

Purchase Obligations, Earnings Persistence and Stock Returns

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Abstract

This paper examines whether the disclosure of purchase obligations in the MD&A section of 10-K filings provides useful information to investors. Firms are predicted to enter into additional purchase obligations when they expect an increase in demand for their products. As such, growth in purchase obligations is predicted to be associated with higher future sales and earnings. The evidence is consistent with these predictions. This suggests that the disclosure of purchase obligations is useful for predicting firm performance. Further tests document a positive contemporaneous relation between stock returns and the growth in purchase obligations, consistent with the information in purchase obligations being value-relevant. However, the investor response appears to be incomplete. Results show that the change in purchase obligations is positively associated with future abnormal stock returns. Additional tests provide evidence suggesting that analyst forecasts also do not appear to fully reflect the implications of the change in purchase obligations.

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1. Introduction

On January 28, 2003, the SEC issued a final rule to implement Section 401(a) of the Sarbanes-Oxley Act of 2002 and codify its earlier statements regarding transparency and quality of financial disclosure. The new rule requires public companies to disclose an overview of their contractual obligations in their 10-K for fiscal years ending on or after December 15, 2003. In particular, companies are required to disclose four major categories of contractual obligations – long-term debt obligations, capital lease obligations, operating lease obligations and purchase obligations. Because U.S. GAAP had already required companies to aggregate and assess the first three categories of contractual obligations before January 2003, the additional information that companies are required to disclose under the new rule is purchase obligations - the total amount of purchase obligations and approximate timing of payments due in future periods.

This paper examines whether the disclosure of purchase obligations is useful for understanding and predicting firm performance. The SEC defines a purchase obligation as an enforceable and legally binding agreement to purchase goods or services in the future. A firm's purchase obligations represent the amount of production inputs that the firm has committed to purchase. A firm will likely adjust the amount of its purchase obligations in response to its expectation about future demand for its products. Consequently, an increase in a firm's purchase obligations could indicate that the firm expects an increase in future demand for its products. Therefore, this paper predicts that change in purchase obligations is positively associated with future firm performance.

I test this prediction by investigating a sample of publicly traded firms from fiscal years 2003 to 2007. Change in purchase obligations (Δ Purchase hereafter) is defined as the annual change in purchase obligations due within one year. This paper finds that Δ Purchase is positively associated with future sales and earnings. Results show that an increase in purchase obligations equal to one percent of average total assets is associated with an increase in future sales equal to approximately 0.58 percent of average total assets. It is also associated with an increase in future

operating income equal to approximately 0.06 percent of average total assets. The positive relation among Δ Purchase, future sales and future earnings is robust to the inclusion of contemporaneous sales growth and accrual components of current earnings.

I examine whether investors respond to the information contained in the disclosure of purchase obligations when the information is released. I measure stock returns over a period of three trading days beginning from the filing date of a 10-K. Results show that Δ Purchase is not significantly associated with the filing-period returns, suggesting that investors do not respond to this information at the 10-K filing dates.

Next, I examine whether investors fully understand the implications of Δ Purchase for future sales and earnings. Results show that Δ Purchase is positively associated with stock returns over the one-year period prior to the 10-K filing dates. Δ Purchase is also positively associated with one-year-ahead stock returns following the three-day 10-K filing window. This suggests that although investors appear to anticipate the contribution of Δ Purchase to future performance before 10-Ks are filed, they do not fully incorporate the resulting implications of Δ Purchase in determining stock prices. Therefore, there is a delayed stock price response to Δ Purchase. Additional tests show that a strategy of buying firms in the top decile of Δ Purchase and selling short firms in the bottom decile of Δ Purchase generates a hedge return of 6.99% over a 12-month holding period.

Finally, I examine whether analysts incorporate the implications of Δ Purchase in their forecasts of future earnings. By investigating the time-series pattern of analyst forecast errors in the periods surrounding the filing of a 10-K, I find that forecast errors are positively correlated with Δ Purchase in the periods before and after the filing of a 10-K. This suggests that analysts fail to incorporate the implications of Δ Purchase in their forecasts of one-year-ahead earnings. Therefore, analyst forecasts tend to be more pessimistic for firms with high Δ Purchase in the periods after the filing of a 10-K. This result suggests that the delayed stock price response to Δ Purchase can be at least partially explained by analysts' inability to incorporate the implications

of Δ Purchase when generating earnings forecasts.

This paper makes three contributions to the literature. First, the results document that the disclosure of purchase obligations is useful for predicting firm performance. Purchase obligations are executory contracts where both parties to the contract have not yet performed their duties. As such, purchase obligations do not meet the FASB definitions of an asset and a liability; therefore, they are not recorded on the balance sheet.¹ However, a large number of firms engage in purchase obligations, and purchase obligations may also have a significant impact on the firms' liquidity. Thus, the SEC reasoned that investors could benefit from this information. As a result, the SEC mandated the disclosure of purchase obligations in the Management's Discussion and Analysis section of 10-Ks as part of firms' contractual obligations. This paper confirms that this disclosure provides useful information to investors.

The second contribution relates to the literature on corporate investment. Since purchase obligations represent a firm's commitment to purchase production inputs at some future periods of time, they can be viewed as the firm's intended future investment. This paper documents that the annual change in the intended investment is positively associated with future sales and earnings. It also finds that growth in purchase obligations translates into asset growth on the future balance sheet, particularly fixed assets. This positive relation between annual change in purchase obligations and future asset growth explains why the change in purchase obligations is positively associated with future performance. These findings are in sharp contrast to the negative association between contemporaneous asset growth and future performance that has been extensively documented in the literature on corporate investment²

Finally, this paper contributes to the literature that documents a relation between stock prices and non-GAAP leading indicators. Existing research on non-GAAP leading indicators has

¹ FASB Statement of Financial Accounting Concepts No. 6 provides definitions of an asset and a liability. The complete text of FASB SFAC 6 can be found at <http://www.fasb.org/pdf/con6.pdf>.

² See, for example, Fairfield, Whisenant and Yohn (2003a), Fairfield, Whisenant and Yohn (2003b); Richardson, Sloan, Soliman and Tuna (2005); and Ge (2006).

primarily focused on the value-relevance of the leading indicators.³ Moreover, several recent studies have examined whether the stock market correctly prices the contribution of non-GAAP leading indicators to future performance.⁴ This paper investigates both the value-relevance of Δ Purchase and the stock market's pricing of Δ Purchase. Findings in this paper suggest that Δ Purchase is a leading indicator of future sales and earnings, and stock prices act as if investors anticipate the value-relevance of Δ Purchase before 10-Ks are filed. However, the delayed stock price response suggests that investors fail to fully incorporate the implications of Δ Purchase for future sales and earnings.

The remainder of the paper is organized as follows. The next section explains the details of the SEC rule that requires the disclosure of purchase obligations, summarizes the types and amount of purchase obligations reported by companies in my sample, and present the portion of purchase obligations due by each period in the future. Section 3 develops testable hypotheses on the relation between annual change in purchase obligations and future earnings. It also discusses how investors and analysts react to the information contained in the disclosure of purchase obligations. Section 4 describes sample formation and defines the financial variables. Section 5 presents the main findings of this paper. Section 6 concludes the paper.

2. Background Information on Purchase Obligations

Section 2.1 discusses the details of the SEC rule that requires the disclosure of purchase obligations. Section 2.2 provides examples of purchase obligations reported by leading firms in each industry. Section 2.3 summarizes the amount of purchase obligations by industry. Finally, Section 2.4 presents the portion of purchase obligations due by each period in the future.

³ Examples of value-relevant leading indicators examined in the literature include product market size and market penetration information in the wireless industry (Amir and Lev 1996), customer satisfaction scores (Ittner and Larcker 1998) and web traffic measures in the Internet industry (Trueman, Wong, and Zhang 2001).

⁴ For example, Rajgopal, Shevlin and Venkatachalam (2003) find that stock prices act as if investors overweight the contribution of level of order backlogs in predicting future earnings. In contrast, Baik and Ahn (2007) provide evidence suggesting that investors underweight the contribution of changes in order backlogs. Regarding customer satisfaction scores, recent studies find that customer satisfaction scores do not predict future abnormal stock returns (Ittner, Larcker and Taylor 2009; Jacobson and Mizik 2009).

2.1. The Final Rule to Implement Section 401(a) of the Sarbanes-Oxley Act of 2002

On January 28, 2003, the SEC issued a final rule to implement Section 401(a) of the Sarbanes-Oxley Act of 2002.⁵ The final rule specifically affected public companies in two separate areas: disclosure of off-balance-sheet arrangements; and disclosure of contractual obligations. The rule required public companies to disclose, in a tabular format, an overview of their known contractual obligations at the balance sheet date. (See Appendix A for the tabular format required by the SEC.) The disclosure is first required for annual filings for fiscal years ending on or after December 15, 2003.

[Appendix A]

According to the rule, companies are required to report the timing and amounts of payments due under the categories of contractual obligations specified in the tabular format. While companies must provide amounts, aggregated by type of contractual obligations, they may disaggregate the specified categories of contractual obligations using other categories suitable to their business. The table also should be accompanied by footnotes or other pertinent data that help understand the timing and amount of the companies' specified contractual obligations.

The rule requires companies to disclose four categories of contractual obligation - long-term debt obligations, capital lease obligations, operating lease obligations and purchase obligations. The first three categories of contractual obligations are defined by FASB Statements of Financial Accounting Standards, and have been disclosed in 10-Ks since the 1980s. On the other hand, this rule provides a definition for purchase obligations, and mandates their disclosure in the Management's Discussion and Analysis section of 10-Ks.

The SEC defines a purchase obligation as an enforceable and legally binding agreement to purchase goods or services that specifies significant terms regarding quantities, price and the approximate timing of transaction. The SEC requires that the disclosure of purchase obligations

⁵ The complete text of this rule can be found at <http://sec.gov/rules/final/33-8182.htm>.

be accompanied by footnotes to discuss any material termination or renewal provisions, and any material market risk due to variable price provisions.

The SEC rule released on January 28, 2003 mandated tabular disclosure of contractual obligations by public companies other than small business issuers.⁶ On December 19, 2007, the SEC adopted amendments to its disclosure and reporting requirements, and exempted smaller reporting companies from the tabular disclosure of contractual obligations.⁷ Therefore, companies qualifying as smaller reporting companies are not required to provide tabular disclosure of contractual obligations in their annual filings due after February 4, 2008.⁸

2.2. Overview of Types of Purchase Obligations Reported in 10-Ks

Appendix B summarizes the types of purchase obligations reported by leading firms in each industry group in fiscal year 2007. From each of the 49 industry groups based on the Fama-French industry classification schemes, I selected firms that are large in terms of market capitalization and also well-known to the general public.⁹ Firms do not typically disaggregate purchase obligations into components in the table of contractual obligations; however, this information is contained in the footnotes attached to the table. Therefore, I read these footnotes or explanations to the table in each firm's 10-K filing, and summarize the types of purchase obligations reported by the firm in Appendix B.

[Appendix B]

Appendix B shows that firms enter into various types of purchase obligations, with inventory purchase commitments being the most common category of purchase obligations. As

⁶ A company qualifies as a small business issuer if it has revenues of less than \$25 million and has a public float of less than \$25 million.

⁷ The complete text of the amendments can be found at <http://www.sec.gov/rules/final/2007/33-8876.pdf>.

⁸ A company qualifies as a smaller reporting company if it has a public float of less than \$75 million. A company without a calculable public float qualifies as a smaller reporting company if its revenues are below \$50 million. A public float is the aggregate market value of the issuer's voting and non-voting common equity held by non-affiliates.

⁹ This paper employs the industry classification schemes obtained from Kenneth French's online data library. (http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html)

can be seen from the appendix, most companies have commitments to purchase inventory – raw material, product components, supplies, merchandise, etc. Also, the majority of firms report service-related contracts as parts of their purchase obligations. Such contracts include information technology, marketing and advertising, research and development, and transportation services. Capital expenditures and construction commitments, minimum royalty payment obligations and licensing agreements are common as well.

Appendix B shows that the types of purchase obligations reported in 10-K filings vary significantly across industries. For instance, while retailers have purchase obligations which primarily consist of commitments to purchase merchandise inventory, utilities companies have a substantial amount of power purchase agreements. On the other hand, companies in the communication industry have a large amount of programming commitments, and some financial companies report commitments to purchase securities and loans as parts of their purchase obligations. The primary purchase obligations of companies in the printing and publishing industry are contracts to purchase paper and printing service agreements.

In addition to this across-industry variation in the types of purchase obligations, there is also a substantial difference in the types of purchase obligations among firms within the same industry. A good example demonstrating that two firms in the same industry, with analogous operations, might enter into different types of purchase obligations is Merck & Co, Inc. and Pfizer Inc. As Appendix B shows, both firms are in the same industry (pharmaceutical products), and they both discover, develop, manufacture and market medicines for humans and animals. However, Merck & Co, Inc. reports inventory contracts, R&D and advertising agreements as its purchase obligations, while Pfizer Inc.'s purchase obligations primarily consist of advertising agreements, information technology services and employee benefit administration services.

It is also possible that firms in the same industry may have similar but varying operating activities, so they enter into different types of purchase obligations. For example, both Microsoft Corp. and Google Inc. are in the computer software industry. However, the former develops and

manufactures a wide range of software products for various computing devices, while the latter provides an automated search engine service and generates revenue by delivering online advertising. These differences in the two firms' operating activities partly explain why they enter into different types of purchase obligations; Google Inc.'s purchase obligations consist of commitments related to data center operations and facility build-outs, while Microsoft Corp.'s purchase obligations consist of open purchase orders and take-or-pay contracts.

2.3. Summary of Amount of Reported Purchase Obligations by Industry

Appendix C summarizes the amount of purchase obligations by industry in fiscal year 2007. For each firm in my base sample, I calculate the present value of the firm's total purchase obligations outstanding at the end of fiscal year 2007 using a 5% discount rate, and then divide the present value of purchase obligations by the firm's total assets at the end of fiscal year 2007. If a firm, which does not qualify either as a small business issuer or as a smaller reporting company, does not disclose any purchase obligations in its 10-K, I assume that the firm has zero purchase obligations because it is required to disclose purchase obligations in its fiscal year 2007 10-K.

[Appendix C]

Appendix C shows that there are large across- and within-industry variations in the amount of purchase obligations measured in terms of total assets. First, the amount of purchase obligations varies significantly across industries. For instance, utilities companies have purchase obligations that are, on average, larger than 30% of their total assets. Firms in the defense industry also have purchase obligations that are large relative to their total assets. On the other hand, companies in the banking and insurance industries usually have the smallest amount of purchase obligations relative to their total assets. In addition to the across-industry variation in the magnitude of purchase obligations, we find large within-industry variations in the amount of purchase obligations. A simple way to check the within-industry variations is to compare the mean and maximum magnitudes of purchase obligations for each industry group. Appendix C

shows that, for 46 out of the 49 industry groups, the maximum magnitude of purchase obligations is at least three times larger than the mean magnitude, and this can be interpreted as a direct evidence of the large within-industry variation in the magnitude of purchase obligations. Lastly, by comparing the mean and median magnitude of purchase obligations for each industry, we find that the magnitude of purchase obligations has a skewed distribution. For 48 out of the 49 industry groups, the mean magnitude of purchase obligations is larger than the median magnitude, which indicates that the distribution of the magnitude of purchase obligations is skewed to the right.

2.4. Portion of Purchase Obligations Due by Future Period

Appendix D summarizes the portion of purchase obligations due by future period relative to total purchase obligations in fiscal year 2007. For each firm in my base sample with non-zero purchase obligations, I calculate the ratio of purchase obligations due by each future period to total purchase obligations. Ratio_1 is defined as purchase obligations due within one year divided by total purchase obligations. Ratio_23 is defined as purchase obligations due between one and three years divided by total purchase obligations. Ratio_45 is defined as purchase obligations due between three and five years divided by total purchase obligations. Ratio_TA is defined as purchase obligations due after five years divided by total purchase obligations.

[Appendix D]

Appendix D shows the cross-sectional distributions of these ratios. Panel A shows the distributions of the ratios based on all firms in my base sample, and Panel B shows those based on all but financial and utilities firms in the sample. Panels A and B show that, for an average firm in my base sample, approximately 70% of its total purchase obligations are due within one year. In addition, Panel C shows that approximately 30% of my sample firms do not have any purchase obligations due after one year. This indicates that firms tend to limit the majority of their purchase obligations to the one-year period subsequent to the current fiscal year.

3. Hypotheses Development

This paper tests four hypotheses. The first hypothesis addresses the association between Δ Purchase and future operating performance. The second hypothesis concerns whether investors anticipate the contribution of Δ Purchase to future sales and earnings. The third hypothesis pertains to whether investors correctly price the information contained in Δ Purchase. The last hypothesis relates how analysts use the information when forecasting future earnings.

First, I expect that Δ Purchase is positively correlated with future performance, *ceteris paribus*. As shown in Appendix D, firms generally limit the majority of their purchase obligations to the one-year period immediately following the current fiscal year. Thus, firms have the flexibility to adjust the amount of their purchase obligations each year in response to their expectation of future demands. Consequently, an increase in a firm's purchase obligations could indicate that the firm expects an increase in future demand. Therefore, I predict that Δ Purchase is positively associated with future performance.

H1 (null): Δ Purchase has no implications for future performance.

H1 (alternative): Δ Purchase is positively associated with future performance, after controlling for contemporaneous performance.

The second hypothesis concerns whether investors anticipate the contribution of Δ Purchase to future performance. Existing studies on non-GAAP leading indicators document the association between contemporaneous stock returns and the leading indicators, suggesting that investors anticipate the contribution of the leading indicators to future performance (e.g., Amir and Lev 1996; Ittner and Larcker 1998; Trueman, Wong and Zhang 2001). If these results extend to the information contained in the purchase obligations disclosure, Δ Purchase would be positively associated with contemporaneous stock returns. Therefore, I predict that Δ Purchase is positively associated with stock returns measured over the one-year period prior to the 10-K filing dates.

H2 (null): There is no relationship between $\Delta\text{Purchase}$ and contemporaneous annual stock returns.

H2 (alternative): $\Delta\text{Purchase}$ is positively associated with contemporaneous annual stock returns.

The third hypothesis pertains to whether the investor response is complete. If investors fully anticipate the contribution of $\Delta\text{Purchase}$ to future sales and earnings, there would be no significant association between future abnormal stock returns and $\Delta\text{Purchase}$. But, if investors fail to fully appreciate the contribution of $\Delta\text{Purchase}$, future abnormal stock returns would be positively associated with $\Delta\text{Purchase}$. If investors overweight the contribution of $\Delta\text{Purchase}$, future abnormal stock returns would be negatively associated with $\Delta\text{Purchase}$.¹⁰ Therefore, I present the following hypotheses.

H3 (null): There is no relationship between $\Delta\text{Purchase}$ and future annual stock returns.

H3 (alternative 1): $\Delta\text{Purchase}$ is positively associated with future annual stock returns.

H3 (alternative 2): $\Delta\text{Purchase}$ is negatively associated with future annual stock returns.

The last hypothesis relates to how analysts use the information contained in $\Delta\text{Purchase}$. Prior studies provide mixed evidence on whether analysts incorporate available information into their forecast of future earnings.¹¹ If analysts fully incorporate the implications of $\Delta\text{Purchase}$ in their forecasts of one-year-ahead earnings, there would be no significant association between $\Delta\text{Purchase}$ and analyst forecast errors in the periods following the filing of a 10-K. However, if analysts fail to fully incorporate the implications of $\Delta\text{Purchase}$, analyst forecasts would be more pessimistic for firms with high $\Delta\text{Purchase}$ in the periods following the filing of a 10-K; thus, analyst forecast errors would be positively associated with $\Delta\text{Purchase}$ in the period following the filing of a 10-K.

¹⁰ Rajgopal, Shevlin and Venkatachalam (2003) provide evidence suggesting that investors appear to overweight the contribution of order backlogs in predicting future earnings.

¹¹ Research on order backlog suggests that analysts correctly incorporate order backlog data into their earnings forecast (e.g., Rajgopal, Shevlin and Venkatachalam 2003). On the other hand, other studies provide evidence suggesting that analysts appear to underreact to prior earnings news (e.g., Abarbanell and Bernard 1992; Soffer and Lys 1999).

H4 (null): There is no relationship between Δ Purchase and analyst forecast errors in the periods following the filing of a 10-K.

H4 (alternative): Δ Purchase is positively associated with greater analyst forecast pessimism in the periods following the filing of a 10-K.

4. Data

Panel A of Table 1 shows the sample formation process. I construct the base sample using publicly traded companies on the Compustat annual database, and the sample period extends from fiscal years 2003 to 2007. I exclude small business issuers and smaller reporting companies from the sample because they are not required to disclose purchase obligations in their company annual filings. I collect purchase obligations data from the 10-K filings submitted by the companies in the sample. The procedures of collecting purchase obligations data is detailed in Appendix E. If a firm does not disclose any purchase obligations in its 10-K for the fiscal year ending on or after December 15, 2003, I assume that the firm-year observation has zero purchase obligations. On the other hand, if a firm does not disclose any purchase obligations in its 10-K for the fiscal year ending before December 15, 2003, I drop the firm-year observation. Then, I merge my dataset with the Compustat and CRSP databases using the GVKEY-CIK links provided by Compustat. The resulting sample is called the base sample, and is used for the preliminary analysis presented in Appendices B and C.

I use a subset of the base sample for the empirical analyses in Section 5. The subsample is called the test sample. To construct the test sample, I first exclude utilities and financial firms from the base sample.^{12, 13} Then, I delete firm-years with zero changes in purchase obligations.

¹² Firms in the utilities industry are considered to have stable demand for their products. Therefore, the changes in these firms' purchase obligations are unlikely to indicate the change in their expectation about future demand. For this reason, I exclude utilities companies.

¹³ Purchase obligations reported by financial companies often include obligations to provide funding under certain terms and conditions. (e.g., loan commitment) These obligations constitute a financial service, which is more similar to an obligation to sell than an obligation to purchase. Therefore, I exclude financial companies because they follow an extended definition of purchase obligations.

Moreover, I eliminate firm-years in the top and bottom 1% of each financial variable in order to avoid the undue influence of extreme observations. I also eliminate observations for fiscal year 2003 because purchase obligations data for two consecutive years are required for constructing the main variable of this paper, $\Delta\text{Purchase}$. The final sample consists of 6,444 firm-year observations, and the sample period extends from fiscal years 2004 to 2007. This sample is called the test sample, and is used for the empirical analyses in Sections 5.1 and 5.2.

[Table 1 and Appendix E]

For the empirical analysis in Section 5.3 where I examine investor response to $\Delta\text{Purchase}$, I further eliminate 209 firm-years for which stock price and return data are unavailable from the CRSP, 44 firm-years where 10-K filings occur more than 120 days after fiscal year end, and 54 firm-years with a stock price less than \$1. Therefore, the sample used in Section 5.3 consists of 6,137 firm-years.

For the analysis in Section 5.4 where I examine the time-series pattern of forecast errors, I eliminate 2,213 firm-year observations without IBES coverage. Therefore, the sample used in Section 5.4 consists of 4,231 firm-year observations.

Panel B of Table 1 provides definitions of financial variables that will be used in the empirical tests. $\Delta\text{Purchase}$ is defined as the annual change in purchase obligations due within one year.¹⁴ $\Delta\text{Sales_Q4}$ is defined as the annual change in the fourth-quarter sales. ΔINV is defined as the annual change in total inventories. ΔPPE is defined as the annual change in total property, plant and equipment. Total accruals (TACC) are defined as the sum of the change in non-cash working capital (ΔWC), the change in net non-current operating assets (ΔNCO) and the change in net financial assets (ΔFIN). ΔSales is defined as the annual change in total sales. As in previous research, I deflate these variables by average total assets. As a measure of accounting income, I

¹⁴ In constructing $\Delta\text{Purchase}$, I use on the within-one-year portion of purchase obligations, rather than total purchase obligations. The within-one-year portion directly represents the amount of resources that will be purchased and used by the firm in the next year. Thus, defining $\Delta\text{Purchase}$ using the within-one-year portion of purchase obligations makes $\Delta\text{Purchase}$ a more precise indicator of the next year's firm performance. The tenor of the results remains unchanged when I define $\Delta\text{Purchase}$ using total purchase obligations.

use return on assets (ROA), which is defined as operating income after depreciation deflated by average total assets.¹⁵

5. Empirical Results

5.1. Descriptive Statistics

Table 2 provides summary statistics of the financial variables used in this section. Panel A reports the distribution of $\Delta\text{Purchase}$ by fiscal year. The panel shows that $\Delta\text{Purchase}$ has a positive mean in each fiscal year, indicating that firms in the test sample, on average, increase the within-one-year portion of their purchase obligations over time. The panel also shows that the mean value of $\Delta\text{Purchase}$ is greater than the median value of $\Delta\text{Purchase}$ in each fiscal year, suggesting that the distribution of $\Delta\text{Purchase}$ is skewed to the right.

[Table 2]

Panel B reports the distributions of other financial variables used in the empirical analysis. First, $\Delta\text{Sales_Q4}$ has a mean of 0.0289, indicating that the average growth in the fourth-quarter sales is approximately a 2.89% of total assets. Second, ΔINV has a mean of 0.0106, and ΔPPE has a mean of 0.0229. This indicates that the average annual growths in total inventories and total property, plant and equipment are approximately 1.06% and 2.29% of total assets, respectively. Third, TACC has a mean of 0.0432, indicating that the magnitude of total accruals is, on average, as large as 4.32% of total assets. Lastly, the mean value of ROA is 0.0624. This indicates that an average firm in the test sample earns 6.24% of total assets as operating income after depreciation.

Panel C provides correlations among $\Delta\text{Purchase}$ and contemporaneous financial variables. For ease of exposition, I discuss the Spearman correlations. First, $\Delta\text{Purchase}_t$ is positively correlated with $\Delta\text{Sales_Q4}_t$ (0.1809). Second, $\Delta\text{Purchase}_t$ is positively correlated with ROA_t

¹⁵ In this paper, I use operating income after depreciation as accounting income. The tenor of the result remains unchanged when income before extraordinary items is used as a measure of accounting income.

(0.0978). Third, $\Delta\text{Purchase}_t$ is positively correlated with accrual components of earnings, ΔINV_t (0.1587), ΔPPE_t (0.1071) and TACC_t (0.1106). Overall, these results indicate that $\Delta\text{Purchase}$ is positively correlated with variables measuring contemporaneous firm performance, with the strongest correlation with $\Delta\text{Sales_Q4}$. This suggests that firms tend to increase their purchase obligations when they have good contemporaneous operating performance, especially sales growth in the last quarter of the current fiscal year.

Panel D provides correlations among $\Delta\text{Purchase}$ and future financial variables. For ease of exposition, I discuss the Spearman correlations. First, $\Delta\text{Purchase}$ is positively correlated with ΔSales_{t+1} (0.1705). Second, $\Delta\text{Purchase}$ is positively correlated with ROA_{t+1} (0.1120). Third, $\Delta\text{Purchase}$ is positively correlated with accrual components of one-year-ahead future earnings, ΔINV_{t+1} (0.1202), ΔPPE_{t+1} (0.1621) and TACC_{t+1} (0.1148). These results indicate that $\Delta\text{Purchase}$ is positively correlated with variables measuring future operating performance. The panel also shows that $\Delta\text{Purchase}_t$ is positively correlated with SAR_{t+1} (0.0479), indicating that $\Delta\text{Purchase}$ is positively correlated with future stock return performance as well as future operating performance.

5.2. $\Delta\text{Purchase}$ and Future Performance

Table 3 shows future operating performance for portfolios of sample firms formed on $\Delta\text{Purchase}$. Each year, firms are ranked into deciles based on $\Delta\text{Purchase}$. The table shows that $\Delta\text{Purchase}$ is positively correlated with one-year-ahead change in sales and one-year-ahead change in ROA. This supports the prediction that $\Delta\text{Purchase}$ is positively associated with future performance, after controlling for contemporaneous performance. For instance, firms in the bottom decile have an average one-year-ahead change in ROA of -0.0191, while firms in the top decile have an average one-year-ahead change in ROA of -0.0002. The table also shows that $\Delta\text{Purchase}$ is positively correlated with accrual components of one-year-ahead earnings. This suggests that $\Delta\text{Purchase}$ is positively associated with future asset growth. For example, firms in

the bottom decile of $\Delta\text{Purchase}$ have an average one-year-ahead change in inventories of 0.0003, while firms in the top decile have an average one-year-ahead change in inventories of 0.0144.

[Table 3 and Figure 1]

Figure 1 shows the time-series properties of financial variables using a constant sample of 901 firms from fiscal years 2004 to 2007. Each panel provides the mean value of the corresponding financial variable for firm-years in the top and bottom deciles of $\Delta\text{Purchase}$, adjusted by the mean value of the variable for all the firm-years in the constant sample. Lowest $\Delta\text{Purchase}$ portfolio consists of 360 firm-years in the bottom decile of $\Delta\text{Purchase}$, and highest $\Delta\text{Purchase}$ Portfolio consists of 364 firm-years in the top decile of $\Delta\text{Purchase}$. Year 0 is the year in which firms are ranked into deciles based on $\Delta\text{Purchase}$.

Panel A shows that firms in the top decile of $\Delta\text{Purchase}$ have a higher average ROA in Year 0 than those in the bottom decile, and the difference in ROA becomes larger in Year 1. This suggests that earnings do not appear to mean-revert for firms in both deciles. Panel B shows that ΔSales is significantly higher in Year 0 for firms in the top decile than those in the bottom decile. Also, ΔSales continues to be low in the bottom decile in Year 1, while it remains high in the top decile. Panel C shows that firms in the top decile have significantly higher total accruals in Year 0 than those in the bottom decile, and the significant difference persists into Year 1. Panels D and E shows that ΔINV and ΔPPE have similar time-series properties: firms in the top decile have a higher mean in Year 0 than those in the bottom decile, and the difference persists into Year 1. These time-series properties of TACC, ΔINV and ΔPPE suggest that firms in the extreme deciles do not appear to reverse their accruals in a subsequent period. Panel F shows that firms in the top decile have large positive size-adjusted returns in Year 0, and they continue to have positive size-adjusted stock returns in Year 1. On the other hand, firms in the bottom decile have negative size-adjusted stock returns in both Year 0 and Year 1.

Table 4 provides the results of multivariate regressions. In Panel A, I estimate regression models using one-year-ahead change in sales (ΔSales_{t+1}) as a dependent variable, and $\Delta\text{Purchase}_t$

as an independent variable. In particular, I estimate the following regression:

$$\Delta\text{Sales}_{t+1} = \beta_0 + \beta_1\Delta\text{Purchase}_t + \beta_2X_t + \beta_3YD + \beta_4ID + \varepsilon_t \quad (1)$$

In Panel B, I estimate regression models using future ROA (ROA_{t+1}) as a dependent variable, and $\Delta\text{Purchase}_t$ and contemporaneous ROA (ROA_t) as independent variables. ROA_t is included in the regression model to control for autocorrelation of ROA. In particular, I estimate the following regression:

$$\text{ROA}_{t+1} = \beta_0 + \beta_1\text{ROA}_t + \beta_2\Delta\text{Purchase}_t + \beta_3X_t + \beta_4YD + \beta_5ID + \varepsilon_t \quad (2)$$

Regression models in Panel C use one-year-ahead change in profit margin (ΔPM_{t+1}) and one-year-ahead change in asset turnover (ΔATO_{t+1}) as a dependent variable, and $\Delta\text{Purchase}_t$ as an independent variable. In particular, I estimate the following regressions:

$$\Delta\text{PM}_{t+1} = \beta_0 + \beta_1\Delta\text{Purchase}_t + \beta_2X_t + \beta_3YD + \beta_4ID + \varepsilon_t \quad (3)$$

$$\Delta\text{ATO}_{t+1} = \beta_0 + \beta_1\Delta\text{Purchase}_t + \beta_2X_t + \beta_3YD + \beta_4ID + \varepsilon_t \quad (4)$$

X_t in the regression models (1) to (4) denotes control variables such as $\Delta\text{Sales_Q4}_t$, ΔINV_t , ΔPPE_t , and TACC_t . To control for year and industry fixed effects, year and industry dummies are also included. YD denotes year dummies, and ID denotes industry dummies. Because the sample covers four fiscal years from 2004 to 2007, three year dummies are included. Industry dummies indicate 49 industry groups based on the Fama-French industry classification scheme. The regression models are estimated using a pooled, cross-sectional time-series regression, and the reported t-statistics are based on White standard errors that are clustered by fiscal year and industry (Petersen 2009).

[Table 4]

Panel A provides results indicating that there is a positive relation between $\Delta\text{Purchase}_t$ and ΔSales_{t+1} . In the first regression model, the coefficient estimate on $\Delta\text{Purchase}_t$ is 0.5804.

This indicates that an increase in purchase obligations equal to one percent of average total assets is associated with an increase in future sales equal to approximately 0.58 percent of average total assets. The second regression model shows that the coefficient on $\Delta\text{Purchase}_t$ is still positive after controlling for $\Delta\text{Sales_Q4}_t$, though it drops significantly from 0.5804 to 0.2826. This indicates that $\Delta\text{Purchase}_t$ has incremental explanatory power for ΔSales_{t+1} , while $\Delta\text{Sales_Q4}_t$ has a predominant impact on ΔSales_{t+1} . The last regression model shows that the positive coefficient on $\Delta\text{Purchase}$ is robust to the inclusion of accrual components of current earnings.

The results in Panel B indicate that there is a positive relation between $\Delta\text{Purchase}_t$ and ROA_{t+1} . In the first regression model, the coefficient estimate on $\Delta\text{Purchase}_t$ is 0.0636, indicating that an increase in purchase obligations equal to one percent of average total assets leads to approximately a 0.06 percentage point increase in next year's return on assets. The second regression model shows that the positive coefficient on $\Delta\text{Purchase}$ drops from 0.0636 to 0.0463, indicating that $\Delta\text{Sales_Q4}$ partially subsumes the positive association between $\Delta\text{Purchase}$ and future ROA. The last regression model shows that the positive coefficient on $\Delta\text{Purchase}_t$ is robust to the inclusion of accrual components of current earnings, while the coefficients on the accrual components are all negative.

Results presented in Panels A and B indicates that $\Delta\text{Purchase}$ provides an incremental signal about future operating performance that is not available from existing information. In particular, $\Delta\text{Purchase}$ supplements $\Delta\text{Sales_Q4}$ in predicting one-year-ahead sales and earnings. This suggests that $\Delta\text{Purchase}$ captures short-term momentum in fundamentals.

Panel C examines the association between $\Delta\text{Purchase}$ and DuPont components of one-year-ahead ROA. The first regression model shows that the coefficient estimate on $\Delta\text{Purchase}_t$ is positive, but statistically insignificant. This indicates that $\Delta\text{Purchase}$ is not associated with ΔPM_{t+1} . On the other hand, the second regression model shows that the coefficient estimate on $\Delta\text{Purchase}_t$ is positive and statistically significant, indicating that $\Delta\text{Purchase}$ is positively associated with ΔATO_{t+1} . These relations between $\Delta\text{Purchase}$ and the multiplicative components

of one-year-ahead ROA explain the mechanics of the positive association between $\Delta\text{Purchase}$ and one-year-ahead ROA.

5.3. $\Delta\text{Purchase}$ and Stock Returns

Now, I examine whether investors respond to the information contained in the disclosure of purchase obligations when the information is released. I measure filing-period size-adjusted returns over a period of three trading days beginning from the filing date of a 10-K.¹⁶

$$\text{FPR}_t = \prod_{k=0}^2 (1 + R_{i,k}) - \prod_{k=0}^2 (1 + R_{p,k})$$

where $R_{i,k}$ is the return on stock i on trading day k relative to the firm's 10-K filing date, and $R_{p,k}$ is the return on the size-matched portfolio on trading day k relative to the firm's 10-K filing date.

$$\text{FPR}_t = \beta_0 + \beta_1 \Delta\text{Purchase}_t + \beta_2 X_t + \beta_3 \text{YD} + \beta_4 \text{ID} + \varepsilon_t \quad (5)$$

I estimate the regression model (5). X_t denotes control variables such as $\Delta\text{Sales_Q4}_t$, ΔINV_t , ΔPPE_t , TACC_t , BM_t and MOM_t . To control for year and industry fixed effects, year and industry dummies are also included. The regression models are estimated using a pooled, cross-sectional time-series regression, and the reported t-statistics are based on White standard errors that are clustered by fiscal year and industry.

Results of multivariate regressions are presented in Panel A of Table 5. The results show that $\Delta\text{Purchase}$ is not significantly associated with the filing-period returns. This suggests that investors do not respond to the information contained in the disclosure of purchase obligations.

[Table 5]

In Panel B, I examine the relationship between $\Delta\text{Purchase}$ and size-adjusted stock returns

¹⁶ In this paper, size-adjusted returns are computed by deducting the value-weighted average return on the size-matched portfolio, and the size-matched portfolios are based on the market capitalization deciles of NYSE, AMEX and NASDAQ firms. For size-adjusted returns, each stock is matched with one of 10 size portfolios at the end of June based on the market capitalization. The daily returns of 10 size portfolios are from Kenneth French's online data library.

over the one-year period prior to the 10-K filing dates. In particular, I measure the stock returns over a period of 252 trading days before the 10-K filing dates.

$$SAR_t = \prod_{k=-252}^{-1} (1 + R_{i,k}) - \prod_{k=-252}^{-1} (1 + R_{p,k})$$

where $R_{i,k}$ is the return on stock i on trading day k relative to the firm's 10-K filing date, and $R_{p,k}$ is the return on the size-matched portfolio on trading day k relative to the firm's 10-K filing date.

$$SAR_t = \beta_0 + \beta_1 ROA + \beta_2 \Delta ROA + \beta_3 \Delta Purchase_t + \beta_4 X_t + \beta_5 YD + \beta_6 ID + \varepsilon_t \quad (6)$$

I estimate the regression model (6). X_t denotes control variables such as $\Delta Sales_Q4_t$, ΔINV_t , ΔPPE_t , and $TACC_t$. To control for year and industry fixed effects, year and industry dummies are also included. The regression models are estimated using a pooled, cross-sectional time-series regression, and the reported t-statistics are based on White standard errors that are clustered by fiscal year and industry.

Results of multivariate regressions are presented in Panel B of Table 5. The results show that the coefficient estimate on $\Delta Purchase$ is positive and statistically significant. This suggests that investors appear to anticipate the contribution of $\Delta Purchase$ to future sales and earnings before 10-Ks are filed.

Further, I examine the relationship between $\Delta Purchase$ and size-adjusted stock returns over the one-year period following the three-day 10-K filing window. In particular, I measure the stock returns over a period of 252 trading days beginning from the third trading day after the filing date of a 10-K.

$$SAR_{t+1} = \prod_{k=3}^{254} (1 + R_{i,k}) - \prod_{k=3}^{254} (1 + R_{p,k})$$

where $R_{i,k}$ is the return on stock i on trading day k relative to the firm's 10-K filing date, and $R_{p,k}$ is the return on the size-matched portfolio on trading day k relative to the firm's 10-K filing date.

$$SAR_{t+1} = \beta_0 + \beta_1 \Delta Purchase_t + \beta_2 X_t + \beta_3 YD + \beta_4 ID + \varepsilon_t \quad (7)$$

I estimate the regression model (7). X_t denotes control variables such as $\Delta Sales_Q4_t$, ΔINV_t , ΔPPE_t , and $TACC_t$. Year and industry dummies are also included. The regression models are estimated using a pooled, cross-sectional time-series regression, and the reported t-statistics are based on White standard errors that are clustered by fiscal year and industry.

Results of multivariate regressions are presented in Panel A of Table 6. The results show that the coefficient estimate on $\Delta Purchase$ is positive and statistically significant. In the first regression model, the coefficient estimate on $\Delta Purchase_t$ is 0.3250. This indicates that an increase in purchase obligations equal to one percent of average total assets is associated with a 0.3250 percentage point increase in one-year-ahead size-adjusted stock returns. In the second regression model, the coefficient on $\Delta Purchase$ remains positive, and the magnitude of the estimated coefficient on $\Delta Purchase$ also remains similar.

[Table 6]

Panel B of Table 6 reports average future stock returns for portfolios of sample firms formed on $\Delta Purchase$. Each year, firms are ranked into deciles based on $\Delta Purchase$. The hedge returns are calculated as the difference of portfolio returns between the top and bottom deciles.

When I examine the one-year-ahead raw returns, the portfolio with the lowest $\Delta Purchase$ has an average return of -10.28%, while the portfolio with the highest $\Delta Purchase$ has an average return of 0.18%. Therefore, the hedge return is 10.46%. When I examine the one-year-ahead size-adjusted returns, the portfolio with the lowest $\Delta Purchase$ has an average return of -3.50%, while the portfolio with the highest $\Delta Purchase$ has an average return of 3.49%. Therefore, the hedge return is 6.99%. Finally, I examine the one-year-ahead size-B/M-adjusted returns.¹⁷ The

¹⁷ Size-B/M-adjusted returns are calculated by deducting the value-weighted average return for all firms in the same size-B/M-matched portfolio. For size-B/M-adjusted returns, each stock is matched with one of 25 size-B/M portfolios at the end of June based on the market capitalization and B/M, the book equity of the last fiscal year end in the prior calendar year divided by the market value of equity at the end of December of the prior year. The monthly returns of 25 size-B/M portfolios are from Kenneth French's online data library.

portfolio with the lowest $\Delta\text{Purchase}$ has a mean return of -3.70%, while the portfolio with the highest $\Delta\text{Purchase}$ has a mean return of 3.04%. Therefore, the hedge return is 6.74%.

Results of the stock return regressions and hedge portfolio returns presented in Table 6 indicate that although investors appear to appreciate the value-relevance of $\Delta\text{Purchase}$, they fail to fully incorporate the implications of $\Delta\text{Purchase}$ in determining stock prices. Therefore, there is a delayed stock price response to $\Delta\text{Purchase}$ in the one-year period after the filing of a 10-K.

5.4. $\Delta\text{Purchase}$ and Analyst Forecast Revisions

In this section, I examine whether analysts fully understand the information contained in $\Delta\text{Purchase}$, and incorporate the information into their forecasts of one-year-ahead earnings.¹⁸ I use data on individual analysts' forecasts of annual earnings per share obtained from Institutional Brokers Estimate System (I/B/E/S) Detail History file in order to calculate consensus forecasts and forecast errors.

Following Richardson, Teoh and Wysocki (2004), I sort analysts' forecasts into twelve groups by 30-day blocks in order to track analyst forecast revisions leading up to the announcement of one-year-ahead earnings. Forecasts made less than 30 days prior to the announcement of one-year-ahead earnings are grouped in Month-1, forecasts between 30- and 60-day lags in Month-2, and so on up to Month-12. Because one-year-ahead earnings are announced on the last day of Month-1, we can assume that earnings for the most recent fiscal year¹⁹ are announced on the first day of Month-12. Additionally, we assume that a 10-K for the most recent fiscal year is filed with the SEC on the last day of Month-12²⁰, and the first-quarter earnings are announced on the first day of Month-9.

¹⁸ By "one-year-ahead" earnings, I refer to those earnings currently being accrued during the fiscal year in progress (year t+1). Because the fiscal year (year t+1) is still on-going, it is more appropriate to refer to these earnings as "one-year-ahead" earnings, rather than "current earnings".

¹⁹ By "the most recent fiscal year", I refer to the fiscal year which just ended (year t).

²⁰ The average number of days between the announcement of annual earnings and the filing of 10-K is 28.9 for firm-years in the test sample.

I calculate a monthly consensus forecast for each firm using the median analyst forecast in each month. The forecast error is defined as the actual earnings per share minus the median forecast of earnings per share scaled by the stock price at the beginning of the year. Formally, forecast error for firm i in year t and forecast horizon month- m is calculated as:

$$(\text{Forecast Error})_{i,t+1,m} = [(\text{Actual EPS})_{i,t+1} - (\text{Consensus Forecast})_{i,t+1,m}] / (\text{Stock Price})_{i,t+1}$$

If analysts fully understand the implications of $\Delta\text{Purchase}$ for future earnings, they should revise their forecasts of one-year-ahead earnings in response to $\Delta\text{Purchase}$ immediately after the filing date of a 10-K for the most recent fiscal year. Therefore, forecast errors for a given month after the filing of a 10-K will not be explained by $\Delta\text{Purchase}$. If analysts fail to fully incorporate the positive association between $\Delta\text{Purchase}$ and one-year-ahead earnings into their forecasts, then forecast errors will be positively correlated with $\Delta\text{Purchase}$ in the periods following the filing of a 10-K.

Figure 2 shows the time-series pattern of forecast errors for two groups of sample firms: one group consists of firms with the highest $\Delta\text{Purchase}$, and the other group consists of firms with the lowest $\Delta\text{Purchase}$. Firms with the highest $\Delta\text{Purchase}$ have, on average, positive forecast errors during the period of Month-12 to Month-9, while firms with the lowest $\Delta\text{Purchase}$ have, on average, negative forecast errors during the same period. This indicates that analyst forecasts are more pessimistic for firms with the highest $\Delta\text{Purchase}$ during the period of Month-12 to Month-9, suggesting that analysts fail to incorporate the information contained in $\Delta\text{Purchase}$ into their forecasts of one-year-ahead earnings after the first-quarter earnings are announced. Figure 2 also shows that the difference in forecast errors between the two groups continues to exist in the remaining periods, but the difference is statistically insignificant.

[Figure 2]

The time-series pattern of forecast errors documented in Figure 2 is supplemented with regression tests that use actual forecast errors as the dependent variable and $\Delta\text{Purchase}$ as an

independent variable. Following Richardson et al. (2004), I include size, market-to-book and a profit dummy as control variables. The regression model is specified as follows:

$$(\text{Forecast Error})_{t+1} = \beta_0 + \beta_1 \Delta \text{Purchase}_t + \beta_2 \text{SIZE}_t + \beta_3 (\text{MB})_t + \beta_4 \text{Profit}_{t+1} + \varepsilon_t \quad (8)$$

Size is defined as the market capitalization at the end of year t , MB is defined as market value of equity divided by the book equity at the end of year t , and Profit is a dummy variable which equals 1 if actual earnings for year t are positive, and 0 otherwise.

The regression model is estimated by each Month group, and the estimated coefficient on $\Delta \text{Purchase}$ for each Month group is reported in Table 7. The table shows the estimated coefficients on $\Delta \text{Purchase}$ are positive and statistically significant for the period of Month-12 to Month-9. The estimated coefficients on $\Delta \text{Purchase}$ are still positive for the remaining periods, but they are statistically insignificant for these periods.

[Table 7]

Both Figure 2 and Table 7 show that forecast errors are positively correlated with $\Delta \text{Purchase}$ during the period of Month-12 to Month-9. This suggests that security analysts do not fully understand the implications of $\Delta \text{Purchase}$ for future earnings and thus fail to incorporate the information contained in $\Delta \text{Purchase}$ into their earnings forecasts. I also find that the positive relation between $\Delta \text{Purchase}$ and forecast errors weakens beginning in Month-8, which suggests that analyst forecasts begin to reflect the information contained in $\Delta \text{Purchase}$ after the first-quarter earnings are announced.

7. Conclusion

This paper investigates the relation between annual changes in purchase obligations and future earnings, using the newly disclosed data on purchase obligations. I find that annual change in purchase obligations is positively associated with future sales and earnings. This finding is

consistent with the prediction that firms enter into additional purchase obligations when they expect an increase in demand. Additional tests provide evidence suggesting that investors appear to anticipate the contribution of annual change in purchase obligations to future performance, but they fail to fully incorporate its implications in determining stock prices. Further investigation shows that analysts also do not appear to fully incorporate the information contained in purchase obligations. These findings suggest that the disclosure of purchase obligations is useful for predicting firm performance, but market participants do not fully understand its implications.

This paper makes three contributions to the literature. First, this paper documents that the disclosure of purchase obligations provide useful information to investors. This suggests that the disclosure mandated by the SEC has information content. The second contribution of this paper relates to the literature on corporate investment. The positive relation between annual changes in purchase obligations and future operating performance suggests that annual changes in purchase obligations capture short-term momentum in fundamentals which is unexplained by existing financial information. Finally, this paper contributes to the literature that documents a relation between stock prices and non-GAAP leading indicators by investigating stock price response to annual changes in purchase obligations before, during and after the 10-K filing window.

The newly disclosed data on purchase obligations and the empirical evidence presented in this paper raise questions for future research. For example, do different types of purchase obligations have different implications for future operating performance and stock returns? Since some firms enter into purchase obligations that do not affect revenues in the immediate future, e.g. research and development contracts, it might be worthwhile to investigate the question. Also, why do utilities companies enter into a large amount of purchase obligations and what are the benefits they get by doing so? Do purchase obligations have anything to do with a firm's business strategy, e.g. vertical or horizontal integrations? There are the research questions I intend to pursue using the purchase obligations data.

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Appendix A: Examples of Contractual Obligations Disclosure

Panel A: Tabular Format Required by the SEC

Contractual Obligations	Payments Due by Period				
	Total	Less than 1 year	1-3 Years	3-5Years	More than 5 Years
Long-Term Debt Obligations					
Capital Lease Obligations					
Operating Lease Obligations					
Purchase Obligations					
Other Long-Term Liabilities Reflected on the Company's Balance Sheet under GAAP					
Total					

Panel B: Verizon Communications Inc.'s Contractual Obligations as of December 31, 2007

Contractual Obligations (dollars in millions)	Payments Due By Period				
	Total	Less than 1 year	1-3 years	3-5 years	More than 5 years
Long-Term Debt	\$ 30,455	\$ 2,518	\$ 5,781	\$ 6,891	\$ 15,265
Capital Lease Obligations	312	46	93	71	102
Total Long-Term Debt, Including Current Maturities	30,767	2,564	5,874	6,962	15,367
Interest on Long-Term Debt	21,116	1,897	3,350	2,622	13,247
Operating Leases	7,001	1,489	2,292	1,253	1,967
Purchase Obligations*	844	613	188	33	10
Income Tax Audit Settlements	233	233	–	–	–
Other Long-Term Liabilities	4,190	2,020	2,170	–	–
Total contractual obligations	\$ 64,151	\$ 8,816	\$ 13,874	\$ 10,870	\$ 30,591

* We have several commitments primarily to purchase network services, equipment and software from a variety of suppliers totaling \$844 million. Of this total amount, \$613 million, \$137 million, \$51 million, \$28 million, \$5 million and \$10 million are expected to be purchased in 2008, 2009, 2010, 2011, 2012 and thereafter, respectively.

Panel C: Kellogg Co.'s Contractual Obligations as of December 29, 2007

Contractual Obligations (millions)	Payments Due By Period						
	Total	2008	2009	2010	2011	2012	beyond
Long-term debt: Principal	\$3,751	\$466	\$2	\$1	\$1,429	\$751	\$1,102
Long-term debt: Interest	2,504	221	215	215	167	170	1,516
Capital leases	8	1	1	1	1	1	3
Operating leases	730	159	137	112	83	56	183
Purchase obligations*	612	477	91	34	4	4	2
Uncertain tax positions	36	36	—	—	—	—	—
Other long-term Liabilities	592	117	76	71	79	60	189
Total	\$8,233	\$1,477	\$522	\$434	\$1,763	\$1,042	\$2,995

* Purchase obligations consist primarily of fixed commitments under various co-marketing agreements and to a lesser extent, of service agreements, and contracts for future delivery of commodities, packaging materials, and equipment. The amounts presented in the table do not include items already recorded in accounts payable or other current liabilities at year-end 2007, nor does the table reflect cash flows we are likely to incur based on our plans, but are not obligated to incur. Therefore, it should be noted that the exclusion of these items from the table could be a limitation in assessing our total future cash flows under contracts.

Panel D: Examples of Calculating the Present Value of Future Purchase Obligations

$$\text{For Kellogg Co., PV} = \frac{477}{1.05} + \frac{91}{(1.05)^2} + \frac{34}{(1.05)^3} + \frac{4}{(1.05)^4} + \frac{4}{(1.05)^5} + \frac{2}{(1.05)^6}$$

The number of years in the “more than 5 years” period is assumed to be the smallest integer that is not less than $\frac{\text{The amount of purchase obligations due after year 5}}{\text{The amount of purchase obligations due in year 5}}$. For instance, at the end of fiscal year 2007,

Kellogg Co. has purchase obligations of \$2 million that are due after year 5, and the amount of the company’s purchase obligations due in year 5 is \$4 million. Therefore, the number of years in the “more than 5 years” period is assumed to be one, which is the smallest number that is not less than 0.5 (= \$2 million / \$4 million).

Appendix B: Description of Purchase Obligations by Industry

This appendix briefly describes the types of purchase obligations entered into by leading companies in each industry in fiscal year 2007. Companies in the sample are assigned to one of the 49 industry groups using industry classification schemes suggested by Fama and French. Kenneth French's online data library provides detailed information on industry classification schemes.

Industry Groups	Companies	Description of Purchase Obligations
Agriculture	Dole Food Co., Inc.	<ul style="list-style-type: none"> • Agreements with independent growers
	Monsanto Co.	<ul style="list-style-type: none"> • Capital expenditures, inventories and breeding research
Food Products	Kellogg Co.	<ul style="list-style-type: none"> • Co-marketing and service agreements, commodities, packaging materials, and equipment
Candy & Soda	Pepsi Bottling Group Inc.	<ul style="list-style-type: none"> • Raw materials and capital expenditure
	Coca-Cola Enterprises Inc.	<ul style="list-style-type: none"> • Purchase agreements with various suppliers
Beer & Liquor	Anheuser-Busch Co Inc.	<ul style="list-style-type: none"> • Brewing and packaging material, capital expenditures, and royalty arrangements
	PepsiCo Inc.	<ul style="list-style-type: none"> • Oranges and orange juice, packaging materials, cooking oil, and marketing commitments
Tobacco Products	Altria Group Inc.	<ul style="list-style-type: none"> • Raw materials, indirect materials and supplies, packaging, co-manufacturing arrangements, storage and distribution • Marketing, advertising, capital expenditures, information technology and professional services
Recreation	Hasbro Inc.	<ul style="list-style-type: none"> • Royalty payments, and minimum expenditures on marketing and promotional activities
	Mattel Inc.	<ul style="list-style-type: none"> • Inventory, other assets, services, and licensing minimum guarantees
Entertainment	Harrahs Entertainment Inc.	<ul style="list-style-type: none"> • Purchase orders, construction commitments, and entertainment obligations
	Caesars Entertainment Inc.	<ul style="list-style-type: none"> • Construction commitments, and purchase orders
Printing and Publishing	McGraw-Hill Companies Inc.	<ul style="list-style-type: none"> • Paper and printing services, broadcast rights for television programming, creative talent agreements, contracts for data, voice and optical network transport services, contracts for IT software licensing and maintenance.
Consumer Goods	Eastman Kodak Co.	<ul style="list-style-type: none"> • Agreements with suppliers production and administrative services, marketing and advertising
	Procter & Gamble Co.	<ul style="list-style-type: none"> • Information technology, human resources facilities management
Apparel	Polo Ralph Lauren Corp	<ul style="list-style-type: none"> • Inventory purchase commitments
	Nike Inc.	<ul style="list-style-type: none"> • Agreements to purchase products, service and marketing commitments
Healthcare	Tenet Healthcare Corp	<ul style="list-style-type: none"> • Information technology services, and purchase orders
Medical Equipment	Boston Scientific Corp	<ul style="list-style-type: none"> • Inventory commitments and capital expenditures
	Medtronic Inc.	<ul style="list-style-type: none"> • Inventory purchases

Appendix B – Continued

Industry Groups	Companies	Description of Purchase Obligations
Pharmaceutical Products	Merck & Co. Inc.	<ul style="list-style-type: none"> • Inventory contracts, research and development, and advertising agreements
	Pfizer Inc.	<ul style="list-style-type: none"> • Advertising, information technology services and employee benefit administration services.
Chemicals	E. I. du Pont de Nemours and Co.	<ul style="list-style-type: none"> • Information technology infrastructure & services, raw material, utility obligations, health care/benefit administration, research and development and other professional and consulting contracts.
	Dow Chemical Co.	<ul style="list-style-type: none"> • Ethylene-related products, steam, electrical power, materials, property and other items
Rubber and Plastic Products	Pactiv Corp	<ul style="list-style-type: none"> • Raw materials and other long-term vendor agreements
	Newell Rubbermaid Inc.	<ul style="list-style-type: none"> • Finished goods, raw materials, components and services
Textiles	Mohawk Industries Inc.	<ul style="list-style-type: none"> • Natural gas, electricity and raw material
	Hanesbrands Inc.	<ul style="list-style-type: none"> • Raw materials, supplies, packaging and manufacturing arrangements, and capital expenditures • Marketing services, license agreement payments and other professional services
Construction Materials	Gillette Co.	<ul style="list-style-type: none"> • Take-or-pay arrangements or firm commitments entered into as part of the normal course of business
	Fortune Brands Inc.	<ul style="list-style-type: none"> • Raw material, finished goods and capital expenditures • Advertising, selling and administrative services
Construction	Centex Corp.	<ul style="list-style-type: none"> • No explanation provided for purchase obligations
Steel Works Etc	United States Steel Corp	<ul style="list-style-type: none"> • Gases and certain energy and utility services, and capital expenditures
	Alcoa Inc.	<ul style="list-style-type: none"> • Energy and raw materials
Fabricated Products	Tower Automotive Inc.	<ul style="list-style-type: none"> • Tooling obligations and capital expenditures
Machinery	Deere & Co.	<ul style="list-style-type: none"> • No explanations provided for purchase obligations
	Caterpillar Inc.	<ul style="list-style-type: none"> • Material and services, and commitments with suppliers
Electrical Equipment	Emerson Electric Co.	<ul style="list-style-type: none"> • Inventory purchases
Automobiles and Trucks	Ford Motor Co.	<ul style="list-style-type: none"> • Raw materials, components and services
	General Motors Corp	<ul style="list-style-type: none"> • Material, information technology, marketing, facilities and rental car repurchases
Aircraft	Boeing Co.	<ul style="list-style-type: none"> • Production goods, tooling costs, electricity and natural gas contracts, property, plant and equipment, inventory and raw materials
Shipbuilding, Railroad Equipment	Brunswick Corp	<ul style="list-style-type: none"> • Raw materials and other supplies
Defense	Lockheed Martin Corp	<ul style="list-style-type: none"> • Direct materials, obligations to subcontractors, outsourcing arrangements, and facilities and equipment

Appendix B – Continued

Industry Groups	Companies	Description of Purchase Obligations
Non-Metallic and Industrial Metal Mining	Vulcan Materials Co.	<ul style="list-style-type: none"> Mineral royalties, capital expenditures, and transportation and electrical contracts
	Freeport-McMoran Copper & Gold Inc.	<ul style="list-style-type: none"> Copper concentrates and cathodes, and transportation contracts
Coal	CONSOL Energy Inc.	<ul style="list-style-type: none"> Gas transportation obligations, and purchase order
	Peabody Energy Corp	<ul style="list-style-type: none"> Coal reserve and royalty obligations, and purchase agreements with vendors
Petroleum and Natural Gas	Chevron Corp	<ul style="list-style-type: none"> Pipeline and storage capacity, drilling rigs, utilities, and petroleum products
	Exxon Mobil Corp	<ul style="list-style-type: none"> Manufacturing supply, pipeline and terminaling agreements
Utilities	PG&E Corp	<ul style="list-style-type: none"> Power purchase, natural gas supply and transportation, and nuclear fuel Telecommunications and information system contracts
	American Electric Power Co., Inc.	<ul style="list-style-type: none"> Fuel purchase contracts, energy and capacity purchase contracts, and construction contracts for capital assets
Communication	News Corp	<ul style="list-style-type: none"> Sports programming rights, entertainment programming rights, News America marketing, and capital expenditures
	Verizon Communications Inc.	<ul style="list-style-type: none"> Network services, equipment and software
Personal Services	Block (H&R) Inc.	<ul style="list-style-type: none"> Advertising
	Avis Budget Group Inc.	<ul style="list-style-type: none"> Vehicle purchase and information technology and telecommunications contracts
Business Services	Automatic Data Processing Inc.	<ul style="list-style-type: none"> Purchase and maintenance agreements on software, equipment and other assets.
Computer Hardware	Apple Inc.	<ul style="list-style-type: none"> Components for final products from suppliers Long-term supply agreements with Semi-conductor manufacturers
	Dell Inc.	<ul style="list-style-type: none"> Raw materials, product components, and million marketing services agreement
Computer Software	Google Inc.	<ul style="list-style-type: none"> Data center operations and facility build-outs
	Microsoft Corp	<ul style="list-style-type: none"> Open purchase orders and take-or-pay contracts
Electronic Equipment	Motorola Inc.	<ul style="list-style-type: none"> Inventory, raw material, components, license of software, promotional activities, and research and development
	Intel Corp	<ul style="list-style-type: none"> Capital expenditures, licenses, raw materials or other goods
Measuring and Control Equipment	Agilent Technologies Inc.	<ul style="list-style-type: none"> Product components, inventory, and contracts with professional services suppliers
Business Supplies	3M Co.	<ul style="list-style-type: none"> Take or pay contracts, capital expenditures, service agreements and utilities
	International Paper Co.	<ul style="list-style-type: none"> Fiber supply agreements

Appendix B – Continued

Industry Groups	Companies	Description of Purchase Obligations
Shipping Containers	Ball Corp	<ul style="list-style-type: none"> Aluminum, steel, plastic resin, other direct materials, natural gas and electricity, aerospace and technologies contracts
Transportation	FedEx Corp	<ul style="list-style-type: none"> Aircraft, aircraft modifications, vehicles, facilities, computers and other equipment
	Delta Air Lines Inc.	<ul style="list-style-type: none"> Aircraft order commitments, contract carrier agreements, outsourced human resource services, marketing, maintenance and obligations related to technology, sponsorship and other services and products
Wholesale	Sysco Corp	<ul style="list-style-type: none"> Hardware and hardware hosting services, electricity and fuel purchase commitments
	McKesson Corp	<ul style="list-style-type: none"> Inventory purchases, capital commitments and service agreements
Retail	Target Corp	<ul style="list-style-type: none"> Inventory purchases, merchandise royalties, purchases of equipment, marketing-related contracts, software acquisition/license commitments and service contracts
	Wal-Mart Stores Inc.	<ul style="list-style-type: none"> Inventory, utility, capital expenditures, software acquisition/license commitments and legally binding service contracts
Restaurants, Hotels, Motels	Darden Restaurants Inc.	<ul style="list-style-type: none"> Food, beverage, supplies, capital projects and other miscellaneous commitments
	Starbucks Corp	<ul style="list-style-type: none"> Green coffee and other commodities
Banking	Bank of America Corp	<ul style="list-style-type: none"> Commitments to purchase securities and loans, and communication services, processing services and software contracts
	JPMorgan Chase & Co.	<ul style="list-style-type: none"> Services and capital expenditures related to real estate and equipment
Insurance	Prudential Financial Inc.	<ul style="list-style-type: none"> Commitments to purchase or fund investments, and commercial mortgage loan commitments
	American International Group Inc.	<ul style="list-style-type: none"> Aircraft purchase, and commitment to repurchase shares
Trading	Morgan Stanley	<ul style="list-style-type: none"> Consulting, outsourcing, advertising, sponsorship, and computer and telecommunications maintenance agreements
	Goldman Sachs Group	<ul style="list-style-type: none"> Acquisition of Litton Loan Servicing LP (Litton) and construction-related obligations
Other	General Electric Co.	<ul style="list-style-type: none"> Take-or-pay arrangements, capital expenditures, equipment, software acquisition/license commitments, and contractual minimum programming commitments

Appendix C: Amount of Purchase Obligations by Industry

This appendix summarizes the amount of purchase obligations by industry in fiscal year 2007. Firms in the sample are assigned to one of the 49 industry groups using industry classification schemes suggested by Fama and French. Kenneth French's online data library provides detailed information on industry classification schemes. For each firm in each industry group, I calculate the present value of the firm's total future purchase obligations using 5% discount rate, and then the present value of purchase obligations is divided by the firm's total assets at the end of fiscal year 2007. If a firm does not disclose any purchase obligations in its 10-K, I assume that the firm has zero purchase obligations.

Fama-French Industry Classification	Number of Firms	Mean	Median	Q1	Q3	Min	Max
Agriculture	8	0.077	0.027	0.004	0.060	0	0.432
Food Products	56	0.168	0.103	0.020	0.204	0	1.570
Candy & Soda	10	0.136	0.052	0.003	0.256	0	0.480
Beer & Liquor	7	0.235	0.187	0.127	0.346	0.027	0.543
Tobacco Products	5	0.116	0.097	0.019	0.147	0	0.317
Recreation	23	0.066	0.080	0	0.107	0	0.213
Entertainment	50	0.054	0.003	0	0.075	0	0.332
Printing and Publishing	31	0.042	0.013	0	0.064	0	0.200
Consumer Goods	46	0.141	0.028	0	0.088	0	2.654
Apparel	48	0.140	0.120	0.018	0.230	0	0.465
Healthcare	72	0.021	0	0	0.012	0	0.267
Medical Equipment	127	0.035	0.008	0	0.053	0	0.267
Pharmaceutical Products	290	0.053	0.003	0	0.050	0	1.506
Chemicals	77	0.199	0.061	0	0.176	0	1.690
Rubber and Plastic Products	19	0.042	0.004	0	0.045	0	0.247
Textiles	10	0.082	0.050	0.010	0.093	0	0.335
Construction Materials	60	0.037	0.005	0	0.050	0	0.419
Construction	47	0.059	0	0	0.029	0	0.515
Steel Works Etc	46	0.180	0.049	0.002	0.196	0	1.376
Fabricated Products	8	0.061	0.015	0	0.144	0	0.167
Machinery	107	0.048	0.020	0	0.086	0	0.414
Electrical Equipments	58	0.090	0.025	0	0.077	0	0.994
Automobile and Trucks	50	0.111	0.013	0	0.075	0	1.950
Aircraft	18	0.177	0.084	0	0.210	0	1.562

Appendix C – Continued

Fama-French Industry Classification	Number of Firms	Mean	Median	Q1	Q3	Min	Max
Shipbuilding, Railroad Equipment	11	0.106	0.041	0	0.103	0	0.588
Defense	9	0.269	0.102	0	0.393	0	0.837
Precious Metals	9	0.011	0	0	0.009	0	0.048
Non-Metallic and Industrial Metal Material	15	0.039	0.012	0	0.035	0	0.214
Coal	15	0.068	0.028	0	0.088	0	0.370
Petroleum and Natural Gas	192	0.094	0.012	0	0.082	0	4.299
Utilities	118	0.302	0.222	0.068	0.453	0	1.442
Communication	119	0.112	0.034	0	0.116	0	1.937
Personal Services	45	0.048	0	0	0.031	0	0.377
Business Services	195	0.035	0.001	0	0.022	0	0.889
Computer Hardware	82	0.078	0.030	0.008	0.072	0	1.078
Computer Software	280	0.018	0	0	0.014	0	0.317
Electronic Equipment	236	0.092	0.033	0	0.076	0	3.578
Measuring and Control Equipment	71	0.035	0.011	0	0.063	0	0.180
Business Supplies	36	0.064	0.034	0	0.091	0	0.374
Shipping Containers	10	0.163	0.020	0	0.135	0	0.915
Transportation	113	0.194	0.046	0	0.221	0	2.184
Wholesale	113	0.091	0.001	0	0.117	0	1.504
Retail	187	0.124	0.025	0	0.169	0	2.714
Restaurant, Hotels, Motels	65	0.064	0.035	0	0.074	0	0.526
Banking	500	0.003	0	0	0.002	0	0.075
Insurance	167	0.006	0	0	0.006	0	0.059
Real Estate	28	0.002	0	0	0.001	0	0.050
Trading	285	0.036	0.003	0	0.032	0	0.635
Other	107	0.056	0	0	0.020	0	1.518
All Companies	4,273	0.072	0.008	0	0.075	0	4.299
All but Financial Companies	3,272	0.093	0.014	0	0.103	0	4.299

Appendix D: Portion of Purchase Obligations Due By Period

This appendix summarizes the portion of purchase obligations due by future period relative to total purchase obligations in fiscal year 2007. For each company with non-zero purchase obligations, I calculate the ratio of purchase obligations due by each future period to total purchase obligations. Ratio_1 is defined as purchase obligations due within one year divided by total purchase obligations. Ratio_23 is defined as purchase obligations due between one and three years divided by total purchase obligations. Ratio_45 is defined as purchase obligations due between three and five years divided by total purchase obligations. Ratio_TA is defined as purchase obligations due after five years divided by total purchase obligations. Distributions of these ratios are presented in Panels A and B. Panel A shows the distributions for all firms, and Panel B shows the distributions for all but financial and utilities firms. Panel C shows the number of firms which do not have any purchase obligations due after one year.

Panel A: Portion of Purchase Obligations Due by Period (All Firms)

Ratio	#Obs.	Mean	Lower Quartile	Median	Upper Quartile
Ratio_1	2,483	0.6906	0.4173	0.7794	1
Ratio_23	2,483	0.1878	0	0.1399	0.3272
Ratio_45	2,483	0.0598	0	0.0005	0.1000
Ratio_TA	2,483	0.0618	0	0	0.0225

Panel B: Portion of Purchase Obligations Due by Period (All but Financial and Utilities Firms)

Ratio	#Obs.	Mean	Lower Quartile	Median	Upper Quartile
Ratio_1	1,960	0.7171	0.4597	0.8357	1
Ratio_23	1,960	0.1776	0	0.1087	0.3089
Ratio_45	1,960	0.0540	0	0	0.0783
Ratio_TA	1,960	0.0503	0	0	0.0082

Panel C: Number of Firms with Zero Purchase Obligations Due After One Year

	#Obs.	# of Firms with Ratio_1=1	% of Firms with Ratio_1 = 1
All Firms	2,483	709	28.6%
All but Financial and Utilities Firms	1,960	605	30.9%

Appendix E: Collection of Purchase Obligations Data

This appendix describes the procedure of collecting purchase obligations data. My sample consists of publicly traded companies on the Compustat annual database from fiscal years 2003 to 2007. I divide the sample firms into three groups based on the S&P indices membership. The first group consists of firms constituting the S&P 500 index. The second group consists of firms constituting the S&P 400 MidCap Index and S&P 600 SmallCap Index. The last group consists of all other firms in the sample.

Before collecting the purchase obligations data, I exclude small business issuers and smaller reporting companies from the sample because they are not required to provide a tabular disclosure of contractual obligations. Companies in the first or second groups do not qualify as a small business issuer or smaller reporting company because they must have a public float of at least \$100 million to be added to the S&P indices. On the other hand, some companies in the last group qualify as a small business issuer or a smaller reporting company; thus, I manually excluded them.

For the first group, I manually collect the purchase obligations data. From the MD&A section of each company's 10-K filing, I copy the table of contractual obligations and paste it into an Excel spreadsheet. Then, I organize the Excel spreadsheet to get the data in the precise format that I want.

For the second group, I collect the purchase obligations data using the directEDGAR extraction engine developed by Burch Kealey. The extraction engine detects and extracts a table including certain search terms from a SGML or HTML document. Using various combinations of search terms, I extract a table of contractual obligations from the 10-K filings submitted by firms in this group. The combinations of search terms include (1) "*contractual*" and "*obligation*", (2) "*contractual*" and "*commitment*", (3) "*purchase*" and "*obligation*", and (4) "*purchase*" and "*commitment*". In case the extraction engine cannot extract a table of contractual obligations from a 10-K filing, I manually collected the table from the 10-K filing. Then, I merge all the collected tables of contractual obligations into an Excel spreadsheet, and organize the spreadsheet to get the data in the format I want.

For the last group, I collect the purchase obligations data using the same procedure that I apply to the second group. Before collecting the purchase obligations data, I exclude small business issuers and smaller reporting companies from this group. To determine if a company qualifies as a small business issuer or a smaller reporting company, I collect data on the public float from the first page of the company's 10-K filing and data on the company's revenues from Compustat.

Table 1
Sample Formation and Variable Definitions

Panel A: Sample Formation

Sample Formation Procedures	Number Firm-Years
Total number of firm-years (Firm-years with non-missing values of total assets, stock prices at fiscal year end, number of common shares at fiscal year end, and CIK-GVKEY links)	37,330
Less:	
Small business issuers and smaller reporting companies	13,271
Base Sample	24,059
Less:	
Utilities and financial firms	6,063
Observations for fiscal year 2003	3,711
Firm-years without sufficient data to construct financial variables (ΔSales_{t+1} , ROA_{t+1} , ROA_t , $\Delta\text{Purchase}_t$, $\Delta\text{Sales_Q4}_t$, ΔINV_t , ΔPPE_t , TACC_t)	3,678
Firm-years with zero changes in purchase obligations	3,476
Top and bottom 1% of financial variables (ROA_t , $\Delta\text{Purchase}_t$, $\Delta\text{Sales_Q4}_t$, ΔINV_t , ΔPPE_t , TACC_t)	687
Test Sample	6,444

The base sample is constructed using firm-year observations on the Compustat annual database, and the sample period extends from fiscal years 2003 to 2007. Each firm-year observation is required to have non-missing values of total assets, stock price at fiscal year end, number of common shares outstanding at fiscal year end, and CIK-GVKEY links. Small business issuers and smaller reporting companies are also excluded from the sample. The resulting sample is called the base sample, and consists of 6,369 firms and 24,059 firm-year observations.

For the empirical analyses in Section 5, I use a subset of the base sample, which I call the test sample. The test sample is constructed by excluding (1) utilities and financial companies, (2) observations for fiscal year 2003, (3) firm-years without sufficient data to construct financial variables, (4) firm-years with zero changes in purchase obligations, and (5) firm-years in the top and bottom 1% of financial variables. The resulting sample consists of 6,444 firm-year observations, and the sample period extends from fiscal years 2004 to 2007.

Table 1 Continued

Panel B: Variable Definitions

Variable	Definition
Δ Purchase	annual change in purchase obligations due within one year, deflated by average total assets (at)
Δ Sales_Q4	annual change in the fourth-quarter sales (revtq), deflated by average total assets (at)
Δ INV	annual change in inventories (invt), deflated by average total assets (at)
Δ PPE	annual change in property, plant and equipment (ppent), deflated by average total assets (at)
Δ Sales	annual change in sales (revt), deflated by average total assets (at)
ROA	operating income after depreciation (oiadp), deflated by average total assets (at)
PM	operating income after depreciation (oiadp) divided by sales (revt)
ATO	sales (revt) divided by average total assets (at)
TACC	sum of annual change in non-cash working capital (Δ WC), annual change in net non-current operating assets (Δ NCO) and annual change in net financial assets (Δ FIN), deflated by average total assets (at)
WC	current operating assets minus current operating liabilities, where current operating assets are current assets (act) minus cash and short-term investments (che), and current liabilities are current liabilities (lct) minus debt in current liabilities (dlc)
NCO	non-current operating assets minus non-current operating liabilities, where non-current operating assets are total assets (at) minus current assets (act) minus investments and advances (ivao), and non-current operating liabilities are total liabilities (lt) minus current liabilities (lct) minus long-term debt (dltt)
FIN	financial assets minus financial liabilities, where financial assets are short-term investments (ivst) plus long-term investments (ivao), and financial liabilities are long-term debt (dltt) plus debt in current liabilities (dlc) plus preferred stock (pstk)
SIZE	logarithm of market value of common equity ($\text{prcc}_f \times \text{csho}$) at fiscal year end
BM	book value of common equity (ceq) divided by market value of common equity ($\text{prcc}_f \times \text{csho}$) at fiscal year end
MOM	six-month stock return ending on the last trading day before a 10-K filing

* Compustat variable names are indicated in lower cases in parentheses next to each item.

Table 2
Summary Statistics for 6,444 Firm-Years for the Period 2004-2007

Panel A: Distribution of Δ Purchase by Fiscal Year

Fiscal Year	# Obs.	Mean	Standard Deviation	Min	Lower Quartile	Median	Upper Quartile	Max
2004	1,492	0.0137	0.0517	-0.1721	-0.0035	0.0033	0.0210	0.3750
2005	1,698	0.0119	0.0458	-0.1665	-0.0041	0.0032	0.0196	0.3087
2006	1,664	0.0115	0.0494	-0.1807	-0.0044	0.0025	0.0214	0.3205
2007	1,590	0.0092	0.0502	-0.1481	-0.0060	0.0011	0.0181	0.3714
Total	6,444	0.0116	0.0492	-0.1807	-0.0046	0.0025	0.0200	0.3750

Panel B: Distribution of Other Financial Variables

Variable	# Obs.	Mean	Standard Deviation	Min	First Quartile	Median	Third Quartile	Max
Δ Sales_Q4	6,444	0.0289	0.0555	-0.1888	0.0010	0.0210	0.0508	0.3317
Δ INV	6,444	0.0106	0.0292	-0.1210	0.0001	0.0024	0.0186	0.1799
Δ PPE	6,444	0.0229	0.0624	-0.1939	-0.0053	0.0069	0.0330	0.4356
TACC	6,444	0.0432	0.1441	-0.5282	-0.0214	0.0381	0.1021	0.7114
ROA	6,444	0.0624	0.1428	-0.8810	0.0308	0.0837	0.1363	0.3947

Panel C: Correlations between Δ Purchase and Contemporaneous Financial Variables.

	Δ Purchase _t	ROA _t	Δ Sales_Q4 _t	Δ INV _t	Δ PPE _t	TACC _t
Δ Purchase _t		0.0545	0.1810	0.1435	0.0859	0.0957
ROA _t	0.0978		0.2078	0.1417	0.1565	0.2176
Δ Sales_Q4 _t	0.1809	0.2884		0.3361	0.2265	0.2340
Δ INV _t	0.1587	0.2042	0.3188		0.1396	0.2098
Δ PPE _t	0.1071	0.2747	0.3201	0.2610		0.2523
TACC _t	0.1106	0.2871	0.2870	0.2509	0.3463	

*Spearman (Pearson) correlations are presented below (above) the main diagonal.

Table 2 ContinuedPanel D: Correlations between Δ Purchase and Future Financial Variables.

	Δ Purchase _t	SAR _{t+1}	ROA _{t+1}	Δ Sales _{t+1}	Δ INV _{t+1}	Δ PPE _{t+1}	TACC _{t+1}
Δ Purchase _t		0.0487	0.0690	0.1515	0.1080	0.1305	0.0923
SAR _{t+1}	0.0479		0.1767	0.2082	0.0834	0.0441	0.1423
ROA _{t+1}	0.1120	0.2766		0.3013	0.1572	0.1921	0.3344
Δ Sales _{t+1}	0.1705	0.2312	0.3926		0.4472	0.2766	0.2835
Δ INV _{t+1}	0.1202	0.0773	0.2282	0.4098		0.1773	0.2419
Δ PPE _{t+1}	0.1621	0.0845	0.3023	0.4094	0.3282		0.3275
TACC _{t+1}	0.1148	0.1653	0.3231	0.3719	0.3111	0.4226	

*Spearman (Pearson) correlations are presented below (above) the main diagonal.

Δ Purchase is the annual change in purchase obligations due within one year. Δ Sales_Q4 is the annual change in the fourth-quarter sales. Δ INV is the annual change in inventories. Δ PPE is the annual change in property, plant and equipment. ROA is operating income after depreciation. TACC is Δ WC+ Δ NCO+ Δ FIN, where Δ WC is the change in non-cash working capital, Δ NCO is the change in net non-current operating assets and Δ FIN is the change in net financial assets. Δ Sales is the annual change in sales. Each of these variables is deflated by average total assets. SAR_{t+1} is the one-year-ahead size-adjusted return measured over a period of 252 trading days from the third trading day after the filing date of a 10-K. All correlations in Panels C and D are significant at one percent level.

Table 3
 Δ Purchase and Future Performance for 6,444 Firm-Years for the Period 2004-2007

Δ Purchase Ranking	#Obs.	Mean Δ Purchase _t	Mean Δ Sales _{t+1}	Mean Δ ROA _{t+1}	Mean Δ INV _{t+1}	Mean Δ PPE _{t+1}	Mean TACC _{t+1}
P1 (lowest)	643	-0.0593	0.0269	-0.0191	0.0003	0.0113	-0.0189
P2	644	-0.0150	0.0634	-0.0085	0.0035	0.0126	-0.0065
P3	645	-0.0048	0.0682	-0.0063	0.0061	0.0120	-0.0004
P4	644	-0.0008	0.0777	-0.0061	0.0059	0.0117	-0.0036
P5	646	0.0011	0.0587	-0.0055	0.0037	0.0156	-0.0030
P6	643	0.0044	0.0805	-0.0069	0.0072	0.0182	0.0188
P7	644	0.0103	0.0770	-0.0049	0.0064	0.0134	0.0073
P8	645	0.0202	0.0914	-0.0034	0.0075	0.0241	-0.0023
P9	644	0.0402	0.1231	-0.0015	0.0136	0.0298	0.0297
P10 (highest)	646	0.1189	0.1506	0.0002	0.0144	0.0486	0.0424
Correlation Coefficient		1.0000	0.9605	0.8480	0.9097	0.9265	0.8960

Δ Purchase is the annual change in purchase obligations due within one year. ROA is operating income after depreciation. Δ Sales is the annual change in sales. Δ INV is the annual change in inventories. Δ PPE is the annual change in property, plant and equipment. TACC is the sum of the change in non-cash working capital (Δ WC), the change in net non-current operating assets (Δ NCO) and the change in net financial assets (Δ FIN). Each of these variables is scaled by average total assets. Each year, firms are ranked into deciles based on Δ Purchase. By construction, P1 contains firms with the lowest Δ Purchase, and P10 contains firms with the highest Δ Purchase. Correlation coefficients presented in the bottom row indicate the correlation coefficient between the column of mean Δ Purchase_t and the corresponding column.

Table 4
Results from Ordinary Least Squares Regressions of Future Performance on Δ Purchase
For 6,444 Firm-Year Observations for the Period 2004-2007

Panel A: Δ Purchase and Future Sales

Dependent Variable	Intercept	Δ Purchase _t	Δ Sales_Q4 _t	TACC _t	Δ INV _t	Δ PPE _t	Adjusted R ²
Δ Sales _{t+1}	0.0271 (2.06)	0.5804 (13.42)					0.0651
Δ Sales _{t+1}	0.0029 (0.33)	0.2826 (5.07)	1.5464 (19.24)				0.2279
Δ Sales _{t+1}	-0.0019 (-0.20)	0.2619 (4.88)	1.4618 (20.71)	0.0451 (4.04)	0.1723 (1.02)	0.1392 (3.59)	0.2315

Panel B: Δ Purchase and Future ROA

Dependent Variable	Intercept	ROA _t	Δ Purchase _t	Δ Sales_Q4 _t	TACC _t	Δ INV _t	Δ PPE _t	Adjusted R ²
ROA _{t+1}	-0.0038 (-0.95)	0.9383 (60.93)	0.0636 (7.43)					0.7738
ROA _{t+1}	-0.0047 (-1.25)	0.9314 (70.71)	0.0463 (8.93)	0.0934 (2.68)				0.7748
ROA _{t+1}	-0.0015 (-0.46)	0.9399 (67.95)	0.0584 (7.02)	0.1447 (3.83)	-0.0122 (-1.59)	-0.1055 (-2.21)	-0.1368 (-5.95)	0.7779

Panel C: Δ Purchase and DuPont Components of Future ROA

Dependent Variable	Intercept	Δ Purchase _t	Δ Sales_Q4 _t	TACC _t	Δ INV _t	Δ PPE _t	Adjusted R ²
Δ PM _{t+1}	0.0306 (0.89)	0.0883 (0.79)	0.0818 (0.58)	0.4304 (1.01)	-0.0136 (-0.15)	-0.2279 (-1.38)	0.0029
Δ ATO _{t+1}	0.0337 (3.13)	0.1199 (5.08)	0.1737 (2.19)	-0.1675 (-9.59)	-0.3444 (-3.42)	-0.2659 (-3.53)	0.0555

Δ Sales is the annual change in sales. ROA is operating income after depreciation. PM is operating income after depreciation divided by sales. ATO is sales divided by average total assets. Δ PM is the annual change in profit margin (PM). Δ ATO is the annual change in asset turnover (ATO). Δ Purchase is the annual change in purchase obligations due within one year. Δ Sales_Q4 is the annual change in the fourth-quarter sales. Δ INV is the annual change in inventories. Δ PPE is the annual change in property, plant and equipment. TACC is total accruals (Δ WC+ Δ NCO+ Δ FIN). Δ Sales, ROA, Δ Purchase, Δ Sales_Q4, Δ INV, Δ PPE and TACC are scaled by average total assets. Year and industry dummies are included in the regressions, and coefficients and t-statistics in the parentheses are based on the White standard errors clustered by year and industry.

Table 5
The Value-Relevance of Δ Purchase and Investor Reaction to Δ Purchase
For 6,137 Firm-Year Observations for the Period 2004-2007

Panel A: Market Reaction to Δ Purchase

Dependent Variable	Intercept	Δ Purchase _t	Δ Sales_Q4 _t	TACC _t	Δ INV _t	Δ PPE _t	BM _t	MOM _t	Adjusted R ²
FPR _t	0.0033 (2.62)	-0.0093 (-0.72)					0.0072 (4.69)	-0.0293 (-1.48)	0.0111
FPR _t	0.0030 (2.15)	-0.0117 (-0.86)	0.0375 (2.55)	-0.0028 (-0.47)	-0.0378 (-1.70)	-0.0116 (-0.78)	0.0075 (5.01)	-0.0305 (-1.52)	0.0128

Panel B: Δ Purchase and Contemporaneous Stock Returns

Dependent Variable	Intercept	ROA _t	Δ ROA _t	Δ Purchase _t	Δ Sales_Q4 _t	TACC _t	Δ INV _t	Δ PPE _t	Adjusted R ²
SAR _t	-0.0213 (-1.14)	0.3074 (8.10)	1.7946 (7.77)	0.7473 (4.42)					0.1307
SAR _t	-0.0442 (-2.72)	0.2159 (5.39)	1.4910 (7.16)	0.4515 (2.86)	1.6474 (8.29)				0.1617
SAR _t	-0.0348 (-2.38)	0.2340 (7.08)	1.4415 (7.42)	0.5047 (2.87)	1.8887 (8.27)	0.0252 (0.54)	-0.9848 (-4.00)	-0.4004 (-2.20)	0.1669

Contemporaneous stock returns (SAR_t) are calculated over a period of 252 trading days prior to the filing date of a 10-K. Filing period returns (FPR_t) are measured over the three-day 10-K filing window. Both SAR_t and FPR_t are size-adjusted returns. The size-adjusted returns are calculated by deducting the value-weighted average return for all firms in the same size-matched portfolio. Δ Purchase is the annual change in purchase obligations that are due within one year. Δ Sales_Q4 is the annual change in the fourth-quarter sales. Δ INV is the annual change in total inventories. Δ PPE is the annual change in property, plant and equipment. TACC is total accruals (Δ WC+ Δ NCO+ Δ FIN). ROA is operating income after depreciation. All of these variables are scaled by average total assets. Δ ROA is the annual change in ROA. BM is the book value of common equity divided by the market value of common equity at fiscal year end. MOM is the six-month stock return prior to the filing date of a 10-K. Year and industry dummies are included in the regressions, and coefficients and t-statistics in the parentheses are based on the White standard errors clustered by year and industry.

Table 6
ΔPurchase and Future Stock Returns for 6,137 Firm-Years for the Period 2004-2007

Panel A: Regression Tests of Predictive Power of ΔPurchase on Future Stock Returns

Dependent Variable	Intercept	ΔPurchase _t	ΔSales_Q4 _t	TACC _t	ΔINV _t	ΔPPE _t	BM _t	MOM _t	Adjusted R ²
SAR _{t+1}	0.0178 (0.75)	0.3250 (2.79)					0.0136 (0.96)	-0.0532 (-0.76)	0.0266
SAR _{t+1}	0.0181 (0.72)	0.2986 (2.55)	0.1104 (0.94)	0.0139 (0.37)	0.0165 (0.74)	-0.1338 (-1.17)	0.0153 (1.07)	-0.0602 (-0.75)	0.0272

Panel B: Cumulative Stock Returns to Portfolios Formed on ΔPurchase

ΔPurchase Ranking	#Obs.	Raw Return	Size-Adjusted Return	Size-B/M-Adjusted Return
P1 (lowest)	613	-0.1028	-0.0350	-0.0370
P2	614	-0.0736	-0.0184	-0.0203
P3	613	-0.0929	-0.0241	-0.0224
P4	614	-0.0786	-0.0168	-0.0131
P5	614	-0.0369	-0.0024	-0.0068
P6	613	-0.0256	0.0039	0.0066
P7	614	-0.0106	0.0181	0.0219
P8	614	-0.0316	0.0117	0.0100
P9	613	-0.0329	0.0104	0.0141
P10 (highest)	615	0.0018	0.0349	0.0304
Hedge Return (P10-P1)		0.1046	0.0699	0.0674
t-statistics		(2.68)	(2.53)	(2.51)

One-year-ahead stock returns are calculated over a period of 252 trading days from the third trading day after the filing date of a 10-K. The size-adjusted (size-B/M-adjusted) return is calculated by deducting the value-weighted average return for all firms in the same size-matched (size-B/M-matched) portfolio. ΔPurchase is the annual change in purchase obligations that are due within one year. ΔSales_Q4 is the annual change in the fourth-quarter sales. ΔINV is the annual change in total inventories. ΔPPE is the annual change in property, plant and equipment. TACC is total accruals (ΔWC+ΔNCO+ΔFIN). All of these variables are scaled by average total assets. BM is the book value of common equity divided by the market value of common equity at fiscal year end. MOM is the six-month stock return prior to the filing date of a 10-K. In Panel A, year and industry dummies are included in the regressions, and coefficients and t-statistics in the parentheses are based on the White standard errors clustered by year and industry. In Panel B, firms are ranked each year into deciles based on ΔPurchase.

Table 7
Regression of Analyst Forecast Errors on Δ Purchase and Firm-Characteristic Variables
For 4,231 Firm-Years for the Period 2004-2007

$$(\text{Forecast Error})_{t+1} = \beta_0 + \beta_1 \Delta \text{Purchase}_t + \beta_2 \text{SIZE}_t + \beta_3 (\text{BM})_t + \beta_4 \text{Profit}_{t+1} + \varepsilon_{t+1}$$

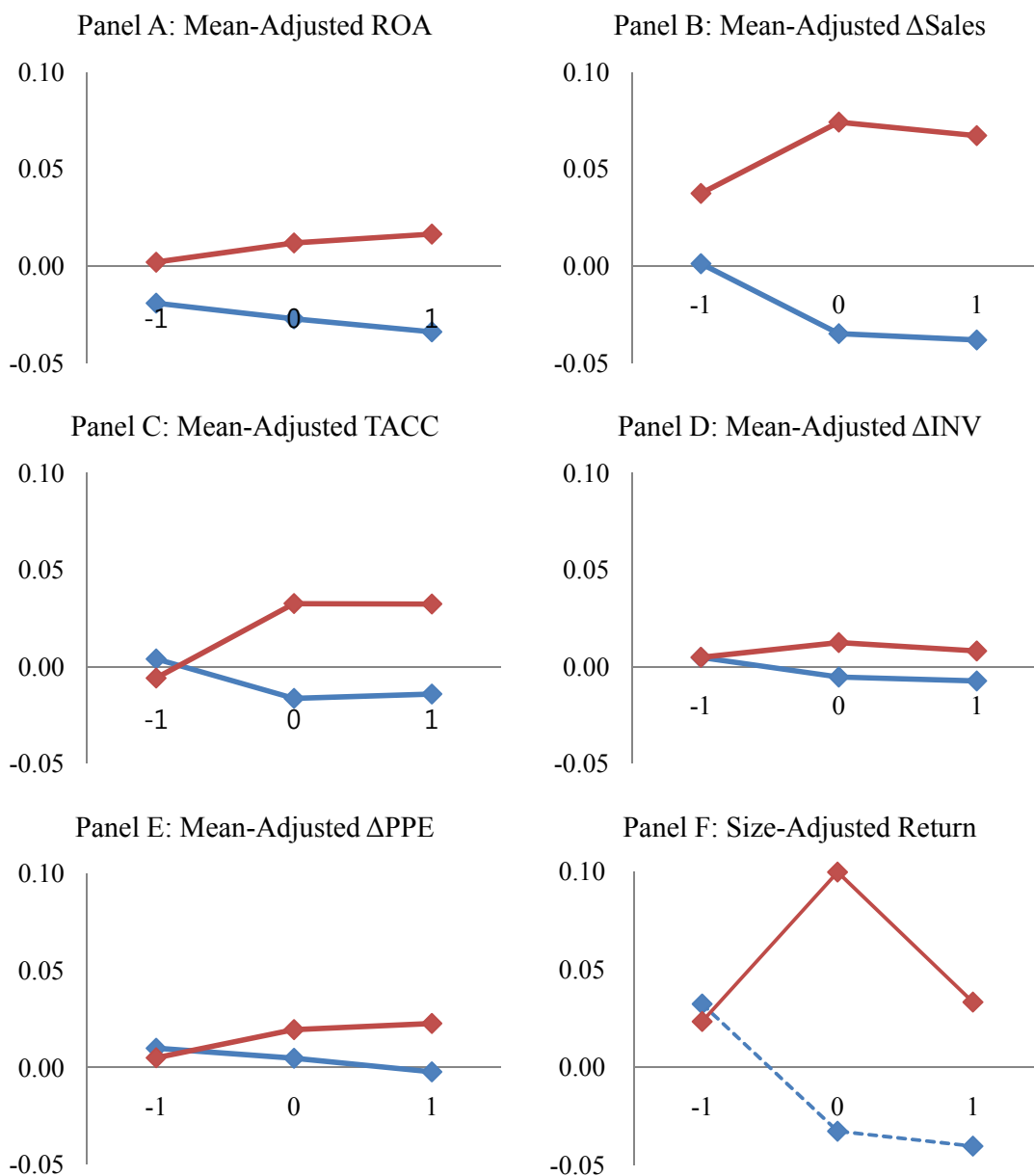
Group by Month	Month-12	Month-11	Month-10	Month-9	Month-8	Month-7
Coefficient on Δ Purchase	0.0261	0.0283	0.0208	0.0174	0.0022	0.0036
t-statistics	(2.58)	(3.66)	(2.57)	(2.41)	(0.53)	(0.82)
Group by Month	Month-6	Month-5	Month-4	Month-3	Month-2	Month-1
Coefficient on Δ Purchase	0.0079	0.0048	0.0046	0.0038	0.0016	0.0012
t-statistics	(1.37)	(1.06)	(0.96)	(0.97)	(0.53)	(0.27)

Following Richardson et al. (2004), I sort analysts' forecasts into twelve groups by 30-day blocks in order to track analyst forecast revisions leading up to the announcement of one-year-ahead earnings. Forecasts made less than 30 days prior to the announcement of one-year-ahead earnings are grouped in Month-1, forecasts between 30- and 60-day lags in Month-2, and so on up to Month-12. For each Month group, I estimate the following regression model, and report the estimated coefficients on Δ Purchase_t in this table.

Forecast error is the actual one-year-ahead earnings per share minus the median forecast of earnings per share scaled by the stock price at the beginning of the year. SIZE is the logarithm of market value of common equity ($\text{prcc}_f \times \text{csho}$) at fiscal year end, BM is the book value of equity divided by the market value of equity at fiscal year end, and Profit is a dummy variable which equals 1 if actual earnings are positive, and equal to 0 otherwise. Following Richardson et al. (2004), I eliminate forecast errors greater than 10% of stock price in order to remove the influence of extreme outliers.

Figure 1
Time-Series Properties of Financial Variables Based on Δ Purchase

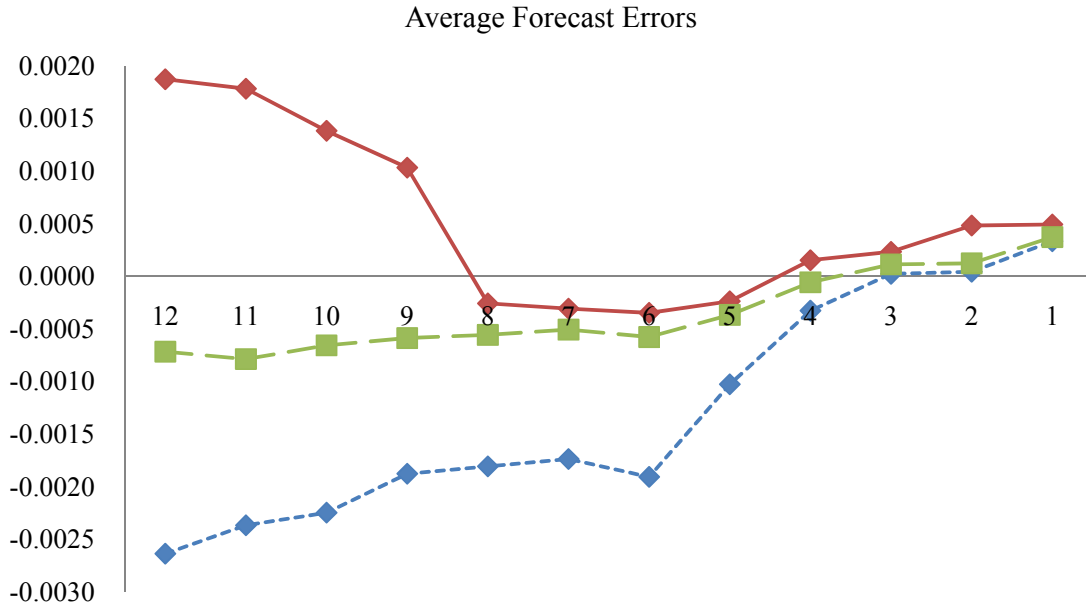
(—◆—: Highest Δ Purchase, - -◆- -: Lowest Δ Purchase)



This figure shows the time-series properties of financial variables using a constant sample of 901 firms (3,604 firm-years). Each panel provides the mean value of the corresponding financial variable for firm-years in the top and bottom deciles of Δ Purchase, adjusted by the mean value of the variable for all the firm-years in the constant sample. Lowest Δ Purchase Portfolio consists of 360 firm-years in the bottom decile of Δ Purchase, and Highest Δ Purchase Portfolio consists of 364 firm-years in the top decile of Δ Purchase. Year 0 is the year in which firms are ranked into deciles based on Δ Purchase.

Figure 2
Time-Series Pattern of Average Forecast Errors

(—◆—: Highest Δ Purchase, - -◆- -: Lowest Δ Purchase, —■—: All Firms)



Following Richardson et al. (2004), I sort analysts' forecasts into twelve groups by 30-day blocks in order to track analyst forecast revisions leading up to the announcement of one-year-ahead earnings. Forecasts made less than 30 days prior to the announcement of one-year-ahead earnings are grouped in Month-1, forecasts between 30- and 60-day lags in Month-2, and so on up to Month-12. For each Month group, I calculate a mean forecast error for two groups of sample firms: one group consists of firms in the top decile of Δ Purchase, and the other group consists of firms in the bottom decile of Δ Purchase. The calculated mean forecast errors are plotted below.