Firm Complexity and Post Earnings Announcement Drift

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Abstract[*]

We show that the post earnings announcement drift (PEAD) is stronger for conglomerates than single-segment firms. Conglomerates, on average, are larger than single segment firms, so it is unlikely that limits-to-arbitrage drive the difference in PEAD. Rather, we hypothesize that market participants find it more costly and difficult to understand firm-specific earnings information regarding conglomerates as they have more complicated business models than single-segment firms. This in turn slows information processing about them. In support of our hypothesis, we find that, compared to single-segment firms with similar firm characteristics, conglomerates have relatively low institutional ownership and short interest, are covered by fewer analysts, these analysts have less industry expertise and also make larger forecast errors. Finally, we find that an increase in organizational complexity leads to larger PEAD and document that more complicated conglomerates have even greater PEAD. Our results are robust to a long list of alternative explanations of PEAD as well as alternative measures of firm complexity.

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1. Introduction

Conglomerates have more complex organizational structures and thus are more difficult to understand than single-segment firms. In this paper, we study the consequences of this complexity for the market's ability to interpret and incorporate earnings news. We find that conglomerates have larger post-earnings-announcement drifts (PEAD) than single-segment firms.

The paper is motivated by the recent finding in Cohen and Lou (2012) that conglomerates take longer to incorporate industry-wide shocks into their prices compared to single-segment firms. In particular, Cohen and Lou (2012) find that returns to pseudo-conglomerates, made up of single-segment firms, predict the returns to actual conglomerates one month ahead.

We focus instead on how investors process firm-specific news about the conglomerate itself. The challenges faced by the investors in our setup, i.e., disaggregating the earnings announcement into information about different segments, are different from the challenges investors face in the Cohen and Lou analysis, i.e., aggregating industry-level news about segments to revise the valuation of the conglomerate. We suggest two reasons for why difficulty in understanding conglomerates can exacerbate market inefficiency: less information intermediation and less interest from sophisticated investors compared to single-segment firms with similar firm characteristics.[1]

Prior literature contains evidence suggesting that analyst coverage of conglomerates is worse than that of single-segment firms, but the evidence comes from non-random samples. For example, Gilson et al. (2001) find that focus-increasing spin-offs improve analyst coverage, since all analysts gain access to disaggregated data for the parent and subsidiary firms after the breakup. Gilson et al. (2001) also find that spin-offs lead to significant improvement in analyst forecast accuracy.

It is not clear, however, if the evidence from spin-offs is generalizable to the full sample. Krishnaswami and Subramaniam (1999) find that conglomerates that choose to break-up are those that are subject to the most severe information dissemination problems: the average forecast error of a conglomerate that breaks up is four times that of a similar conglomerate that does not break up.

We directly compare conglomerates to single-segment firms in the full sample and find, controlling for the known drivers of analyst coverage and forecast precision, that conglomerates, compared to otherwise similar single-segment firms, are covered by fewer analysts, these analysts have less industry expertise and also make larger forecast errors.

[1] We estimate information intermediation via analyst following and forecast error while we use institutional ownership and relative short interest to proxy for investor sophistication.

We hypothesize that sophisticated investors tend to avoid conglomerates, since conglomerates are hard to understand.[2] We find, controlling for relevant firm characteristics, that conglomerates have lower institutional ownership and short interest than single-segment firms and attract less aggregate trading activity. This result is new to the literature to the best of our knowledge. The implication of this result is slower price discovery for conglomerates and, as a consequence, stronger PEAD.

The data confirm that PEAD is indeed stronger for conglomerates: controlling for several well-known determinants of PEAD, we find in cross-sectional regressions that on average conglomerates have 30% to 50% stronger PEAD than single-segment firms.

Next, we present three pieces of evidence that the relation between PEAD and organizational complexity is not limited to the relation between PEAD and the conglomerate status as we document that more complex conglomerates have significantly higher PEAD than simpler ones.

First, we look at periods right after conglomerates are formed and hypothesize that new conglomerates seem more complex to investors, as investors do not have the experience of dealing with a newly formed conglomerate. Consistent with this prediction, we find that PEAD for new conglomerates is 38% larger than that of existing conglomerates and 65% more than that of single-segment firms. Furthermore, we find 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. This result can be explained by the fact that merger targets have a record of being an independent company and consequently mergers in general receive scrutiny from media and advisors, while new lines of business created from within are less likely to be familiar to investors.

The stronger PEAD for new conglomerates also alleviates the concern that both conglomerate status and PEAD are potentially related to an omitted variable. For example, if a firm becomes a conglomerate if the omitted variable exceeds a certain threshold and a conglomerate disbands if the omitted variable drops below the threshold, then new conglomerates are likely to have the omitted variable close to the threshold, while for old conglomerates it can become much higher than the threshold. If the same variable is positively related to PEAD, which would be consistent with our finding that conglomerates have higher PEAD than single-segment firms, then new conglomerates would have lower PEAD, contrary to what we find. We conclude therefore that our finding that

[2] Unsophisticated investors, on the other hand, invest for savings/liquidity reasons and do not attempt to process firm-specific information. This leads to unsophisticated investors holding relatively more shares in conglomerates compared to sophisticated investors who avoid investing in more difficult to understand multi-segment companies.

conglomerates have higher PEAD is inconsistent with the existence of an omitted variable that drives both PEAD and the conglomerate status.

Second, we estimate the complexity of conglomerates by measuring the dispersion in their segment earnings growth rates. Hirshleifer and Teoh (2003) present a theoretical model that suggests that as long as some investors use a conglomerate's aggregate earnings growth rate, instead of individual segments' growth rates, to extrapolate the future value of the firm, the conglomerate will be mispriced. The model shows that higher dispersion in segment-level earnings growth rates with respect to the firm's aggregate earnings growth rate will lead to higher information processing costs, which will lead to more mispricing for the conglomerate. We find, consistent with this theoretical prediction, that conglomerates with high dispersion in their segments' growth rates have larger PEAD.

Third, we use an alternative measure of conglomerate complexity derived from segment-level differences in cost structure. Specifically, we posit that investors would have significantly more difficulty pricing conglomerates with segments that have differing cost structures. We argue that even if investors take into account different sales growth rates at the segment level, this would not be sufficient to price the conglomerate correctly without factoring in the cost structure of each segment separately. Investors would fail to correctly estimate firm-level profitability if they naively use firm-level operating leverage in their analyses instead of estimating profitability at the segment level utilizing each segment's own operating leverage value. Thus, we hypothesize that investors would be most confused about conglomerates, for which segments have significantly different levels of operating leverage due to differing cost structures. We take inspiration from the divergence in investment opportunity measure proposed by Rajan, Servais and Zingales (2000) to estimate the divergence in the cost structure of multi-segment firms. In particular, we measure the divergence in the operating leverage of multi-segment firms by calculating the standard deviation of a conglomerate's sales weighted operating leverage divided by the equally weighted average operating leverage of its segments. We find, in line with our prediction, that conglomerates with high divergence in their segments' operating leverage have larger PEAD.

In our basic tests we control for the impact of the loss effect (Narayanamoorthy 2006), investor sophistication (Bartov, Radhakrishnan and Krinsky 2000), liquidity (Sadka 2006), analyst coverage (Gleason and Lee 2003), as well as size and market-to-book. Our results are further robust to a long list of alternative explanations of PEAD such as potential spillover from the predictability documented in Cohen and Lou (2012), the impact of analyst responsiveness (Zhang 2008), the impact of ex-ante earnings volatility on earnings persistence (Cao and Narayanamoorthy 2012), the time-

varying nature of earnings persistence (Chen 2013), as well as the impact of disclosure complexity (Miller 2010, You and Zhang 2009, Feldman, Govindaraj, Livnat, and Segal 2010, Lehavy, Li and Merkley 2011, Lee 2012).[3] Furthermore, we find no evidence that conglomerates are more likely to choose Fridays (DellaVigna and Pollet 2009) or days with more competing news (Hirshleifer, Lim and Teoh 2009) to announce their earnings.[4]

Our study contributes to two strands of literature. First, we add to the literature on the determinants of PEAD. To the best of our knowledge, there is no empirical research on the relation between organizational structure and PEAD. The literature on PEAD largely focuses on the relation between PEAD and capital market characteristics such as information uncertainty, investor sophistication, trading frictions, as well as information production by the firm and analysts.

In terms of information production, conglomerate status (or the number of business segments) is an input-based measure, as opposed to output-based measures used by the literature, such as noisy earnings and return volatility. The focus on the input-based measure can help us to better identify the link between organizational complexity and PEAD, since noisy earnings, for example, can measure both the underlying business characteristics and actions by the manager to distort information. Likewise, return volatility can stem both from the nature of the firm's business and from the stock market state and characteristics.

Second, our paper contributes to the literature on the information environment of conglomerates. Using the full sample of all conglomerates and single-segment firms, we find that conglomerates, all else equal, have worse analyst coverage; and informed investors, such as institutions and short sellers, tend to ignore conglomerates, which is likely to lead to less market efficiency (e.g., stronger PEAD for conglomerates).

To the best of our knowledge, the only paper that studies the impact of conglomeration on analyst forecast errors in the full cross-section is Thomas (2002). Thomas finds that over the 1986 to 1995 time period the sign of the relation between forecast errors and organizational complexity varies depending on the controls he uses.[5] In particular, consistent with our results, the size control is particularly important for finding larger forecast errors for conglomerates. We use a longer sample

[3] We investigate whether alternative explanations of PEAD, which could be tied to other dimensions of firm complexity, can explain our results explicitly in Tables 8, 9 and 10.

[4] In untabulated analysis, we also find that our results are robust to controlling for the impact of limits-to-arbitrage measured via idiosyncratic volatility (Mendenhall 2004) as well as an alternative measure of investor sophistication measured via relative short interest. Results are available upon request.

[5] In fact, Thomas' (2002) main claim is that conglomeration does not lead to an increase in forecast errors.

period (1977-2010) and a more comprehensive list of controls and find a reliable negative relation between conglomeration and forecast precision through regression analyses.

2. Hypothesis development

Cohen and Lou (2012) show that industry-level information is incorporated into conglomerates' prices with a delay, since conglomerates are harder to analyze. There could be various reasons why conglomerates are harder to analyze. For example, analysts and investors may know the fraction each business segment contributes to the total sales of the conglomerate as well as the growth rates of sales at each segment, but still may find it hard to predict the impact of segment level sales on the value of the conglomerate, if some segments have high fixed costs while others have mostly variable costs. In such an instance, even if one knows the sales as well as the sales growth rates for each segment, it would be very difficult to predict the impact of the sales figures on profits without understanding the internal cost structure of the conglomerate.

Further complementing the findings in Cohen and Lou (2012), Chemmanur and Liu (2011) show in a theoretical model that organizational complexity impedes information processing for two reasons. First, division of consolidated firms into less complex units with their own financial reports reduces analysts' and outside investors' information production costs. Second, focus-increasing restructurings allow institutional investors to concentrate their investment in those parts of the conglomerate about which they have expertise.[6]

Our first hypothesis is that conglomerates' organizational complexity adversely affects analyst following (and consequently information production) and reduces the interest of sophisticated investors in owning and trading shares of conglomerates (and thus reduces market efficiency). Since these two channels are distinct from each other in the way they affect price formation we divide Hypothesis 1 into two subsections:

Hypothesis 1a: Holding everything else constant, conglomerates are followed by a smaller number of analysts and have larger analyst forecast errors.

Hypothesis 1b: Holding everything else constant, conglomerates have lower institutional ownership, lower short interest, as well as lower turnover.

Prior research has demonstrated the role that corporate focus can play in improving the firm's information environment. In particular, Gilson et al. (2001) attribute the improvement in analyst

[6] The same argument can apply to analysts who can choose the segment of the former conglomerate to follow according to their industry expertise after the conglomerate is disbanded.

forecast accuracy following focus increasing spin-offs in part to increased disclosure, as all analysts gain access to disaggregated data for the parent and subsidiary firms after the breakup. While Gilson et al. (2001) conduct their analyses in a non-random sample of conglomerates that choose to conduct spin offs and carve outs, we test Hypothesis 1a in the full cross-section that includes all conglomerates and single-segment firms. This is important because, as Krishnaswami and Subramaniam (1999) report, the average forecast error of a conglomerate that breaks up is four times that of a similar conglomerate that does not break up. Hence, the fact that conglomerates that decide to break up improve their information environment does not necessarily imply that an average conglomerate has worse information environment than an average single-segment firm.

Hypothesis 1b also invites the question of why retail investors' ownership in conglomerates is significantly larger than their ownership in single-segment firms. For the purposes of this paper, we view individual investors as liquidity traders who buy and sell based on their need to save or tap into their savings and as such we assume that they do not attempt to forecast cash flows and gain an edge by processing information about the firms they invest in as much as institutional investors do. Hence, we propose that the relative passive approach taken by retail investors towards stock ownership ultimately leads to them investing in the very conglomerates that institutional investors abandon.

The first hypothesis predicts costlier and slower processing of information about conglomerates, as well as a smaller presence of sophisticated investors in the market for conglomerates' shares. Costlier information processing and reduced information intermediation about conglomerates would then suggest that conglomerates should be priced less efficiently than single segment firms leading to Hypothesis 2a:

Hypothesis 2a: Post-earnings announcement drift (PEAD) is larger for conglomerates.

Hypothesis 2a is in line with the findings in Cohen and Lou (2012) who also document reduced market efficiency for conglomerates. While Cohen and Lou (2012) document that prices of conglomerates take longer to incorporate industry-level shocks, our research design is completely different from theirs as we study how the market processes firm-specific information about conglomerates (earning announcements) as opposed to analyzing how the investors process information about the industries the complicated firm operates in. The challenges faced by the investors in our setup, i.e., disaggregating the earnings announcement into information about different segments, are unique and different from the challenges investors face in the Cohen and Lou analysis, i.e., aggregating industry-level news about segments to revise the valuation of the conglomerate.

A stronger price drift in the post-announcement window can happen both because a larger fraction of the information in the earnings announcement is processed by the market with a delay and because the earnings announcement conveys more information to the market. In order to investigate the source of the larger PEAD for conglomerates, we follow DellaVigna and Pollet (2009) and calculate the delayed response ratio, defined as the share of the total stock response to earnings announcements that occurs in the post-announcement window. A natural implication of Hypothesis 2a would suggest that the market responds to earnings news about conglomerates more slowly, leading to Hypothesis 2b:

Hypothesis 2b: Conglomerates have higher delayed response ratios.

Conglomerates differ by their degree of complexity. In particular, conglomerates with segments in very different industries (e.g., mining and retail) are likely to be harder to analyze compared to conglomerates with segments in similar industries (e.g. metal mining and coal mining) as it would be challenging to develop expertise in dissimilar industries. There are multiple ways through which segment-level differences can lead to higher cognitive processing costs. Hirshleifer and Teoh (2003) suggest that the high cognitive processing costs associated with analyzing earnings growth at the segment level could lead at least some investors to focus on aggregated information even if segment level data are available. They propose measuring conglomerate complexity, and the mispricing associated with it, using the standard deviation of segment growth rates. We call this measure HTSD (Hirshleifer-Teoh standard deviation).

Alternatively, differences in the cost structures of disparate business segments can introduce similar cognitive processing costs. Take the case of a conglomerate with one segment with very high fixed costs and the other with highly variable costs. Even if an investor knows the exact sales figures generated by each segment, it would be very difficult to predict the impact of segment-level sales on the conglomerate's overall profits without understanding the unique cost structures of the distinct segments. Thus, an alternative approach to measuring a conglomerate's level of complexity is to estimate the divergence in the cost structures of different segments operating within the same conglomerate. We estimate this divergence with the coefficient of variation of operating leverage (COLV). COLV is the standard deviation of a firm's sales weighted operating leverage divided by the equally weighted average operating leverage of its segments.

Ultimately, segment level differences due to differences in growth rates or cost structures have the potential to complicate the analysis of conglomerates, slowing down the price discovery process about them and leading to under-reaction to earnings news. This leads to our third hypothesis:

Hypothesis 3: More complex conglomerates (the ones with higher HTSD and COLV measures) have stronger PEAD.

Another type of conglomerate that is particularly hard to analyze is newly formed conglomerates. Such new conglomerates lack the history of existence as a conglomerate, and in many cases (such as in the case of merger with a private company, or the development of a new line of business from within) the new segment also lacks observable performance history.

In the initial years, subsequent to conglomerate formation, investors (analysts) would face significant uncertainty regarding whether conglomeration will be value enhancing through synergies between segments or value-destroying due to a decline in business focus. This uncertainty should add an extra level of complexity compared to established conglomerates. Hence, our fourth hypothesis is:

Hypothesis 4: Newly formed conglomerates have larger PEAD than established conglomerates.

If conglomerate status and the level of PEAD are both positively correlated with an omitted variable then empirical verification of hypothesis 4 can help in addressing this omitted variable problem. Assume the relation between the omitted variable and conglomerate status is such that a firm decides to become a conglomerate when the omitted variable in question is above a certain threshold, and the conglomerate disbands if the omitted variable is below the threshold. Then new conglomerates on average would be more likely to have the omitted variable slightly above the conglomeration threshold, while established conglomerates on average would have the omitted variable further above the threshold. Under such a scenario, new conglomerates with low values of the omitted variable would have lower levels of PEAD in direct opposition to Hypothesis 4. Thus, if Hypothesis 4 holds empirically, this would suggest that investors have the greatest confusion when interpreting earnings announcements of new conglomerates, due to the significant and recent change to their organizational structure supporting the notion that an increase in organizational complexity leads to larger PEAD.

3. Data and summary statistics

We use three measures of organizational 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 squared sales shares of each division, HHI= $\sum_{i=1}^{N} s_i^2$, 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 an HHI of 1 and 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.[7] Since we calculate SUE and PEAD values as in Livnat and Mendenhall (2004) 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 segment data and lasts from January 1977 to December 2010. All other variables are defined in the Data Appendix.

Panel A of Table 1 reports the full distribution of SUE, Complexity=1-HHI, and the number of segments for all firms and for conglomerates only. A few numbers are particularly noteworthy. First, it is important to note that SUE changes by 0.101 (0.041 minus -0.060) between the 95th and the 5th percentiles and by 0.197 (0.079 minus -0.118) between the 97.5th and the 2.5th SUE percentiles – this information will be used later to evaluate the economic magnitude of the SUE slope in the Fama-MacBeth regressions of post-announcement CAR on SUE. Second, we notice that most firms in our sample are not conglomerates (the median number of segments in the full sample is 1.2) and most conglomerates have two segments (the median number of segments for conglomerates is 2.2 except for a few years early in the sample).[8] A relatively large number of conglomerates report three

[7] In unreported tables, calculating SUE as the deviation from consensus analyst forecasts, we find results that are qualitatively and quantitatively consistent with our main findings. Results are available upon request.

[8] 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.

segments, whereas conglomerates with four or more segments make up less than 2.5% of the full sample (and thus less than 10% of all conglomerates). Third, the distribution of firm complexity suggests that there is a significant number of low-complexity firms. For example, a two-segment firm, for which one of the segments accounts for 95% of the revenues, would have a complexity measure of 0.095. This level of complexity is comparable to the 10th complexity percentile among conglomerates, which is only 0.079. A two-segment firm, for which one of the segments accounts for 90% of sales, would have a complexity measure of 0.18. This level of complexity is comparable to the 25th complexity percentile among conglomerates. These observations suggest that even small segments are reported in Compustat Segment files and that we are not lumping together single-segment firms with conglomerates that have many small unreported segments.[9]

The rest of Table 1 compares firm characteristics of single-segment firms and multi-segment firms (conglomerates). In Panel B, we summarize earnings surprises (SUE) and announcement returns (CAR(-1;1)). CAR(-1;1) is size and book-to-market adjusted as in DGTW. Panel B1 reports mean CAR values, in an attempt to assess whether conglomerates, on average, have more positive earnings surprises, and Panel B2 reports means of absolute values of CAR(-1;1), testing whether earnings surprises experienced by conglomerates are different in magnitude.

We find in Panel B1 that SUEs of the two firm groups (single-segment and multi-segment) are, on average, positive at 0.153% and 0.138% of the stock price, respectively, and that conglomerates have more positive CARs, 0.018% vs -0.030%, but the difference is not statistically significant.

Panel B2 shows that the magnitude of announcement CARs is significantly smaller for conglomerates than for single-segment firms, whereas the average absolute magnitude of SUE is similar for both groups of firms. While the first result is not surprising, since conglomerates are significantly larger and thus less volatile than single-segment firms, the second one (similar SUE magnitude despite different size) offers a preview of our findings in the next section that conglomerates have poor analyst coverage as well as reduced institutional trading compared to single-segment firms of the same size. The smaller absolute CARs of conglomerates, coupled with similar SUE of conglomerates and single-segment firms, are also suggestive that the stronger PEAD for conglomerates is unlikely to imply that conglomerates experience more information revelation at earnings announcements.

[9] The number of firms in quarterly Compustat files is larger than 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. In our main analysis, we do not use firms covered by Compustat quarterly that are not on Compustat segment files, because we cannot exclude the possibility that such firms have small unreported segments. However, we confirm that our main results remain qualitatively intact if we assume that all firms that are on Compustat quarterly, but not on Compustat segment files are single-segment firms.

4. Results

4.1 Information production for conglomerates and similar single-segment firms

Building on our first hypothesis that conglomerates have greater organizational complexity and as such are more difficult to understand, we predict that analysts will be discouraged from following conglomerates while sophisticated investors will be less likely to invest and trade in them. As a result, we predict that there will be less information production about multi-segment firms compared to single-segment firms.

In Table 2, we analyze the link between organizational complexity and information production about the firm by comparing single-segment firms and conglomerates across several dimensions. First, we investigate the impact of organizational complexity on the quality of information intermediation by comparing the number of analysts as well as the magnitude of their forecast errors for single-segment firms and multi-segment firms.[10] Second, we explore how organizational complexity affects ownership and trading by sophisticated investors. We associate larger institutional ownership as well as larger relative short interest with greater presence of sophisticated investors and compare the sophistication of investor clienteles in single-segment firms and multi-segment firms using these two metrics.[11] Finally, we assess the impact of organizational complexity on general investor interest by analyzing its impact on turnover.

We run panel regressions and cluster standard errors by firm-year, following Peterson (2009). The regressions control for firm size, market-to-book, CAPM beta, lagged returns, momentum returns, share price, capital structure, firm age, firm profitability, loss dummy, number of analysts, return volatility and other firm-characteristics deemed relevant by the existing literature where necessary.[12] Most importantly, in all of our regressions we account for the impact of geographic complexity on the firm's information environment. Geographic complexity, (GeoMulti), is a dummy variable equal to one if the firm generates its sales from several overseas segments and zero if the

[10] In unreported tables, we also investigate the impact of organizational complexity on forecast dispersion, analyst quality proxied by analysts' industry specialization as well as accounting disclosure quality using segment disclosure quality as in Franco, Urcan, and Vasvari (2015). Those analyses yield results consistent with our hypotheses. Results are available upon request.

[11] Institutional ownership (relative short interest) is the number of shares held by institutions (number of shares shorted) divided by number of shares outstanding.

[12] The turnover regression uses the control variables from Chordia et al. (2007), the institutional ownership regression follows Gompers and Metrick (2001), determinants of forecast errors are from Thomas (2002), the analyst coverage regression is from Hong, Lim, and Stein (2000), and the short interest regression follows Barinov and Wu (2014).

firm generates all of its sales from one geographic segment. It is important to understand the differential impact of geographic complexity and control for its impact on PEAD, as some previous studies suggest using it as a proxy for business complexity.[13]

We find that the coefficient on the Conglo dummy is negative and statistically significant in columns (1), (3), (4) and (5) while positive and statistically significant in column (2) in line with our expectations. Consistent with our Hypotheses 1a and 1b, conglomerates have lower analyst coverage, institutional ownership, relative short interest and turnover, holding fixed other relevant firm characteristics that are known to affect those variables.[14] Finally, the statistically significant and positive coefficient on Conglo in column (2) suggests that analysts make larger forecast errors about conglomerates, all else fixed.[15]

Coefficients on GeoMulti suggest that it is unrelated to analyst coverage and institutional ownership and it is negatively, rather than positively, related to analyst forecast error. Taken together, these findings suggest that geographic complexity is a poor proxy for firm complexity, supporting our use of organizational form instead. Finally, controlling for geographic complexity does not change our inferences regarding sophisticated investors' preference to avoid trading in organizationally complicated firms.

In Table 2, we find that when compared to single-segment firms of similar characteristics, conglomerates are followed by a fewer number of analysts and those analysts make larger forecast errors. Lower information quality production about conglomerates compared to single-segment firms of similar characteristics is not confined to analysts. We also find that institutional investors and short-sellers face similar difficulty understanding conglomerates and thus refrain from investing or trading in them. We conclude that the complex nature of operating in multiple lines of business makes

[13] For example, Duru and Reeb (2002) study the impact of international diversification on analyst accuracy and report that prior to year 2000 analyst forecast accuracy is lower for firms with internationally more diverse operations. In unreported results, we replicate and extend Duru and Reeb (2002) and find no evidence that international diversification reduces analyst forecast accuracy in the post-2000 period. Results are available upon request.

[14] Short interest can also reflect a directional bet, but this consideration works against us finding that short sellers avoid conglomerates, like institutions and analysts do. A long literature on the conglomerate discount, starting with Lang and Stulz (1994) and Berger and Ofek (1995), finds that conglomeration is, on average, value-destroying, and leads to conglomerates having worse operating performance and lower price multiples. Barinov (2018) further shows that conglomerates, on average, underperform by 3-6% per annum on risk-adjusted basis. Hence, conglomerates should be attractive shorting targets everything else fixed, and the fact that we find the opposite result is a strong indication that organizational complexity influences sophisticated investors' trading choices.

[15] In untabulated results, we find that simply controlling for the confounding effect of size shows that conglomerates have larger forecast errors (18% higher), lower analyst coverage (1 to 2 fewer), lower turnover (1.4% less) and lower short interest (0.5% less) compared to single-segment firms of similar size. Results are available upon request.

conglomerates significantly more difficult to understand in the eyes of market participants including equity analysts, institutional investors and short sellers. Next, we investigate how the market reacts to firm-specific information about conglomerates and single-segment firms.

4.2 Main result: Organizational complexity leads to higher post earnings announcement drift

Table 3 presents our main results, as we study the relation between PEAD and organizational complexity. We perform Fama-MacBeth (1973) regressions with post-announcement cumulative abnormal returns (CAR(2;60))[16] on the left-hand side and earnings surprise (SUE) and its interaction with alternative measures of organizational complexity on the right-hand side:

$$CAR_{2;60} = \gamma_0 + \gamma_1 \cdot SUE_0 + \gamma_2 \cdot Complexity_0 + \gamma_3 \cdot SUE_0 \cdot Complexity_0$$

Our measure of PEAD is the (positive) slope on SUE. Higher values of our complexity measures correspond to a higher degree of organizational complexity by construction. Thus, observing stronger PEAD for complex firms implies a positive coefficient on the interaction of SUE and complexity.[17]

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.

The first column in Table 3 estimates PEAD in the pairwise regression of CAR(2;60) on SUE. The regression estimates that the difference in SUE between the 97.5th and 2.5th (95th and the 5th) SUE percentiles implies a CAR of 2.01% (1.03%) in the three months following the announcement for the average firm in the sample without controlling for any firm characteristics.

In the second 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

[16] We use size and book-to-market (BM) adjusted abnormal returns as in Daniel et al. (1997), also known as DGTW.

[17] A positive loading on the interaction of organizational complexity with SUE, however, would also imply a tradable strategy as described in Fama (1976), who shows in Chapter 9 that slopes from Fama-MacBeth regressions are returns to tradable portfolios. In Table 4 and columns 7-9 of Table 10, we further study and document the tradability of this strategy using portfolios.

conglomerates PEAD is 4.10% (2.10%) per three months which is approximately three times what it is for single-segment firms when we estimate the difference in PEAD by using the SUE differential between the 97.5th and the 2.5th (95th and 5th) SUE percentiles.

The third column estimates the relation between PEAD and conglomerate status controlling for market-to-book (MB), size (Size), institutional ownership (IO), loss effect (Loss), liquidity (Amihud), analyst coverage (# Analysts) and the interactions of this large set of controls with SUE. All control variables, except for *Loss*, are standardized to have a mean of zero and a standard deviation of one. *Loss* is a dummy variable equal to 1 if the company incurred an operating loss in the immediate quarter and 0 otherwise. We find that controlling for interactions of SUE with additional firm characteristics slightly reduces the loading on the interaction term between SUE and the conglomerate dummy from 0.141 to 0.129. After adding this large set of controls we find that for an *average* conglomerate (single-segment firm) that has not incurred a loss in the immediate quarter, PEAD is 4.77% (3.57%) per three months after the earnings announcement when we use the SUE differential between the 95th and 5th SUE percentiles.[18,19] This suggests that even after controlling for a comprehensive list of firm characteristics associated with PEAD returns conglomerates have PEAD that is approximately one third higher than PEAD for single-segment firms.

Columns (4) and (5) repeat the analyses conducted in columns (2) and (3), and replace the conglomerate dummy with the continuous complexity measure Comp, 1-HHI. The results in columns (4) and (5) are qualitatively similar to the results in columns (2) and (3): more complex firms have significantly stronger PEAD for the same level of SUE, and this relation persists after accounting for the usual list of control variables and their interactions with SUE. The magnitude of the coefficient on the product of SUE and the complexity measure, Comp, in column (4) suggests that, without controlling for the long list of control variables, PEAD for conglomerates is about twice as large as the PEAD for single segment firms: the mean level of the complexity variable for conglomerates is 0.368[20], thus using the slope of 0.313 in column (4) we estimate the difference in PEAD of a representative conglomerate and a representative single-segment firm at 2.27% (1.16%) when the SUE differential between the 97.5th and the 2.5th (95th and 5th) percentiles is used in the estimation.

[18] Here and henceforth in the coefficient interpretation an "average" conglomerate (single-segment) firm is assumed to have the values of all control variables at their averages (which is zero after standardization). *Loss* is not standardized, however, since the average firm is profitable, *Loss* is also equal to zero for the "average" firm.

[19] For *Loss* firms PEAD is significantly lower. Single-segment firms with an operating loss in the immediate quarter have average PEAD of 0.85%, while conglomerates with immediate operating losses have average PEAD of 2.05%.

[20] Complexity of 0.368, or HHI equal to 0.632, roughly corresponds to a two-segment firm with one segment taking slightly over 76% of sales, or to a three-segment firm with one segment taking 78% of sales and the other two taking 12% and 10% respectively.

After controlling for the long list of characteristics that impact PEAD we observe that PEAD for an average conglomerate (an average single-segment firm) is 4.77% (3.55%) almost exactly as in our findings in column (3).

Columns (6) and (7) use the number of segments (with different two-digit SIC codes) as the third measure of complexity. Once again, the interaction term between SUE and complexity, NSeg, is statistically significant. In column (6), the magnitude of the coefficient on the product of SUE and the number of segments, NSeg, suggests that, without controlling for the confounding effects of other factors, PEAD for conglomerates is roughly twice as large as PEAD for single segment firms. The median conglomerate has 2.2 segments, so the slope of 0.069 on SUE*NSeg in column (6) would estimate the difference in PEAD of a representative conglomerate and a representative single-segment firm at 1.51% (0.74%) when the SUE differential between the 97.5th and the 2.5th (95th and 5th) percentiles is used in the estimation.[21] In column (7), economic significance of the interaction term is little changed after controlling for the usual list of independent variables and the interactions of these controls with SUE. After accounting for the effect of the controls, we estimate PEAD for an average single-segment firm to be 2.99% for the three months following earnings announcements, while PEAD for an average conglomerate is 4.47% for the same duration.

To sum up, we find in Table 3, after controlling for a large set of confounding factors influencing PEAD, that among firms which have not incurred an operating loss in the immediate quarter, PEAD is 34% to 49% larger for a representative conglomerate than a representative single-segment firm.

4.3 Controlling for announcement effects and comparison of delayed response ratios

One possible explanation for why complex firms have stronger PEAD is that the information revealed by complex firms on the announcement day takes longer to diffuse. Alternatively, for the same level of earnings surprise, more information may be revealed to the market on the announcement day of firms that are organizationally more complicated. If this indeed is the case, then we should see a stronger response around the announcement event followed by a stronger drift for firms with more organizational complexity. Empirically, the alternative scenario would suggest that regressing announcement returns (CAR(-1;1)) as well as the post earnings announcement drift returns (CAR(2;60)) on the interaction of SUE and organizational complexity, would both yield a positive coefficient.

[21] Results in column (6) of Table 3 would estimate the PEAD return to a representative conglomerate at 3.00% (1.54%) vs. 1.37% (0.70%) for a single segment firm when the SUE differential between the 97.5th and the 2.5th (95th and 5th) percentiles is used in the estimation.

In Panel A of Table 4, we perform OLS regressions of announcement returns (CAR(-1;1)), PEAD returns (CAR(2;60)) as well as total earnings reaction returns (CAR(-1;60)) on the top earnings surprise decile dummy (SUETop), its interactions with Conglo, market-to-book (MB), size (Size), institutional ownership (IO), loss dummy (Loss), illiquidity (Amihud) and analyst coverage (# Analysts) as well as the control variables themselves. Following our approach in Table 3, we exclude microcaps from the sample. SUETop is 1 (0) for the top (bottom) SUE decile and helps us capture hedge returns to going long in the highest SUE decile and going short in the lowest SUE decile.[22]

Column (1) in the Panel A of Table 4 reveals that the interaction of SUETop with Conglo is almost zero (-0.002) and statistically insignificant (t-stat of -0.66). This finding indicates that single-segment firms and conglomerates have similar 10-1 hedge returns in the three days around earnings announcements. On the other hand, column (2) clearly indicates that the 10-1 hedge strategy of going long/short on the highest/lowest SUE decile would net larger returns for conglomerates than single-segment firms as the interaction of SUETop and Conglo is economically (1.5% per quarter) and statistically significant (t-stat of 2.12). The coefficient on the interaction of SUETop with Conglo is comparable in economic magnitude to the coefficient on SUETop itself, 0.022 vs 0.015. Finally, column (3) shows that overall stock return responses in announcement plus post-announcement periods are significantly greater for conglomerates compared to single-segment firms. Taken together, results in Panel A of Table 4 suggest that while conglomerates see more information revealed at earnings announcements (see the total response result in column 3), the incorporation of all extra information is delayed till the post-announcement period (see equal announcement effects in column 1), i.e., stronger PEAD for conglomerates comes from delayed reaction.

Next, following DellaVigna and Pollet (2009), we quantify the magnitude of the earnings surprise under-reaction for conglomerates. In particular, we calculate the ratio of the drift return, CAR(2,60), to the total earnings reaction return, CAR(-1,60), to measure the delayed response ratio for single-segment firms and conglomerates using regression coefficients estimated in Panel A. For single segment firms we calculate the delayed response ratio by dividing the coefficient on SUETop (0.022) in column (2) by the coefficient on SUETop (0.050) in column (3), while the delayed response ratio of conglomerates is the ratio of the sum of coefficients on SUETop (0.022) and SUETop*Conglo (0.015) in column (2) to the sum of coefficients on SUETop (0.050) and SUETop*Conglo (0.014) in column (3). We report the delayed response ratios in Panel B. Standard errors are calculated using the Delta method.

[22] As in DellaVigna and Pollet (2009), firms outside of the top and bottom SUE deciles are excluded from this analysis; the analysis is effectively the analysis of the 10-1 SUE hedge decile return spread in returns.

Finally, we calculate the difference in the delayed response ratios for single-segment firms and conglomerates for the 10-1 hedge portfolio that trades in extreme positive (negative) surprise earnings deciles. We find that the delayed response ratio for this hedge trade is 59.1% (44.5%) for conglomerates (single-segment firms) and the difference is statistically significant with t-statistic of 2.17. Table 4 lends further support to our central hypothesis that investors have more difficulty processing earnings-related information regarding conglomerates and that information processing takes more time for complex firms. The portfolio approach adopted to measure the delayed response ratio also makes it clear that it is indeed possible to trade on stronger PEAD for conglomerates.

4.4 Impact of changes to organizational form on PEAD

Conglomerates on average are significantly larger than single-segment firms and thus have lower limits to arbitrage, so the stronger PEAD for conglomerates is unlikely to pick up the well-known relation between PEAD and limits to arbitrage (Bartov et al. 2000, Mendenhall 2004, etc.). Nevertheless, it is still possible that organizational complexity and conglomerate status in particular are related to a certain unknown variable that in turn affects the strength of PEAD.[23]

In an effort to understand if investors indeed have difficulty interpreting information related to more complicated firms, we focus on periods during which organizational complexity increases. If the level of organizational 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 lower levels of PEAD compared to more established conglomerates. Indeed, if firms become conglomerates once this unknown variable exceeds a certain threshold (and conglomerates disband after the same unknown variable dips under the threshold), new conglomerates would have values for this unobserved characteristic higher than, but close to the threshold, while old conglomerates would potentially have the unobserved variable at values significantly above the threshold. Under the complexity 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.[24]

[23] Conglomerates are on average larger, less volatile, and more transparent and as such they are expected to have lower limits to arbitrage. Further cementing this idea, we find in untabulated results that according to several measures of liquidity that include the Gibbs measure (Hasbrouck, 2009), the Roll (1984) measure, the effective spread estimate of Corwin and Schultz (2012), the Amihud (2002) measure and the frequency of no-trade days from Lesmond et al. (1999) conglomerates on average are significantly more liquid than single-segment firms. Results are available upon request.

[24] We argue that changes to the unobserved characteristic are associated with organizational structure, i.e. when the unobserved characteristic exceeds a certain threshold the firm becomes a conglomerate. Conglomeration is not the cause of the change in this unobserved characteristic but rather the change in the unobserved characteristic itself leads to conglomeration. There could be a different omitted variable, separate from the one we consider, such that it can increase

In 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 presents results comparable to our baseline regression from column (3) of Table 3 (post-announcement CAR on SUE, the Conglo dummy, MB, Size, IO, Loss, Amihud and the interactions of SUE with Conglo and all of the control variables) with the NewConglo dummy and its interaction with SUE added.[25] 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 definition, always 1 when NewConglo is 1.

We make two important observations based on the analysis conducted in the first column of Table 5. First, the regression estimates suggest that PEAD is 2.38% (per three months after the announcement) for single-segment firms and 2.85% for established conglomerates (firms that have been conglomerates for more than two years) when we use the difference between the 95th and the 5th percentiles of SUE (see Panel A1 of Table 1) to calculate differences in PEAD.[26] Treating new conglomerates as a separate group reduces the economic significance of the interaction term between PEAD and the conglomerate dummy (which now represents only established conglomerates) by about a third while not affecting its statistical significance. This suggests that stronger PEAD for more complex firms cannot be attributed solely to firms that recently have become conglomerates.

Second, we do find that PEAD is significantly stronger for new conglomerates than it is for established conglomerates. The product of SUE and NewConglo dummy is statistically significant

in response to conglomeration and then subside. If such an alternative omitted variable is also associated with higher PEAD, then PEAD would be stronger for new conglomerates. We argue in this paper that this potential alternative omitted variable is organizational complexity. Nevertheless, we acknowledge that there could be more alternative omitted variables that could behave similar to organizational complexity but are fundamentally different. While acknowledging that such alternative omitted variables may offer different explanations of the association between organizational complexity and PEAD, we suggest that it is almost impossible to control for all such alternative scenarios. In conclusion, we do not claim to solve all omitted variables problems.

[25] Since the number of new conglomerates is low, in Table 5 we do not control for # Analysts. Requiring that new conglomerates have non-missing analyst coverage data leaves us, in some years that have little M&A/conglomeration activity, with new conglomerates numbering in low double-digits and even in single digits.

[26] 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.

and its coefficient implies that for an average new conglomerate PEAD is 3.93% per three months, almost two thirds larger than that of an established conglomerate.

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.[27] In the other one-third of the cases, it appears that the firm expands from within, starting a new line of business inside the firm.

In the next two columns, we try to estimate the PEAD 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 PEAD 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, firms may prefer to expand through M&A activity when venturing into more "distant" industries as they lack the expertise to develop a business line from within. Expansion through M&A activity can also catch investors by surprise. When firms develop a new line of business organically, such internal growth usually takes time, whereas M&A activity is not necessarily predictable in advance. These considerations would suggest that stronger PEAD for new conglomerates could 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 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 PEAD 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.

Results strongly support the latter view. In column (2), which singles out new conglomerates created through mergers, we find that PEAD for these new conglomerates is indistinguishable from PEAD for existing conglomerates (the difference, measured by the slope on the product of SUE and NewCongloM&A, is statistically and economically insignificant). In column (3) though, we discover a huge difference in PEAD of new conglomerates that are created from within (i.e., not through a merger) and PEAD of existing conglomerates. Substituting the difference in SUE between the 95th and 5th percentiles into the regression in column (3), we estimate the average PEAD for single-segment firms at 2.41%, the average PEAD of existing conglomerates at 2.74%, and the average

[27] SDC data includes both public and private firms. We include acquisitions of both public and private targets as potential ways of adding a new segment through merger and acquisition activity (M&A).

PEAD of new conglomerates created from within at a whopping 8.89% (per three months after the announcement). We conclude that 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.

Results in Table 5 strongly suggest that the increase in organizational complexity (defined as the change in the conglomerate status) is associated with a large increase in PEAD, consistent with our hypothesis that it is organizational complexity (and not any other characteristic driving the conglomerate status) that creates stronger PEAD. We also find that investors are most confused about firms that expand organically from within, i.e. about those firms that add segments without being involved in M&A activity.

4.5 Does the degree of complexity matter?

In the previous subsections, we have established that there exists a strong relationship between organizational complexity and the strength of PEAD. In this subsection, we investigate if PEAD is stronger for more complicated conglomerates by utilizing two alternative measures of complexity.

We follow Hirshleifer and Teoh (2003) in constructing our first measure. Hirshleifer and Teoh (2003) suggest that the high cognitive processing costs associated with analyzing earnings growth at the segment level lead at least some investors to focus on aggregated information even if segment level data are available. They propose that even if only some investors use aggregate firm earnings growth rates to estimate future firm values, instead of using individual segments' earnings growth rates, conglomerates will be mispriced. Hirshleifer and Teoh (2003) suggest that the level of mispricing (cognitive processing costs) will increase with the dispersion of the segment growth rates.

We call our first empirical proxy of conglomerate complexity measure HTSD (Hirshleifer-Teoh-Segment-Dispersion) and calculate it as $HTSD = \sum_{i=1}^{N}(e_i - f)^2 * s_i$, for a firm with *N* segments that has an aggregate earnings growth rate of *f*, where each segment *i* has growth rate e_i, and sales share as a percentage of the firm's total sales which is equal to s_i. We also compute log of one plus HTSD, LogHTSD, to account for HTSD's high skewness.

Our second measure takes into account the realization that even if an investor knows the exact sales figures generated by each segment, it would be very difficult to predict the impact of the segment-level sales figures on the conglomerate's overall profits without understanding the unique cost structures of the distinct segments. Thus, we propose that differences in the cost structures of disparate business segments can introduce cognitive processing costs similar to those proposed by Hirshleifer and Teoh (2003). Inspired by Rajan, Servaes and Zingales (2000), we estimate the

divergence of a firm's cost structure with the coefficient of variation of operating leverage (COLV).[28] COLV is the standard deviation of a firm's sales weighted operating leverage divided by the equally weighted average operating leverage of its segments, where each *i* corresponds to a segment, s_i captures the sales share for segment *i*, OL_i corresponds to the operating leverage of segment *i*:

$$\text{COLV} = \frac{\sqrt{\sum_{i=1}^{n} \frac{(s_i * OL_i - \overline{\text{s} * \text{OL}})^2}{n-1}}}{\sum_{i=1}^{n} \frac{OL_i}{n}}$$

In Table 6, we focus on the conglomerate-only sample and investigate if conglomerates with higher HTSD and higher COLV have higher PEAD. In the first column of Table 6, controlling for the effects of size, market-to-book, Loss, Amihud and their interactions with SUE, we analyze the interaction of HTSD with SUE and find that conglomerates with greater segment earnings growth dispersion have larger post-earnings announcement drifts.[29] The interaction term is positive and statistically significant. The interaction term indicates that, assuming that all control variables are at their means, the PEAD returns between the 95th and the 5th (97.5th and 2.5th) SUE percentiles for a conglomerate that is in the top complexity decile would be 0.61% (1.19%) more than PEAD for a conglomerate that is in the bottom complexity decile based on the HTSD measure.[30]

In column (2) of Table 6, we repeat the same analysis using LogHTSD and reach similar qualitative and quantitative conclusions. In columns (3) and (4), we add institutional ownership (IO) and its interaction with SUE and find results similar to our findings in columns (1) and (2).

Finally, in column (5), we investigate the role that diversity of operating leverage plays in determining PEAD. Coefficient on the interaction of SUE with COLV is positive and highly statistically significant. Results in column (5) would suggest that for an average conglomerate PEAD would increase by 1.33% for an increase of one standard deviation in COLV. This finding implies that while PEAD is 2.95% for an average conglomerate, PEAD goes up to 4.95% for a similar conglomerate that is in the 90th percentile of COLV. Overall, our results imply, as we predict, that it is cognitively taxing for investors to process earnings announcements of conglomerates with very different cost structures across segments.

[28] Rajan, Servaes and Zingales (2000) measure the diversity of investment opportunities among the segments of a conglomerate as they study how this diversity affects internal capital allocations.

[29] As in Table 5, we have to exclude # Analysts from the set of controls, since requiring non-missing # Analysts would have left us with too few observations to carry out the required analyses.

[30] The average for HTSD is 0.19 among conglomerates. The 90th percentile value of HTSD is 0.336 while the 10th percentile value for HTSD is 0.013.

Results in Table 6 indicate that market participants take longer to incorporate earnings-related information into the prices of more complicated conglomerates in line with Hirshleifer and Teoh's (2003) suggestion that organizational complexity introduces cognitive processing costs. These results also help establish the fact that the degree of complexity also matters in determining the magnitude of PEAD.

5 Robustness tests

5.1 Controlling for potential spillover from industry-wide information events on PEAD

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 potentially 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 (2012) lasts for only one month, whereas the stronger PEAD for conglomerates lasts throughout the quarter.[31]

In Table 7, we explicitly control for pseudo-conglomerate returns (PCRet) by adding it along with its interaction with SUE to the long list of control variables in our main regression of CARs on SUE. Following Cohen and Lou (2012), 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 PEAD for the two types of firms, we have to substitute an alternative variable for

[31] In untabulated results, we find that the larger drift experienced by organizationally more complicated firms is not confined to the first month of the quarter. Results are available upon request.

"PCRet" for single-segment firms. We define "PCRet" of single-segment firms as the lagged return to single segment firms in the same industry, thus turning it into a measure of industry momentum.[32]

In the first column of Table 7, we regress CARs on SUE, PCRET itself as well as the interaction of PCRet with Conglo and our standard set of controls from Table 3. We control for 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 column (1), we observe that PCRet itself is insignificant, while its interaction with the conglomerate dummy is statistically significant. In the second column of Table 7, we add the interaction of SUE with Conglo to the list of controls and find that the interaction between PCRET and Conglo is no longer significant.

The other two columns of Table 7 add to the regression the alternative measures of complexity, namely Comp in column (3) and NSeg in column (4), and their interactions with SUE. 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 3, and the slope on interaction between PCRET and Conglo is now marginally significant. We conclude that the stronger PEAD experienced by conglomerates is a separate phenomenon that has little overlap with the Cohen and Lou (2012) predictability of conglomerate returns using returns to pseudo-conglomerates.

5.2 Controlling for alternative explanations of PEAD

In Table 8, we control for the potential impact of a large number of alternative explanations of the post-earnings announcement drift anomaly. In particular, we control for the impact of the time-varying nature of earnings persistence (Chen 2013), the impact of disclosure complexity (Miller 2010, You and Zhang 2009, Feldman, Govindaraj, Livnat, and Segal 2010, Lehavy, Li and Merkley 2011, Lee 2012), analyst responsiveness (Zhang 2008), ex-ante earnings volatility (Cao and Narayanamoorthy 2012), as well as the impact of the quality of earnings information (Francis, Lafond, Olsson and Schipper 2007) on PEAD in an effort to distinguish the impact of organizational complexity on PEAD.

The first column in Table 8 estimates the relation between PEAD and conglomerate status controlling for the effect of market-to-book, size, institutional ownership, *Loss*, *Amihud*, and the

[32] 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.

interactions of this long list of control variables with SUE. We use the results in column (1) of Table 8 as a benchmark for the other columns in Table 8.[33]

In the second column of Table 8, we repeat the basic analysis conducted in column (1) for a subsample of firms for which we can calculate the time-varying earnings persistence variable (EP) proposed by Chen (2013).[34] Results are qualitatively and quantitatively comparable to full-sample results. In column (3) we estimate the relation between PEAD and conglomerate status controlling for time-varying earnings persistence (EP) and its interaction with SUE. We find that the interaction of SUE with EP has the predicted positive sign documented by Chen (2013). Controlling for the interaction of SUE with EP does not reduce the loading on the interaction term between SUE and the conglomerate dummy.

The fourth and fifth columns investigate the impact of organizational complexity on PEAD while controlling for the impact of disclosure complexity. Our proxy for disclosure complexity is the Gunning FOG index calculated as in Li (2008).[35] In column (4), we investigate the impact of organizational complexity on PEAD for the sub-set of firms for which we have textual complexity information. Column (4) reveals results consistent with our basic findings, as conglomerates have higher PEAD compared to single-segment firms with similar characteristics in this sub-sample as well. In column (5), we find a surprising result. The interaction of SUE with FOG, our proxy for disclosure complexity, is negative and statistically significant suggesting that the post-earnings announcement drift anomaly in fact seems to be smaller for firms with higher disclosure complexity. We believe this result could potentially indicate that the interaction of FOG with SUE is more likely to capture the impact of managerial obfuscation on PEAD, rather than the impact of firm complexity.[36] Controlling for FOG does not affect our results, as the interaction of SUE with Conglo in column (5) is virtually indistinguishable from the results in column (4).

In columns (6) and (7), we construct a measure of analyst responsiveness (DRESP) following Zhang (2008) and investigate whether controlling for its interaction with SUE could reduce the impact of organizational complexity on PEAD. Column (6) reveals that our basic results go through for the

[33] In Table 8, we do not control for *# Analysts*, as requiring non-missing variables of analyst coverage would significantly reduce the sample in some years in several columns of Table 8.

[34] Earnings Persistence (EP) is the firm-specific time-varying autocorrelation between two adjacent quarterly seasonally differenced earnings (SDE), where the autocorrelation is estimated in a two-step procedure using 14 persistence-related firm characteristics each quarter, following Chen (2013).

[35] We got the data from Feng Li's website, for which we are grateful.

[36] Future research may attempt to decompose FOG into innate business-complexity and managerial obfuscation components, as in Bushee et al. (2017), and analyze the impact of these components on PEAD separately.

sub-sample of firms with available DRESP information. In column (7), we find that the interaction of SUE with DRESP is negative, qualitatively in line with Zhang's (2008) prediction that more responsive analysts help investors react to earnings in a timelier manner.[37] Controlling for the impact of analyst responsiveness does not change our basic result regarding the impact of organizational complexity on PEAD.

In a recent paper, Cao and Narayanamoorthy (2012) show that firms with lower ex-ante earnings volatility (trading frictions) have higher earnings surprise (SUE) persistence leading to higher PEAD. Since conglomerates, on average, have smaller earnings volatility (EarnVol) and fewer overall trading frictions, it is imperative that we control for this effect. In column (8), we analyze the impact of organizational structure on PEAD for a subset of firms for which we have ex-ante earnings volatility, calculated as in Cao and Narayanamoorthy (2012). We find that our results are virtually the same as the full-sample results. In column (9), we explicitly control for the impact of ex-ante earnings volatility on PEAD. Our results are consistent with Cao and Narayanamoorthy (2012) – higher ex-ante earnings volatility leads to lower PEAD, as evidenced by the negative coefficient on the interaction of SUE and EarnVol. This, however, barely affects our main finding as the interaction of SUE with Conglo is slightly reduced from 0.082 to 0.069 and remains statistically significant.

In a related paper, Francis, Lafond, Olsson and Schipper (2007) document that PEAD is larger for firms that have poorer earnings quality. In particular, Francis et al. (2007) measure earnings quality as the coefficient of variation, standard deviation divided by average, of discretionary accruals (VolDA) computed as in Dechow and Dichev (2002). In column (10), we analyze the impact of organizational structure on PEAD for a subset of firms, for which we can measure earnings quality. We find that our results are qualitatively the same as the full-sample results. In column (11), we explicitly control for the impact of earnings quality on PEAD and find that our basic findings do not change as the coefficient on the interaction of Conglo with SUE is almost the same as the one in column (10).

Finally, in columns (12) and (13) we study the impact of organizational complexity on PEAD in a sample where we simultaneously control for the impact of MB, Size, IO, Loss, Amihud, Conglo, EP, FOG, DRESP, EarnVol and VolDA along with their interactions with SUE and find in column (13) that the interaction of SUE with Conglo is statistically and economically significant even in this kitchen sink regression, verifying the distinctiveness of the effect we have uncovered in this paper.

[37] Unlike Zhang (2008), however, our interaction term is statistically insignificant. We attribute this difference mainly to methodology. When we use panel regressions as in Zhang (2008), instead of Fama-MacBeth (1973) style regressions, the interaction term becomes significant.

5.3 Controlling for the joint impact of investor sophistication and firm complexity on PEAD

Since Bartov et al. (2000), it has been well documented that sophisticated investors' trading can help reduce the level of the post-earnings announcement drift anomaly. Bartov et al. attribute this to unsophisticated investors' mistaken assumption that the process which underlies earnings is a seasonal random walk. Bartov et al. suggest and document that sophisticated investors such as institutions understand the pricing implications of earnings surprises better and for this reason there is less mispricing and lower PEAD in stocks largely held by institutional investors. We control for the interaction of institutional ownership (IO) with organizational complexity (Conglo) in all of our analyses and document that our main finding cannot be explained by differences in the average investor sophistications of single-segment and multi-segment companies.

In Table 9, we take a step further and analyze the joint impact of organizational complexity and investor sophistication on PEAD. In doing so, every quarter we sort stocks into quintiles based on their institutional ownership percentage, our proxy for investor sophistication. Then, we run our basic regression separately in each quintile. Our results indicate that in IO quintiles 1 and 2 PEAD is economically and statistically larger for conglomerates than for single segment firms. In IO quintiles 3 and 4, PEAD for conglomerates is economically larger but statistically not significantly different from PEAD for single segment firms. In IO quintile 5, where investor sophistication is at its highest, PEAD for conglomerates is about the same as the PEAD for single segment firms. While using the smaller subsamples may reduce the statistical significance of the interaction term, there is a clear pattern in our results. As investor sophistication increases, the PEAD differential between conglomerates and single-segment firms is reduced. Our results suggest that for the subsample of firms with the largest institutional ownership, sophisticated investors fully eliminate the adverse effects of organizational complexity on mispricing.

5.4 Using alternative CAR measures and accounting for non-linearity in SUE

In our final set of robustness checks, we use an alternative measure of abnormal returns, namely four-factor Carhart alphas. In Table 10, we repeat our basic analysis from Table 3 using Carhart alphas as the dependent variable. In particular, we run quarterly Fama-MacBeth regressions of firm-specific Carhart alphas cumulated in the 60 trading days (one-quarter) following earnings announcements ($\alpha C(2;60)$) on earnings surprise (SUE), interactions of SUE with measures of organizational complexity (Conglo, Comp and NSeg) and the standard controls (MB, Size, IO, Loss, Amihud and # Analysts) as well as their interactions with SUE.

Columns (1) to (3) use the baseline definition of SUE, where we winsorize SUE at 99.5% and 0.5% percentile levels every given quarter in order to account for the non-linear relation between SUE and future returns. In columns (4) to (6) we winsorize SUE at 95% and 5% percentile levels in a given quarter to account for both the non-linearity mentioned earlier as well to eliminate the possibility that extreme SUE values drive our results. Finally, in columns (7) to (9) we transform SUE into decile ranks to verify that our main result in this paper leads to a profitable trading strategy.

In column (1) of Table 10, we find that the interaction of SUE with Conglo is virtually unchanged in our basic specification when we replace size-and-BM adjusted returns with Carhart alphas. Similarly, columns (2) and (3) reveal that interactions of SUE with Comp and NSeg, respectively, yield very similar results to those observed in Table 3, suggesting that whether we use size-and-BM adjusted returns or Carhart alphas, we find larger PEAD for organizationally more complicated firms.

Similarly, winsorizing SUE values at the 5^{th} and 95^{th} percentiles every quarter does not change our results. In columns (4) through (6), we find that the interaction of SUE with measures of organizational complexity are all positive and economically as well as statistically significant indicating higher PEAD for conglomerates. Results in columns (4) through (6) suggest that our results are not driven by extreme values of SUE.

Finally, in columns (7) through (9) we repeat our basic Fama-MacBeth (1973) regressions using Carhart alphas and decile values for SUE. Our conclusions are unchanged as these regressions also predict higher PEAD values for more complicated firms. In all specifications, we find that conglomerates have PEAD 25% to 40% larger than the PEAD for single-segment firms. Results in columns (7) through (9) add further evidence to the tradability of this strategy as it utilizes decile portfolios.[38]

6 Conclusions

In this paper, we hypothesize and document that information about complex firms is harder to process, and predict that PEAD is stronger for complex firms. Using organizational structure as our proxy for organizational complexity, we find that firms with more complicated organizational structure (conglomerates) have 34% to 49% larger PEAD compared to simpler firms (single-segment firms) with the same level of unexpected earnings surprise (SUE).

We attribute our findings to the fact that it is more costly and difficult to process firm-specific earnings information about complicated firms. We show that, once we control for firm size and other

[38] Results in column (7) suggest that for an average single-segment firm the hedge return to buying the highest SUE decile and selling the lowest SUE decile is 2.76% while for a similar conglomerate the hedge return for the same trading strategy would be 3.91%. The difference is 1.25% for the three months subsequent to earnings announcement and is tradable.

relevant firm characteristics, conglomerates have lower institutional ownership and smaller presence of short sellers than single-segment firms do. The lack of sophisticated investors who are driven away by information processing costs leads to less efficient pricing and stronger PEAD for conglomerates. We also find that, for a similar reason, conglomerates are covered by fewer analysts and those analysts make larger forecast errors about them compared to single-segment firms with similar firm characteristics. We conclude that relatively less information is produced about conglomerates, which leads again to less efficient pricing and stronger PEAD for conglomerates.

We also find that the earnings announcement reaction is similar for single-segment firms and conglomerates, which, coupled with the stronger PEAD for conglomerates, implies that the total amount of information released at earnings announcements is larger for conglomerates. However, all this extra information seems to be absorbed in the post-announcement window, as evidenced by larger delayed response ratios for conglomerates (59.1%) compared to single-segment firms (44.5%).

To address the concern that conglomerate status is related to a certain unknown variable that also affects the strength of PEAD, we re-examine the effect of complexity on PEAD focusing on periods right after a conglomerate is formed. Consistent with our slower-information-processing hypothesis, PEAD is stronger for new conglomerates than for existing conglomerates. We also find that investors are most confused about firms that expand from within rather than firms that diversify into a new industry via M&A (and receive significant public scrutiny in the process).

Hirshleifer and Teoh's (2003) model predicts that more complicated conglomerates, i.e. those with greater dispersion in the growth rates of their segment level earnings, face larger mispricing. We show empirically that such complicated conglomerates have stronger PEAD. We also use an alternative measure of a conglomerate's complexity based on the divergence in the cost structures of a conglomerate's segments and find that conglomerates have stronger PEAD if operating leverage of their segments is vastly different. Our analysis indicates that, as segments of a conglomerate become more dissimilar, the cognitive costs of processing information in their earnings increase, which leads to larger PEAD for more complicated conglomerates.

Our results are robust to controlling for the impact of analyst responsiveness, ex-ante earnings volatility, time-varying earnings persistence, earnings quality and disclosure complexity on PEAD. We also show that the relation between PEAD and organizational complexity is stronger among firms with lower institutional ownership. This finding suggests that sophisticated investors' preference not to invest in organizationally complicated firms significantly impacts the level of mispricing uncovered in this paper. Finally, we show that our results go through when we use Carhart alphas

instead of size-BM adjusted returns and that our conclusions are robust to alternative definitions of SUE such as using SUE values winsorized at .5% (99.5%/0.5%), 5% (95%/5%) or simply using SUE deciles.

We conclude that organizational complexity, proxied via organizational structure, has a profound effect on how investors process earnings-related information. Our analyses show that investors face large cognitive processing costs when analyzing conglomerates, which leads to stronger PEAD for conglomerates, especially for new conglomerates and conglomerates with diverse business segments.

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Data appendix

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

 # Age - Age measures firm age, as in Gompers and Metrick (2001), by counting the number of months since the first return appears in CRSP file.

 # 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).

Beta – Beta is the systematic risk exposure to market-risk-premium in the Capital Asset Pricing Model and is calculated using the returns from the past 60 months.

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.

Div (dividend payout ratio) – Dividend payout ratio is the ratio of dividends paid out to shareholders scaled by net income.

Forecast dispersion – Forecast dispersion is the standard deviation of all earnings per share (EPS) forecasts, scaled by the absolute value of mean EPS forecasts.

Forecast error - Forecast Error is the absolute value of the difference between consensus earnings forecast and actual earnings, scaled by actual earnings.

GeoMulti (Geographic complexity) - GeoMulti, measuring geographic complexity, is a dummy variable equal to one if the firm generates its sales from a multitude of geographic segments and zero if the firm generates all of its sales from the same geographic segment. In calculating GeoMulti, we use Compustat segment files.

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).

Intan (intangible asset ratio) - Intan is the log of one plus the ratio of intangible assets to total assets.

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).

Lev (book leverage) - is the book leverage measured by total liabilities divided by total assets

Loss - is an indicator variable equal to 1 if the company incurred an operating loss in the immediate quarter, 0 otherwise.

MB (market-to-book) – MB measures the ratio of market value of equity to book value of equity. Book value of equity reported any time within a given calendar year is calculated following Daniel and Titman (2006). If the fiscal year end falls between January and May, then the MB for, say, calendar year 2005 will be the market value of equity as of Dec 2004 scaled by the book equity reported for the fiscal year 2003. If the fiscal year end falls between June and December, then MB ratios for calendar year 2005 will be the market value of equity of as Dec 2004 divided by book equity in fiscal year 2004.

Mlev (market leverage) – Market leverage is calculated as the ratio of the market value of debt scaled by the summation of market value of debt and market value of equity. We calculate the market value of debt using Merton's (1974) structural model.

Momentum - Momentum is the cumulative return between month -2 and month -12.

Mom1 – Mom1 is the cumulative return in the past three months.

Mom4 – Mom4 is the cumulative return between month -4 and month -12.

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.

Rdsales (Research and Development expenses to sales) - Rdsales is the ratio of R&D expense to sales.

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.

Ret_t – Ret_t is the annual stock return of the current year.

Ret_{t-1} - Ret_{t-1} measures the annual stock return of the previous year.

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

RSI (Relative short interest) - Relative short interest is equal to outstanding short position divided by the number of shares outstanding.

Size – Size is market capitalization.

Snp (S&P 500 membership dummy) – Snp is equal to one if the firm is a member of the Standard and Poor's 500 index, zero otherwise.

 # 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

$$SUE_t = \frac{E_t - E_{t-4}}{P_t}$$

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):

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

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

$$\beta = log^2\left(\frac{HI_t}{LO_t}\right) + log^2\left(\frac{HI_{t+1}}{LO_{t+1}}\right) \text{ and } \gamma = log^2\left(\frac{\max(HI_t, HI_{t+1})}{\min(LO_t, LO_{t+1})}\right)$$

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.

Vol (volatility) – Vol is the standard deviation of daily stock returns over the fiscal year.

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

Table 1
Descriptive Statistics

Panel A1. SUE and Organizational Complexity Distribution - All Firms a la Fama MacBeth

			Percentiles										
	# Observations	**Mean**	**1%**	**2.5%**	**5%**	**10%**	**25%**	**50%**	**75%**	**90%**	**95%**	**97.5%**	**99%**
SUE	269,285	-0.004	-0.260	-0.118	-0.060	-0.028	-0.006	0.002	0.006	0.020	0.041	0.079	0.174
Nseg	269,285	1.6	1	1	1	1	1	1.2	2.0	3.1	3.6	4.2	4.7
Comp	269,285	0.108	0	0	0	0	0	0.001	0.134	0.428	0.542	0.609	0.679

Panel A2. SUE and Organizational Complexity Distribution - Conglomerates Only

			Percentiles										
	# Observations	**Mean**	**1%**	**2.5%**	**5%**	**10%**	**25%**	**50%**	**75%**	**90%**	**95%**	**97.5%**	**99%**
SUE	88685	-0.004	-0.246	-0.111	-0.057	-0.027	-0.006	0.001	0.007	0.021	0.041	0.073	0.160
Nseg	88685	2.67	2	2	2	2	2	2.2	3.1	4.0	4.4	5.0	5.7
Comp	88685	0.351	0.007	0.016	0.036	0.076	0.190	0.365	0.499	0.604	0.661	0.699	0.741

Panel B. Earnings Announcements – a la Fama MacBeth

Panel B1. Raw Values

	Single	**Conglo**	**S-C**
SUE	0.153%	0.138%	0.015%
	(7.03)	*(4.24)*	*(0.86)*
EA	-0.030%	0.018%	-0.048%
	(-1.09)	*(2.59)*	*(-1.15)*
# Observations	180,600	88,685	

Panel B2. Absolute Values

	Single	**Conglo**	**S-C**
SUE	0.630%	0.652%	-0.022%
	(20.30)	*(19.90)*	*(-1.31)*
EA	3.622%	2.899%	0.722%
	(17.40)	*(18.70)*	*(8.23)*
# Observations	180,600	88,685	

Note: This table presents mean values of numerous firm characteristics for single-segment firms (``Single") and conglomerates (``Conglo") as well as the difference between single-segment firms and conglomerates (S-C). Conglomerates are defined as firms with business segments in more than one industry (industries are based on two-digit SIC codes) with corresponding information in Compustat Segment files, single-segment firms are all other firms with information in Compustat segment files. Organizational complexity, (*Comp)*, 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. (*Nseg)* is the number of segments the firm has and is an alternative measure of innate business complexity along with (*Conglo)* and (*Comp)*. Segments are counted as distinct business units if they can be assigned to different two-digit SIC industries. (*SUE)* measures surprise unexpected earnings as $(E_t-E_{t-4})/P_t$, 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. (*EA)* measures earnings announcement reaction in percentage returns. Detailed explanations of *SUE, Nseg, Comp, EA* as well as firm level liquidity and information environment variables are in the Data Appendix. The means for all variables as well as differences for different firm characteristics between Single and Conglo firms are calculated quarterly and the time-series averages of these differences are reported in the difference columns hence the term *a la Fama-MacBeth* is used in the descriptions of the relevant panels. The t-statistics use Newey-West (1987) correction for heteroscedasticity and autocorrelation and are reported below each coefficient in *Italic* font and in parentheses in Panel B. The sample period is from January 1977 to December 2010. The number of firm-quarters used in the analyses is abbreviated as *# Observations*.

Table 2
Impact of Organizational Complexity on the Information Environment of the Firm

log(1 + # Analysts)		Forecast Error		log(IO)		Turn		RSI	
	1		2		3		4		5
Intercept	0.008	**Intercept**	0.434	**Intercept**	-1.464	**Intercept**	-12.121	**Intercept**	-0.007
	(0.04)		*(0.66)*		*(-2.55)*		*(-7.13)*		*(0.89)*
Conglo	-0.108	**Conglo**	0.040	**Conglo**	-0.346	**Conglo**	-0.379	**Conglo**	-0.003
	(-10.73)		*(2.84)*		*(-3.46)*		*(-2.04)*		*(-4.25)*
GeoMulti	0.008	**GeoMulti**	-0.026	**GeoMulti**	-0.044	**GeoMulti**	-0.682	**GeoMulti**	-0.003
	(0.79)		*(-1.91)*		*(-0.47)*		*(-4.14)*		*(-4.41)*
Size	0.265	**Size**	0.000	**Size**	0.072	**Size**	0.633	**Size**	-0.000
	(66.38)		*(-0.04)*		*(1.52)*		*(7.06)*		*(-1.10)*
MB	0.028	**MB**	-0.014	**MB**	-0.000	**MB**	0.127	**MB**	0.001
	(21.12)		*(-7.83)*		*(-0.65)*		*(5.28)*		*(6.64)*
Beta	0.075	**Rdsales**	-0.034	**Div**	-0.040	**Beta**	2.604	**Beta**	0.008
	(12.90)		*(-5.57)*		*(-0.39)*		*(19.36)*		*(17.11)*
Nasdaq	0.041	**Lev**	0.318	**Age**	0.000	**Age**	-1.268	**IO**	0.001
	(3.54)		*(10.74)*		*(0.03)*		*(-11.22)*		*(12.68)*
1/P	-0.151	**Intan**	-0.273	**Mom1**	0.001	**Mlev**	2.425	**Ret_{t-1}**	0.000
	(-8.99)		*(-5.07)*		*(2.47)*		*(6.79)*		*(1.81)*
Vol	-0.735	**Vol**	1.440	**Mom4**	-0.001	**# Analysts**	1.072	**Mom**	-0.004
	(-8.27)		*(12.11)*		*(-3.15)*		*(10.09)*		*(-10.54)*
Ret	-0.015	**Loss**	0.196	**Prc**	0.005	**Prc**	2.594	**Prc**	0.009
	(-3.57)		*(12.41)*		*(1.78)*		*(18.24)*		*(14.52)*
Ret_{t-1}	0.011	**Age**	-0.004	**Snp**	-0.237	**Retn**	-0.288	**Loss**	0.008
	(3.31)		*(-6.27)*		*(-1.34)*		*(-58.27)*		*(13.23)*
Turn	0.107	**Log(1+#Analysts)**	-0.216	**Turn**	0.865	**Retp**	0.208		
	(29.70)		*(-18.77)*		*(3.48)*		*(63.09)*		
Loss	-0.087			**Vol**	-0.049	**Loss**	0.596		
	(-10.36)				*(-8.95)*		*(4.50)*		
Age	*-0.005*			**Loss**	-0.556				
	(-9.54)				*(-8.60)*				
ROA	0.147								
	(*4.97*)								
# Observations	185,380	**# Observations**	188,746	**# Observations**	133,435	**# Observations**	445,347	**# Observations**	360,053

Note: In this table we analyze the link between organizational complexity and information production about the firm by comparing single-segment firms and conglomerates across several dimensions. In particular, we investigate the impact of organizational complexity on the quality of information intermediation and the participation of the general investor public as well as sophisticated investors in ownership and trading decisions. In doing so we run panel regressions. We are specifically interested in five dependent variables. *# Analysts* measures the total number of analysts covering a firm. *Forecast Error* is the absolute value of the difference between consensus earnings forecast and actual earnings, scaled by actual earnings. *IO* is the percent of institutional ownership. *Turn* measures turnover as traded dollar volume scaled by market capitalization. *RSI* is relative short interest measured by outstanding short position divided by the number of shares outstanding. *# Analysts* and *Forecast Error* help us measure the quality of information intermediation. *IO* and *RSI* proxy for investor sophistication. *Turn* captures the trading activity of the general investor public. The regressions control for a myriad of firm characteristics. *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. Geographic complexity, (GeoMulti), is a dummy variable equal to one if the firm generates its sales from several geographic segments and zero if the firm generates all of its sales from one geographic segment. *Size* is the logarithm of market capitalization. *MB* is the market-to-book ratio. *Beta* is the CAPM market beta in the past 60 months. *Nasdaq* is a dummy variable equal to one if the firm trades on the Nasdaq stock exchange and zero otherwise. *1/P* is one divided by the year-end stock price. *Vol* is the standard deviation of daily stock returns over the fiscal year. *Ret* is the annual stock return of the current year, and Ret_{t-1} measures the annual stock return of the previous year. *Rdsales* is the ratio of R&D expense to sales. *Lev* is the book leverage measured by total liabilities divided by total assets. *Intan* is the log of one plus the ratio of intangible assets to total assets. *Div* is the dividend payout ratio. *Age* is the firm age. *Mom* is the cumulative return between month -2 and month -12, *Mom1* is the cumulative return in the past three months, and *Mom4* is the cumulative return between month -4 and month -12. *Prc* is the stock price. *Snp* is the membership in the S&P500 index dummy variable. *Mlev* is the market leverage. *Retp* (*Retn*) is the positive (negative) return in the previous quarter which equals to the return if it is positive (negative), zero otherwise. *Loss* is an indicator variable equal to 1 if the company incurred an operating loss in the immediate quarter. *ROA* is return on assets. In all columns we control for year-quarter fixed effects as well as industry fixed effects and cluster standard errors by firm-year, following Peterson (2009). The number of firm-quarters used in the analyses is abbreviated as *# Observations*. The sample excludes firms with market caps in the lowest NYSE/AMEX size quintile. The sample period is from January 1984 to December 2010 as we are not able to calculate analyst forecast errors prior to January 1984 due to data limitation.

Table 3
Impact of Organizational Complexity on the Post-Earnings-Announcement Drift

	1	2	3	4	5	6	7
SUE	0.102	0.068	0.353	0.077	0.351	0.005	0.297
	(3.46)	*(2.31)*	*(3.81)*	*(2.67)*	*(3.74)*	*(0.13)*	*(3.08)*
SUE*Conglo		0.141	0.129				
		(2.73)	*(2.33)*				
SUE*Comp				0.313	0.344		
				(2.79)	*(2.58)*		
SUE*Nseg						0.069	0.066
						(2.50)	*(2.11)*
SUE*MB			-0.411		-0.469		-0.512
			(-1.05)		*(-1.13)*		*(-1.23)*
SUE*Size			0.053		0.038		0.049
			(0.70)		*(0.45)*		*(0.60)*
SUE*IO			0.000		0.001		0.003
			(0.00)		*(0.06)*		*(0.13)*
SUE*Loss			-0.160		-0.161		-0.169
			(-2.95)		*(-2.95)*		*(-3.14)*
SUE*Amihud			0.796		0.815		0.824
			(2.79)		*(2.89)*		*(2.88)*
SUE*# Analysts			-0.059		-0.048		-0.054
			(-1.77)		*(-1.33)*		*(-1.50)*
Conglo		-0.001	-0.001				
		(-0.31)	*(-0.32)*				
Comp				-0.003	-0.001		
				(-0.62)	*(-0.34)*		
Nseg						-0.001	0.000
						(-0.47)	*(-0.42)*
MB			0.018		0.019		0.018
			(1.49)		*(1.48)*		*(1.49)*
Size			0.001		0.001		0.001
			(0.53)		*(0.54)*		*(0.62)*
IO			0.002		0.002		0.002
			(1.77)		*(1.69)*		*(1.71)*
Loss			-0.011		-0.011		-0.011
			(-2.40)		*(-2.46)*		*(-2.46)*
Amihud			0.034		0.035		0.034
			(1.64)		*(1.60)*		*(1.62)*
# Analysts			0.004		0.004		0.004
			(2.44)		*(2.44)*		*(2.45)*
# Observations	113,470	113,470	113,470	113,470	113,470	113,470	113,470

Note: This table presents the results for quarterly Fama-MacBeth regressions of size and book-to-market adjusted cumulative returns in the 60 trading days (one-quarter) following earnings announcements (CAR(2;60)) on earnings surprise, *SUE*, and its interaction with alternative measures of innate business complexity as well as a set of control variables that impact the magnitude of the post earnings announcement drift (PEAD). (*SUE)* measures surprise unexpected earnings as $(E_t-E_{t-4})/P_t$, 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. *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. Business complexity, *Comp*, 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. *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. (*MB)* is the market-to-book ratio. Size (*Size*) is the log of market capitalization. (*IO)* is the percent of institutional ownership. (*Loss)* is an indicator variable equal to 1 if the company incurred an operating loss in the immediate quarter. (*Amihud)* is Amihud's (2002) transaction costs measure. (*# Analysts)* is the number of the analysts covering the firm. The t-statistics use Newey-West (1987) correction for heteroscedasticity and autocorrelation and are reported below each coefficient in *Italic* font and in parentheses. The sample period is from January 1977 to December 2010. The sample excludes firms with market caps in the lowest NYSE/AMEX size quintile. The number of firm-quarters used in the analyses is abbreviated as *# Observations*.

Table 4

Delayed Response Reaction for Single-segment Firms versus Conglomerates

Panel A. PEAD in Extreme Deciles

	Announcement Returns	PEAD Returns	Total Earnings Reaction
	CAR(-1;1)	**CAR(2;60)**	**CAR(-1;60)**
SUETop	0.028	0.022	0.050
	(12.22)	*(3.67)*	*(7.70)*
SUETop*Conglo	-0.002	0.015	0.014
	(-0.66)	*(2.12)*	*(1.74)*
SUETop*MB	-0.001	-0.003	-0.004
	(-0.91)	*(-1.10)*	*(-1.34)*
SUETop*Size	-0.004	-0.001	-0.005
	(-1.49)	*(-0.15)*	*(-0.66)*
SUETop*IO	0.001	-0.006	-0.006
	(0.42)	*(-1.84)*	*(-1.56)*
SUETop*Loss	-0.005	-0.018	-0.023
	(-1.79)	*(-2.55)*	*(-3.00)*
SUETop*Amihud	0.008	0.033	0.041
	(1.47)	*(2.44)*	*(2.78)*
SUETop*# Analysts	-0.003	-0.01	-0.013
	(-2.22)	*(-2.64)*	*(-3.23)*
Conglo	0.000	-0.011	-0.010
	(0.10)	*(-2.10)*	*(-1.92)*
MB	0.001	-0.003	-0.002
	(1.310	*(-1.35)*	*(-0.80)*
Size	0.002	0.001	0.002
	(1.32)	*(0.15)*	*(0.60)*
IO	0.002	0.005	0.007
	(1.89)	*(2.17)*	*(2.68)*
Loss	-0.002	0.005	0.003
	(-1.40)	*(1.13)*	*(0.57)*
Amihud	-0.002	-0.003	-0.005
	(-0.46)	*(-0.35)*	*(-0.49)*
# Analysts	0.002	0.01	0.012
	(2.02)	*(4.02)*	*(4.46)*
# Observations	18,484	18,484	18,484

Panel B. Delayed Response Ratio			
	Single	**Conglo**	**Diff**
Delayed Response Ratio	0.445	0.591	0.146
	(6.36)	*(10.87)*	*(2.17)*
# Observations	18,484	18,484	

Note: Panel A of this table presents the results for quarterly Fama-MacBeth regressions of size and book-to-market adjusted cumulative returns in the three days around earnings announcements, CAR(-1;+1) and in the post-announcement window, CAR(+2;+60), on the top decile dummy (*SUETop*) and on its interactions with the conglomerate dummy (*Conglo*), market-to-book ratio (*MB*), size (*Size*), institutional ownership (*IO*), quarterly loss dummy that takes on a value of one when the firm incurs losses (*Loss*), a measure of transaction costs (*Amihud*) and the number of analysts (*# Analysts*), as well as (*Conglo*), (*MB*), (*Size*), (*Loss*), (*Amihud*) and (*# Analysts*) themselves. SUETop is 1 for the top *SUE* decile and 0 for the bottom *SUE* decile and helps capture hedge returns to going long on the highest SUE decile and going short on the lowest SUE decile (all other firms are dropped from the sample). The t-statistics use Newey-West (1987) correction for heteroscedasticity and autocorrelation and are reported below each coefficient in *Italic* font and in parentheses. Panel B uses the results in Panel A to estimate what fraction of information in earnings announcement is incorporated into the prices outside of the earnings announcement window. Specifically we calculate the ratio of the drift return, CAR(+2,+60), to the total earnings reaction return, CAR(-1,+60), to measure the delayed response ratio for single-segment firms and conglomerates, respectively, and calculate the difference in the delayed response for these two groups of firms for extreme positive (negative) surprise earnings deciles. In Panel B, the z-statistics are reported below each coefficient in *Italic* font and in parentheses. *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. The sample period is from January 1977 to December 2010. The sample excludes firms with market caps in the lowest NYSE/AMEX size quintile. The number of firm-quarters used in the analyses is abbreviated as *# Observations*.

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

PEAD and New Conglomerates			
	1	**2**	**3**
SUE	0.236	0.234	0.239
	(4.39)	*(4.39)*	*(4.36)*
SUE*Conglo	0.086	0.099	0.072
	(2.48)	*(2.69)*	*(2.12)*
SUE*NewConglo	0.146		
	(1.97)		
SUE*M&A		0.004	
		(0.03)	
SUE*NoM&A			0.658
			(2.04)
SUE*MB	0.089	0.121	0.082
	(0.55)	*(0.72)*	*(0.51)*
SUE*Size	-0.033	-0.033	-0.029
	(-1.42)	*(-1.43)*	*(-1.25)*
SUE*IO	-0.018	-0.017	-0.018
	(-1.72)	*(-1.69)*	*(-1.72)*
SUE*Loss	-0.152	-0.151	-0.147
	(-5.92)	*(-5.73)*	*(-5.79)*
SUE*Amihud	0.272	0.267	0.296
	(1.38)	*(1.37)*	*(1.46)*
MB	0.009	0.009	0.009
	(1.47)	*(1.48)*	*(1.47)*
Size	0.002	0.002	0.002
	(1.66)	*(1.65)*	*(1.63)*
IO	0.001	0.001	0.001
	(1.87)	*(1.92)*	*(1.87)*
Loss	-0.009	-0.008	-0.009
	(-2.38)	*(-2.37)*	*(-2.39)*
Amihud	-0.008	-0.007	-0.008
	(-0.93)	*(-0.92)*	*(-0.93)*
Conglo	-0.004	-0.004	-0.004
	(-2.49)	*(-2.66)*	*(-2.54)*
NewConglo	-0.004	-0.002	-0.005
	(-2.02)	*(-0.75)*	*(-1.72)*
# Observations	232,738	232,738	232,738

Note: This table presents the results for quarterly Fama-MacBeth regressions of size and book-to-market adjusted cumulative returns in the 60 trading days (one-quarter) following earnings announcements (CAR(2;60)) on earnings surprise (*SUE*), interactions 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*). We also control for market-to-book (MB), firm size (*Size*), and their interactions in all the regressions. *NewConglo* dummy is equal to one for two years after a firm reports an increase in the number of segments and zero otherwise. NewConglo is set to zero for all single-segment firms. SUE*M&A (SUE*NoM&A) is the interaction of SUE with NewConglo for segment increases that can be attributed to diversifying M&A activity (that cannot be attributed to diversifying M&A activity). The analyses in the table also control for the interactions of SUE with market-to-book (*MB*), size measured as the logarithm of market capitalization (*Size*), institutional ownership (*IO*), a quarterly loss dummy that takes on the value of one when the firm incurs losses (*Loss*), a measure of transaction costs (*Amihud*) as well as (*MB*), (*Size*), (*IO*), (*Loss*), (*Amihud*), (*Conglo*) and (*NewConglo*) themselves. Detailed definitions of all variables are in the Data Appendix. The t-statistics use Newey-West (1987) correction for heteroscedasticity and autocorrelation and are reported below each coefficient in *Italic* font and in parentheses. The sample period is from January 1977 to December 2010. The sample excludes firms with market caps in the lowest NYSE/AMEX size quintile. The number of firm-quarters used in the analyses is abbreviated as *# Observations*.

Table 6
Impact of Conglomerate Complexity on Post Earnings Announcement Drift

PEAD in the Conglomerates Only Sample					
	1	**2**	**3**	**4**	**5**
SUE	0.233	0.224	0.239	0.226	0.292
	(3.36)	*(3.09)*	*(2.55)*	*(2.55)*	*(3.01)*
SUE*HTSD	0.192		0.231		
	(2.08)		*(2.32)*		
SUE*LogHTSD		0.271		0.314	
		(1.89)		*(2.23)*	
SUE*COLV					0.122
					(2.57)
SUE*MB	0.158	0.139	0.083	0.068	0.322
	(0.57)	*(0.54)*	*(0.33)*	*(0.28)*	*(0.72)*
SUE*Size	-0.043	-0.048	-0.042	-0.045	-0.258
	(-0.68)	*(-0.77)*	*(-0.65)*	*(-0.71)*	*(-1.33)*
SUE*Loss	-0.183	-0.183	-0.169	-0.161	-0.234
	(-2.25)	*(-2.36)*	*(-1.87)*	*(-1.89)*	*(-2.13)*
SUE*Amihud	-0.009	-0.005	0.010	0.010	0.036
	(-0.19)	*(-0.10)*	*(0.17)*	*(0.17)*	*(0.31)*
SUE*IO			-0.038	-0.038	-0.134
			(-1.03)	*(-1.00)*	*(-1.50)*
MB	-0.004	-0.004	-0.004	-0.004	0.002
	(-1.09)	*(-1.06)*	*(-0.98)*	*(-0.96)*	*(0.36)*
Size	0.004	0.004	0.004	0.004	0.006
	(1.80)	*(1.78)*	*(1.74)*	*(1.71)*	*(2.94)*
Loss	-0.016	-0.016	-0.014	-0.014	-0.012
	(-4.87)	*(-4.90)*	*(-3.88)*	*(-3.91)*	*(-2.50)*
Amihud	-0.001	-0.001	0.000	0.000	0.001
	(-1.20)	*(-1.19)*	*(0.33)*	*(0.33)*	*(0.54)*
IO			0.002	0.002	0.004
			(2.81)	*(2.72)*	*(3.50)*
HTSD	-0.003		-0.003		
	(-1.83)		*(-1.97)*		
LogHTSD		-0.006		-0.008	
		(-1.82)		*(-2.20)*	
COLV					0.001
					(0.67)
# Observations	59,280	59,280	54,648	54,648	45,124

Note: This table presents the results for quarterly Fama-MacBeth regressions of size and book-to-market adjusted cumulative returns in the 60 trading days (one-quarter) following earnings announcements (CAR(2;60)) on earnings surprise, SUE, and its interactions with (*HTSD)* and (*COLV)*. (*HTSD)* is a theoretical construct proposed by Hirshleifer and Teoh (2003), which captures the level of dispersion in segment growth rates with respect to the aggregate growth rate of the firm. (*LogHTSD)* is the natural logarithm of one plus *HTSD*. (*COLV)* is the standard deviation of a firm's sales weighted operating leverage divided by the equally weighted average operating leverage of its segments. Segments are counted as distinct business units if they can be assigned to different two-digit SIC industries. The analyses control for the interactions of SUE with market-to-book (*MB*), logarithm of market capitalization (*Size*), institutional ownership (*IO*), a quarterly loss dummy that takes on the value of one when the firm incurs losses (*Loss*), transaction costs (*Amihud*) as well as (*MB*), (*Size*), (*IO*), (*Loss*), (*Amihud*) themselves. The t-statistics use Newey-West (1987) correction for heteroscedasticity and autocorrelation and are reported below each coefficient in *Italic* font and in parentheses. The sample period is from January 1978 to December 2011. The one-year lag in the sample is necessary in order to calculate segment and firm growth rates. The sample excludes firms with market caps in the lowest NYSE/AMEX size quintile. The number of firm-quarters used in the analyses is abbreviated as # Observations.

Table 7
Robustness: Controlling for Potential Spillover from Industry-wide Information Events on PEAD

Complexity Measure	Conglo	Conglo	Comp	Nseg
	1	2	3	4
SUE	0.375	0.350	0.347	0.286
	(4.03)	*(3.90)*	*(3.80)*	*(3.09)*
SUE*Complexity		0.136	0.357	0.072
		(2.45)	*(2.70)*	*(2.25)*
PCRet* Complexity	0.046	0.029	0.040	0.044
	(2.19)	*(1.29)*	*(1.85)*	*(1.97)*
SUE*MB	-0.542	-0.396	-0.455	-0.496
	(-1.31)	*(-1.02)*	*(-1.11)*	*(-1.20)*
SUE*Size	0.070	0.049	0.034	0.043
	(0.83)	*(0.63)*	*(0.39)*	*(0.52)*
SUE*IO	0.002	-0.000	0.001	0.003
	(0.07)	*(-0.02)*	*(0.04)*	*(0.12)*
SUE*Loss	-0.154	-0.160	-0.160	-0.168
	(-2.77)	*(-2.96)*	*(-2.97)*	*(-3.17)*
SUE*Amihud	0.784	0.795	0.810	0.820
	(2.71)	*(2.89)*	*(2.96)*	*(2.97)*
SUE*# Analysts	-0.049	-0.059	-0.048	-0.055
	(-1.47)	*(-1.77)*	*(-1.34)*	*(-1.51)*
Complexity		-0.001	-0.002	-0.000
		(-0.29)	*(-0.49)*	*(-0.53)*
PCRet	-0.008	-0.004	-0.007	-0.007
	(-0.37)	*(-0.17)*	*(-0.31)*	*(-0.32)*
MB	0.019	0.018	0.018	0.017
	(1.53)	*(1.57)*	*(1.55)*	*(1.55)*
Size	0.001	0.001	0.001	0.001
	(0.54)	*(0.60)*	*(0.62)*	*(0.70)*
IO	0.002	0.002	0.002	0.002
	(1.81)	*(1.85)*	*(1.79)*	*(1.80)*
Loss	-0.012	-0.012	-0.012	-0.012
	(-2.63)	*(-2.63)*	*(-2.70)*	*(-2.69)*
Amihud	0.035	0.034	0.036	0.035
	(1.60)	*(1.63)*	*(1.60)*	*(1.62)*
# Analysts	0.004	0.004	0.004	0.004
	(2.35)	*(2.40)*	*(2.39)*	*(2.40)*
# Observations	112,520	112,520	112,520	112,520

Note: This table presents the results for quarterly Fama-MacBeth regressions of size and book-to-market adjusted cumulative returns in the 60 trading days (one-quarter) following earnings announcements (CAR(2;60)) on earnings surprise (*SUE*), interaction of *SUE* with *Conglo* (*Comp* / *Nseg*), interactions of (*SUE)* with the recurring control variables, as well as *Conglo* (*Comp* / *Nseg*) and the usual control variables themselves. Furthermore, we also control for the impact of industry-wide information events, estimated via pseudo-conglomerate returns (*PCRet*), in all columns. Recurring control variables include market-to-book (*MB*), size (*Size*), institutional ownership (*IO*), loss dummy (*Loss*), transaction costs (*Amihud*) and the number of analysts (*# Analysts*). *Conglo* is the conglomerate dummy, equal to 1 if the firm is a conglomerate and 0 otherwise. Innate business complexity, *Comp*, is 1-HHI, where HHI is the Herfindahl index computed using segment sales shares within a conglomerate. *Nseg* is the number of distinct business segments that the firm operates in. The t-statistics use Newey-West (1987) correction for heteroscedasticity and autocorrelation and are reported below each coefficient in *Italic* font and in parentheses. The sample period is from January 1977 to December 2010. The sample excludes firms with market caps in the lowest NYSE/AMEX quintile. The number of firm-quarters used in the analyses is abbreviated as *# Observations*.

Table 8

Robustness: Controlling for Alternative Explanations of PEAD

	1	2	3	4	5	6	7	8	9	10	11	12	13
SUE	0.159	0.159	0.156	0.154	0.163	0.126	0.222	0.168	0.180	0.157	0.175	0.042	0.335
	(5.84)	(5.40)	(5.34)	(3.21)	(3.30)	(2.14)	(2.07)	(6.16)	(5.80)	(2.61)	(2.99)	(0.33)	(1.26)
SUE*Conglo	0.088	0.057	0.065	0.094	0.086	0.212	0.214	0.082	0.069	0.125	0.131	0.338	0.245
	(2.54)	(1.60)	(1.85)	(1.74)	(1.68)	(2.55)	(2.52)	(2.32)	(1.90)	(1.76)	(1.87)	(2.71)	(1.87)
SUE*MB	0.071	-0.088	-0.103	-0.033	-0.030	-0.066	-0.090	-0.062	-0.047	-0.656	-0.601	-0.754	-0.563
	(0.35)	(-0.20)	(-0.24)	(-0.37)	(-0.35)	(-0.44)	(-0.58)	(-0.20)	(-0.13)	(-1.45)	(-1.41)	(-1.97)	(-1.10)
SUE*Size	-0.039	-0.052	-0.055	-0.004	0.001	0.000	-0.005	-0.033	-0.033	-0.113	-0.118	0.119	0.096
	(-1.77)	(-1.78)	(-1.95)	(-0.11)	(0.02)	(0.00)	(-0.09)	(-1.58)	(-1.47)	(-1.82)	(-1.89)	(1.16)	(0.89)
SUE*IO	-0.015	-0.013	-0.014	-0.020	-0.022	0.061	0.071	-0.022	-0.019	-0.075	-0.074	-0.040	-0.130
	(-1.34)	(-1.07)	(-1.16)	(-1.13)	(-1.19)	(1.48)	(1.69)	(-1.80)	(-1.58)	(-2.19)	(-2.10)	(-0.57)	(-1.57)
SUE*Loss	-0.144	-0.164	-0.157	-0.129	-0.135	-0.283	-0.275	-0.162	-0.157	-0.282	-0.288	-0.049	0.014
	(-5.90)	(-5.46)	(-5.42)	(-2.50)	(-2.50)	(-1.45)	(-1.40)	(-6.71)	(-6.64)	(-4.28)	(-4.36)	(-0.27)	(0.05)
SUE*Amihud	0.111	0.077	0.077	0.164	0.163	0.070	0.071	0.123	0.143	-0.027	-0.018	0.198	0.118
	(1.45)	(1.38)	(1.33)	(1.99)	(1.96)	(0.80)	(0.79)	(1.80)	(1.79)	(-0.70)	(-0.46)	(1.32)	(0.72)
SUE*EP			0.012										-0.013
			(0.98)										(-0.24)
SUE*FOG					-0.044								-0.009
					(-1.69)								(-0.15)
SUE*DRESP							-0.300						-0.255
							(-1.15)						(-1.43)
SUE*EarnVol									-0.010				-0.002
									(-0.83)				(-0.03)
SUE*VolDA											0.052		0.150
											(1.23)		(1.48)
Conglo	-0.004	-0.005	-0.004	-0.004	-0.004	0.001	0.001	-0.004	-0.004	-0.004	-0.004	-0.007	-0.005
	(-2.26)	(-2.31)	(-2.29)	(-1.62)	(-1.63)	(0.24)	(0.46)	(-2.44)	(-2.38)	(-1.86)	(-1.85)	(-2.11)	(-1.78)
MB	0.001	0.004	0.004	0.004	0.003	-0.001	-0.001	0.001	0.000	0.002	0.003	0.003	0.000
	(0.10)	(0.34)	(0.33)	(1.10)	(1.01)	(-0.33)	(-0.31)	(0.10)	(-0.05)	(0.61)	(0.90)	(0.94)	(0.09)
Size	0.003	0.002	0.002	0.003	0.003	0.003	0.002	0.003	0.003	0.003	0.003	0.042	0.335
	(2.17)	(1.94)	(1.93)	(1.68)	(1.69)	(1.79)	(1.48)	(2.22)	(2.36)	(2.02)	(2.10)	(0.33)	(1.26)
IO	0.001	0.001	0.001	0.002	0.002	0.003	0.002	0.001	0.001	0.003	0.003	0.003	0.002
	(1.49)	(1.48)	(1.47)	(1.09)	(1.09)	(1.97)	(1.76)	(1.42)	(1.51)	(2.30)	(2.28)	(1.60)	(1.58)
Loss	-0.008	-0.008	-0.008	-0.002	-0.002	-0.012	-0.012	-0.007	-0.007	-0.010	-0.009	-0.003	-0.006
	(-1.87)	(-1.74)	(-1.79)	(-0.31)	(-0.32)	(-1.94)	(-1.97)	(-1.70)	(-1.60)	(-1.87)	(-1.86)	(-0.44)	(-0.85)
Amihud	-0.001	0.002	0.002	-0.001	-0.001	-0.008	-0.008	-0.001	-0.001	0.003	0.003	-0.009	-0.006
	(-0.57)	(0.75)	(0.80)	(-0.36)	(-0.42)	(-3.11)	(-2.99)	(-0.57)	(-0.45)	(2.24)	(2.31)	(-2.26)	(-2.04)

EP			0.000										0.000
			(-0.73)										(-0.36)
FOG					0.001								0.002
					(1.13)								(1.02)
DRESP							0.009						0.013
							(2.22)						(2.33)
EarnVol									-0.001				0.001
									(-1.61)				(0.47)
VolDA											0.052		0.001
											(1.23)		(1.21)
# Observations	233,373	173,584	173,584	114,765	114,765	87,365	87,365	218,789	218,789	67,372	67,372	24,653	24,653

Note: This table presents the results for quarterly Fama-MacBeth regressions of size and book-to-market adjusted cumulative returns in the 60 trading days (one-quarter) following earnings announcements (CAR(2;60)) on earnings surprise (*SUE*), interaction of SUE with the conglomerate dummy, (*Conglo*), and the interactions of SUE with a set of control variables, as well as the conglomerate dummy and the set of control variables themselves. The control variables include market-to-book (*MB*), size (*Size*), institutional ownership (*IO*), a quarterly loss dummy that takes on a value of one when the firm incurs losses (*Loss*), a measure of transaction costs (*Amihud*) and where appropriate we also control for time-varying earnings persistence (*EP*), textual complexity (*FOG*), analyst responsiveness (*DRESP*), earnings volatility (*EarnVol*) and earnings quality (*VolDA*). Earnings Persistence (*EP*) is the firm-specific time-varying autocorrelation between two adjacent quarterly seasonally differenced earnings (SDE), where the autocorrelation is estimated in a two-step procedure using 14 persistence-related firm characteristics each quarter following Chen (2013). Our proxy for disclosure complexity is the Gunning FOG index calculated as in Li (2008). We got the (*FOG)* data from Feng Li's website, for which we are grateful. Following Zhang (2008) our measure of analyst responsiveness at the firm level is an indicator variable (*DRESPj,t)* which equals 1 if at least one analyst following firm j in quarter t is responsive to earnings announcements, and 0 otherwise. Ex-ante earnings volatility (*EarnVol*) is calculated following Cao and Narayanamoorthy (2012). (*VolDA*) captures the information quality of earnings and is defined as the coefficient of variation (standard deviation divided by average) of discretionary accruals computed as in Dechow and Dichev (2002). Detailed definitions of all control variables are either in the manuscript or in the Data Appendix. The t-statistics use Newey-West (1987) correction for heteroscedasticity and autocorrelation and are reported below each coefficient in *Italic* font and in parentheses. The sample period is from January 1977 to December 2010. The sample excludes firms with market caps in the lowest NYSE/AMEX size quintile. The number of firm-quarters used in the analyses is abbreviated as *# Observations*.

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Table 9
Robustness: Joint impact of organizational complexity and investor sophistication on PEAD

Joint Impact of Innate Business Complexity and Institutional Ownership on PEAD					
Institutional Ownership Quintiles	**Low**	**Quintile 2**	**Quintile 3**	**Quintile 4**	**High**
SUE	0.305	0.215	0.288	0.201	0.299
	(3.18)	*(1.66)*	*(2.69)*	*(2.51)*	*(2.07)*
SUE*Conglo	0.264	0.317	0.182	0.087	-0.031
	(2.11)	*(1.97)*	*(1.25)*	*(0.68)*	*(-0.14)*
SUE*MB	-0.223	-0.017	0.184	-0.239	-0.011
	(-0.82)	*(-0.09)*	*(0.85)*	*(-1.14)*	*(-0.04)*
SUE*Size	0.014	0.038	0.160	0.402	0.101
	(0.10)	*(0.16)*	*(0.69)*	*(2.62)*	*(0.54)*
SUE*Loss	-0.288	-0.277	-0.344	0.069	-7.566
	(-2.78)	*(-1.95)*	*(-2.39)*	*(0.32)*	*(-1.06)*
SUE*Amihud	0.389	0.245	0.179	-0.013	0.384
	(2.25)	*(2.02)*	*(1.35)*	*(-0.09)*	*(2.16)*
SUE*# Analysts	-0.115	-0.072	0.004	-0.131	-0.212
	(-1.50)	*(-0.57)*	*(0.04)*	*(-1.35)*	*(-1.56)*
Conglo	-0.002	-0.008	-0.000	0.002	0.004
	(-0.52)	*(-2.33)*	*(-0.04)*	*(0.82)*	*(1.37)*
MB	0.002	0.004	0.012	0.002	0.001
	(0.20)	*(1.90)*	*(2.49)*	*(1.21)*	*(0.76)*
Size	-0.000	0.000	0.000	-0.001	0.002
	(-0.08)	*(0.25)*	*(-0.04)*	*(-0.42)*	*(0.99)*
Loss	-0.004	-0.010	-0.009	-0.009	0.092
	(-0.73)	*(-1.56)*	*(-1.49)*	*(-1.69)*	*(0.81)*
Amihud	0.008	0.002	0.001	0.001	- 0.003
	(1.16)	*(1.17)*	*(0.90)*	*(0.30)*	*(-1.26)*
# Analysts	0.003	0.003	0.005	0.007	0.003
	(1.68)	*(1.66)*	*(3.10)*	*(3.69)*	*(1.29)*
# Observations	23,947	21,421	22,717	22,479	22,904

Note: This table presents the results for quarterly Fama-MacBeth regressions of size and book-to-market adjusted cumulative returns in the 60 trading days (one-quarter) following earnings announcements (CAR(2;60)) on earnings surprise, SUE, and its interaction with organizational complexity, measured using the *Conglo* dummy, in five distinct cross-sections sorted based on the percentage owned by institutions *(IO)*. *Conglo* is equal to 1 if the firm is a conglomerate and 0 otherwise. Every quarter, firms are classified into five distinct institutional ownership groups. In column (1) we use firm-quarters with the lowest institutional ownership, in column (2) institutional ownership is in the 2nd lowest quintile, in column (3) we limit our analyses to firm-quarters where (*IO*) is in the median quintile, in column (4) we use firm-quarters in the 2nd highest (*IO*) quintile and in column (5) we use firm-quarters that are in the highest institutional ownership quintile. The analyses in the table also control for the interactions of SUE with market-to-book (*MB*), size (*Size*), quarterly loss dummy (*Loss*), transaction costs (*Amihud*) and the number of analysts (*# Analysts*), as well as (*Conglo*), (*MB*), (*Size*), (*Loss*), (*Amihud*) and (*# Analysts*) themselves. The t-statistics use Newey-West (1987) correction for heteroscedasticity and autocorrelation and are reported below each coefficient in Italic font and in parentheses. The sample period is from January 1977 to December 2010. The sample excludes firms with market caps in the lowest NYSE/AMEX size quintile. The number of firm-quarters used in the analyses is abbreviated as # Observations.

Table 10
Robustness: Accounting for Non-Linearity in SUE and Using Alternative CAR Measures in PEAD Regressions

	Carhart Alphas			Winsorized SUE			SUE as Decile Rank		
	1	2	3	4	5	6	7	8	9
Complexity Measure	**(Conglo)**	**(Comp)**	**(NSeg)**	**(Conglo)**	**(Comp)**	**(NSeg)**	**(Conglo)**	**(Comp)**	**(NSeg)**
SUE	0.401	0.404	0.361	0.759	0.762	0.630	0.031	0.032	0.023
	(3.16)	*(3.12)*	*(2.85)*	*(5.62)*	*(5.44)*	*(4.59)*	*(4.74)*	*(5.09)*	*(2.98)*
SUE* Complexity	0.129	0.338	0.060	0.194	0.490	0.127	0.013	0.023	0.008
	(2.18)	*(2.42)*	*(1.89)*	*(1.85)*	*(1.90)*	*(2.15)*	*(2.30)*	*(1.64)*	*(2.71)*
SUE*MB	-0.352	-0.414	-0.453	-1.770	-1.792	-1.840	0.011	0.010	0.010
	(-0.96)	*(-1.02)*	*(-1.14)*	*(-1.96)*	*(-1.96)*	*(-1.98)*	*(1.14)*	*(0.96)*	*(1.05)*
SUE*Size	0.088	0.067	0.072	0.023	0.018	0.022	-0.045	-0.045	-0.049
	(0.79)	*(0.55)*	*(0.62)*	*(0.26)*	*(0.19)*	*(0.24)*	*(-1.92)*	*(-1.86)*	*(-2.03)*
SUE*IO	0.006	0.005	0.007	-0.071	-0.072	-0.070	-0.015	-0.015	-0.014
	(0.23)	*(0.21)*	*(0.03)*	*(-1.74)*	*(-1.73)*	*(-1.71)*	*(-2.26)*	*(-2.24)*	*(-2.13)*
SUE*Loss	-0.146	-0.151	-0.163	-0.299	-0.299	-0.303	-0.018	-0.018	-0.018
	(-2.62)	*(-2.57)*	*(-2.77)*	*(-3.17)*	*(-3.16)*	*(-3.19)*	*(-2.82)*	*(-2.83)*	*(-2.89)*
SUE*Amihud	0.981	1.022	1.037	1.467	1.466	1.482	-0.004	-0.006	-0.006
	(2.82)	(2.95)	(2.95)	(2.97)	(2.96)	(3.03)	(-0.17)	(-0.25)	(-0.24)
SUE*# Analysts	-0.077	-0.061	-0.067	-0.196	-0.192	-0.192	-0.025	-0.025	-0.024
	(-2.28)	(-1.65)	(-1.82)	(-4.19)	(-3.97)	(-3.64)	(-2.55)	(-2.54)	(-2.44)
Complexity	-0.005	-0.010	-0.003	-0.000	-0.001	-0.000	-0.001	-0.004	-0.001
	(-2.36)	(-2.01)	(-2.72)	(-0.19)	(-0.22)	(-0.21)	(-0.53)	(-1.29)	(-0.63)
MB	0.000	0.001	0.000	0.018	0.019	0.018	0.015	0.015	0.015
	(0.07)	(0.26)	(0.02)	(1.51)	(1.51)	(1.52)	(3.20)	(3.13)	(3.17)
Size	-0.002	-0.002	-0.001	0.001	0.001	0.001	0.037	0.037	0.037
	(-1.56)	(-1.56)	(-1.27)	(0.52)	(0.51)	(0.58)	(2.96)	(3.01)	(3.03)
IO	0.001	0.001	0.001	0.002	0.002	0.002	0.005	0.005	0.005
	(1.12)	(1.02)	(1.00)	(1.68)	(1.62)	(1.63)	(1.32)	(1.24)	(1.26)
Loss	-0.008	-0.009	-0.009	-0.011	-0.011	-0.011	-0.018	-0.018	-0.010
	(-2.19)	(-2.28)	(-2.29)	(-2.29)	(-2.31)	(-2.30)	(-2.83)	(-2.83)	(-2.29)
Amihud	0.046	0.047	0.048	0.029	0.031	0.030	0.026	0.026	0.026
	(1.99)	(1.96)	(1.95)	(1.57)	(1.55)	(1.55)	(2.29)	(2.29)	(2.29)
# Analysts	0.001	0.001	0.001	0.004	0.004	0.004	0.009	0.009	0.009
	(0.50)	(0.49)	(0.51)	(2.61)	(2.60)	(2.59)	(2.02)	(1.97)	(2.00)
# Observations	113,173	113,173	113,173	113,470	113,470	113,470	113,470	113,470	113,470

Note: This table presents the results for quarterly Fama-MacBeth regressions of firm-specific Carhart alphas in the 60 trading days (one-quarter) following earnings announcements $\alpha_C(2;60)$) on earnings surprise (*SUE*), interactions of *SUE* with three different measures of organizational complexity (*Conglo*, *Comp* and *Nseg*), interactions of SUE with a recurring set of standard controls (*Size. MB, IO, Loss, Amihud, # Analysts*) as well as the controls themselves. Columns one to three use the baseline definition of *SUE* (winsorized at 99.5% and 0.5% percentiles), columns four to six winsorize *SUE* at 95% and 5% percentiles, columns seven to nine transform *SUE* into decile ranks. The t-statistics use Newey-West (1987)correction for heteroscedasticity and autocorrelation and are reported below each coefficient in *Italic* font and in parentheses. The sample period is from January 1977 to December 2010. The sample excludes firms with market caps in the lowest NYSE/AMEX size quintile. The number of firm-quarters used in the analyses is abbreviated as *# Observations*.