Do changes in gross margin percentage provide complementary information to revenue and earnings surprises?

Camillo Lento and Naqi Sayed
Business Administration Department, Lakehead University, Thunder Bay, Canada

Received 3 July 2014
Revised 5 June 2015
Accepted 10 June 2015

Abstract

Purpose – The purpose of this paper is to investigate the association between gross profit percentage, abnormal market returns, revenue surprises and earnings surprises. Gross margin is relied upon by various market participants, as its predictive power is incremental and distinct from revenue and earnings signals; however, gross margin has received little researcher attention.

Design/methodology/approach – General regression specifications found in the prior literature are extended to assess the informational content of changes in gross margin percentage. In addition, various portfolios are created based around the nature of the signals (positive or negative), provided by each income statement metrics (revenue, gross margin and earnings). A sample of 5,582 quarterly observations of S&P 500 firms is compiled. The main regressions are exposed to three robustness tests that focus on industry sub-groupings, institutional ownership and fourth-quarter observations.

Findings – The main findings reveal that gross margin percentage changes and earnings surprises are significantly related to abnormal market returns in the short window around the earnings announcement date and persist into a wider window measured as the quarter after the earnings announcement date. The relationship between gross margin percentage changes and abnormal returns is more pronounced when positive (negative) changes in gross margin percentage are accompanied by positive (negative) revenue and earnings surprises.

Research limitations/implications – This study relies upon S&P 500 firms which are all relatively large firms. Therefore, the results may not be generalizable to smaller firms. In addition, the gross margin change is measured as the quarter-over-quarter percentage change because there is no analyst expectation for gross margin.

Originality/value – This paper extends the prior literature by developing three testable hypotheses that investigate the linkages between abnormal market returns, gross margin and revenue and earnings surprises. This is the first known study to investigate the informational content of changes in gross margin percentage.

Keywords Abnormal returns, Earnings surprise, Gross margin percentage, Revenue surprises

Paper type Research paper

Introduction

There is a rich history of research investigating the relationship between earnings surprises and abnormal stock returns (Bartov *et al.*, 2002; Balsam *et al.*, 2002). More

The authors would like to acknowledge the feedback received from the anonymous referees and participants at the 2014 Canadian Academic Accounting Association Annual Conference.

Review of Accounting and Finance
Vol. 14 No. 3, 2015
pp. 239-261

1475-7702
DOI 10.1108/RAF-07-2014-0071

recently, research has incorporated the incremental information content provided by both revenue and earnings surprises (Kama, 2009; Rees and Sivaramakrishnan, 2007; Ertimur *et al.*, 2003). Gross margin has received much less attention from researchers even though its predictive power is incremental and distinct from other income statement measures (Fama and Mcbeth, 1973). Researchers have recently begun to investigate the information content of gross margin. Early results reveal that the seasonal difference in gross profit is predictive of stock returns (Chiu and Haight, 2013). This paper extends the literature by developing three testable hypotheses that investigate the relationships between the change in gross profit percentage, abnormal market returns, revenue surprises and earnings surprises.

A data set of 5,582 quarterly observations using Standard and Poor's 500 (S&P 500) firms from 1998-2007 is analyzed to investigate the hypotheses. The market returns are measured as the cumulative abnormal returns in both a short window around the earnings announcement date and a wider window that measures the quarter following the earnings announcement date. The revenue and earnings surprises are measured based on the more recent, consensus analysts' expectations relative to the actual amounts reported. The change in the gross profit percentage is calculated based on the quarter-over-quarter change in gross margin. General regression specifications found in the prior literature are extended to include the change in gross margin percentage into the analysis. In addition, various portfolios are created based around the signals (positive or negative) provided by each of the three income statement metrics (revenue, gross margin and earnings).

The main findings reveal that gross margin percentage changes and earnings surprises are significantly related to abnormal market returns in the short window around the earnings announcement date and persist into the wider window. The relationship between gross margin percentage changes and abnormal returns is more pronounced when positive (negative) changes in gross margin percentage are accompanied by positive (negative) revenue and earnings surprises. Sub-period analysis reveals that the association between gross margin percentage changes and abnormal returns became more pronounced after the Enron Scandal. The main findings are robust to three sensitivity tests that focused on industry sub-groupings, institutional ownership and fourth-quarter observations.

Taken as a whole, the results suggest that the association between the abnormal returns and the income statement signals strengthen in conjunction with the information provided about expenses. That is, gross margin (revenue less cost of goods sold) is shown to be more informative than revenues alone, while earnings (gross margin less other expenses) are shown to be more informative than both gross margin and revenues.

These results are useful for investors in making resource allocation decisions. Analysts can use the results to refine their prediction about a company's financial performance. The results can also be used by corporate management as an aid to financial planning and determination of optimal compensation packages that are based on accounting metrics. In addition, these results are significant to standard setters. These results reaffirm the relevance of recognition, measurement and presentation standards for the income statement in the Post-Enron Scandal period.

The remainder of this paper is organized as follows: Section 2 provides theoretical background; Section 3 presents the research design and data; Section 4 discusses the

results of the empirical tests; and Section 5 provides the conclusion and implication of the findings.

Theoretical background

Conceptual framework of financial reporting

Financial reporting is intended to provide information that is *useful* in making business and economic decisions. Decisions by existing and potential investors about buying, selling or holding equity and debt instruments depend on the returns that they expect from an investment (FASB, 2013). To achieve the *usefulness* objective, the conceptual framework for financial accounting strives for financial statements to have four broad fundamental qualitative characteristics: relevance, faithful representation, comparability and understandability. The fundamental qualitative characteristic of relevance suggests that accounting information is capable of impacting a user's decision (FASB, 2010).

The income statement (or, statement of operations) provides information which should be useful for making resource allocation decisions. The income statement presents revenue and expense information that culminates in net income (or, earnings). When earnings are announced, market participants have been shown to closely follow aggregated and disaggregated earnings measures.

Revenue is seen as the foundation for generating profits and cash flows (Kama, 2009; Brush *et al.*, 2000). Revenue growth is necessary for sustainable corporate growth as cost reduction is finite (Ghosh *et al.*, 2005) and is an important driver of earnings and cash flow growth (Brush *et al.*, 2000). However, it can be argued that revenue's informational impact is limited because it does not consider the efforts made and expenses incurred to generate the revenues.

Gross margin (revenue less cost of goods sold) is a measure of net revenue that reflects the direct costs of the sales (cost of goods sold). Gross margin is relied upon by investors (Savitz, 2011) because it provides valuable insights into the financial performance of a firm (White *et al.*, 2003), aides in forecasting revenues (Kesavan *et al.*, 2010) and determines the extent of earnings persistence (Lev and Thiagarajan, 1993).

Earnings are the most followed metric by market participants and executives (Graham *et al.*, 2005). Earnings are a summary metric of all material economic events that have impacted a firm during a given period. In addition, the Financial Accounting Standards Board (FASB) and International Accounting Standards Board (IASB) assert that accrual-based earnings should be more predictive about future cash flows than current cash flows.

Prior research

The predictive ability of the income statement has been investigated extensively (Kothari, 2001). However, the majority of the literature focuses on the predictive ability of earnings (Greenberg *et al.*, 1986; Dechow *et al.*, 1998; Finger, 1994; Graham *et al.*, 2005). Early literature on the predictive ability of earnings was somewhat inconclusive. Bowen *et al.* (1986) and McBeth (1993) failed to find any significant evidence that earnings provide improved predictive ability of future cash flows over and above current cash flows alone, whereas Greenberg *et al.* (1986) concluded that current earnings and traditional measures of future cash flows are highly correlated.

Early research focused on the predictive ability of earnings relative to future cash flows. Along these lines, Finger (1994) and Dechow *et al.* (1998) revealed that earnings are a significant predictor of both future earnings and cash flows from operations over longer periods of time, and that earnings provide incremental contributions to cash flows in predicting future cash flows. Barth *et al.* (2001a, 2001b) extended the literature by analyzing the role of accruals in predicting future cash flows. The results reveal that disaggregating earnings into cash flows and six major accrual components (changes in receivable, inventory and accounts payables, depreciation, amortization and other accruals) significantly enhances the predictive ability of earnings.

Aside from cash flows, many researchers have investigated the relationship between earnings and stock prices. This research on the "value relevance" of earnings has concluded that the association between earnings and stock prices has been declining in strength over time (Amir and Lev, 1996; Lev and Zarowin, 1999; Brown *et al.*, 1999; Collins *et al.*, 1997). The declining "value relevance" of earnings may suggest that earnings are losing their ability to forecast future cash flows. Alternatively, the declining association between earnings and stock prices may be indicative of market inefficiencies in pricing assets (Lev and Thiagarajan, 1983).

Kim and Kross (2005) investigated the cause of the declining association between stock prices and earnings by examining how well earnings track future cash flows across two decades (1980 to 1999). Their results reveal that although the extant literature reveals a weakening relationship between stock prices and earnings, the relationship between earnings and future cash flows has been strengthening over time.

Current literature on the predictive ability of revenues is not nearly as saturated as the literature related to the predictive ability of earnings. The research on revenue began to emerge as more S&P 500 firms began to report revenues in addition to earnings as part of their quarterly earnings announcements. In addition, the Institutional Brokers' Estimate System database started collecting analysts' revenue forecasts in 1996 which allowed investors to more accurately reflect both earnings and revenue surprises into stock prices (Jagadeesh and Livnat, 2006). Research on usefulness of revenue tends to cluster around assessing the informational content of revenue surprises (defined as actual reported revenue minus analysts' expected revenue) by link revenue surprises with contemporaneous and future stock returns (Jagadeesh and Livnat, 2006; Rees and Sivaramakrishnan, 2007; Kama, 2009).

In one of the first studies on revenue surprises, Ertimur *et al.* (2003) found a significant market reaction to revenue surprises over the period of 1997 to 2001. The market reaction to the revenue surprises existed even after controlling for the earnings surprise. Their results suggest that the market expects firms with positive earnings and revenue surprises to experience more persistent future earnings growth than firms that experience positive earnings surprises that are not accompanied by a positive revenue surprise. Jegadeesh and Livnat (2006) used a large sample of quarterly observations of New York Stock Exchange firms from 1987 to 2003 to conclude that revenue surprises are in fact useful for predicting more persistent future earnings growth. Both these studies found that earnings increases that are accompanied by revenue surprises also tend to be of higher quality. These finding were later supported by Ghosh *et al.* (2005) as well.

Rees and Sivaramakrishnan (2007) analyzed a data set of quarterly observations from 1998 to 2001 to conclude that the signal presented by meeting or beating revenue expectations is more important than the magnitude of the revenue surprises. That is,

market participants tend to focus more on the direction of the revenue surprise (positive or negative) as opposed to the magnitude of the revenue surprise. Kama (2009) also extended the prior literature by providing a contextual framework for analyzing earnings and revenue surprises, concluding that the influence of earnings surprises on market prices is lower for companies that are intensively involved in research and development. However, the market reaction is higher for companies with revenue surprises.

Recently, gross margin has become an increasingly important component in earnings announcements. For example, the following excerpt from Apple's 2015 first-quarter press release reveals a focus on revenue, earnings and gross margin:

> Apple today announced financial results for its fiscal 2015 first quarter ended December 27, 2014. The Company posted record quarterly revenue of $74.6 billion and record quarterly net profit of $18 billion, or $3.06 per diluted share. These results compare to revenue of $57.6 billion and net profit of $13.1 billion, or $2.07 per diluted share, in the year-ago quarter. Gross margin was 39.9 per cent compared to 37.9 per cent in the year-ago quarter. (Apple Press Info, 2015).

There has been much less research on the association between gross margin measures and future stock returns or future cash flows. However, studies inquiring into accruals or disaggregated earning and their association with stock returns seem to indicate that gross margin surprises may hold informational content (Barth *et al.*, 2001a, 2001b; El-Sayed Ebaid, 2011).

A direct test of the association between gross margin surprises and abnormal returns was conducted by Chiu and Haight (2013). Gross profit surprises was calculated as the current quarter's total gross profit minus the total gross profit from the same quarter of the previous year, scaled by the market value of equity. Using a data set that spans from 1977 to 2010, seasonally adjusted gross profit surprises are shown to predict future stock returns incremental to the returns predicted by earnings surprises. Gross profit surprises are also shown to subsume the information provided by revenue surprises when the returns are measured over three months beginning in the fiscal quarter subsequent to the gross profit surprise.

Motivation and hypotheses

In general, this study is motivated by the value relevance research constructs advanced by Francis and Schipper (1999), whereby financial information is considered to be value relevant if it contains information that can be used as part of a valuation model or to predict the key variables used in valuation models. For example, financial information is value relevant if it can help predict future earning or cash flows, either directly or indirectly through market prices.

The extant literature that investigates the predictive value of earnings is robust and mature, while the research on the predictive value of revenues has grown significantly over the past decade. However, the literature investigating the predictive value of gross margin is still emerging. Currently, research investigating gross margin focuses on the aggregate gross margin (Chiu and Haight, 2013). However, a review of press releases reveals a heavy focus on the gross margin percentage. In addition, a recent survey reveals that senior marketing managers rated the gross margin percentage higher than other gross margin measures in terms of usefulness (Farris *et al.*, 2010).

Gross profit percentage is a measure of profitability and is calculated by dividing the gross profit by total revenues. The gross profit percentage provides useful information

regarding a firm's operating performance and insights regarding value propositions, cost structures, ability to price products (i.e. mark-ups) and the value of incremental sales. The lack of literature investigating the gross margin percentage is not consistent with the emphasis placed on this metric by investors and market participants and provides the motivation for the first hypothesis (all hypotheses are stated in alternate form):

H1. Positive (negative) changes in gross margin percentage are associated with positive (negative) future abnormal stock returns.

H1 focuses on gross margin. However, revenue and earnings are also relied upon as credible signals of future performance. When issuing these three signals, a firm may provide a positive revenue surprise, accompanied by a positive gross margin change and positive earnings surprise. In this situation, all three metrics are signaling positive future performance. Conversely, all three of a firm's metrics may signal negative future performance (i.e. negative revenue surprise accompanied by negative gross margin change and negative earnings surprise).

There are a total of eight different combinations of signals that can be offered by a firm when considering two states (positive or negative surprise) across three metrics (revenue, gross margin and earnings). A rational investor should respond more positively to the earnings announcement of firms that signal strong future performance through multiple signals that are consistent with each other. This rationale provides the motivation for the second hypothesis:

H2A. The positive (negative) abnormal stock returns to changes in gross margin percentage will be more pronounced if the gross margin and earnings surprises signals are consistent with each other.

H2B. The positive (negative) abnormal stock returns to changes in gross margin percentage will be more pronounced if the gross margin and revenue surprises signals are consistent with each other.

Even though the research on earnings and revenue is robust, much of the prior literature relies heavily on data that are mostly from before the collapse of Enron. The collapse of Enron was one of the most significant events in financial reporting over the past 15 years, resulting in many changes to the reporting landscape. One of the most profound, and long-lasting implications was the enactment of the Sarbanes-Oxley Act of 2002 ("SOX"), which took effect in July 2002. The adoption of SOX, along with its subsequent rules, resulted in increased responsibilities for directors and aimed to enhance investor protection through accounting reforms. Prior research has established that the market reaction to meeting or beating analyst expectations experienced a structural change in the period after the Enron collapse (Koh *et al.*, 2008), while earnings quality improved (Lobo and Zhou, 2006) and earnings management declined (Cohen *et al.*, 2008). We posit that improvement in earnings quality, decrease in earnings management and stricter controls discouraging improper insider information sharing is more likely to generate a more pronounced market reaction to accounting information:

H3. Positive (negative) changes in gross margin percentages are associated with more pronounced positive (negative) future abnormal stock returns in the Post-Scandal period than the Pre-Scandal period.

Research design

To test the hypotheses, we begin with the following general specification found in the prior literature (Ertimur *et al.*, 2003 and Jegadeesh and Livnat, 2006) that considers the revenue and earnings signals:

$$R = \alpha_1 + \beta_1 efe + \beta_2 rfe + \varepsilon \quad (1)$$

In the above specification, the R is a measure of equity return extending from the date the income statement signals become available, normally the earnings announcement date, to some specified date. The *efe* and *rfe* refer to the earnings and revenue signals, normally measured as the surprise (forecast error). The coefficients β_1 and β_2 are the earnings response coefficient and revenue response coefficient, respectively. Prior literature suggests that both coefficients are positive and significantly different than zero.

This research augments the above specification by incorporating gross margin percentage into the analysis as follows:

$$CAR_{(0,i)} = \alpha_1 + \delta_1 REVSURP + \delta_2 \Delta GM\% + \delta_3 EPSSURP + \varepsilon \quad (2)$$

Where:

CAR = The stock price reaction is measured with industry-adjusted cumulative abnormal return (CARs). The industry return is defined as the return from a value-weighted portfolio of companies with the same two-digit Standard Industrial Classification (SIC) (Koh *et al.*, 2008; Balsam *et al.*, 2002).

REVSURP = The revenue surprise, measured as the [(Actual Revenue – Analyst's Revenue Expectation)/Analyst's Revenue Expectation]. The revenue expectation is based on the consensus analyst estimate prior to the earnings announcement date.

$\Delta GM\%$ = The change in gross margin percentage, measured as the percentage change in the quarter-over-quarter change in gross margin ($[GM\%_q - GM\%_{q-1}]/GM\%_{q-1}$).

EPSSURP = The earnings surprise, measured as the [(Actual Earnings per Share [EPS] – Analyst's EPS Expectation)/Analyst's EPS Expectation]. The earnings expectation is based on the consensus analyst estimate prior to the earnings announcement date.

The CARs are measured in both a short and wider window around the earnings announcement date. In the short window, the immediate market reaction to the income statement metrics are captured by measuring the CARs on the earnings announcement date and for the three days following the financial statement release date[1][2]. Two additional measures are employed for the wider window. First, we rely on Balsam *et al.* (2002) and measure the market reaction for 17 days after the earnings announcement to provide sufficient time for investors to analyze the earnings announcement information and revise their beliefs. Next, the market reaction is measured over the entire quarter (63 days), following the earnings announcement date. The 63-day CAR is selected because it is the longest period available before the next quarterly financial statements are

released. Therefore, the stock price movements in this 63-day long-run window will not be influenced by the release of future financial statements.

Consistent with the prior literature (Jegadeesh and Livnat, 2006; Rees and Sivaramakrishnan, 2007; Kama, 2009), the revenue and earnings surprises are utilized as independent variables in the regression with stock price returns as the dependent variable because stock prices already reflect the expected revenues and earnings at the financial statement release date. The unexpected component of revenue and earnings should result in a stock price reaction.

Currently, analysts' rarely provide expectations for gross margin. Accordingly, we rely on the prior literature by utilizing the previous quarter's gross margin percentage as the proxy for the expected gross margin percentage. In the absence of analysts' expectations, researchers have commonly relied on a prior period measure to proxy for investor expectations (Ball and Brown, 1968; Chiu and Haight, 2013).

In addition to the main regressions, portfolios will be constructed around the three income statement metrics. A *t*-test for differences in the mean portfolio returns will provide further insights into the association between each income statement signal and future stock returns. The mean difference tests are based upon the difference in average CARs for various portfolios composed of firms with similar income statement signals (positive or negative).

The data

The sample consists of firm-quarter observations, using Standard and Poor's 500 firms, from 1998-2007. The S&P 500 is one of the most commonly used benchmarks, as it represents the market capitalizations of 500 leading companies publicly traded on the US stock market. The data are obtained from the following databases:

- Thomson Reuter's Institutional Brokers' Estimate System (IBES);
- Standard and Poor's Compustat databases; and
- University of Chicago's Centre for Research on Security Prices (CRSP) database.

The data set ends in 2008 to avoid the financial credit crisis, which could significantly reconfigure relation between market prices and fundamental accounting information.

The actual and consensus estimates of the EPS and revenue are obtained from the IBES database. Obtaining both the actual and consensus estimates from the same database is important to maintain consistency when determining if expectations are exceeded (Bhojraj *et al.*, 2009). The earnings announcement date was obtained from both the IBES and Compustat database[3]. The Computat databases provide the fundamental data: revenue, gross margin and earnings per share. The CRSP database is used to obtain the cumulative abnormal returns.

Consistent with past studies, financial institutions and financial service firms (SIC 6000-6999) were excluded from the population prior to the sample selection because their accounting is different from other firms (Ronen and Yaari, 2008). In addition, companies with inadequate data have been removed. Overall, a total of 327 companies were tested in this study. It is important to clarify that the sample over the entire 10-year period is based on the 500 companies that were included in the S&P 500 at the end of 2007. The firms were not required to survive over the full sample period to be included in the sample.

Table I outlines the number of firms and the distribution of firms by industry groups that are included in the sample. Panel A shows that a total of 10 of the 12 industry groupings has at least 20 companies and 6 of the 12 industry groups have at least 30 companies.

Table II outlines the breakdown of the number of quarterly observations in the sample of 327 firms. The total number of firm-quarter observations in the sample for hypotheses testing is 5,582. Consistent with prior studies (Bartov *et al.*, 2002; Koh *et al.*, 2008), the extreme 1 per cent of the highest and lowest for CAR, REVSURP, ΔGM% and EPSSURP have been winsorized.

Empirical results

Descriptive statistics

Table III presents descriptive statistics for the dependent variables (CAR) and the independent variables (REVSURP, ΔGM% and EPSSURP), while Table IV presents the correlations between all combinations of dependent and independent variables.

Table III reveals that the variables have fairly normal distribution, which is a requirement for the ordinary least squares regression analysis.

GICS industry grouping (four-digit)	Companies in industry
Capital Goods	37
Consumer Durables & Apparel	17
Energy	38
Food, Beverage & Tobacco	22
Health Care Equipment & Services	22
Materials	32
Pharmaceuticals, Biotechnology & Life Sciences	23
Retailing	30
Semiconductors & Semiconductor Equipment	18
Software & Services	31
Technology Hardware & Equipment	24
Utilities	33
	327

Note: GICS = Global Industry Classification Standard

Table I. Sample selection: number of firms by companies in industry

Description	No.	Total
Number of companies in sample	327	
Number of quarters from Q4 1998[a] to Q4 2007	37	
Potential maximum number of observations (327 × 37)		12,099
Number of observations where the data are not available in CRSP, IBES and/or Compustat		(6,517)
Number of quarterly observations in sample		5,582

Note: [a] Although the time period beings in the first quarter 1998, the first three quarters are not included in the regression tests, as they are used to calculate the changes in gross margin variable

Table II. Sample selection: quarterly observations in the sample

Variables	Minimum	Maximum	Mean	SD	Median	Skewness
REVSURP	−0.752	0.760	−0.015	0.193	−0.016	0.168
ΔGM%	−0.836	0.811	0.005	0.195	0.002	0.215
EPSSURP	−1.375	1.765	−0.016	0.485	−0.026	0.731
$CAR_{(0, 1)}$	−0.323	0.461	0.004	0.048	0.001	0.430
$CAR_{(0, 3)}$	−0.327	0.493	0.005	0.058	0.002	0.683
$CAR_{(0, 17)}$	−0.548	0.974	0.010	0.090	0.005	0.953
$CAR_{(0, 63)}$	−0.383	0.588	0.020	0.152	0.009	0.649

Notes: REVSURP = revenue surprise; ΔGM% = quarter-over-quarter change in gross margin percentage; EPSSURP = earnings per share surprise; CAR(0, 1) = the cumulative abnormal return (CAR) from the earnings announcement date to one day after the earnings announcement date; CAR(0, 3) = the cumulative abnormal return (CAR) from the earnings announcement date to three days after the earnings announcement date; CAR(0, 17) = the cumulative abnormal return (CAR) from the earnings announcement date to 17 days after the earnings announcement date; CAR(0, 63) = the cumulative abnormal return (CAR) from the earnings announcement date to 63 days after the earnings announcement date

Table III.
Summary statistics

Table IV reveals that revenue surprise, change in gross margin percentage and earnings surprise are all shown to be positively correlated. Correlation amongst the explanatory variables could suggest multicollinearity and, therefore, the regression analyses will be run with each accounting measure independently and as a whole. Variable inflation factor testing will be done to identify the existence of any multicollinearity.

H1 – *gross margin and stock returns*

H1 is first explored by analyzing the regression results from equation (2). Table V presents the results of the regression estimation.

The results reveal that positive changes in gross margin percentage and earnings surprises are associated with positive abnormal returns in both the short and wide windows. Specifically, positive changes in gross margin percentage have a statistically significant, positive relationship with abnormal returns around the earnings announcement ($\alpha = 0.05$) date which persists throughout the entire quarter ($\alpha = 0.01$). The statistical significance of the relationship increases as the window increases. That is, the relationship between changes in gross margin percentage and abnormal returns becomes stronger during the quarter following the announcement date.

In addition to the regression estimations, we created six portfolios based on the three income statement signals (positive or negative). In relation to *H1*, we are mostly interested in the portfolios created with firms that had either positive or negative changes in gross margin percentage. Table VI displays the abnormal returns from each of the six portfolios.

The results reveal that the positive changes in gross margin percentage, revenue surprises and earnings surprises are all associated with positive abnormal stock returns in the short windows around the earnings announcement date [CAR(0, 1) and CAR(0, 3)]. Specifically, firms with positive gross margin changes experienced excess abnormal returns of 0.42 per cent ($\alpha = 0.01$) over firms with negative surprises on the earnings announcement date. In regards to the other two income statement signals, firms with positive revenue surprises experienced a 0.42 per cent abnormal return ($\alpha = 0.01$) over

Table IV.
Correlation matrix

Coefficient *p*-value	REVSURP	ΔGM%	EPSSURP	Pearson correlations CAR(0, 1)	CAR(0, 3)	CAR(0, 17)	CAR(0, 63)
Spearman correlations							
REVSURP	1.0000	0.0566	0.4490	0.0181	0.0077	−0.0125	0.0035
		0.000***	0.000***	0.177	0.564	0.350	0.795
ΔGM%	0.079	1.0000	0.1410	0.0315	0.0368	0.0334	0.0504
	0.000***		0.000***	0.019**	0.006***	0.012**	0.000***
EPSSURP	0.594	0.192	1.0000	0.0394	0.0349	0.0224	0.0246
	0.000***	0.000***		0.003***	0.009***	0.094*	0.066*
CAR(0, 1)	0.025	0.057	0.043	1.0000	0.8545	0.5776	0.3649
	0.061*	0.000***	0.001***		0.000***	0.000***	0.000***
CAR(0, 3)	0.024	0.058	0.058	0.773	1.0000	0.6611	0.3971
	0.079*	0.000***	0.000***	0.000***		0.000***	0.000***
CAR(0, 17)	−0.006	0.063	0.027	0.502	0.617	1.0000	0.5830
	0.634	0.000***	0.044	0.000***	0.000***		0.000***
CAR(0, 63)	0.011	0.050	0.023	0.306	0.353	0.537	1.0000
	0.393	0.000***	0.089*	0.000***	0.000***	0.000***	

Notes: *significant at the 0.10 percent level (two-tailed); ***Significant at the 0.05 level (two-tailed); *** significant at the 0.01 level (two-tailed); REVSURP = revenue surprise; ΔGM% = quarter-over-quarter change in gross margin percentage; EPSSURP = earnings per share surprise; CAR(0, 1) = the cumulative abnormal return (CAR) from the earnings announcement date to one day after the earnings announcement date; CAR(0, 3) = the cumulative abnormal return (CAR) from the earnings announcement date to three days after the earnings announcement date; CAR(0, 17) = the cumulative abnormal return (CAR) from the earnings announcement date to 17 days after the earnings announcement date; CAR(0, 63) = the cumulative abnormal return (CAR) from the earnings announcement date to 63 days after the earnings announcement date

Variable	Predicted sign	CAR(0, 1) Coefficient HCO *t*-statistic	CAR(0, 3) Coefficient HCO *t*-statistic	CAR(0, 17) Coefficient HCO *t*-statistic	CAR(0, 63) Coefficient HCO *t*-statistic
Intercept	?	0.0037	0.0047	0.0095	0.0202
		5.802***	6.122***	8.917***	9.904***
REVSURP	+	0.0001	−0.0029	−0.0116	−0.0071
		0.044	−0.5375	−1.701*	−0.552
ΔGM%	+	0.0065	0.0096	0.012	0.0374
		1.852*	2.120**	1.938**	2.995***
EPSSURP	+	0.0035	0.0041	0.0051	0.0068
		1.901*	1.701*	1.618*	1.114
N		5,582	5,582	5,582	5,582
Adjusted R^2		0.002	0.002	0.002	0.003
F		3.990	3.178	3.105	3.775
Sign. *F*		0.007***	0.023**	0.025**	0.010***

Notes: $CAR_{(0,i)} = \alpha_1 + \delta_1 REVSURP + \delta_2 \Delta GM\% + \delta_3 EPSSURP + \varepsilon$; ***significant at the 0.01 level (two-tailed); **significant at the 0.05 level (two-tailed); *significant at the 0.10 level (two-tailed); robust heteroscedasticity-consistent standard errors (HCO) were estimated to control for any heteroscedasticity; variance inflation factors (VIF) were estimated (untabulated) and the results did not suggest the presence of any multicollinearity; REVSURP = revenue surprise; ΔGM% = gross margin surprise; EPSSURP = earnings per share surprise; CAR(0, 1) = the cumulative abnormal return (CAR) from the earnings announcement date to one day after the earnings announcement date; CAR(0, 3) = the cumulative abnormal return (CAR) from the earnings announcement date to three days after the earnings announcement date; CAR(0, 17) = the cumulative abnormal return (CAR) from the earnings announcement date to 17 days after the earnings announcement date; CAR(0, 63) = the cumulative abnormal return (CAR) from the earnings announcement date to 63 days after the earnings announcement date; Sign. F = significance of F value

Table V.
Main regression results

firms with negative surprises, while firms with positive earnings surprises experienced excess abnormal returns of 0.29 per cent ($\alpha = 0.05$) over firms with negative surprises.

The wider windows around the earnings announcement date [CAR(0, 17) and CAR(0, 63)] reveals that the abnormal returns associated with positive changes in gross margin tend to persist ($\alpha = 0.01$) beyond the earnings announcement date. In regards to the other income statement signals, positive revenue surprises are no longer associated with statistically significant excess abnormal returns, whereas positive earnings surprise are only associated with statistically significant ($\alpha = 0.05$) abnormal returns around the widest window following the earnings announcement (CAR 0.63).

Overall, the result from Tables V and VI are consistent with *H1* and suggest that there is a positive, statistically significant association between changes in gross margin percentage and abnormal future stock returns.

Sensitivity analysis

The results from Table VI reveal that firms with positive revenue surprises experience positive abnormal return relative to firms with negative revenue surprises. However, the regression results in Table V reveal that there is no statistically significant relationship between revenue surprises and abnormal returns. Taken together, these results suggest that the sign of the revenue surprise (positive or negative) is informative (as per

Revenue	CAR(0, 1) (%)	CAR(0, 3) (%)	CAR(0, 17) (%)	CAR(0, 63) (%)
Portfolio 1: REVSURP-Positive	0.61	0.71	1.09	2.25
Portfolio 2: REVSURP-Negative	0.18	0.29	0.99	1.87
Positive-Negative Diff	0.42	0.42	0.10	0.38
t-statistic	0.00***	0.01***	0.68	0.35
Gross margin				
Portfolio 3: ΔGM%-Positive	0.57	0.73	1.41	2.52
Portfolio 4: ΔGM%-Negative	0.15	0.20	0.61	1.50
Positive-Negative Diff	0.42	0.53	0.80	1.02
t-statistic	0.00***	0.00***	0.00***	0.01***
Earnings				
Portfolio 5: EPSSURP-Positive	0.52	0.73	1.23	2.52
Portfolio 6: EPSSURP-Negative	0.23	0.25	0.86	1.59
Positive-Negative Diff	0.29	0.48	0.37	0.93
t-statistic	0.02**	0.00***	0.13	0.02**

Notes: *Significant at the 0.10 per cent level (two-tailed); **significant at the 0.05 level (two-tailed); ***significant at the 0.01 level (two-tailed); REVSURP-Positive = portfolio created based on all firms with positive revenue surprises; REVSURP-Negative = portfolio created based on all firms with negative revenue surprises; ΔGM%-Positive = portfolio created based on all firms with a quarterly increase in gross margin percentage; ΔGM%-Negative = portfolio created based on all firms with a quarterly decline in gross margin percentage; EPSSURP-Positive = portfolio created based on all firms with a positive earnings surprise; EPSSURP-Negative = portfolio created based on all firms with a negative earnings surprise; Positive-Negative Diff = the difference between returns from the portfolios created around the positive and negative signals; REVSURP = Revenue surprise; ΔGM% = Change in gross margin percentage; EPSSURP = Earnings per share surprise; CAR(0, 1) = the cumulative abnormal return (CAR) from the earnings announcement date to one day after the earnings announcement date; CAR(0, 3) = the cumulative abnormal return (CAR) from the earnings announcement date to three days after the earnings announcement date; CAR(0, 17) = the cumulative abnormal return (CAR) from the earnings announcement date to 17 days after the earnings announcement date; CAR(0, 63) = the cumulative abnormal return (CAR) from the earnings announcement date to 63 days after the earnings announcement date

Table VI. Abnormal returns for portfolios constructed around a single income statement signal

Table VI); however, the magnitude of the revenue surprise is not informative (as per Table V). This assertion is consistent with conclusion offered by Rees and Sivaramakrishnan (2007) that market participants tend to focus more on the direction of the revenue surprise as opposed to the magnitude of the revenue surprise.

To directly test this assertion, we estimate the regression specification presented in equation (3):

$$CAR_{(0,i)} = \alpha_1 + \gamma_1 DMY\_REVSURP + \gamma_2 DMY\_\Delta GM\% + \gamma_3 DMY\_EPSSURP + \varepsilon \quad (3)$$

Where:

CAR = The cumulative abnormal return calculated in accordance with equation (2).

DMY_REVSURP = A dummy variable that receives a value of 1 if the revenue surprise is not negative and 0 otherwise.

DMY_ΔGM% = A dummy variable that receives a value of 1 if the percentage change in gross margin is not negative and 0 otherwise.

DMY_EPSSURP = A dummy variable that receives a value of 1 if the earnings surprise is not negative and 0 otherwise.

The results from the estimation of equation (3) (un-tabulated) confirm the supposition that the direction the revenue surprise is the informative signal as opposed to the magnitude of the surprise. Specifically, the γ_1 coefficient is positive and significant ($\alpha = 0.01$) during the short window when revenue surprise is used as the sole explanatory variable (n.b., the γ_1 coefficient is not significant in the wider window). The γ_1 coefficient is also positive and significant ($\alpha = 0.01$) when both the revenue surprise and change in gross margin percentage dummy variables are employed. However, the γ_1 ceases to be significant when all three explanatory variables are employed, while both γ_2 and γ_3 coefficients are statistically significant ($\alpha = 0.01$).

Overall, our results and data set are consistent with the prior literature in that they do not support the significance of the relationship between the abnormal returns and the magnitude of the revenue surprise.

Note that the γ_2 coefficient is statistically significant ($\alpha = 0.01$) when estimating equation (3) (un-tabulated) in both the short and wider windows. This provides further support for the informational content provided by the change in gross margin percentage change signal.

Robustness checks

We ran three sensitivity analyses to ascertain the robustness of the main findings. The first robustness is based on the premise that the income statement signals can vary based on their respective industries. For example, gross margin percentage may be less informative for service sector firms than for manufacturing or retail sector firms. Accordingly, the main regressions have been re-estimated for firms based on their four-digit GICS industry groupings. The industry-level regressions (un-tabulated) confirm the main findings and reveal that the informational content of the income statement increases as additional costing information is provided. That is, earnings surprises are the most predictive, followed by gross margin and revenue, respectively. The gross margin percentage change is associated with abnormal returns in either the short or wider window for firms in the following industries: capital goods, consumer durables and apparel, energy, retailing, software and services and technological hardware and equipment.

A second robustness check is based on the premise that institutional owners are more sophisticated in incorporating financial statements information into stock prices. Accordingly, we stratified our sample into firms with institutional ownership levels above and below the median. Consistent with prior studies (Balsam *et al.*, 2002), the results of the robustness check (un-tabulated) reveals that the main results are more pronounced for firms with high levels of institutional owners.

A third robustness check arises from the prior literature that suggests that the market reacts differently to earnings in the fourth quarter (Mendenhall and Nichols, 1988) and the increased constraints on earnings management in the fourth quarter due to the audit function (Brown and Pinello, 2007). Accordingly, we segregated the sample into observations from the first three quarters and the fourth quarter. The regression estimations on the two sub-samples (un-tabulated) reveal that the main results are robust to the different quarters and persist even in the fourth quarter.

H2 – *consensus among revenue, gross margin and earnings signals*

H2 states that the market places greater emphasis on gross margin percentage changes when they are accompanied by consistent revenue and earnings signals. Therefore, *H2* explores the different combinations of signals that are provided by the revenue, gross margin and earnings.

To investigate the individual impact of the revenue and earnings surprises on the change in gross margin percentage, we create portfolios based on two income statement signals (i.e. changes in gross margin percentage and revenue surprise and portfolios based on changes in gross margin percentage and earnings surprises). Table VII presents the abnormal returns for each portfolio (Panel A presents the four portfolios based on revenue and gross margin signals and Panel B presents the four portfolios based on gross margin and earnings signals).

	Income statement signal		Abnormal portfolio returns				
Portfolio	REVSURP	ΔGM%	CAR(0, 1) (%)	CAR(0, 3) (%)	CAR(0, 17) (%)	CAR(0, 63) (%)	Portfolio size (*n*)
Panel A – portfolios created with gross margin and revenue signals							
1	+	+	0.70	0.96	1.64	2.77	1,385
2	+	−	0.41	0.45	1.14	2.21	1,569
3	−	+	0.28	0.41	0.66	2.37	1,098
4	−	−	0.07	0.05	0.58	0.92	1,530
Average portfolio return			0.36	0.47	1.01	2.07	
Difference between Portfolio 1 and 4			0.63	0.91	1.06	1.87	
t-test for difference			0.01***	0.00***	0.01***	0.00***	

	Income statement signal		Abnormal portfolio returns				
Portfolio	ΔGM%	EPSSURP	CAR(0, 1) (%)	CAR(0, 3) (%)	CAR(0, 17) (%)	CAR(0, 63) (%)	Portfolio size (*n*)
Panel B – portfolios created with gross margin and earnings signals							
1	+	+	0.80	0.95	1.56	2.47	1,635
2	+	−	0.36	0.53	1.29	2.56	1,319
3	−	+	0.36	0.41	0.51	1.97	1,061
4	−	−	0.00	0.04	0.69	1.16	1,567
Average portfolio return			0.38	0.48	1.01	2.04	
Difference between Portfolio 1 and 4			0.80	0.91	0.87	1.31	
t-test for difference			0.00***	0.00***	0.01***	0.01***	

Notes: ***Significant at the 0.01 level (two-tailed); **significant at the 0.05 level (two-tailed); *significant at the 0.10 level (two-tailed); REVSURP = Revenue surprise; ΔGM% = change in gross margin percentage; EPSSURP = earnings per share surprise; CAR(0, 1) = the cumulative abnormal return (CAR) from the earnings announcement date to one day after the earnings announcement date; CAR(0, 3) = the cumulative abnormal return (CAR) from the earnings announcement date to three days after the earnings announcement date; CAR(0, 17) = the cumulative abnormal return (CAR) from the earnings announcement date to 17 days after the earnings announcement date; CAR(0, 63) = the cumulative abnormal return (CAR) from the earnings announcement date to 63 days after the earnings announcement date

Table VII. Abnormal returns for portfolios constructed with two income statement signals

The results from Table VII – Panel A reveal that the portfolio with firms that had positive revenue and gross margin signals generated statistically significant ($\alpha = 0.01$) excess abnormal returns relative to the portfolio of firms that had negative revenue and gross margin signals. Table VII – Panel B reveals that the portfolio of firms that had positive gross margin and earnings signals also generated statistically significant ($\alpha = 0.01$) excess abnormal returns relative to the portfolio of firms that had negative earnings and gross margin signals.

Table VII can also be used to obtain investigate the performance of mixed signal portfolios. However, no clear patterns emerge. For example, the portfolios with positive gross margin signals and negative earnings outperform the portfolio with negative gross margin signals and positive earnings signal. However, the portfolio with positive revenue signals and negative gross margin signals outperform the portfolio with positive gross margin signals and negative revenue signals.

To further illustrate the performance of mixed signal portfolios, we created Figure 1 to graphically depict the abnormal returns from the portfolios presented in Table VII – Panel B.

Figure 1 displays that the portfolio that consists of positive earnings and gross margin signals is the clear outperformer, whereas the portfolio with negative earnings and gross margin signals is the clear underperformer. However, the performance of the two mixed signal portfolios is similar (differences are not statistically significant).

To further test *H2*, eight additional portfolios are created based on all possible combination of the three income statement signals. The portfolios are modeled around the hierarchy of the income statement as follows. First, revenues are presented. Therefore, we segregated the observations based on positive and negative revenue surprises. This results in two portfolios. Next, gross margin is presented. As a result, we further segregate each of the two positive and negative revenue surprise groups based on the positive and negative changes in gross margin percentage. This results in four

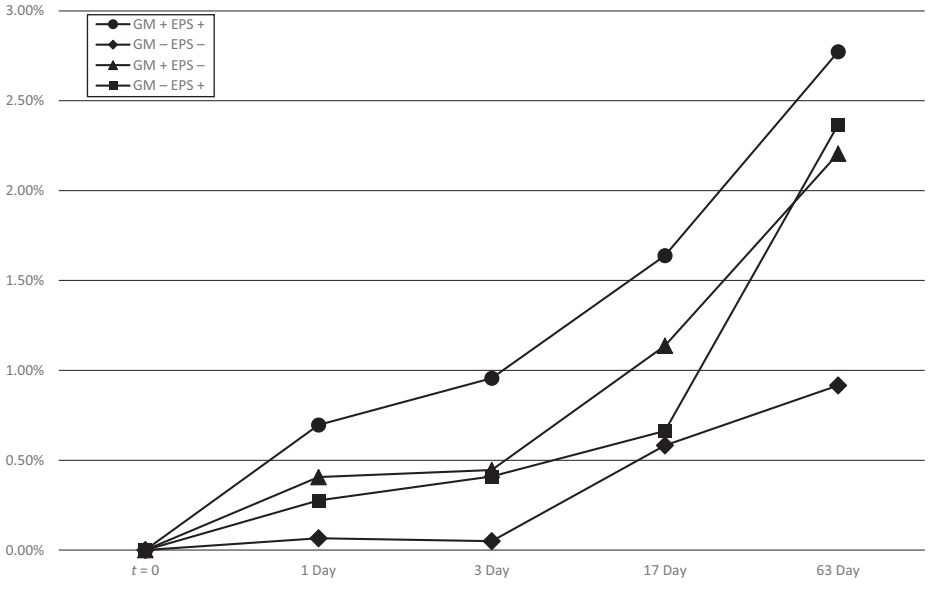

Figure 1.
Performance of gross margin and earnings surprise portfolios

portfolios. Lastly, earnings are presented. Therefore, we further segregate each of the four portfolios based on positive and negative earnings surprises. This results in eight different portfolios based on the sequence of signals offered by the income statement. The abnormal returns for each portfolio are presented in Table VIII.

Table VIII reveals that the portfolios with all three positive signals generated excess abnormal returns relative to the portfolios with all three negative signals across both the short and wide windows. The excess returns range from 0.74 per cent on the earnings announcement date to 1.55 per cent in the quarter following the earnings announcement. The excess returns across the two portfolios are all statistically significant ($\alpha = 0.01$) and consistent with the excess portfolio returns presented in the prior literature (Jegadeesh and Livnat, 2006).

Portfolio 3, Portfolio 5 and Portfolio 7 from Table VIII all include two negative signals and display abnormal returns that are below the average portfolio return. Specifically, Portfolio 3 (firms with negative gross margin and earnings surprises and positive revenue surprises) generated the lowest abnormal returns in the wide window, while Portfolio 7 (firms with negative gross margin and revenue surprises and positive earnings surprises) generated the lowest returns in the short window. Portfolio 5 consists of firms that reported positive gross margin signals and negative earnings and revenue signals. This portfolio generates below average abnormal returns only in the short window.

Portfolio 1 and Portfolio 8 from Table VIII are shown to be the two largest portfolios (n = 1,123 and 1,206, respectively). This reveals that most firms report consistent income

	Income statement signal			Abnormal portfolio returns				
Portfolio	REVSURP	ΔGM%	EPSSURP	CAR(0, 1) (%)	CAR(0, 3) (%)	CAR(0, 17) (%)	CAR(0, 63) (%)	Portfolio Size (n)
1	+	+	+	0.83	1.01	1.65	2.62	1,123
2	+	+	–	0.67	0.73	1.17	1.82	262
3	+	–	–	−0.03	−0.12	0.05	0.38	361
4	+	–	+	0.55	0.67	0.74	2.75	737
5	–	+	–	0.34	0.38	1.13	2.30	1,057
6	–	+	+	0.40	0.85	1.62	3.11	512
7	–	–	+	−0.34	−0.18	0.50	1.49	324
8	–	–	–	0.09	0.10	0.74	1.08	1,206
Average portfolio return				0.31	0.43	0.95	1.94	
Difference between Portfolio 1 and 8				0.74	0.90	0.91	1.55	
t-test for difference				0.00***	0.00***	0.01***	0.01***	

Notes: $CAR_{(0,i)} = \alpha_1 + \delta_1 REVSURP + \delta_2 \Delta GM\% + \delta_3 EPSSURP + \varepsilon$; ***Significant at the 0.01 level (two-tailed); **significant at the 0.05 level (two-tailed); *significant at the 0.10 level (two-tailed); REVSURP = Revenue surprise; ΔGM% = change in gross margin percentage; EPSSURP = earnings per share surprise; CAR(0, 1) = the cumulative abnormal return (CAR) from the earnings announcement date to one day after the earnings announcement date; CAR(0, 3) = the cumulative abnormal return (CAR) from the earnings announcement date to three days after the earnings announcement date; CAR(0, 17) = the cumulative abnormal return (CAR) from the earnings announcement date to 17 days after the earnings announcement date; CAR(0, 63) = the cumulative abnormal return (CAR) from the earnings announcement date to 63 days after the earnings announcement date

Table VIII. Abnormal returns for portfolios constructed with all three income statement signals

statement signals that are either all positive or all negative. There are very few firms that reported positive revenue and gross margin signals with negative earnings signals.

Overall, the results provide evidence that is consistent with *H2A* and *H2B* by suggesting that the abnormal market returns associated with gross margin percentage changes are accentuated by consistent revenue and earnings signals.

H3 – *the impact of the Enron Scandal*

H3 explores the relationship between the income statement signals during the Pre- and Post-Enron Scandal periods. Table IX presents the results from the regression estimation of equation (2) across three different sub-periods:

(1) the Pre-Scandal era of Q1 1998 to Q2, 2001, inclusive;

(2) the Scandal era of Q3 2001 to Q1 2003, inclusive; and

(3) the Post-Scandal era of Q2 2003 to Q4 2007, inclusive[4].

The results from the Pre-Scandal data set (Panel A, $n = 951$) do not reveal a strong relationship between the income statement signals and abnormal returns. Gross margin is not shown to be associated with the abnormal stock returns during the Pre-Scandal period.

During the Scandal Period (Panel B, $n = 947$), it appears that the market began to focus on gross margin; however, no relationship is documented between revenue and earnings signals with abnormal stock returns. The results from the Post-Scandal Period (Panel C, $n = 3{,}684$) reveal that both gross margin and earnings are positively associated with the abnormal stock returns. However, the gross margin is only associated with the abnormal returns during the wider windows during the Post-Scandal Period ($\alpha = 0.10$).

The results from Table IX can be contextualized through the prior literature to shed light on *H3*. The prior literature has established that earnings surprises were the main focus of the market prior to the Enron Scandal (Bartov *et al.*, 2002). The heavy market focus on earning surprises in the Pre-Scandal period led to the amplified use of earnings management, resulting in increased skepticism about the nature of the earnings surprise (Levitt, 1998). As a result, the market reaction to earnings surprises declined significantly during the Scandal period. This is supported by the results from Table IX – Panel B and prior literature (Koh *et al.*, 2008). Our results reveal that the association between earnings surprises and abnormal returns declined during the Scandal Period, while the association between gross margin changes and abnormal returns emerged. The Post-Scandal period witnesses the renewed association between earnings surprises and abnormal returns around the earnings announcement date, with the continued association between gross margin and abnormal returns during the wider window.

Overall, the results offer evidence that is consistent with *H3*. The market reaction to gross margin percentage changes are more pronounced in the Post-Scandal period.

Conclusions, limitations and future research

This paper is motivated by the lack of academic research investigating the information content of gross margin. Accordingly, three hypotheses are proposed to investigate the relationship between revenues, gross margin and earnings signals and abnormal returns. A data set of 5,582 firm-quarter observations using Standard and Poor's 500 firms from 1998-2007 is used to investigate the hypotheses. Regression analysis reveals that positive (negative) gross margin percentage changes are associated with positive

Variable	Predicted sign	CAR(0, 1) Coefficient HCO *t*-statistic	CAR(0, 3) Coefficient HCO *t*-statistic	CAR(0, 17) Coefficient HCO *t*-statistic	CAR(0, 63) Coefficient HCO *t*-statistic
Panel A – pre-scandal period (1998 Q2 to 2001 Q2)					
Intercept	?	0.0078	0.0097	0.0182	0.0315
		5.151***	5.327***	6.029***	5.950***
REVSURP	+	0.0015	0.0052	−0.0147	−0.0530
		0.1578	0.4116	−0.7963	−1.764**
ΔGM%	+	0.0032	0.0028	0.0001	0.0152
		0.3906	0.2512	0.0066	0.4776
EPSSURP	+	0.0012	−0.0019	−0.0007	0.0135
		0.2618	−0.3530	−0.073	0.8119
N		951	951	951	951
Adjusted R^2		0.000	0.000	0.000	0.003
F		0.156	0.081	0.348	1.2012
Sign. *F*		0.925	0.970	0.790	0.308
Panel B – scandal period (2001 Q3 to 2003 Q1)					
Intercept	?	0.0020	0.0033	0.0087	0.0224
		1.352	1.757*	2.713***	4.395***
REVSURP	+	0.0031	0.0012	−0.0321	−0.0439
		0.3287	0.0749	−1.145	−1.242
ΔGM%	+	0.0177	0.0304	0.0394	0.0889
		2.064*	2.492**	1.914*	3.155***
EPSSURP	+	0.0019	0.0054	0.0087	0.0111
		0.4330	0.6974	0.7409	0.726
N		947	947	947	947
Adjusted R^2		0.00	0.014	0.009	0.016
F		2.239	2.813	1.588	3.670
Sign. *F*		0.082*	0.038**	0.190	0.011***
Panel C – post-scandal period (2003 Q2 to 2007 Q4)					
Intercept	?	0.0031	0.0038	0.0084	0.0167
		3.878***	4.011***	5.936***	6.870***
REVSURP	+	−0.0010	−0.0062	−0.0118	0.0133
		−0.1940	−0.9968	−1.298	0.8585
ΔGM%	+	0.0040	0.0049	0.012	0.0292
		0.9246	0.9314	1.639*	1.904*
EPSSURP	+	0.0046	0.0055	0.0069	0.0042
		2.058**	2.023**	1.677*	0.5805

(*continued*)

Table IX.
Enron scandal period regression results

(negative) abnormal returns around the earnings announcement date and persistent throughout the quarter following the earnings announcement. The positive (negative) market reaction to gross margin percentage changes is accentuated by consistent revenue and earnings signals and became prominent during and after the Enron Scandal. The main findings are robust to sensitivity tests that focused on industry classifications, institutional ownership and fourth-quarter observations.

Overall, the results can also be interpreted to provide evidence that the income statement signals become more informative as additional costing information is

Variable	Predicted sign	CAR(0, 1) Coefficient HCO *t*-statistic	CAR(0, 3) Coefficient HCO *t*-statistic	CAR(0, 17) Coefficient HCO *t*-statistic	CAR(0, 63) Coefficient HCO *t*-statistic
N		3,684	3,684	3,684	3,684
Adjusted R^2		0.002	0.002	0.002	0.002
F		2.735	2.220	2.250	2.221
Sign. *F*		0.042**	0.083*	0.080*	0.083*

Notes: ***Significant at the 0.01 level (two-tailed); **significant at the 0.05 level (two-tailed); *significant at the 0.10 level (two-tailed); Robust standard errors (HCO) were estimated to control for any heteroscedasticity; variance inflation factors (VIF) were estimated (untabulated) and the results did not suggest the presence of any multicollinearity; REVSURP = revenue surprise; ΔGM% = change in gross margin percentage; EPSSURP = earnings per share surprise; CAR(0, 1) = the cumulative abnormal return (CAR) from the earnings announcement date to one day after the earnings announcement date; CAR(0, 3) = the cumulative abnormal return (CAR) from the earnings announcement date to three days after the earnings announcement date; CAR(0, 17) = the cumulative abnormal return (CAR) from the earnings announcement date to 17 days after the earnings announcement date; CAR(0, 63) = the cumulative abnormal return (CAR) from the earnings announcement date to 63 days after the earnings announcement date

Table IX.

provided. Earnings surprises are found to have the most association with abnormal returns, followed by gross margin and revenue, respectively. This suggests that cost of goods sold information provides valuable insights into a firms performance (i.e. gross margin is more informative than revenues), along with other operating expenses (i.e. earnings are more informative than gross margin).

As with any study, the results are subject to some limitations. The first limitation is with regards to the sample which includes only S&P 500 firms. Selecting S&P 500 firms results in a sample of large firms, thereby limiting the generalizability of the results to smaller firms. Future researchers are encouraged to replicate these results amongst a data set that includes both small and large firms. A second limitation is with regards to the measurement of the independent variables. The gross margin percentage change is measured as the quarter-over-quarter change, while the revenue and earnings surprises are measured based on analysts' expectations. Therefore, the measurement of the revenue and earnings variables differs from the measurement of the gross margin variable. It is not possible to calculate a gross margin surprise based on analysts' expectations because analysts' do not provide gross margin expectations for many firms. However, future researchers are encouraged to consider alternative measures of calculating the gross margin surprise.

Notes

1. Note that the earnings announcement dates were obtained from both the IBES and Compustat database. To avoid any differences that exist between the earnings announcement dates in each database, the dates from both Compustat and IBES were compared to determine the accuracy of the dates. Observations having Compustat and IBES report dates of more than one day apart were dropped from the analysis of this research.
2. Prior literature suggests that for short periods of time, the summation process used when calculating CARs behaves better statistically than the compounding process used when

calculating buy and hold abnormal returns (BHARs), leading to fewer inference problems (Bhojraj, 2009). Aside from the common use of CARs in past literature, Fama (1998) suggests that the compounding process inherent in BHARs can magnify a single period of abnormal performance and, therefore, advocate the use of CARs.

3. The fundamental data obtained from the database and the earnings announcement dates were audited on a sample basis against the actual 10-K/10-Q files in the Securities and Exchange Commission's EDGAR (Electronic Data Gathering, Analysis, and Retrieval).
4. These sub-periods are consistent with related, prior literature (e.g., Koh *et al.* (2008)).

References

Amir, E. and Lev, B. (1996), "Value-relevance of nonfinancial information: the wireless communications industry", *Journal of Accounting and Economics*, Vol. 22 Nos 1/3, pp. 3-30.

Apple Press Info (2015), "Apple reports record first quarter results", available at: www.apple.com/ca/pr/library/2015/01/27Apple-Reports-Record-First-Quarter-Results.html (accessed 1 April 2015).

Ball, R. and Brown, P. (1968), "An empirical evaluation of accounting income numbers", *Journal of Accounting Research*, Vol. 6 No. 2, pp. 159-178.

Balsam, S., Bartov, E. and Marquardt, C. (2002), "Accruals management, investor sophistication, and equity valuation: evidence from 10-Q filings", *Journal of Accounting Research*, Vol. 40 No. 4, pp. 987-1012.

Barth, M., Beaver, W. and Landsman, W. (2001b), "The relevance of the value relevance literature for financial accounting standard setting: another view", *Journal of Accounting and Economics*, Vol. 31 Nos 1/3, pp. 77-104.

Barth, M.E., Cram, D.P. and Nelson, K.K. (2001a), "Accruals and the prediction of future cash flows", *The Accounting Review*, Vol. 76, No. 1, pp. 27-58.

Bartov, E., Givoly, D. and Hayn, C. (2002), "The rewards to meeting or beating earnings expectations", *Journal of Accounting and Economics*, Vol. 33 No. 2, pp. 173-204.

Bhojraj, S., Hribar, P., Picconi, M. and McInnis, J. (2009), "Making sense of cents: an examination of firms that marginally miss or beat analyst forecasts", *Journal of Finance*, Vol. 64 No. 5, pp. 2361-2388.

Bowen, R.M., Burgstahler, D. and Daley, L.A. (1986), "Evidence on the relationships between earnings and various measures of cash flow", *The Accounting Review*, Vol. 86 No. 4, pp. 713-725.

Brown, L.D. and Pinello, A. (2007), "To what extent does the financial reporting process curb earnings surprise game?", *Journal of Accounting Research*, Vol. 45 No. 5, pp. 947-981.

Brown, S., Lo, K. and Lys, T. (1999), "Use of R-squared in accounting research: measuring changes in value relevance over the last four decades", *Journal of Accounting and Economics*, Vol. 28 No. 2, pp. 83-115.

Brush, T., Bromiley, P. and Hendricks, M. (2000), "The free cash flow hypothesis for sales growth and firm performance", *Strategic Management Journal*, Vol. 21 No. 4, pp. 455-472.

Chiu, P.C. and Haight, T. (2013), "Gross profit surprises and future stock returns", Working Paper, available at: http://cbeweb-1.fullerton.edu/centers/ccrg/PDF/Gross%20Profit%20Surprises%20and%20Future%20Stock%20Returns.pdf (accessed 13 April 2015).

Cohen, D.A., Dey, A. and Lys, T.Z. (2008), "Real and accrual-based earnings management in the pre- and post-Sarbanes Oxley periods", *The Accounting Review*, Vol. 83 No. 3, pp. 757-787.

Collins, D.W., Maydew, E.L. and Weiss, E.L. (1997), "Changes in the value-relevance of earnings and book values over the past forty years", *Journal of Accounting and Economics*, Vol. 24 No. 1, pp. 39-67.

Dechow, P., Kothari, S.P. and Watts, R.L. (1998), "The relation between earnings and cash flows", *Journal of Accounting and Economics*, Vol. 25 No. 2, pp. 133-168.

El-Sayed Ebaid, I. (2011), "Accruals and the prediction of future cash flows: empirical evidence from an emerging market", *Management Research Review*, Vol. 34 No. 7, pp. 838-853.

Ertimur, Y., Livnat, J. and Martikainen, M. (2003), "Differential market reactions to revenue and expense surprises", *Review of Accounting Studies*, Vol. 8 Nos 2/3, pp. 185-211.

Fama, E. (1998), "Market efficiency, long-term returns, and behavioural finance", *Journal of Financial Economics*, Vol. 49 No. 3, pp. 283-306.

Fama, E.F. and Macbeth, J.D. (1973), "Risk, return, and equilibrium: empirical tests", *Journal of Political Economy*, Vol. 81 No. 3, pp. 607-636.

Farris, P.W., Bendle, N.T., Pfeifer, P. and Reibstein, D. (2010), *Marketing Metrics: The Definitive Guide to Measuring Marketing Performance*, Pearson Education, Upper Saddle River, NJ.

FASB (2010), "Conceptual framework for financial reporting", Financial Accounting Standards Board.

FASB (2013), "Conceptual framework for financial reporting: objective of financial reporting and qualitative characteristics of decision-useful financial reporting information", Financial Accounting Standards Board.

Finger, C. (1994), "The ability of earnings to predict future earnings and cash flow", *Journal of Accounting Research*, Vol. 32 No. 2, pp. 210-223.

Francis, J. and Schipper, K. (1999), "Have financial statements lost their relevance?", *Journal of Accounting Research*, Vol. 37 No. 2, pp. 319-352.

Ghosh, A., Gu, Z. and Jain, P.C. (2005), "Sustained earnings and revenue growth, earnings quality, and earnings response coefficients", *Review of Accounting Studies*, Vol. 10 No. 1, pp. 33-57.

Graham, J., Harvey, C. and Rajgopal, S. (2005), "The economic implications of corporate financial reporting", *Journal of Accounting and Economics*, Vol. 40 Nos 1/3, pp. 3-73.

Greenberg, R.R., Johnson, G.L. and Ramesh, K. (1986), "Earnings versus cash flow as a predictor of future cash flow measures", *Journal of Accounting, Auditing, and Finance*, Vol. 1 No. 4, pp. 266-277.

Jegadeesh, N. and Livnat, J. (2006), "Revenue surprises and stock returns", *Journal of Accounting and Economics*, Vol. 41 No. 1, pp. 147-171.

Kama, I. (2009), "On the market reaction to revenue and earnings surprises", *Journal of Business Finance and Accounting*, Vol. 36 No. 1, pp. 31-50.

Kesavan, S., Gaur, V. and Raman, A. (2010), "Do inventory and gross margin data improve sales forecasts for US public retailers?", *Management Science*, Vol. 56 No. 9, pp. 1519-1533.

Kim, M. and Kross, W. (2005), "The ability of earnings predict future operating cash flows has increasing – not decreasing", *Journal of Accounting Research*, Vol. 43 No. 3, pp. 753-780.

Koh, K., Matsumoto, D.A. and Rajgopal, S. (2008), "Meeting or beating analyst expectations in the post-scandals world: changes in stock market rewards and managerial actions", *Contemporary Accounting Research*, Vol. 25 No. 4, pp. 1067-1098.

Kothari, S.P. (2001), "Capital markets research in accounting", *Journal of Accounting and Economics*, Vol. 31 Nos 1/3, pp. 105-231.

Lev, B. and Thiagarajan, R. (1993), "Fundamental information analysis", *Journal of Accounting Research*, Vol. 31 No. 2, pp. 190-215.

Lev, B. and Zarowin, P. (1999), "The boundaries of financial reporting and how to extend them", *Journal of Accounting Research*, Vol. 37 No. 2, pp. 353-385.

Levitt, A. (1998), "'The numbers game', Security and Exchange Commission, Remarks by Chair Arthur Levitt at New York University Center or Law and Business", available at: www.sec.gov/news/speech/speecharchive/1998/spch220.txt (accessed 1 April 2015).

Lobo, G.J. and Zhou, J. (2006), "Did conservatism in financial reporting increase after the Sarbanes-Oxley Act? Initial evidence", *Accounting Horizons*, Vol. 20 No. 1, pp. 57-73.

McBeth, K.H. (1993), "Forecasting operating cash flow: evidence on the comparative predictive abilities of net income and operating cash flow from actual cash flow data", *The Mid-Atlantic Journal of Business*, Vol. 29 No. 2, pp. 173-187.

Mendenhall, R. and Nichols, W. (1988), "Bad news and differential market reactions to announcements of earlier-quarters versus fourth-quarter earnings", *Journal of Accounting Research*, Vol. 26 No. 1, pp. 63-86.

Rees, L. and Sivaramakrishnan, K. (2007), "The effect of meeting or beating revenue forecasts on the association between quarterly returns and earnings forecast errors", *Contemporary Accounting Research*, Vol. 24 No. 1, pp. 259-290.

Ronen, J. and Yaari, V.L. (2008), *Earnings Management: Emerging Insights in Theory, Practice, and Research*, Springer.

Savitz, E. (2011), "Apple filing repeats view that gross margins will fall in 2011", *The Wall Street Journal*.

White, G., Sondhi, A. and Fried, D. (2003), *The Analysis and Use of Financial Statements*, 3rd ed., John-Wiley and Sons, New York, NY.

Further reading

ACFE (2010), "Report to the nation on occupation fraud and abuses", Certified Fraud Examiners, available at: www.acfe.com/uploadedFiles/ACFE_Website/Content/rttn/2012-report-to-nations.pdf (accessed 1 April 2014).

Baber, W., Chen, S. and Kang, S. (2006), "Stock price reaction to evidence of earnings management: implications for supplementary financial disclosure", *Review of Accounting Studies*, Vol. 11 No. 1, pp. 5-19.

Holthausen, R.W. and Watts, R. (2001), "The relevance of value-relevance literature for financial accounting standard setting", *Journal of Accounting and Economics*, Vol. 31 Nos 1/3, pp. 3-75.

About the authors

Camillo Lento is an Associate Professor of Accounting in the Faculty of Business Administration. He received his PhD from the University of Southern Queensland (Australia), and both his Master's (MSc) degree and undergraduate degree (HBComm) from Lakehead University. He is a Chartered Professional Accountant, Chartered Accountant, Chartered Business Valuator and a Certified Fraud Examiner. His research investigates the capital market implication of earnings management and earnings quality of firms that meet or beat their earnings expectations. In addition, his research interests include technical trading models and accounting education. Camillo Lento is the corresponding author and can be contacted at: clento@lakeheadu.ca

Naqi Sayed is an Associate Professor of Accounting in the Faculty of Business Administration at Lakehead University. He holds a Master's of Business Administration from Pakistan and a Master's in Banking Management from the United Kingdom. He received his PhD from University of Wollongong, Australia in 2002. He has gained extensive working experience in non-banking financial institutions and commercial banks in the area of small business and corporate finance. He received his Certified Management Accountant designation in Ontario, Canada in 2009.Beside financial and management accounting, his publications and research interests include accountability issues, equity finance (especially venture capital) and resource-based theory.