimates suggest that PEAD is 1.1% (per three months after the announcement) for single-segment firms and 2.5% for existing conglomerates when we use the difference between the 95th and the 5th percentiles of SUE to calculate differences in PEAD.[11] We conclude that controlling for the effect of new conglomerates does not reduce the significance of the interaction term between PEAD and the conglomerate dummy. The interaction term is as strong as it is in Table 2, which suggests that stronger PEADs for more complex firms cannot be attributed to firms that recently have become conglomerates.

Second, we do find that PEAD is significantly stronger for new conglomerates than it is for single-segment firms as well as it is for existing conglomerates. The product of SUE and NewConglo dummy is statistically significant and its coefficient implies that for new conglomerates PEAD is 4.7% per three months, almost double that of existing conglomerates and more than four times that of single-segment firms.

How are new conglomerates created? In roughly two-thirds of the cases, we are able to trace the increase in the number of segments to M&A activity using SDC data. In the other one-third of the cases it appears that the firm expands from within, starting a new line of business on its own.

[11] The estimates of PEAD would be roughly twice in magnitude for both single-segment firms and existing conglomerates if we instead use the difference between the 97.5th and the 2.5th percentiles of SUE.

In the next two columns of Panel A we try to estimate the PEADs of new conglomerates formed through acquisitions (we replace NewConglo with NewCongloM&A, which equals one only if the change in the conglomerate status can be attributed to a merger with a firm from a different two-digit SIC code on SDC) and the PEADs of new conglomerates created from within (replacing NewConglo with NewCongloNoM&A, which equals one only if the change in the conglomerate status cannot be traced back to a corresponding merger).

We do not have a strong prior regarding whether becoming a new conglomerate through M&A activity or via expansion from within leads to more confusion on the part of investors. On the one hand, the segment added through M&A activity is more likely to be completely new to the firm (whereas the new line of business could have been developing within the firm for several years before the firm starts reporting it as a separate segment) and firms may prefer to expand through M&A activity when venturing into more "distant" industries. These considerations would suggest that stronger PEADs for new conglomerates would be more attributable to new conglomerates formed through M&A activity. On the other hand, both the acquirer and the target receive a lot of scrutiny during a merger, and the target also has a history as a stand-alone firm before the merger. Such scrutiny and the availability of historical information about the target might suggest that higher PEADs for new conglomerates might be driven by new conglomerates that are formed via expansion from within rather than those that are formed through M&A activity.

Panel A strongly supports the latter view. In column two, which singles out new conglomerates that are created through mergers, we find that PEAD is higher only by 0.5% per three months for these new conglomerates than it is for existing conglomerates (the difference, measured by the slope on the product of SUE and NewCongloM&A, is statistically insignificant). In column three though, we focus on new conglomerates that are created from within (i.e., not through a merger), and we discover a huge difference in the

PEADs of these new conglomerates and the PEADs of existing conglomerates. Substituting the difference in SUE between the 95th and the 5th percentiles into the regression in the third column, we estimate the average PEAD for single-segment firms at 1.1% (per three months after the announcement), the average PEAD of existing conglomerates at 2.3%, and the average PEAD of new conglomerates created from within at a whopping 8.8%. We conclude therefore that the stronger average PEAD for firms that have recently become conglomerates is attributable primarily to firms that have created a new line of business from within, without merging with another firm from a different industry.

In Panel B, we utilize a different measure of increase in complexity: the SegInc dummy that equals 1 for all firms that experience an increase in the number of segments in the past two years and zero otherwise (by definition, SegInc is zero for all single-segment firms). Firms with SegInc=1 include firms with NewConglo=1 as a subset, but some firms with SegInc=1 are not new conglomerates, they are old conglomerates that have expanded into yet another industry (for example, a firm that reports three segments in year t and four segments in years t+1 and t+2 will have SegInc=1 in years t+1 and t+2).

The obvious upside of using SegInc instead of NewConglo is that there are more firms that experience an increase in the number of segments than those that become new conglomerates. In fact, in a representative year, there are on average 180 firms that add a new segment, while the number of single segment firms that become new conglomerates never exceeds 100 (the number of firm-years with SegInc(NewConglo)=1 is twice the number of firms that experience an increase in segments (that become a new conglomerate), because we track new conglomerates and firms with an increase in the number of segments for two years). The downside of using SegInc is that adding an extra segment to a three-segment firm is clearly a less drastic change than turning a single-segment firm into a conglomerate.

In the first column of Panel B, we regress CAR on SUE, its product with the number of segments (NSeg), and its product with SegInc, as well as NSeg and SegInc by themselves. We use NSeg rather than the Conglo dummy (used in Panel A), because now we are comparing not the PEADs of new and old conglomerates, but rather the PEADs of conglomerates with the same number of segments that have and have not recently experienced an increase in the number of segments. This is what the slope on the product of SUE and SegInc measures: the difference in PEADs between, say, two three-segment firms, one of which has recently become a three-segment firm (out of a single-segment or a two-segment firm) and the other that has stayed as a three segment firm for at least two years.

The first column of Panel B finds that firms with a recent increase in the number of segments have significantly higher PEADs as compared to firms with the same number of segments that have not experienced a change in their number of segments. Substituting the differential between the 95th and the 5th SUE percentiles, we estimate the average PEAD for a single-segment firm at 1.15% (per three months after the announcement)[12], for a three-segment firm with no recent increase in the number of segments at 2.59%, and for a three-segment firm that recently added a new segment (or two) in the past two years at 4.88%. As the regression suggests, the difference in PEADs between the latter two types of firms is also statistically significant with a t-statistic of 2.26.

In the next two columns, we disaggregate segment increase (SegInc=1) events into two subsets: one group of events attributable to M&A activity (those cases of a firm adding a segment or several segments that can be traced to M&A activity on SDC) and a second group of events that are not attributable to such activity, and instead most likely attributable to adding a new line of business for which the firm deploys its internal

[12]The regressions in Panel B assume that the slope on SUE equals $a+b\cdot NSeg+c\cdot SegInc$, where a is the slope of the SUE term, b is the slope of the interaction of SUE and NSeg, c is the slope of the interaction of SUE and SegInc. Hence, the PEAD of single-segment firms is $a+b$ times the SUE differential.

resources. The estimates in the second column suggest that an increase in the number of segments through M&A has an economically sizeable, but statistically insignificant effect on PEAD: the difference in PEAD between two, say, three-segment firms, one of which added a segment or two through M&A in the past two years and the other one that did not is 1.31% (per three months after the earnings announcement), with a t-statistic of 0.93.

The third column of Panel B, consistent with the third column of Panel A, shows that adding segments from within impacts firm complexity more. Comparing two firms with the same number of segments shows that, the firm that adds a new line of business by growing from within has a PEAD that is 3.85% greater than the PEAD of the firm which adds a new line of business through M&A activity.

To sum up, Table 5 strongly suggests that the increase in complexity (defined either as an increase in the number of segments or as the change in the conglomerate status) is associated with a large increase in PEAD, consistent with our hypothesis that it is firm complexity (and not any other characteristic common to conglomerates) that creates stronger PEAD. We also find that investors are most confused about firms that expand from within, i.e. about those firms that add segments without being involved in M&A activity.

5 Why Do Complex Firms Have Stronger PEAD?

5.1 Firm Complexity and Announcement Effects

One possible explanation of why complex firms have stronger PEAD is that the information revealed by complex firms on the announcement day takes longer to diffuse. If this is the case, then we should expect to see a smaller response around the announcement date, followed by a stronger drift. Another explanation would suggest that, per unit of SUE, more information hits the market on the announcement day in the case of complex firms.

If this indeed is the case, then for complex firms we should see a stronger response around the announcement event followed by a stronger drift. Empirically, the first scenario would suggest that regressing announcement returns (CAR(-1;+1)) on the interaction of SUE and firm complexity, would yield a negative coefficient, while the second scenario would imply the opposite result.

In Table 6, we perform Fama-MacBeth regressions of announcement returns (size and book-to-market adjusted as in DGTW, cumulated over the period from the day before to the day after the earnings announcement) on SUE, its interaction with the proxy for complexity (the conglomerate dummy in Panel A, the continuous complexity measure, 1-HHI, in Panel B, and the number of segments in Panel C), its interaction with several limits to arbitrage variables that are studied in detail in Table 1, as well as the complexity measure and the limits to arbitrage variable themselves. Following our approach in Table 2, we exclude microcaps (firms with market cap in the lowest NYSE/AMEX size quintile) from the sample.

We find that irrespective of the control variables used and the complexity measure utilized, complicated firms have significantly larger announcement returns. We also show that the impact of firm complexity on announcement returns is more modest when compared to the impact of firm complexity on PEAD.[13] For example, Panel A suggests that around the earnings announcement date, for single-segment firms the difference in announcement CARs between firms with SUE in the 95th and the 5th percentiles is roughly 1.4% , while

[13]The two exceptions when the product of SUE and complexity is insignificant are the columns that control for the product of SUE and the Amihud measure and the product of SUE and institutional ownership. This is due to sample composition rather than being attributable to the effect of the interaction between complexity and the Amihud measure (institutional ownership). The subsample of firms with non-missing institutional ownership as well as the subsample of firms with at least 200 non-missing returns in a year (needed to compute the Amihud measure) and stock price above $5 are very different from the full sample, and in these subsamples the interaction between firm complexity and the announcement effect is weak even prior to controlling for the interaction of SUE with the Amihud measure (institutional ownership).

for conglomerates the same difference in announcement CARs is only slightly greater at 1.8%. We also find that firms with higher trading costs have stronger announcement effects (either because they are small and witness extreme SUEs more frequently, or because more pre-announcement information is pent up in the price due to infrequent trading) and firms with higher volatility (higher turnover, lower institutional ownership, lower age) have weaker announcement effects (probably because for these firms information takes longer to be incorporated into prices).

In untabulated results, we find that including microcaps back into the sample results in an even stronger positive relation between the announcement effect and firm complexity, as well as a stronger interaction between the announcement effect and trading costs or limits to arbitrage.

The results in Table 6 are consistent with the second scenario of stronger PEADs for complex firms: for complex firms, a unit of SUE contains more news, probably because conglomerates are more diversified and less likely to experience large SUEs (as Panel A2 of Table 1 suggests). More news takes longer to digest, which leads to greater PEADs for complex firms.

Does the evidence in Table 6 undermine our main story that investors find it more difficult to process the information about complex firms? Could it be that PEAD is stronger for complex firms only because investors have more information to process (per unit of SUE)? The answer relies on a careful examination of the magnitudes of the coefficients. Dividing the slope on the interaction term by the slope on the SUE in Panel A, we find that the announcement effects are about 25-30% stronger for conglomerates. If higher PEADs for conglomerates could only be attributed to these complicated firms having more information per unit of SUE, then PEADs for conglomerates would have also been 25-30% stronger. Yet, Table 2 clearly shows that PEAD is twice as large for conglomerates as they are for single-segment firms. Thus, although investors have more information to digest in the case of conglomerates, the rate at which they process the information is also much slower.

5.2 Controlling for Pseudo-Conglomerate Returns

The return predictability documented by Cohen and Lou (2012), though clearly different from our result, can potentially overlap with it in the following way: if the industries the conglomerate operates in are doing well in month t-1, the conglomerate is more likely to report good earnings in month t. If the earnings are particularly good, they will be followed by the post-announcement drift. However, part of this drift, at least in the first month (month t), can be explained by good returns to the pseudo-conglomerate in month t-1. Thus, the predictability documented by Cohen and Lou (2012) can partially explain why PEAD is stronger for conglomerates.

Our prior is that the overlap between our result and the Cohen and Lou result is not strong. First, Cohen and Lou show that their predictability of conglomerate returns in month t using pseudo-conglomerate returns in month t-1 is attributable primarily to the first two weeks of month t. Since an average earnings announcement happens in the middle of the month, it would be fair to say that we will be missing those two weeks most of the time. Second, the predictability in Cohen and Lou lasts for only one month, whereas the stronger PEAD for conglomerates lasts for at least two months, as Table 4 shows.

In Table 7, we explicitly control for pseudo-conglomerate returns (PCRet) by adding it into our main regressions of CARs on SUE, complexity, and the product of SUE and complexity. Following Cohen and Lou, PCRet is computed by first taking an equal-weighted average return of all single-segment firms in each two-digit SIC industry, and then, for each conglomerate, value-weighting the industry returns by the fractions of the segments with the same two-digit SIC code that comprise the total sales of the conglomerate.

Since our sample has to include both single-segment firms and conglomerates in order to compare the PEADs for the two types of firms, we have to substitute an alternative variable for "PCRet" for single-segment firms. We define "PCRet" of single-segment firms as the return to single segment firms in the same industry, thus turning it into a measure of industry momentum. We also control for in our regressions both PCRet itself and the interaction of PCRet with the conglomerate dummy, to allow for different slopes on it for single-segment firms and conglomerates.

In the first column of Table 7, we regress CARs on SUE, PCRet, and PCRet times the conglomerate dummy. We observe two results. First, controlling for industry momentum in the form of "PCRet" for single-segment firms makes the slope on SUE somewhat smaller: it declines from 0.118 in the first column of Table 2 to 0.101 in the first column of Table 7. Second, we observe that PCRet itself is significant, while its product with the conglomerate dummy has a tiny, insignificant coefficient. This evidence implies that pseudo-conglomerate returns proposed by Cohen and Lou as well as measures of industry momentum are positively related to CARs.[14] Indeed, since PCRet picks up industry momentum in the single-segment firms subsample and the Cohen and Lou predictability in the conglomerate subsample, the tiny insignificant coefficient on the interaction of PCRet and the conglomerate dummy suggests that the slopes on PCRet are the same in both subsamples and the Cohen and Lou predictability for conglomerates is just as strong as industry momentum for single-segment firms.

The other three columns of Table 7 add to the regression in the first column a measure of complexity and its product with SUE. The slopes on the interaction of complexity with

[14]Strictly speaking, the correct way to estimate industry momentum would be to compute industry returns using all firms in the industry, including conglomerates. We tried that and found little change in the slope of "PCRet" for single-segment firms defined this way, which suggests that the average return to all single-segment firms in an industry is a good enough proxy for the true industry return.

SUE estimate the additional PEAD experienced by conglomerates. The slopes estimated after controlling for the predictability documented in Cohen and Lou (2012) are similar in magnitude to the slopes estimated earlier in Table 2. We conclude that the stronger PEADs experienced by conglomerates is a separate phenomenon that has no overlap with the predictability of conglomerate returns using returns to pseudo-conglomerates as suggested by Cohen and Lou (2012).

5.3 Firm Complexity and Analyst Coverage

If information about conglomerates is harder to process, analysts can be discouraged from following conglomerates, which, in turn, can lead to stronger PEADs for conglomerates. In Table 8, we analyze the link between firm complexity and analyst coverage by comparing single-segment firms and conglomerates across several dimensions. In addition to utilizing the traditional measure of analyst coverage, the number of analysts following the firm, we also measure the quality of the coverage by analyzing the number and fraction of specialists following the firm. An analyst following a firm is categorized as a specialist in that quarter, if the analyst covers five or more firms in the same industry in a given quarter (we use both two-digit and three-digit SIC codes to define an industry). For a conglomerate, specialists are defined using the industry affiliation of its main segment.

Size potentially has a large confounding effect on the link between firm complexity and analyst following. While conglomerates are harder to understand due to their complexity, the benefits of understanding conglomerates can be greater due to their larger size. Thus, in order to assess how complexity impacts analyst coverage, we have to control for size by comparing conglomerates to single-segment firms of similar size.

In Panel A of Table 8, we define firm size as its market cap and distribute conglomerates and single-segment firms into size deciles formed using CRSP breakpoints. While this method of controlling for size is imperfect, it turns out powerful enough to elicit that conglomerates have less analyst coverage and their coverage is of lower quality than that of single-segment firms. In all size deciles, conglomerates are followed by fewer analysts and fewer specialists. We also observe that a smaller percentage of analysts covering conglomerates are specialists. The biggest difference is in the number of specialists, as single-segment firms have 25% to 40% higher percentage of specialists. Both the relative and absolute differences in the analyst coverage peak in size deciles six to eight, suggesting that conglomerates which suffer from lower quality coverage are relatively large firms and are not obscure/micro-cap multi-segment firms.

Once we control for size we also find that conglomerates suffer from larger analyst forecast errors due to the lower quality and the quantity of analyst coverage they receive. As the second bottom row of Panel A suggests, conglomerates have larger analyst forecast errors in all size deciles but one (decile two), and the difference is material: on average, conglomerates have 15% larger forecast errors compared to single-segment firms controlling for size. Once again, the difference is mainly observed in the deciles with the largest conglomerate population: the differences in forecast errors are particularly large, in relative terms, in size deciles seven, nine and ten.

In Panel B1, we control for size in a different way: we match each conglomerate to a single-segment firm with the closest market cap. We observe again, consistent with Panel A, that conglomerates are followed by 1-2 analysts and specialists less than single-segment firms of comparable size, which constitutes a difference of 20-30% in the quality of analyst coverage. In terms of fraction of specialists, we find, for example, that on average 70% of analysts covering a single-segment firm specialize in its three-digit SIC industry, but only 57% of analysts covering a conglomerate specialize in the three-digit SIC industry of its main segment. All differences in analyst coverage are highly statistically significant and are observed in the vast majority of quarters.

As a consequence of lower quality analyst coverage, Panel B1 also reports that analyst forecast error is 19% higher for conglomerates than it is for single-segment firms of the same size, and the difference is significant with a t-statistic of 3.29.

Panel B2 illustrates the importance of controlling for size when comparing analyst coverage of conglomerates and single-segment firms by removing the size-matching. If we do not match by size, we find that conglomerates, due to their larger market cap, are followed by significantly more analysts. However, the difference in specialist coverage is not significant prior to controlling for size, and in relative terms, the fraction of specialists among analysts following conglomerates is still smaller than the same fraction for single-segment firms even without the size control.

We conclude that while a representative conglomerate is covered by somewhat larger number of analysts than a representative single-segment firm due to the conglomerate being much larger, this extra coverage is of poor quality, since it comes primarily from non-specialists and probably even dilutes the average analyst quality. Controlling for the confounding effect of size makes the negative relation between firm complexity and the quality of analyst coverage really stand out: when compared to single-segment firms of similar size, conglomerates are followed by a fewer number of analysts and specialists, and those analysts make larger forecast errors.

5.4 Is Analyst Coverage Responsible for Stronger PEAD of Complex Firms?

Stronger PEADs experienced by conglomerates could be attributed to the lower quality and quantity of the analyst coverage they receive. Lower quality and quantity of analyst coverage would imply a less transparent information environment for conglomerates, which would make complicated firms harder to value and as a result would deter arbitrageurs from betting against any perceived mispricing of complicated firms. But, can the relatively lower quality and quantity of analyst coverage of conglomerates fully explain higher PEADs experienced by complicated firms? Or is there more to firm complexity per se that makes the firm harder to value?

In an attempt to disentangle the impact of firm complexity on PEAD from the impact of analyst coverage on PEAD, in Table 9, we perform a horse race between these two alternative sources of PEAD. In doing so, we regress post-announcement CAR on the interaction of SUE and complexity (the slope on which captures stronger PEAD for complex firms) and the interaction of SUE and the number of analysts/specialists covering the firm. If differences in analyst coverage between conglomerates and single-segment firms drive stronger PEADs for complex firms, then we would expect the slope on the product of SUE and complexity to diminish drastically once we control for the product of SUE and the number of analysts/specialists.

Since the analysis in Table 8 shows that controlling for size is critical when comparing analyst coverage of conglomerates and single-segment firms, in Table 9 we orthogonalize our alternative measures of analyst coverage with respect to firm size: Every quarter we regress analyst coverage on size in the full cross-section of firms and denote the residuals of this regression as our measure of relative / residual analyst coverage.

In column one, we re-estimate our baseline regression of CAR on SUE, firm complexity (defined as 1-HHI), and the product of SUE and complexity using only the firms for which we have analyst coverage data. Since the number of specialists covering the firm is computed using IBES detail files, our sample for Table 9, as well as for Table 8, starts in January 1984. We find that in this new sample the relation between PEAD and complexity is about a third stronger than it is in the full sample.

In columns two, four, and six of Table 9, we regress CAR on SUE, number of analysts/specialists and the interaction of SUE with the number of analysts/specialists. We observe that the product of SUE with all measures of analyst coverage is significantly negative, resulting in significantly stronger PEADs for firms with relatively low analyst coverage, as expected. The negative relationship between PEAD and analyst coverage documented in Table 9, to the best of our knowledge, is new to the literature.

Columns three, five, and seven present the main tests of Table 9. In these columns, we simultaneously control for both interactions: SUE times complexity and SUE times analyst coverage. We observe that, consistent with the hypothesis that relatively low analyst coverage of conglomerates leads to stronger PEADs for complex firms, the slope on the interaction of SUE and analyst coverage is positive, and economically as well as statistically highly significant even after we control for the interaction of SUE and complexity. On the other hand we find that the interaction of SUE and complexity becomes visibly smaller and is sometimes only marginally significant after we control for the interaction of SUE and analyst coverage.

Comparing the slopes on SUE times complexity before and after controlling for the interaction of SUE and analyst coverage, we estimate that only 20% to 30% of the additional PEAD experienced by complex firms can be accounted for by the lower quality and quantity of the analyst coverage received by complex firms. This finding is independent of the measure of analyst coverage utilized, though using three-digit SIC specialists (the largest and perhaps the most important difference in the coverage of single-segment firms and conglomerates) elicits the biggest overlap between SUE times complexity and SUE times coverage.

In untabulated results, we check whether the overlap between SUE times complexity and SUE times analyst coverage changes if we use the other two measures of complexity (the conglomerate dummy and the number of segments) and find that the overlap is roughly the same no matter which measure of complexity we use.

To sum up, Tables 8 and 9 suggest that the complexity of conglomerates makes them relatively unattractive targets for analysts to follow. This is especially true for specialist analysts, who cover firms from the same industry and rely on industry expertise. Thus, the analyst coverage of complex firms is both relatively thin and of relatively low quality once we control for size effects. The lower quality of the analyst coverage received by complex firms is one of the reasons why complex firms have stronger PEADs. Nevertheless, reduced coverage amount (quality) can account for at most 30% of the additional PEAD experienced by complex firms. We conclude therefore that there is more to firm complexity than the difference in the quality (quantity) of analyst coverage: even when a complex firm has the same amount and quality of analyst coverage as a single-segment firm of the same size, the complex firm will still have materially stronger PEAD than its size-and-coverage matched single-segment peer.

6 Conclusion

We propose using firm complexity, measured alternatively as the conglomerate status, the number of business segments and the concentration of segment sales, as a new limits to arbitrage variable. We hypothesize that information about complex firms is harder to process, and predict therefore that PEAD is stronger for complex firms per unit of SUE.

Firm complexity is an unusual limits to arbitrage variable, because, as we confirm, complex firms are significantly larger and their other characteristics, such as trading costs, volatility, analyst coverage, and institutional ownership, suggest that complex firms should have lower, not higher limits to arbitrage. Hence, if we find higher limits to arbitrage for more complicated firms, we can be sure that this effect is attributable to firm complexity, and not some other variable.

We do find, using cross-sectional regressions, that PEAD per unit of SUE is twice as large for complex firms as it is for single segment firms. The effect of complexity on PEAD is even stronger when we control for trading costs. The impact of complexity on PEAD lasts for at least two months, which leads us to conclude that investors of complex firms have even more trouble interpreting earnings-related information than they do interpreting industry-wide shocks (Cohen and Lou (2012) find that the returns to conglomerates are predictable using the returns to single-segment firms from the same industry, but this effect lasts for only one month).

We also find that the degree of complexity matters: PEAD is not only stronger for conglomerates than for single-segment firms, but it is also stronger for more complex conglomerates than for less complex conglomerates. This conclusion holds true irrespective of the measure of complexity used.

To address the concern that complexity is related to a certain unknown variable that also affects the strength of PEAD, we reexamine the effect of complexity on PEAD focusing on periods during which firm complexity increases. The analysis provides compelling evidence that supports our slower-information-processing hypothesis: PEAD is stronger for new conglomerates than it is for existing conglomerates, and it is also stronger for complicated firms that have recently experienced an increase in the number of segments. We also find that investors are most confused about complicated firms that expand from within rather than firms that diversify into new business segments via mergers and acquisitions.

We investigate whether the difference in the PEADs of complex and simple firms could be purely attributed to the difference in the amount of information revealed by these firms during earnings announcements. Our analysis suggests that for complex firms, one unit of SUE generates a stronger return reaction at the earnings announcement. Since extreme values of SUEs are less characteristic of conglomerates, we conclude that a unit of SUE contains more information for complex firms than it does for single-segment firms. Further analysis reveals that the return reaction around the announcement date for complex firms is larger by 25-30%, when compared to single-segment firms. Although the difference in announcement returns of complex and single-segment firms suggests that complex firms release more information per unit of SUE when compared to simple firms, the magnitude of this difference in the information content is not large enough to justify almost twice as large PEAD per unit of SUE experienced by complex firms. Taken together these results suggest that not only the earnings announcements of conglomerates contain more news than the earnings announcements of single-segment firms, but also that the rate of information processing is much slower for conglomerate firms.

We also investigate whether this phenomenon is related to the return predictability documented in Cohen and Lou (2012). We control for pseudo-conglomerate returns in our regressions and find that the interaction between SUE and complexity is unaffected, which means that there is virtually no overlap between the Cohen and Lou result and the stronger PEADs for conglomerates.

Finally, we entertain the possibility that stronger PEAD for complex firms is due to the fact that analysts tend to provide less and lower quality coverage for complex firms. We do find that conglomerates are followed by a fewer number of analysts compared to single-segment firms of similar size. The analysts covering conglomerates are also less likely to have industry expertise and more likely to make larger forecast errors than the analysts covering single-segment firms. We also document that lower analyst coverage is associated with stronger PEAD and that controlling for the relation between PEAD and analyst coverage reduces the impact of complexity on PEAD by about 20-30%.

In summary, our study of the reasons why complex firms have stronger PEAD reaches three main conclusions. First, the stronger PEAD for complex firms is independent from the return predictability documented by Cohen and Lou (2012) and thus represents a separate case of the impact of firm complexity on stock prices. Second, roughly a quarter of the relation between PEAD and complexity can be attributed to the fact that a unit of SUE has more information for complex firms than for simple firms and another quarter of the relation can be attributed to the relatively low analyst coverage of complex firms after one controls for size. Third, even after controlling for these alternative explanations, complexity per se plays an important role as a limits to arbitrage variable.

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A Data Appendix

The variables are arranged in alphabetical order according to the abbreviated variable name used in the tables.

 # An (number of analysts; analyst coverage) – the number of analysts covering the firm (from IBES detail file).

Amihud (Amihud illiquidity measure) – the average ratio of absolute return to dollar volume, both from CRSP. The ratio is computed daily and averaged within each firm–year (firms with less than 200 valid return observations in a year and firms with stock price less than $5 at the end of the previous year are excluded)

CAR(-1;+1) (announcement return) – size and book-to-market adjusted cumulative daily returns between the day prior to the earnings announcement and the day after the earnings announcement. Earnings announcement dates are from COMPUSTAT, daily returns are from CRSP daily files, size and book-to-market adjustment is performed following Daniel et al. (1997)

CAR(2;60) – size and book-to-market adjusted cumulative daily returns between the second day after the earnings announcement and the 60th day after the earnings announcement.

CAR(2;20) (CAR(21;40), CAR(41;60)) – size and book-to-market adjusted cumulative daily returns between the second (21st, 41st) day after the earnings announcement and the 20th (40th, 60th) day after the earnings announcement.

Complexity (firm complexity) – 1-HHI, where HHI is the Herfindahl index computed using segment sales, $HHI = \sum_{i=1}^{N} s_i^2$. N is the number of segments (from Compustat segment files, segments with the same two-digits SIC code are counted as one segment), s_i is the fraction of total sales generated by segment i.

Conglo (conglomerate dummy) – 1 if the firm is a conglomerate, 0 otherwise. The firm is a conglomerate if it has business segments in more than one two-digit SIC industry.

Gibbs (Gibbs measure) – the slope from the regression $\Delta P_t = a + c\Delta Q_t$, where P_t is the stock price and Q_t is the trade direction indicator. The values of the Gibbs measure are taken from the website of Joel Hasbrouck and are available from January 1964 to December 2009. For more details, please refer to Hasbrouck (2009).

IO (institutional ownership) – the sum of institutional holdings from Thompson Financial 13F database, divided by the shares outstanding from CRSP. All stocks below the 20th NYSE/AMEX size percentile are dropped. If the stock is not dropped, appears on CRSP, but not on Thompson Financial 13Fs, it is assumed to have zero institutional ownership.

IVol (idiosyncratic volatility) – the standard deviation of residuals from the Fama-French model, fitted to the daily data for each firm-month (at least 15 valid observations are required).

NewConglo (new conglomerate dummy) – 1 if the firm became a conglomerate in the past two years (the year of the change in the conglomerate status excluded), zero otherwise. Single-segment firms always have NewConglo=0.

NSeg (number of segments) – the number of business segments the firm has (from Compustat segment files). Segments with the same two-digit SIC code are counted as one segment.

PCRet (pseudo-conglomerate return) – For each conglomerate firm, a pseudo-conglomerate consists of a portfolio of the conglomerate firm's segments made up using only stand-alone firms from the respective industries. For each portfolio that corresponds to a specific segment of the conglomerate firm an equal-weighted return is calculated. Returns corresponding to each segment are then value weighted according to that segment's contribution to the conglomerate firm's total revenues in order calculate a corresponding pseudo conglomerate return.

Res # An, Res # Spec (residual number of analyst/specialists) – the number of analysts/specialists following the firm orthogonalized to size. The orthogonalization is performed by running a cross-sectional regression of the number of analysts/specialists on size in each quarter and taking the residuals.

Roll (Roll measure) – the estimate of effective bid-ask spread, computed as $Roll_t = 200 \cdot \sqrt{abs(Cov(R_t, R_{t-1}))}$

SegInc (segment increase dummy) – 1 if the firm experienced an increase in the number of segments in the past two years (the year of the change excluded), zero otherwise. Single-segment firms always have SegInc=0.

 # Spec (number of specialists) – the number of analysts covering the firm who are specialists in the firm's industry. An analyst is considered a specialist in the firm's industry if he/she covers at least five other firms with the same two-digit (# Spec2) or three-digit (# Spec3) SIC code in the same quarter. For a conglomerate, an analyst is classified as a specialist based on the industry affiliation of the largest segment.

% Spec (percentage of specialists) – the number of specialists following the firm (# Spec) divided by the number of analysts following the firm (# An).

SUE (earnings surprise) – standardized unexpected earnings, computed as

$$SUE_t = \frac{E_t - E_{t-4}}{P_t}, \tag{A-1}$$

where E_t is the announced earnings per share for the current quarter, E_{t-4} is the earnings per share from the same quarter of the previous year, and P_t is the share price for the current quarter.

Size (market cap) – shares outstanding times price, both from the CRSP monthly returns file. Size is measured in billion dollars.

Spread - the spread implied by the daily high and low prices. Spread is calculated by the formula from Corwin and Schultz (2012):

$$\text{Spread} = \frac{2 \cdot (\exp^{\alpha} - 1)}{1 + \exp^{\alpha}}, \quad \text{where} \tag{A-2}$$

$$\alpha = \frac{\sqrt{\beta} \cdot (\sqrt{2} - 1)}{3 - 2\sqrt{2}} - \sqrt{\frac{\gamma}{3 - 2\sqrt{2}}}, \quad \text{where} \tag{A-3}$$

$$\beta = \log^2\left(\frac{HI_t}{LO_t}\right) + \log^2\left(\frac{HI_{t+1}}{LO_{t+1}}\right) \quad \textit{and} \quad \gamma = \log^2\left(\frac{\max(HI_t,\ HI_{t+1})}{\min(LO_t,\ LO_{t+1})}\right) \tag{A-4}$$

where HI_t (LO_t) is the highest (lowest) price of the stock on day t.

Turn (turnover) - monthly dollar trading volume over market capitalization at the end of the month (both from CRSP), averaged in each firm-year.

Zero (zero frequency) – the fraction of zero-return days within each firm-year.

Table 1. Descriptive Statistics

The table presents mean (Panel A) and median (Panel B and C) values of numerous firm characteristics for single-segment firms ("Single"), conglomerates ("Conglo"), and all Compustat firms ("All"), as well as the difference between single-segment firms and conglomerates (S-C) and the difference between all Compustat firms and conglomerates. Conglomerates are defined as firms with business segments in more than one industry (industries are based on two-digit SIC codes), single-segment firms are all other firms with information in Compustat segment files. The definitions of the firm characteristics are in the Data Appendix. The t-statistics use Newey-West (1987) correction for heteroscedasticity and autocorrelation. The sample period is from January 1977 to December 2010.

Panel A1. SUE and Complexity Distribution - All Firms

	Mean	**1%**	**2.5%**	**5%**	**10%**	**25%**	**50%**	**75%**	**90%**	**95%**	**97.5%**	**99%**
SUE	0.010	-0.317	-0.145	-0.075	-0.034	-0.007	0.002	0.008	0.029	0.064	0.129	0.302
NSeg	1.547	1	1	1	1	1	1	2	2.7	3.4	4	4.7
Comp	0.117	0	0	0	0	0	0.023	0.143	0.449	0.546	0.608	0.678

Panel A2. SUE and Complexity Distribution - Conglomerates Only

	Mean	**1%**	**2.5%**	**5%**	**10%**	**25%**	**50%**	**75%**	**90%**	**95%**	**97.5%**	**99%**
SUE	-0.001	-0.271	-0.129	-0.067	-0.031	-0.007	0.002	0.008	0.026	0.053	0.101	0.220
NSeg	2.646	2	2	2	2	2	2.2	3.1	3.8	4.3	4.9	5.7
Comp	0.351	0.011	0.021	0.041	0.079	0.191	0.368	0.497	0.596	0.655	0.694	0.736

Panel B. Earnings Announcements

Panel B1. Raw Values

	Single	Conglo	All	S-C	A-C
SUE	0.156%	0.155%	0.160%	0.001%	0.005%
t-stat	6.86	4.03	5.44	0.06	0.32
EA	0.137%	0.161%	0.125%	-0.024%	-0.036%
t-stat	2.80	3.17	3.11	-0.59	-1.15

Panel B2. Absolute Values

	Single	Conglo	All	S-C	A-C
SUE	0.626%	0.660%	0.635%	-0.034%	-0.025%
t-stat	17.4	17.2	17.8	-1.52	-2.40
EA	3.575%	2.866%	3.160%	0.709%	0.294%
t-stat	12.5	14.4	14.2	5.67	4.46

Panel C. Liquidity

	Single	Conglo	All	S-C	A-C
Gibbs	0.540	0.389	0.489	0.151	0.100
t-stat	13.3	21.9	15.2	4.61	4.42
Spread	0.871	0.599	0.755	0.272	0.156
t-stat	12.4	13.0	14.4	5.20	4.92
Roll	1.525	1.200	1.417	0.325	0.217
t-stat	17.8	20.9	19.8	4.95	4.6
Amihud	3.686	2.201	2.463	1.484	0.262
t-stat	3.73	2.94	3.78	4.76	0.91
Zero	14.09	11.81	13.69	2.28	1.88
t-stat	*5.64*	*5.87*	*5.78*	*3.85*	*4.48*

Panel D. Information Environment

	Single	Conglo	All	S-C	A-C
Size	0.304	0.600	0.361	-0.296	-0.239
t-stat	5.25	5.64	5.16	-5.54	-5.55
IO	0.404	0.452	0.394	-0.048	-0.058
t-stat	6.76	8.17	7.14	-6.97	-9.40
# An	4.748	5.414	4.513	-0.667	-0.901
t-stat	11.7	16.1	13.2	-5.28	-9.68
IVol	2.033	1.598	1.854	0.435	0.255
t-stat	14.6	21.2	17.5	4.73	4.20
Turn	7.633	6.941	7.019	0.692	0.078
t-stat	4.91	5.07	5.04	2.38	0.75

Table 2. Conglomerates, Firm Complexity, and the Post-Earnings-Announcement Drift

The table presents quarterly Fama-MacBeth regressions of size and book-to-market adjusted cumulative returns in the 60 days following earnings announcements (CAR(2;60)) on earnings surprise (SUE) and its interaction with measures of firm complexity and trading costs. Amihud measures the price impact. Complexity is 1-HHI, where HHI is the Herfindahl index computed using segment sales within a conglomerate: for each segment, we compute the amount of sales generated by that segment as a fraction of the total sales of the firm and add up the squared fractions to compute HHI. Conglo is the conglomerate dummy, equal to 1 if the firm is a conglomerate and 0 otherwise. Conglomerates are defined as firms with more than one business segment. NSeg is the number of segments the firm has. Segments are counted as distinct business units if they can be assigned to different two-digit SIC industries. Definitions of firm characteristics are in the Data Appendix. The t-statistics use Newey-West (1987) correction for heteroscedasticity and autocorrelation. The sample period is from January 1977 to December 2010. The sample excludes firms with market caps in the lowest NYSE/AMEX quintile.

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
SUE	0.118	0.143	0.095	0.115	0.099	0.123	0.051	0.079
t-stat	*4.98*	*4.62*	*4.17*	*3.48*	*4.36*	*4.00*	*1.63*	*1.70*
Amihud		-0.007		-0.007		-0.007		-0.007
t-stat		*-1.81*		*-1.90*		*-1.91*		*-1.88*
SUE×Ami		0.320		0.323		0.335		0.326
t-stat		*3.56*		*3.37*		*3.54*		*3.45*
Conglo			-0.001	-0.001				
t-stat			*-0.55*	*-0.27*				
SUE×Cong			0.084	0.107				
t-stat			*2.61*	*2.51*				
Complexity					-0.003	-0.002		
t-stat					*-0.64*	*-0.38*		
SUE×Comp					0.184	0.218		
t-stat					*2.73*	*2.70*		
NSeg							0.000	0.000
t-stat							*-0.30*	*-0.09*
SUE×N							0.048	0.052
t-stat							*2.56*	*2.17*

Table 3. Does the Degree of Complexity Matter?

The table studies PEAD in the subsamples of low and high complexity conglomerates. The columns labeled "All" use all firms in the sample, including those with market caps in the lowest NYSE/AMEX quintile. The column marked "0<Comp<Med" ("Comp>Med") uses only conglomerates with complexity measure, 1-HHI, below (above) the median. The column marked "NSeg>1" uses all conglomerates, but excludes single-segment firms. CompLow (CompHigh) is a dummy variable that equals 1 for conglomerates with complexity, 1-HHI, below (above) the median and 0 otherwise. CompLow and CompHigh are 0 for all single-segment firms. SegLow (SegHigh) is a dummy variable that equals 1 if a firm has 2 (more than 2) segments and 0 otherwise. SUE×Low and SUE×High are the products of SUE with CompLow and CompHigh, respectively (first column) and the products of of SUE with SegLow and SegHigh, respectively (fifth column). Definitions for all other firm characteristics are in the Data Appendix. The t-statistics use Newey-West (1987) correction for heteroscedasticity and autocorrelation. The sample period is from January 1977 to December 2010.

	All	**0<Comp<Med**	**Comp>Med**	**All**		**All**	**NSeg>1**	**All**
SUE	0.099	0.131	-0.074	0.093	**SUE**	0.059	0.096	0.094
t-stat	*5.26*	*3.04*	*-0.55*	*4.04*	**t-stat**	*2.43*	*1.46*	*4.24*
Complexity	-0.011	-0.012	0.002		**NSeg**	-0.002	0.000	
t-stat	*-2.39*	*-1.44*	*0.22*		**t-stat**	*-1.99*	*-0.32*	
SUE×Comp	0.127	0.448	0.458		**SUE×N**	0.038	0.026	
t-stat	*2.32*	*2.03*	*1.71*		**t-stat**	*2.81*	*1.05*	
CompLow				0.000	**SegLow**			-0.002
t-stat				*-0.04*	**t-stat**			*-0.86*
CompHigh				-0.002	**SegHigh**			-0.001
t-stat				*-0.95*	**t-stat**			*-0.46*
SUE×Low				0.110	**SUE×Low**			0.073
t-stat				*2.35*	**t-stat**			*2.30*
SUE×High				0.100	**SUE×High**			0.161
t-stat				*2.81*	**t-stat**			*3.17*

Table 4. For How Long Does Complexity Impact PEAD?

The table presents results of regressions of CAR on SUE, alternative measures of complexity, and the interactions of SUE with various complexity measures. CAR(N;M) is size and book-to-market adjusted cumulative daily return between the Nth and Mth days after the earnings announcement. Complexity variables are described in the header of Table 2 and Data Appendix. The t-statistics use Newey-West (1987) correction for heteroscedasticity and autocorrelation. The sample period is from January 1977 to December 2010. The sample excludes firms with market caps in the lowest NYSE/AMEX quintile.

Panel A. Conglomerate Dummy

	CAR(2;60)	CAR(2;20)	CAR(21;40)	CAR(41;60)
SUE	0.094	0.030	0.046	0.020
t-stat	*4.24*	*2.60*	*4.31*	*1.56*
Conglo	-0.002	-0.001	0.000	-0.001
t-stat	*-0.74*	*-1.04*	*0.22*	*-1.13*
SUE×Cong	0.093	0.030	0.039	0.025
t-stat	*3.02*	*1.79*	*2.24*	*1.10*

Panel B. Complexity

	CAR(2;60)	CAR(2;20)	CAR(21;40)	CAR(41;60)
SUE	0.098	0.030	0.046	0.023
t-stat	*4.29*	*2.65*	*4.59*	*1.78*
Complexity	-0.004	-0.002	0.000	-0.002
t-stat	*-0.92*	*-1.14*	*-0.18*	*-0.85*
SUE×Comp	0.199	0.066	0.097	0.033
t-stat	*3.09*	*1.53*	*2.69*	*0.69*

Panel C. Number of Segments

	CAR(2;60)	CAR(2;20)	CAR(21;40)	CAR(41;60)
SUE	0.051	0.002	0.038	0.014
t-stat	*1.78*	*0.15*	*2.53*	*0.67*
NSeg	-0.001	0.000	0.000	0.000
t-stat	*-0.50*	*-1.01*	*0.20*	*-0.53*
SUE×N	0.048	0.024	0.013	0.010
t-stat	*2.74*	*2.92*	*1.62*	*0.89*

Table 5. Post-Earnings-Announcement Drift and Changes in Complexity

The table presents quarterly Fama-MacBeth regressions of size and book-to-market adjusted cumulative returns in the 60 days following earnings announcement (CAR(2;60)) on earnings surprise (SUE), interaction of SUE with alternative measures of firm complexity (Conglo and NSeg), as well as the interaction of SUE with a dummy variable for newly created conglomerates (NewConglo, Panel A) or a dummy variable for increase in the number of segments (SegInc). NewConglo (SegInc) is one for two years after a one-segment firm (any firm) reports an increase in the number of segments and zero otherwise. Both NewConglo and SegInc are set to zero for all single-segment firms. SUE*times*M&A (SUE*times*NoM&A) is the interaction of SUE with NewConglo / SegInc for segment increases that can be attributed to diversifying M&A activity (that can not be attributed to diversifying M&A activity). Definitions for all other firm characteristics are in the Data Appendix. The t-statistics use Newey-West (1987) correction for heteroscedasticity and autocorrelation. The sample period is from January 1977 to December 2010.

Panel A. PEAD and New Conglomerates | **Panel B. PEAD and New Segments**

	1	**2**	**3**		**1**	**2**	**3**
SUE	0.080	0.080	0.080	**SUE**	0.031	0.031	0.036
t-stat	*4.25*	*4.25*	*4.25*	**t-stat**	*1.08*	*1.08*	*1.30*
Conglo	-0.002	-0.002	-0.002	**NSeg**	-0.001	-0.001	-0.001
t-stat	*-0.96*	*-0.96*	*-0.96*	**t-stat**	*-0.62*	*-0.64*	*-0.63*
NewConglo	-0.005	-0.004	-0.006	**SegInc**	-0.006	-0.004	-0.006
t-stat	*-2.04*	*-1.35*	*-1.60*	**t-stat**	*-2.59*	*-1.65*	*-2.07*
SUE×Cong	0.100	0.100	0.100	**SUE×NSeg**	0.052	0.054	0.048
t-stat	*2.91*	*2.91*	*2.91*	**t-stat**	*2.49*	*2.64*	*2.42*
SUE×New	0.158			**SUE×SegInc**	0.164		
t-stat	*2.13*			**t-stat**	*2.26*		
SUE×M&A		0.046		**SUE×M&A**		0.095	
t-stat		*0.39*		**t-stat**		*0.93*	
SUE×NoM&A			0.452	**SUE×NoM&A**			0.277
t-stat			*2.08*	**t-stat**			*1.63*

Table 6. Conglomerates, Firm Complexity, and the Earnings Announcement Reaction

The table presents quarterly Fama-MacBeth regressions of size and book-to-market adjusted cumulative returns in the three days around earnings announcements (CAR(-1;+1)) on earnings surprise (SUE) and on the interaction of SUE with measures of firm complexity and other firm characteristics. Complexity is 1-HHI, where HHI is the Herfindahl index computed using segment sales within a conglomerate: for each segment, we compute the amount of sales generated by that segment as a fraction of the total sales of the firm and add up the squared fractions to compute HHI. Conglo is the conglomerate dummy, equal to 1 if the firm is a conglomerate and 0 otherwise. Conglomerates are defined as firms with more than one business segment. NSeg is the number of segments the firm has. Segments are counted as distinct business units if they can be assigned to different two-digit SIC industries. Definitions of firm characteristics are in the Data Appendix. The t-statistics use Newey-West (1987) correction for heteroscedasticity and autocorrelation. The sample period is from January 1977 to December 2010. The sample excludes firms with market caps in the lowest NYSE/AMEX quintile.

Panel A. Conglomerate Dummy and Announcement Effects

	1	**2**	**3**	**4**	**5**	**6**
SUE	0.083	0.084	0.090	0.126	0.103	0.101
t-stat	*7.80*	*9.23*	*7.91*	*7.81*	*7.31*	*9.83*
Conglo	0.000	0.000	0.000	0.000	0.000	0.000
t-stat	*-0.22*	*-0.76*	*0.46*	*-1.17*	*0.12*	*-0.97*
SUE×Cong	0.025	0.010	0.026	0.032	0.028	0.027
t-stat	*2.38*	*0.81*	*2.43*	*3.06*	*2.53*	*2.22*
	Gibbs	**Amihud**	**Zero**	**IVol**	**Turn**	**IO**
Var	-0.147	-0.004	-0.023	-0.124	-0.016	0.006
t-stat	*-1.94*	*-2.31*	*-1.89*	*-4.54*	*-3.14*	*5.57*
SUE×Var	0.928	0.310	-0.046	-1.467	-0.375	0.040
t-stat	*0.71*	*3.40*	*-0.41*	*-3.94*	*-2.14*	*1.22*

Panel B. Complexity and Announcement Effects

	1	**2**	**3**	**4**	**5**	**6**
SUE	0.080	0.079	0.087	0.127	0.102	0.100
t-stat	*7.87*	*8.73*	*8.25*	*7.69*	*7.21*	*10.21*
Complexity	-0.001	-0.001	0.000	-0.001	-0.001	-0.001
t-stat	*-0.83*	*-1.63*	*-0.51*	*-1.82*	*-0.82*	*-1.53*
SUE×Comp	0.073	0.070	0.089	0.086	0.082	0.060
t-stat	*2.97*	*2.18*	*3.40*	*3.33*	*3.06*	*2.01*
	Gibbs	**Amihud**	**Zero**	**IVol**	**Turn**	**IO**
Var	-0.155	-0.004	-0.023	-0.127	-0.016	0.006
t-stat	*-2.01*	*-2.30*	*-1.91*	*-4.59*	*-3.15*	*5.59*
SUE×Var	0.896	0.316	-0.028	-1.503	-0.363	0.044
t-stat	*0.62*	*3.53*	*-0.27*	*-3.99*	*-2.07*	*1.35*

Panel C. Number of Segments and Announcement Effects

	1	**2**	**3**	**4**	**5**	**6**
SUE	0.059	0.071	0.068	0.105	0.082	0.084
t-stat	*4.97*	*4.89*	*4.95*	*6.44*	*5.16*	*5.92*
NSeg	0.000	0.000	0.000	0.000	0.000	0.000
t-stat	*-0.49*	*-0.93*	*0.02*	*-2.19*	*-0.23*	*-1.13*
SUE×N	0.017	0.010	0.017	0.020	0.019	0.016
t-stat	*3.12*	*1.35*	*2.81*	*3.44*	*2.98*	*2.29*
	Gibbs	**Amihud**	**Zero**	**IVol**	**Turn**	**IO**
Var	-0.155	-0.004	-0.023	-0.126	-0.016	0.006
t-stat	*-2.03*	*-2.29*	*-1.90*	*-4.54*	*-3.11*	*5.55*
SUE×Var	1.054	0.304	-0.044	-1.497	-0.395	0.042
t-stat	*0.78*	*3.49*	*-0.39*	*-4.07*	*-2.12*	*1.33*

Table 7. Controlling for Pseudo-Conglomerate Returns

The table presents quarterly Fama-MacBeth regressions of size and book-to-market adjusted cumulative returns in the 60 days following earnings announcements (CAR(2;60)) on earnings surprise (SUE) and on the interaction of SUE with alternative measures of firm complexity controlling for pseudo-conglomerate returns (PCRet). PCRet is calculated one month before the earnings announcement. To compute PCRet, we first compute equal-weighted returns to all single-segment firms in an industry (industries are defined based on the two-digit SIC codes). For a single-segment firm, PCRet is calculated as the return to other single-segment firms in its two-digit SIC industry. For conglomerates, industry returns for affiliated segments are weighed by the respective sales shares of the business segments and the weighted average is referred to as PCRet. Complexity variables are described in the header of Table 2 and in the Data Appendix. The t-statistics use Newey-West (1987) correction for heteroscedasticity and autocorrelation. The sample period is from January 1977 to December 2010. The sample excludes firms with market caps in the lowest NYSE/AMEX quintile.

	1	**2**	**3**	**4**
SUE	0.101	0.080	0.083	0.035
t-stat	5.10	4.13	4.14	1.22
PCRet	0.057	0.056	0.054	0.054
t-stat	1.88	1.87	1.83	1.81
PCRet×Cong	0.006	-0.006	0.001	-0.001
t-stat	0.26	-0.26	0.07	-0.03
Conglo		-0.002		
t-stat		-0.75		
SUE×Cong		0.097		
t-stat		2.87		
Complexity			-0.005	
t-stat			-1.05	
SUE×Comp			0.209	
t-stat			3.12	
NSeg				0.000
t-stat				-0.37
SUE×N				0.051
t-stat				2.50

Table 8. Firm Complexity and Analyst Following

The table compares analyst coverage of single-segment firms and conglomerates. Specialists are analysts that cover five or more firms in the same industry (defined using either the two- or the three-digit SIC code, as indicated). For conglomerates, specialists are defined based on the industry affiliation of the firm's main segment. Forecast error is the difference between consensus earnings forecast and actual earnings, scaled by actual earnings. The t-statistics use Newey-West (1987) correction for heteroscedasticity and autocorrelation. The sample period is from January 1984 to December 2010.

Panel A. Analyst Following of Single-Segment Firms and Conglomerates across Size Deciles

Panel A1. Single-Segment Firms

Size	**Small**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Big**
# Analysts	1.2	1.5	1.9	2.4	3.0	3.6	4.5	5.7	7.2	11.4
# Specialists (SIC2)	0.8	1.0	1.4	1.8	2.3	2.9	3.7	4.8	6.3	10.4
# Specialists (SIC3)	0.6	0.9	1.2	1.5	2.0	2.5	3.3	4.3	5.7	9.7
% of Specialists (SIC2)	0.604	0.657	0.682	0.702	0.725	0.754	0.771	0.805	0.837	0.896
% of Specialists (SIC3)	0.472	0.533	0.564	0.576	0.606	0.633	0.662	0.696	0.736	0.820
Forecast Error	1.169	1.154	0.909	0.824	0.762	0.662	0.540	0.474	0.384	0.293
# obs	16 344	16 079	15 768	15 180	14 615	14 132	13 351	12 268	11 048	9 579

Panel A2. Conglomerates

Size	**Small**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Big**
# Analysts	1.1	1.4	1.7	2.0	2.4	2.8	3.4	4.3	6.0	10.1
# Specialists (SIC2)	0.6	0.7	1.0	1.2	1.6	1.9	2.4	3.2	4.7	8.6
# Specialists (SIC3)	0.4	0.5	0.7	1.0	1.2	1.5	1.9	2.7	4.0	7.6
% of Specialists (SIC2)	0.508	0.482	0.542	0.561	0.580	0.628	0.637	0.696	0.740	0.819
% of Specialists (SIC3)	0.367	0.377	0.402	0.420	0.415	0.463	0.498	0.570	0.608	0.711
Forecast Error	1.257	1.087	1.152	0.958	0.848	0.717	0.704	0.534	0.471	0.341
# obs	2 792	3 115	3 437	4 009	4 570	5 083	5 849	6 926	8 157	9 573

Panel B. Analyst Following of Single-Segment Firms and Conglomerates: The Role of Size Matching

Panel B1. Size Matching

	Conglo	Simple	diff	t-stat
# Analysts	5.4	6.6	-1.2	-7.53
# Specialists (SIC2)	4.3	5.8	-1.5	-10.01
# Specialists (SIC3)	3.6	5.2	-1.6	-11.06
% of Specialists (SIC2)	0.70	0.81	-0.12	-12.42
% of Specialists (SIC3)	0.57	0.71	-0.15	-14.46
Forecast Error	0.59	0.50	0.09	3.29

Panel B2. No Matching

	Conglo	Simple	diff	t-stat
# Analysts	5.4	4.7	0.7	5.28
# Specialists (SIC2)	4.3	4.0	0.3	2.41
# Specialists (SIC3)	3.6	3.6	0.1	0.74
% of Specialists (SIC2)	0.70	0.77	-0.07	-12.63
% of Specialists (SIC3)	0.57	0.66	-0.09	-14.45
Forecast Error	0.59	0.63	-0.04	-1.88

Table 9. Firm Complexity and Analyst Following

The table presents quarterly Fama-MacBeth regressions of size and book-to-market adjusted cumulative returns in the 60 days following earnings announcements (CAR(2;60)) on earnings surprise (SUE), interaction of SUE with firm complexity, (1-HHI), and different measures of analyst coverage: number of analysts following the firm (# An) and number of analysts who are specialists in the industry of the firm (# Spec2 if the industry is defined using two-digit SIC code and # Spec3 if the industry is defined using three-digit SIC code). All measures of analyst coverage are orthogonalized with respect to size by running quarter-by-quarter cross-sectional regressions of respective coverage measure on size and taking the residuals. The t-statistics use Newey-West (1987) correction for heteroscedasticity and autocorrelation. The sample period is from January 1984 to December 2010.

	1	**2**	**3**	**4**	**5**	**6**	**7**
SUE	0.066	0.091	0.083	0.091	0.084	0.092	0.086
t-stat	*3.03*	*4.36*	*3.86*	*4.39*	*3.94*	*4.45*	*4.02*
Complexity	0.000		0.002		0.003		0.003
t-stat	*0.03*		*0.30*		*0.53*		*0.59*
SUE×Comp	0.259		0.207		0.186		0.179
t-stat	*2.93*		*2.19*		*1.88*		*1.82*
Res # An		0.001	0.001				
t-stat		*1.21*	*1.10*				
SUE×# An		-0.022	-0.021				
t-stat		*-4.71*	*-4.10*				
Res # Spec2				0.001	0.001		
t-stat				*1.50*	*1.40*		
SUE×# Spec2				-0.020	-0.020		
t-stat				*-3.69*	*-3.39*		
Res # Spec3						0.001	0.001
t-stat						*1.39*	*1.33*
SUE×# Spec3						-0.017	-0.018
t-stat						*-3.03*	*-2.84*