# On the Usefulness and Production of Bellwether Firms' Management Earnings Forecasts

Yung-Fang Ayung Tseng

Submitted in partial fulfillment of the

requirements for the degree of

Doctor of Philosophy

under the Executive Committee

of the Graduate School of Arts and Sciences

COLUMBIA UNIVERSITY

2015

# ABSTRACT

## On the Usefulness and Production of Bellwether Firms' Management Earnings Forecasts

Yung-Fang Ayung Tseng

This study examines whether bellwether firms' management earnings forecasts predict future macroeconomic trends and their propensity to issue these forecasts. I find that forecasts issued by firms producing/sourcing commodities in a large cyclical sector of the economy (defined as bellwether firms) predict real and nominal GDP growth and aggregate earnings for the subsequent four quarters. Forecasts issued towards the end of a quarter and forecasts by small bellwether firms present greater predictive power. When examining the propensity to issue forecasts, I find that bellwether firms provide less frequent disclosures than non-bellwether firms, but bellwether firms owned by many institutional investors issue more frequent disclosures than other bellwether firms. These results suggest that bellwether firms may be reluctant to issue timely disclosures because their investors can learn about them from government announcements. However, institutional investors may pressure bellwether firms to issue these timely disclosures.

Table of Contents

List of Charts, Graphs, and Illustrations

# 1. Introduction

Prior studies document that aggregate stock returns move significantly around announcements of management earnings forecasts issued by bellwether firms and interpret this result as investors using bellwether firms' disclosed forward-looking information to learn about many other firms in the market (e.g., Bonsall, Bozanic, and Fischer, 2013). In this study, I examine whether bellwether firms' management earnings forecasts predict future macroeconomic indicators in the subsequent periods. Different from the existing literature that shows bellwether firms' disclosed forward-looking information has a contemporaneous impact on other firms' stock values, I attempt to demonstrate that bellwether firms' disclosed forward-looking information is a leading indicator of future macroeconomic trends, such as GDP growth and aggregate earnings in the following periods.

Whether individual bellwether firms' disclosures predict future macroeconomic indicators is an important research question in the macroeconomic forecasting literature because existing studies often use aggregate accounting measures to predict future macroeconomic announcements. For example, Konchitchki and Patatoukas (2014a) find that aggregate earnings growth predicts nominal GDP growth in the subsequent three quarters. Konchitchki and Patatoukas (2014b) use the largest 100 firms' accounting profitability as a proxy for aggregate earnings and document that this aggregate earnings proxy predicts future real GDP growth. The advantage of using an individual bellwether firm's disclosure rather than an aggregate earnings measure to predict future macroeconomic trends is to save information search costs. Following an individual bellwether firm's disclosure is less costly than collecting the majority of (large) firms' announcements. In addition, some bellwether firms issue their management earnings

forecasts earlier than the majority of firms' earnings announcements. This early forward-looking information released by an individual bellwether firm is a more timely indicator of future macroeconomic trends than aggregate accounting information.

In a multivariate empirical analysis, I find that management earnings forecast by bellwether firms is an incremental leading indicator of nominal and real GDP growth in the subsequent four quarters. This result is robust to predicting either first-released or final-released GDP growth. Furthermore, management earnings forecasts by bellwether firms also predict aggregate earnings in the subsequent four quarters. In a placebo test, management earnings forecast by non-bellwether firms do not predict future GDP growth and aggregate earnings. In summary, I document robust evidence that individual bellwether firms' disclosed forward-looking information is a leading indicator of future macroeconomic trends.

In the robustness test, I validate that these prediction results are mainly driven by bellwether firms' management earnings forecasts issued in the third month of a quarter (i.e., Mar., Jun., Sept., and Dec.) and that bellwether firms' management earnings forecasts issued in the first month of a quarter do not predict future GDP growth and aggregate earnings. This finding suggests that managers of bellwether firms gradually learn about the state of the economy from daily transactions over a quarter; hence, they possess more timely information about future macroeconomic trends towards the end of a quarter. This test confirms that it is indeed the macroeconomic information possessed by bellwether firms' managers driving the prediction results.

I further examine whether my results are driven by only large bellwether firms since prior studies often use firm size to identify bellwether firms (e.g., Anilowski, Feng, and Skinner, 2007; Konchitchki and Patatoukas, 2014b). Results show that management earnings forecasts by small

bellwether firms present stronger predictive power than those by large bellwether firms. Large firms usually have more resources to diversify their lines of business or to hedge their exposure to market risk than small firms; therefore, small firms are more sensitive to macroeconomic shocks than large firms. This robustness check confirms that it is bellwether firms' nature of business that endows their managers with useful and timely information regarding future macroeconomic trends.

After demonstrating the predictability of bellwether firms' management earnings forecasts, I switch gears to ask whether bellwether firms are willing to provide these timely disclosures. Although bellwether firms' forwarding-looking information helps investors gauge where the economy is heading, it is unlikely that managers of bellwether firms care much about supplying timely information for macroeconomic forecasts. Assuming that bellwether firms, like all the other firms, want to maximize their own values, they would choose to provide timely voluntary disclosures if these disclosures create net benefits to the firm itself. Helping investors learn about other firms' values is not going to be on top of bellwether firms' priority. Therefore, I conjecture that bellwether firms are reluctant to provide timely disclosures because of the substitution effect.

The substitution effect means that investors can obtain useful information about bellwether firms from many sources (e.g., government announcements about macroeconomic trends). In other words, investors can either use bellwether firms' timely disclosures to predict GDP or use the announced GDP to gauge the performance of bellwether firms. Given that bellwether firms do not care about public interests in forecasting macroeconomic trends as much as governments, they are less willing to provide frequent disclosures but would rather direct their investors to follow government macroeconomic announcements.

However, a group of investors may present strong demand for bellwether firms' timely disclosures. In particular, investors who hold diversified portfolios can use bellwether firms' disclosures to evaluate many securities in their portfolios, so they may pressure bellwether firms for frequent and timely disclosures. Since learning market leading indicators from an individual bellwether firm is less costly and time-consuming than following the whole market, diversified investors who own substantial stakes in an individual bellwether firm may influence this firm's disclosure policy. In light of these two countervailing forces, whether bellwether firms would provide frequent disclosures is ultimately an empirical question.

On average, I find that bellwether firms issue regular management forecasts less frequently than non-bellwether firms. It appears that the substitution effect between bellwether firms' disclosures and public macroeconomic announcements outweighs the stronger demand from diversified investors. Specifically, bellwether firms, on average, issue 0.25--0.38 fewer forecasts than non-bellwether firms. A one standard deviation increase in the probability of being a bellwether firm is associated with a decline of 2.4--3.3% of the standard deviation in disclosure frequency. This magnitude is similar to the impact from leverage or profitability, but it is much smaller than the impact from size.

Furthermore, I analyze the relation between the composition of institutional investors and the frequency of bellwether firms' disclosures. If some investors demand more frequent disclosures by bellwether firms because the disclosed information is useful in assessing the values of other firms, there should be a positive relation between the disclosure frequency of bellwether firms and the percentage of bellwether firms owned by investors who are likely to use this information. Following Bushee (1998), I use quasi-indexers to identify investors who hold diversified

portfolios and are likely to use bellwether firms' disclosures to evaluate other firms.[1] I find that bellwether firms owned by many institutional investors disclose more frequently than other bellwether firms, but I fail to find that bellwether firms owned by many diversified institutional investors disclose more frequently than other bellwether firms. Put differently, only bellwether firms with few institutional investors disclose less frequently than non-bellwether firms, probably because they do not face pressure for frequent disclosures. No significant relation between diversified investors' ownership and bellwether firms' disclosure frequency may be due to the weak identification of diversified investors based on the Bushee classification.

My findings above are based on associations, so I use exogenous shocks in an attempt to shed light on the potential causal effects. Following Balakrishnan, Billings, Kelly, and Ljungqvist (2014), brokerage house closures are assumed to be unexpected changes in a firm's information environment. I find that while firms, on average, increase their disclosure frequency after negative coverage shocks (as in Balakrishnan et al., 2014), bellwether firms do not increase their disclosure frequency after brokerage house closures. This result is consistent with the conjecture that the loss in analyst coverage does not have a significant impact on bellwether firms' information environment because investors can learn about bellwether firms from many other sources. In other words, the marginal benefit of issuing additional forecasts may be low for bellwether firms. Therefore, bellwether firms do not react to these shocks by increasing their disclosure frequency. On the other hand, bellwether firms owned by many institutional investors

[1] Bushee (1998) classifies institutional investors into three groups: quasi-indexers are long-term diversified investors, dedicated investors are long-term concentrated investors, and transient investors are short-term investors. On average, quasi-indexers' and transient investors' holdings are positively correlated with disclosure frequency, but there is no association between dedicated investors' holdings and disclosure frequency, consistent with the findings in Bushee and Noe (2000).

do increase their disclosure frequency after brokerage house closures. This finding suggests that institutional investors may pressure these bellwether firms to make frequent disclosures.

This study extends the growing literature on linking accounting information with macroeconomics. Existing studies show that aggregate accounting information predicts macroeconomic indicators, such as nominal GDP growth up to four quarters ahead, forecast errors in Production Price Index in the subsequent two months, and future restatements in GDP growth and unemployments (e.g., Kothari, Shivakumar, and Ucran, 2013; Konchitchki and Patatoukas, 2014a & b; Nallareddy and Ogneva, 2014). This paper complements to the evidence in the prior studies by showing that individual bellwether firms' earnings forecasts released before earnings announcement periods predicts the subsequent real and nominal GDP growth. The nature of bellwether firms' business provides their managers timely macroeconomic information towards the end of a quarter and their released forward-looking information during these non-earnings-announcements periods is a timely indicator of economic activities in the subsequent four quarters.

This paper further contributes to the institutional investor literature. Many studies focus on investment horizons. For instance, Chen, Harford, and Li (2007) argue that short-term investors focus on trading, while long-term investors are devoted to monitoring firms. Based on this notion, An and Zhang (2013) show that both stock price synchronicity and crash risk are positively related to short-term investors' holdings, but negatively associated with long-term investors' holdings (Callen and Fang (2013) find a similar result on crash risk). However, we know little about the role played by long-term diversified investors even though they account for two-thirds of institutional investors' holdings (Bushee and Noe, 2000). Bushee and Noe (2000) find a positive relation between diversified investors' holdings and disclosure quality, and

conjecture that high-quality disclosure reduces diversified investors' monitoring costs. This hypothesis is consistent with the theoretical prediction in Van Nieuwerburgh and Veldkamp (2010), who argue that diversified investors prefer low-cost information sources because it is too expensive to pursue high-cost information sources for many securities in their diversified portfolios. My study adds to this literature by identifying a unique demand from diversified investors---to learn about market-wide news---however, I fail to show a significant connection between the ownership level of diversified investors and the disclosure frequency of bellwether firms.[2]

The remainder of the paper is organized as follows. Section 2 describes the identification of bellwether firms. Section 3 examines whether management earnings forecasts by bellwether firms predicts future macroeconomic indicators. Section 4 analyzes the propensity of bellwether firms to issue management earnings forecasts, and Section 5 concludes.

[2] Some existing studies also argue and present evidence that disclosure practices match with different groups of investors (e.g., Bushee, 2004; Jung, 2013; Kalay, 2014).

## 2. Identification of Bellwether Firms

Although investors have frequently used bellwether firms in their discussions, there still lacks a formal definition of bellwether firms. In this study, I define bellwether firms as those whose disclosures 1) have implications for many other firms in the economy and 2) predict future macroeconomic trends. There are at least two approaches to identify bellwether firms. One is a time-series approach and the other is a cross-sectional approach. The time-series approach was adopted by Bonsall, Bozanic, and Fischer (2013). Following their terminology, high-macroeconomic-information-content firms are identified by how well a firm's performance is explained by macroeconomic indicators. The cross-sectional approach pertains to the concept of inter-firm network and identifies well-connected firms as potential candidates for bellwether firms. In this study, I define bellwether firms as the intersection of high-macro-info firms and well-connected firms. In the following subsections, I describe the methodology and the nature of business for bellwether firms.

### 2.1 High-macroeconomic-information-content firms

Bonsall, Bozanic, and Fischer (2013) identify high-macro-info firms based on how well macroeconomic shocks explain a firm's earnings. Suppose a firm's earnings are subject to macroeconomic shocks and firm-specific shocks:

$$\widetilde{e_\iota} = \mu_i + \beta_i^e \widetilde{M} + \widetilde{m}$$

$\beta_i^e$ is the sensitivity of a firm's earnings to macroeconomic shocks, and $\mu_i$ is a constant over time. Macroeconomic shocks $\widetilde{M}$ and firm-specific shocks $\widetilde{m}$ both have means of zero and are independently and normally distributed with variances V and v, respectively. High-macro-info firms are assumed to have a high $R_e^2$ such that:

$$R_e^2 = \frac{V}{V + v} > \varepsilon$$

Empirically, the $R_e^2$ is estimated by regressing a firm's earnings on aggregate earnings based on 20 quarters of data (at least 10 quarters of data are required):[3]

$$E_{i,q} = \beta_0 + \beta_1 E_{m,q} + \varepsilon_{i,q}$$

Firm-level earnings $E_{i,q}$ are measured as quarterly income before extraordinary items deflated by the beginning market capitalization. Aggregate earnings $E_{m,q}$ are measured as the sum of all Compustat firms' quarterly income before extraordinary items deflated by the sum of the beginning market capitalization. I use aggregate earnings as a summary statistic for macroeconomic shocks because existing studies have shown that aggregate accounting information predicts macroeconomic indicators (e.g., Kothari, Shivakumar, and Ucran, 2013; Konchitchki and Patatoukas, 2014a). The average value of $R_e^2$ is 0.11, the median is 0.06, the 25$^{th}$ percentile is 0.02, and the 75$^{th}$ percentile is 0.16 (see Table 1).

What exactly does this earnings $R^2$ capture? Earnings $R^2$ identifies cyclical business and larger sectors of the economy. Cyclical business often involves lump sum fixed investments. Because these firms pre-commit to long-term investments, such as equipment or human capital, they particularly worry about overcapacity during a downturn. When the overall industry has excess capacity and member firms do not have the flexibility to sell their fixed assets or lay off their

[3] Measurement errors may be substantial in an estimation procedure that uses only twenty time-series data points to estimate $R^2$. In fact, the low serial correlation, 0.09, indicates this measurement issue. When using sixty months of returns to estimate the $R^2$, the serial correlation increases to 0.47. I find consistent results when using the 60-month returns $R^2$ instead of the 20-quarter earnings $R^2$ in the propensity analysis but not in the predictability analysis.

employees, their costs maintain high while their profits are shrinking due to a price war among competitors. Therefore, high fixed-costs business is likely to present a cyclical performance (i.e., riding with peak, recession, trough, and expansion).[4] One popular competing strategy adopted by high fixed-costs firms is to increase their economic scale. As a result, many cyclical industries account for a large portion of the economy conditional on a strong supportive demand for their products. For example, the automobile industry represented a large portion of the U.S. economy in the 1960s and General Motors was considered a bellwether firm.

During my sample period from 1996-2010, large cyclical sectors of the U.S. economy have shifted from traditional manufacturing, such as chemicals, machinery, metals, and mining, to high technology sectors, such as semiconductors, internet, software, and biotechnology. Illustration A presents high-macro-info industries based on the number of member firms having an earnings $R^2$ greater than 0.29 (the $90^{th}$ percentile). I use Global Industry Classification Standard to define 67 industries. Chemicals (GICS: 151010) was ranked as the first in 1996 and 1998 (recall the 1996 earnings $R^2$ is generated by data from 1992-1996). Producing chemical commodities is a cyclical business because its production requires a high level of fixed investments. Dow Chemicals and DuPont are identified as high-macro-info firms because they are major players in this sector. After millennium, the U.S. economy shifts towards high technology sectors. Semiconductors (GICS: 453010) was ranked as the top five high-macro-info industries from 1999-2010 (see Illustration A). Semiconductor fabrication plants (fabs) require many expensive devices to function. The estimated range of building a fab is about $1-4 billion. Such a high level of fixed investments makes semiconductor firms vulnerable to overall business

[4] During a boom, high fixed-costs industry may face under-capacity. Price rises because of a lack of supply to meet demand, and profit increases. The inflexibility to adjust capacity leads profits to comove with the business cycle.

cycles. Since semiconductor chips are used in many electronic devices, such as computer and cell phones, this industry has grown to represent a large portion of the economy. Well-known semiconductor firms that are identified as high-macro-info firms are Intel, Texas Instruments, and Qualcomm.

Large cyclical industries are not limited to only high fixed-investments business. Industries that face cyclical demands are also highly cyclical. Media (GICS: 254010) was ranked as the first in 2002, the first in 2009 and the second in 2010 because media industry relies on advertising revenue, which is highly cyclical, and is usually hurt the most after a downturn. Well-known media firms that are identified as high-macro-info firms are Walt Disney and News Corp. Financial institutions, such as commercial banks, REITs, insurance, capital markets, and mortgage finance, are also cyclical because the supply of and the demand for capital move with business cycles.

In summary, descriptive statistics show that firms operating in a large cyclical sector of the economy tend to have a high earnings $R^2$. Because the nature of cyclicality and the representation of an industry in the economy, managers of these high earnings $R^2$ firms are assumed to possess timely macroeconomic information by observing their daily transactions.

## 2.2 Well-connected firms

Another way to identify bellwether firms is based on the inter-firm network. Suppose each firm i experiences a shock $\widetilde{m_i}$. When a firm is connected to many other firms in the network, its performance is more subject to common shocks ($\cup\widetilde{m_i}$ or $\cap\widetilde{m_i}$). Forward-looking information by these well-connected firms may help investors learn about common shocks that apply to many other connected firms in the economy. For instance, Aobdia, Caskey, and Ozel (2014) use inter-

industry trade flows to identify well-connected (central) industries and show that information released by firms in the central industries predicts earnings and stock returns of firms in their linked industries.

Instead of using trade flows, which data is only available at the industry level, Hoberg and Phillips (2014) develop a firm-level network measure based on textual analysis. They first create a word vector for each 10-K's Item 1 business description, and then calculate the cosine similarity of two firms' word vectors to measure the number of overlapping words. If this cosine similarity is under a certain threshold, these two firms are assumed to be connected. This technique identifies a firm's position in the network. When two firms rely on a similar production function or technology, or compete in the same product or service segment, they are likely to use similar vocabularies to describe their business. This textual-based measure captures not only firms with physical trades with each other but also firms operating in the same value chain. The original intent of Hoberg and Phillips is to measure competition faced by each firm. However, this textual-based measure also captures whether a firm's disclosure has broad implications to many other firms in the economy because the degree of overlapping words captures the extent to which a firm's disclosure helps investors learn about other firms. Put differently, well-connected firms are those operating in a highly competitive environment because their products or inputs are commodities or standardized services.

The average number of firms to which a firm connects is 82, the median is 49, the $25^{th}$ percentile is 17, and the $75^{th}$ percentile is 104 (Table 1). The serial correlation of this connectedness measure is 0.95. Such a high correlation may be driven by stable use of vocabularies in business descriptions. Note that as a firm increases its size, it is naturally

connected with more firms in the network. Therefore, well-connected firms, on average, are larger in size than less-connected firms.

Two broad industries have the most well-connected firms: high technology (e.g., software, communication equipment, biotechnology) and financial institutions (e.g., commercial banks and mortgage finance). For example, QuadraMed, a healthcare IT company, is paired with IDX Systems based on words such as patient, database, physician, and server, and Wanderlust Interactive, an entertainment game producer, is paired with Take Two Interactive based on words like royalties, video, television, and entertainment. These words describe their common customers, the means to collect revenue, and the resources used in their production process. Well-known high tech firms identified as well-connected are Cisco, Intel, and Microsoft. Financial institutions use many standardized contracts to create liquidity in the exchange markets, so they tend to use similar vocabularies in their business descriptions. For instance, First Niagara is paired with Burke Group based on annuities, creditworthy, pledging, and uncollectible. Well-known financial firms identified as well-connected are Citigroup, State Street, and Bank of America.

The degree of overlapping words captures the extent to which a firm's disclosure helps investors learn about other firms. When a firm is textually connected to many other firms, information disclosed by this firm can be used to evaluate its connected firms.

## 2.3 Definition of Bellwether Firms

In this study, I define bellwether firms as the intersection of being both high-macro-info and well-connected firms, that is, firms operating in a large cyclical industry and producing/sourcing commodities. Performance of these firms is highly correlated with business cycles. Inputs to

their production process or characteristics of their outputs are very similar to other firms in the economy.

Surprisingly, the correlation between the estimated earnings $R^2$ and the connectedness is only 0.06, indicating that very few firms are both high-macro-info and well-connected. Most of high-macro-info and well-connected firms are in the high technology (e.g., software, hardware, biotechnology) or financial sectors (e.g., commercial banks and mortgage finance).

# 3. Predictability of Bellwether Firms' Disclosures

## 3.1 Empirical Design and Descriptive Statistics

In this section, I examine whether management earnings forecasts by bellwether firms predict future announced GDP growth and aggregate earnings. The prediction model is as follows:

$$Y_{q+k} = \alpha_k + \beta_k \Delta E(X^{BW})_q + \varepsilon_{q+k}$$

$\Delta E(X^{BW})_q$ is the change in expectation of a bellwether firm's future earnings or earnings forecast surprise, measured as the midpoint of management earnings forecast announced in quarter q minus the median consensus of analysts' earnings forecasts issued during the thirty days prior to the announcement of this management earnings forecast. I use total assets from the previous quarter as the deflator. Essentially, $\Delta E(X^{BW})_q$ reveals forward-looking information regarding a bellwether firm's future performance, incremental to what the market or analysts already knew. I find the same results when using the lower bound of management earnings forecast or the mean analyst consensus to calculate surprise, or when using book values of equities from the previous quarter as a deflator.

Bellwether firms (BW) are identified as being both high-macro-info and well-connected firms. High-macro-info firms are those having earnings $R^2$, generated by regressing a firm's earnings on aggregate earnings based on 20 quarters of data, greater than 0.29 (the 90th percentile). Well-connected firms are those connecting to more than 181 firms (the 90th percentile). High-macro-info and well-connected firms are the intersection of the two. Low-macro-info and less-connected firms are used in a placebo test and these firms have earnings $R^2$ lower than 0.01 (the 10th percentile) and connect to fewer than 7 firms (the 10th percentile).

$Y_{q+k}$ is a macroeconomic indicator for a future quarter q+k. I consider five indicators: the first-released real GDP growth, the final-released real GDP growth, the first-released nominal GDP growth, the final-released nominal GDP growth, and aggregate earnings (measured as the seasonally-adjusted change in the sum of quarterly operating income (Compustat: OIADPQ) to the sum of lagged total assets). Using quarterly income before extraordinary items instead of operating income yields the same results. GDP growths are from real-time data research center at Federal Reserve Bank of Philadelphia. In terms of timeline for $Y_{q+1}$, the first-released GDP growth for quarter q+1 is usually announced after the end of q+1 and aggregate earnings are announced during q+1. Since the predictor $\Delta E(X^{BW})_q$ is based on management earnings forecasts issued during quarter q and analyst forecasts released before the announcement of a management forecast, this prediction model is not subject to look-ahead bias.

In the multivariate analysis, I further include these control variables (following Konchitchki and Patatoukas, 2014a & b): the first-released real/nominal GDP growth for quarter q (announced after the end of quarter q), aggregate earnings announced during quarter q, and twelve-month cumulative aggregate stock return (CRSP: VWRETD) up till the end of quarter q.

Management earnings forecasts are from the First Call's Corporate Issued Guidance database. Sample period spans from 1997Q1-2010Q4 (total 56 quarters) because CIG management forecasts coverage before 1997 is scarce and this database is no longer available after 2010 (see Chuk, Matsumoto, and Miller 2013). There are 33,158 guidance events with non-missing inputs to calculate earnings forecast surprise (see Table 1). The mean surprise is 0.01 and the median is 0.00, suggesting no news revealed by these management forecasts. The $10^{th}$ percentile of surprise is -0.04 and the $90^{th}$ percentile is 0.05. The average first-released real GDP growth is 2.25% and the average final-released real GDP growth is 1.80%. The average nominal GDP growth is about 2% greater than the average real GDP growth, reflecting the 2% average inflation rate. The distribution of GDP growth is slightly skewed to the left. The average final-released numbers are lower than the average first-released numbers, suggesting that revisions tend to be lower. Aggregate earnings and twelve-month cumulative aggregate returns are distributed towards the left, indicating more extreme negative earnings and returns than extreme positive ones.

## 3.2 Results

In a multivariate analysis with control variables, I examine whether bellwether firms' management earnings forecast is a leading indicator of future macroeconomic trends, such as GDP growth and aggregate earnings in the following periods. The predicted macroeconomic indicator in Table 2 is real GDP growth. When the event sample includes earnings forecasts issued by bellwether firms in the third month of a quarter (Panels A & B), these earnings forecasts predict the first-released and the final-released GDP growths in the subsequent three to four quarters. A one standard deviation increase in bellwether firms' earnings forecast surprise is associated with a decline of 30-40% of the standard deviation in the real GDP growth in the subsequent two quarters and then the predictive power gradually decreases over time. This

magnitude is greater than other predictors, such as the contemporaneous real GDP growth, aggregate earnings and twelve-month cumulative stock returns. The event sample for Panels C & D includes small bellwether firms' earnings forecasts issued in the second or third month of a quarter, and these small firms have market capitalization less than $1 billion. The results present similar trends. Earnings forecasts by small bellwether firms predict the first-released and the final-released GDP growths for the future three to four quarters and the predictive power declines over time. These results are incremental to the evidence that aggregate earnings predict future real GDP growth (as in Konchitchki and Patatoukas, 2014a).

Table 3 presents the analysis on predicting nominal GDP growth, which includes inflation and real GDP growth. Similarly, a one standard deviation increase in bellwether firms' earnings forecast surprise is associated with a decline of 30-40% of the standard deviation in the nominal GDP growth for the subsequent two quarters and then the predictive power gradually decreases over time. This magnitude is again greater than other predictors, such as the contemporaneous real GDP growth, aggregate earnings and twelve-month cumulative stock returns. Consistent results are also found when restricting events issued by only small bellwether firms. These findings are complements to the evidence that the largest firms' profitability predicts future nominal GDP growth (as in Konchitchki and Patatoukas, 2014b).

In addition to predicting GDP growth, I examine whether earnings forecasts by bellwether firms predict the subsequent aggregate earnings, i.e., predicting the market. In Table 4, I find that earnings forecasts by bellwether firms predict aggregate earnings in the subsequent quarters incremental to the contemporaneous aggregate earnings. Specifically, aggregate earnings predict future aggregate earnings positively, while bellwether firms' earnings forecasts predict future aggregate earnings negatively. This result is not driven by multicollinearity since a similar

magnitude of negative predictive power is still found after excluding the contemporaneous aggregate earnings. A one standard deviation increase in bellwether firms' earnings forecast surprise is associated with a decline of 10-25% of the standard deviation in aggregate earnings for the subsequent four quarters, which magnitude is smaller than those contributed by the contemporaneous aggregate earnings and cumulative aggregate returns. Because of seasonality in earnings, small bellwether firms' earnings forecasts present strong predictive power for aggregate earnings in the same quarter of the subsequent year. In general, these results confirm the speculation by investors and academics that bellwether firms' disclosures lead the market.

I further conduct several robustness tests in a univariate analysis (see Table 5). Bellwether firms' management forecasts are pooled in a panel and standard errors are clustered by firm and quarter to account for correlations among firms and across time periods. Dependent variable is the first-released real GDP growth for quarter q+1. Earnings forecast surprise indicates the difference between management earnings forecast and analyst forecast consensus. Panel A examines management earnings forecasts by which group of potential bellwether firms predict real GDP growth announced in the subsequent quarter. In Model (1), sample includes only high-macro-info firms, as those having earnings $R^2$ greater than 0.29 (the $90^{th}$ percentile). Earnings forecasts by high-macro-info firms do not seem predicting real GDP growth (p-value = 0.55; adjusted $R^2 = 0$). Similarly, earnings forecasts by well-connected firms, identified as those connecting to more than 181 firms (the $90^{th}$ percentile), do not predict real GDP growth either (p-value = -0.76; adjusted $R^2 = 0$). However, earnings forecasts by high-macro-info and well-connected firms (representing only 1.4% of the event sample) weakly predict real GDP growth (p-value = 0.19; adjusted $R^2 = 0.004$). The coefficient of -1.02 indicates that earnings forecasts by high-macro-info and well-connected firms predict future GDP growth negatively (see Model

(3) in Panel A of Table 5). Model (4) presents a placebo test and shows that earnings forecasts by low-macro-info and less-connected firms (representing only 0.7% of the event sample) do not predict future GDP growth (p-value = 0.97; adjusted $R^2$ = 0). This placebo test confirms that the negative and significant prediction result for high-macro-info and well-connected firms is not purely driven by sorting on extremes. These results confirm that only management earnings forecasts issued by both high-macro-info and well-connected firms predict real GDP growth in the subsequent quarter.

Then I explore whether this prediction result indeed comes from managers' possession of timely macroeconomic information by analyzing the timing of bellwether firms' earnings forecasts. If managers of bellwether firms obtain timely macroeconomic information through observing daily transactions, they are expected to possess more precise signals about the state of the economy towards the end of a quarter after reading more signals from many transactions. For an example in Illustration B, TI's manager attributed the high level of inventory to the weaker-than-expected demand from its customers in the PC and TV markets, but ruled out the possibility of over-built inventories in the supply chain. Its manager also mentioned that as time goes, he would gain a more complete picture over this issue. Therefore, we should expect that bellwether firms' earnings forecasts issued towards the end of a quarter present greater predictive power than those released in the beginning of a quarter.

Results in Panel B of Table 5 confirm this conjecture. Bellwether firms' earnings forecasts issued in the first month of a quarter (i.e., Jan., Apr., Jul., and Oct.) do not predict real GDP growth in the subsequent quarter (p-value = 0.74; adjusted $R^2$ = 0). As time passes, bellwether firms' earnings forecasts issued in the second month of a quarter (i.e., Feb., May, Aug., and Nov.) weakly predict future real GDP growth (p-value = 0.14; adjusted $R^2$ = 0.02). The strongest

predictive power comes from forecasts issued in the last month of a quarter (Mar., Jun., Sept., and Dec.). The p-value is less than 0.0001 and the adjusted $R^2$ is as high as 0.13. A one standard deviation increase in bellwether firms' earnings forecast surprise is associated with a decline of 37% of the standard deviation in the first-released real GDP growth in the subsequent quarter. Note that 58% of bellwether firms' earnings forecasts are issued in the first month of a quarter, 24% in the second month, and only 18% in the third month, suggesting that most firms bundle their earnings forecasts with actual earnings announcements and only few firms are willing to provide additional mid-quarter forecasts. The placebo test in Model (4) further confirms that the result is driven by only bellwether firms.

Several prior studies use firm size to identify bellwether firms. I further examine whether this result is driven by only large bellwether firms. Model (1) of Panel C in Table 5 presents earnings forecasts by bellwether firms issued in the second or third month of a quarter, Model (2) restricts firm size, measured as market capitalization, to be less than $2 billion, and Model (3) further restricts firm size to be less than $1 billion. I find that small bellwether firms' earnings forecasts have greater predictive power than large bellwether firms (p-value = 0.063, 0.014, and 0.009; adjusted $R^2$ = 0.02, 0.07, and 0.12 as firm size decreases). A one standard deviation increase in small bellwether firms' earnings forecast surprise is associated with a decline of 37% of the standard deviation in the first-released real GDP growth in the subsequent quarter.

Earnings forecasts by small bellwether firms presenting stronger predictive power than those by large bellwether firms is somehow surprising. The intuition is as follows. Small cyclical firms are more vulnerable to macroeconomic shocks because they have few resources to manage these shocks, such as diversification or hedging instruments, than large cyclical firms. Therefore, their performance and disclosed forecasts are more sensitive to macroeconomic trends. Moreover,

small firms producing or sourcing commodities in a large industry of the economy face a low entry barrier and fierce competition. They are likely the late entrants or the last group imitating a new trend of technology developed by large leaders. For one example, when a small cell phone manufacturer starts producing smartphones that share similar characteristics with existing products in the market, smartphone penetration rate is probably approaching its high end. For another example, a housing bubble is at the corner when a small-town local mortgage financier solicits you to buy a second house because he can quickly resell your loan through securitization. Therefore, optimistic earnings forecasts issued by small bellwether firms predict an upcoming downturn in the economy, and their pessimistic earnings forecasts predict a recovery in the economy.

I try several additional tests to check how robust these results are. First, the current research design is pooling all bellwether firms' events in a panel. To address the cross-sectional or cross-event correlations, I restrict the event sample to include only one bellwether firm's earnings forecast in a quarter. Specifically, I choose the last available earnings forecast issued by bellwether firms for each quarter. This restriction reduces the sample size to 42 forecasts by bellwether firms issued in the third month of a quarter and 30 forecasts by small bellwether firms issued in the second or third month of a quarter. In this time-series regression with standard errors clustered by quarters, I continue to find consistent results that these forecasts predict real and nominal GDP growths in the subsequent three to four quarters and predict aggregate earnings announced in the future four quarters.

Second, I try different ways to calculate earnings forecast surprise, which is currently measured as the midpoint of management earnings forecast announced in quarter q minus the median consensus of analysts' earnings forecasts issued during the thirty days prior to the

announcement of this management earnings forecast. When using the lower bound of management earnings forecast or the mean analyst consensus to calculate surprise, or when using book values of equities from the previous quarter as a deflator, I continue to find the same results. I also try using quarterly income before extraordinary items instead of operating income to compute aggregate earnings and document the same results.

Lastly, when high-macro-info firms are identified by a high return $R^2$, estimated by regressing a firm's return on aggregate returns based on 60 months of data (at least 24 months of data are required), I do not find that earnings forecasts by bellwether firms, defined as being both high-micro-info and well-connected firms, predict future GDP growth or aggregate earnings. The correlation between earnings $R^2$ and return $R^2$ is 0.17. In addition to this low correlation and measurement issues in earnings $R^2$, these two measures seem capturing different natures of business or groups of firms. For example, high return $R^2$ can be due to common ownerships, i.e., the same group of investors holding two different firms. Ownership structure and other market microstructure mechanism affect return $R^2$ but may not influence earnings $R^2$.

In conclusion, results presented in this section suggest that forward-looking information by bellwether firms leads the economy and the equity market.

# 4. Production of Bellwether Firms' Disclosures

## 4.1 Hypothesis

After presenting the usefulness of bellwether firms' management earnings forecasts on predicting future GDP growth and aggregate earnings, I swift my focus to analyze whether these bellwether firms are willing to provide timely forward-looking information. Although bellwether firms' forwarding-looking information helps investors gauge where the economy is heading, it is

unlikely that managers of bellwether firms care much about supplying timely information for macroeconomic forecasts. Assuming that bellwether firms, like all the other firms, want to maximize their own values, they would choose to provide timely voluntary disclosures if these disclosures create net benefits to the firm itself. Helping investors learn about other firms' values is not going to be on top of bellwether firms' priority. In fact, I conjecture that bellwether firms are reluctant to provide timely disclosures because of the substitution effect and proprietary costs.

The substitution effect means that investors can obtain useful information about bellwether firms from many sources (e.g., government announcements about macroeconomic trends). In other words, investors can either use bellwether firms' timely disclosures to predict GDP or use the announced GDP to gauge the performance of bellwether firms. Consider Texas Instruments (TI), which produces semiconductor chips used in cell phones, PCs, TVs, and industrial equipment for corporations. Given its wide range of customers and the cyclical semiconductor business, TI is likely to be classified as a bellwether firm. Thus, when the Bureau of Labor Statistics announced the employment statistics, investors are able to use this information to update TI's value because consumers' demand for durable goods depends on the unemployment rate. Theoretical model by Marinovic and Varas (2013) predicts that firms issue less frequent disclosures when public announcements about the macroeconomy are substitutes for company disclosures. In practice, investor relations (IR) consultants recommend that firms well-understood by investors should not issue frequent disclosures because investors already know a lot about these firms (Cossette, 2008). Given that bellwether firms do not care about public interests in forecasting macroeconomic trends as much as governments, they are less willing to provide timely disclosures but would rather direct their investors to follow government

macroeconomic announcements. Therefore, we should expect that bellwether firms issue less frequent disclosures than non-bellwether firms.

Proprietary costs may play an incremental role in bellwether firms' reluctance to provide timely disclosures (Verrecchia, 1983). Recall that bellwether firms are identified as firms producing or sourcing commodities in a large cyclical sector of the economy. The homogeneous nature of outputs or inputs indicates a low entry barrier or fierce competition, which reduces bellwether firms' incentive to provide timely forward-looking information.

Visibility is another reason bellwether firms may not find the need to supply timely disclosures (Bushee and Miller, 2012). Bellwether firms are usually more visible than non-bellwether firms because they are operating in a large cyclical sector of the economy or their inputs and outputs share similar characteristics with many other firms in the market. These firm characteristics are likely to attract investors' attention, compared to business, such as producing a unique product in a small industry. Therefore, bellwether firms have weaker incentives to issue frequent disclosures.

However, there are several alternative explanations. Bellwether firms may face greater pressures from their analysts or institutional investors because the nature of their business endows their forward-looking information predictive value of future macroeconomic trends. Releasing timely macroeconomic information may help these institutional investors or analysts forecast other firms although bellwether firms do not particularly care about providing information to help evaluate other firms in the market. In addition, bellwether firms are firms more sensitive to macroeconomic shocks. Investors and analysts may request bellwether firms to frequently update their exposures to these publicly observable macroeconomic shocks (Armstrong, Banerjee, and Corona, 2013).

The value of information transfer provides another alternative hypothesis. Continuing with Texas Instruments (TI) example above, investors may use information disclosed in TI's mid-quarter update to learn about other firms in the market. For an example in Illustration B, TI's manager attributed the high level of inventory to the weaker-than-expected demand from its customers in the PC and TV markets, but ruled out the possibility of over-built inventories in the supply chain. This information has implications for consumer durables companies and firms in the semiconductor supply chain, and it provides information about where the economy is heading. Investors, especially those holding diversified portfolios, would find TI's mid-quarter update useful when evaluating other securities in their portfolios, and thus may demand that TI discloses more frequently.

This argument, that diversified investors demand disclosures of bellwether firms, is based on the idea of disclosure clientele (e.g., Bushee, 2004; Jung, 2013; Kalay, 2014). Van Nieuwerburgh and Veldkamp (2010) study the matching between investors' information acquisition strategies and investment styles. They argue that investors holding concentrated portfolios are more likely to acquire high-cost information than investors holding diversified portfolios because it is too expensive to acquire costly information for every security in a diversified portfolio. Consistent with this conjecture, Bushee and Noe (2000) show a positive association between long-term diversified investors' holdings and disclosure quality. They attribute this result to the possibility that diversified investors demand company disclosures because company disclosures are less costly than other sources of information. If diversified investors rely on company disclosures, especially from bellwether firms, to learn about market-wide news, we should expect that bellwether firms owned by many diversified investors provide more disclosures.

One may wonder whether and why companies respond to investors' demands for disclosure. Studies in the investor activism literature provide potential explanations. Smith (1996) and Carleton, Nelson, and Weisbach (1998) show that firms respond to the corporate governance requests from large investors, such as CalPERS and TIAA-CREF. Many long-term investors may also play a similar role to CalPERS and TIAA-CREF. For example, Capital Group (i.e., American Funds) is one of the largest institutional investors with over one trillion USD under management. It has substantial stakes in many companies, including bellwether and non-bellwether firms. Given its large size, Capital Group is a major investor for many companies. For instance, Capital Group owned 18.3% of Texas Instruments as of June 2014 when summing up all shares held by its numerous funds. Hence, Capital Group may be able to influence the disclosure policy of TI. Consistent with this notion, Jung (2013) shows that disclosure practices spill over to firms with overlapping institutional investors. Based on these rationales, it is possible that bellwether firms may provide frequent disclosures when facing pressures from their diversified institutional investors.

## 4.2 Empirical Design and Results

I focus on analyzing the frequency of regular management earnings forecasts because these regular disclosures are less likely driven by unexpected events (also argued by Rogers, Skinner, and Van Buskirk, 2009). My initial sample includes all CRSP-Compustat firms with non-missing market value and book value of equities. I rely on the First Call's Corporate Issued Guidance database to identify management earnings forecasts. In each year, firms are classified into four groups: do not issue forecasts, provide bundled-only forecasts (defined as those issued within two days of actual earnings announcements), release unbundled-only forecasts (defined as those issued outside of the five-day earnings announcement window), and provide mid-quarter

forecasts in addition to quarterly bundled forecasts (see the number of firms in each group in Table 6 Panel A).

Before Regulation Fair Disclosure (effective in Oct. 2000), 25% of CRSP-Compustat firms issued forecasts, and 70% of forecasting firms provided 1--2 unbundled-only forecasts in a year.[5] During the post-Reg. FD period from 2001--2010, 34% of CRSP-Compustat firms issued forecasts, and forecasting firms chose a higher disclosure frequency, such as semiannual bundled forecasts, quarterly bundled forecasts, or additional mid-quarter forecasts. These forecasting practices also became more persistent after Reg. FD. The likelihood for a bundled-only-forecasting practice or a mid-quarter-forecasting practice to continue in the next year is as high as 48% or 60%, respectively (see the transition matrix in Table 6 Panel B). Investors may assume these recurring disclosures are a regular policy. Moreover, companies pre-announce the dates of these regular disclosures (see examples in Illustration C). My final sample includes 13,570 regular forecasting firm-years from 2001--2010, and regular forecasting firms are defined as those issuing bundled-only or additional mid-quarter forecasts.[6]

This empirical model aims to capture how the disclosure frequency of bellwether firms differs from non-bellwether firms:

$$Frequncy_{i,t} = \gamma Bellwether_{i,t-1} + \sum \beta_j Control_{j,i,t-1} + \sum \alpha_l Year - Industry_l + \varepsilon_{i,t}$$

[5] These unbundled forecasts are likely to be pre-announcement warnings motivated by litigation or reputation concerns (Skinner, 1994; Kothari, Shu, and Wysocki, 2009).
[6] Rogers, Skinner, and Van Buskirk (2009) also distinguish regular forecasts from sporadic forecasts. I find consistent results when using their identification---at least three forecasts in a year. Results also hold when excluding financial firms from the sample.

$Frequncy_{i,t}$ is the number of forecasts by firm i in year t.[7] $Bellwether_{i,t-1}$ is a dummy variable for firms being both high-macro-info and well-connected firms (as defined in Section 2). In each year, bellwether firms are identified as those in the top 20% of the estimated $R_e^2$ distribution and well-connected firms as those in the top 20% of the distribution of connectedness, which is measured as the number of firms to which a firm connects.[8] Control variables are based on determinants of disclosure frequency from prior studies (e.g., Leftwich, Watts, and Zimmerman, 1981; McNichols and Manegold, 1983; Botosan and Harris, 2000; Fu, Kraft, and Zhang, 2012). Please refer to Illustration D for detailed descriptions and references of these variables. Panel C of Table 6 presents summary statistics of these variables. On average, regular forecasting firms (defined as firms issuing bundled-only or additional mid-quarter forecasts) issue 6 forecasts per year (the median is 5, the 25$^{th}$ percentile is 3, and the 75$^{th}$ percentile is 8). I also include year-fixed and industry-fixed (based on the SIC two-digit code) effects to control for unobserved heterogeneity, and I cluster standard errors by firm and year.

I find that, on average, bellwether firms disclose less frequently than non-bellwether firms (see Model (1) in Table 7). In particular, bellwether firms issue nearly one fewer forecast than non-bellwether firms, and a one standard deviation increase in the probability of being a bellwether firm is associated with a decline of 30% of the standard deviation in disclosure frequency. This magnitude is greater than the impact from all other determinants, such as firm size, the market-to-book ratio, the portion of peers providing forecasts and institutional ownership. Overall, this result suggests that bellwether firms are reluctant to provide timely disclosures potentially

[7] In the robustness tests, I find similar results when using a dummy variable for issuing additional mid-quarter forecasts or when taking the logarithm transformation of the number of forecasts.
[8] In the robustness tests, I find consistent results when using the top 17% or 25% of the $R_e^2$ distribution and the connectedness distribution to identify bellwether firms.

because of the substitution effect between bellwether firms' disclosures and other public macroeconomic information and high proprietary costs faced by bellwether firms.

However, it is puzzling to observe some bellwether firms still issue management earnings forecasts, especially towards the end of a quarter, and these forecasts predict future GDP growth and aggregate earnings. One alternative explanation for why bellwether firms would issue frequent disclosures is the pressure from their institutional investors. In this extended empirical model, I further examine whether bellwether firms owned by many institutional investors issue more frequent disclosures than other bellwether firms:

$$Frequncy_{i,t} = \gamma_1(Bellwether \times Institutional)_{i,t-1} + \gamma_2 Bellwether_{i,t-1} + \gamma_3 Institutional_{i,t-1} + \sum \beta_j Control_{j,i,t-1} + \sum \alpha_l Year - Industry_l + \varepsilon_{i,t}$$

$Institutional_{i,t-1}$ is the percentage of outstanding shares held by institutional investors for firm i in year t-1. Institutional investors, defined as those required to file the 13F, own 61% of total outstanding shares of firms in my sample (see Panel C of Table 6). $(Bellwether \times Institutional)_{i,t-1}$ represents the interaction term between $Bellwether_{i,t-1}$ (a dummy variable) and institutional investor ownership.

I find that bellwether firms owned by many institutional investors provide more frequent disclosures than other bellwether firms and more frequent disclosures than other firms owned by many institutional investors, although the magnitude (standard coefficient = 0.02) is marginal (see Model (2) of Table 7). Such a small magnitude is reasonable because we do not expect that all bellwether firms respond to the demand from their institutional investors. Firms that aim to maximize their own values should weigh the costs and benefits to make their disclosure

decisions rather than fulfilling the need from one group of investors, especially when this demand does not create much value for the disclosing bellwether firm.

To further examine whether the demand for bellwether firms' frequent disclosures comes from the diversified institutional investors, I conduct the following analysis:

$$Frequncy_{i,t} = \gamma_1(Bellwether \times Diversified)_{i,t-1} + \gamma_2(Bellwether \times Institutional)_{i,t-1} + \gamma_3 Bellwether_{i,t-1} + \gamma_4 Institutional_{i,t-1} + \gamma_5 Diversified_{i,t-1} + \sum \beta_j Control_{j,i,t-1} + \sum \alpha_l Year - Industry_l + \varepsilon_{i,t}$$

$Diversified_{i,t-1}$ is the ratio of the outstanding shares held by diversified institutional investors to the outstanding shares held by all institutional investors for firm i in year t-1. I use quasi-indexers from Bushee (1998) as a proxy for diversified investors. Quasi-indexers are defined as long-term institutional investors who hold a diversified portfolio. Investment horizon is based on quarterly portfolio turnovers and the percentage of portfolio held for two years. Investment diversification is based on a portfolio's concentration or a target firm's ownership concentration. The other two groups of investors are dedicated investors (defined as long-term concentrated investors) and transient investors (defined as short-term investors). On average, the quarterly portfolio turnover of transient investors is 77%, while the quarterly portfolio turnover of quasi-indexers or dedicated investors is only 40% (see Table 1 in Bushee and Noe, 2000). In addition, 21--32% of dedicated investors' investments are in large blocks (i.e., accounting for more than 5% of a portfolio or in a target firm), while only 1--3% of quasi-indexers' and transient investors' investments are in large blocks. Diversified investors, on average, account for 63% of all institutional investors' holdings. $(Bellwether \times Diversified)_{i,t-1}$ represents the interaction term between $Bellwether_{i,t-1}$ (a dummy variable) and $Diversified_{i,t-1}$.

In Model (3) of Table 7, bellwether firms owned by many diversified institutional investors do not present an incremental difference in disclosure frequency from other firms. The magnitude of the coefficient for (Bellwether × Institutional) becomes insignificant. These results may be driven by the poor identification of diversified institutional investors because Bushee (1998) directly identifies block-holders and high-frequency traders and then classifies the rest of institutional investors as diversified investors. Diversified investors account for 63% of overall institutional investors' holdings. This identification strategy may not differentiate a diversified institutional investor sufficiently enough from an average institutional investor. Therefore, I fail to find that bellwether firms owned by many diversified institutional investors disclose differently from other firms.

To check the robustness of these results, I use exogenous shocks in an attempt to shed light on the potential causal effects. Following Balakrishnan, Billings, Kelly, and Ljungqvist (2014), brokerage house closures are assumed to be unexpected changes in a firm's information environment. I first validate their findings that firms increase their disclosure frequencies as a response to negative coverage shocks in this empirical model:

$$Frequncy_{i,t} = \gamma Shock_{i,t-1/t} + \sum \beta_j Control_{j,i,t-1} + \sum \alpha_l Year - Industry_l + \varepsilon_{i,t}$$

$Shock_{i,t-1/t}$ equals one if a firm i experiences brokerage house closures or mergers in year t or t-1.[9] I include year t-1 because if brokerage house closures or mergers occurred in the end of a year, firms' responses in disclosure frequency are likely to be in the following year.[10] I also

[9] I thank Oded Rozenbaum for sharing this data.
[10] I find consistent results when using only brokerage house closures or mergers in year t.

include year-fixed and industry-fixed (based on the SIC two-digit code) effects to control for unobserved heterogeneity, and I cluster standard errors by firm and year. The result in Model (1) of Table 8 confirms that, on average, firms increase their disclosure frequency after brokerage house closures or mergers, consistent with the results in Balakrishnan, Billings, Kelly, and Ljungqvist (2014).

In this extended empirical model, I further examine the extent to which bellwether firms increase their disclosure frequency after exogenous coverage shocks, relative to non-bellwether firms:

$$Frequncy_{i,t} = \gamma_1(Bellwether \times Shock)_{i,t-1} + \gamma_2 Bellwether_{i,t-1} + \gamma_3 Shock_{i,t-1/t} + \sum \beta_j Control_{j,i,t-1} + \sum \alpha_l Year - Industry_l + \varepsilon_{i,t}$$

I find that bellwether firms increase fewer disclosures than non-bellwether firms when they respond to these coverage shocks; however, the difference in reaction between bellwether firms and non-bellwether firms is weak (p-value = 0.11 in Model (2) of Table 8). This result is consistent with the earlier finding that bellwether firms disclose less frequently than non-bellwether firm. Because investors can learn about bellwether firms from many other sources, the loss in analyst coverage does not have a significant impact on bellwether firms' information environments. Therefore, bellwether firms do not react to these shocks by increasing their disclosure frequencies.

Then I restrict the sample to include only bellwether firms and examine whether bellwether firms react to exogenous coverage shocks differently when they face different levels of pressures from their institutional investors in the following model:

$$Frequncy_{i,t} = \gamma_1(Shock \times Institutional)_{i,t-1} + \gamma_2 Shock_{i,t-1/t} + \gamma_3 Institutional_{i,t-1} + \sum \beta_j Control_{j,i,t-1} + \sum \alpha_l Year - Industry_l + \varepsilon_{i,t}$$

Results in Model (3) of Table 8 show that bellwether firms owned by many institutional investors significantly increase their disclosure frequencies after brokerage house closures, but other bellwether firms do not increase their disclosure frequencies after brokerage house closures. This finding is consistent with the conjecture that bellwether firms provide timely disclosures when they face pressures from their institutional investors. Institutional investors gather information from both analysts and company disclosures. When a bellwether firm loses its analyst coverage, its institutional investors may demand more company disclosures.

In a sample that includes only bellwether firms, I further examine whether the demand for bellwether firms' frequent disclosures comes from diversified institutional investors in the following empirical model:

$$Frequncy_{i,t} = \gamma_1(Shock \times Diversified)_{i,t-1} + \gamma_2(Shock \times Institutional)_{i,t-1} + \gamma_3 Shock_{i,t-1/t} + \gamma_4 Institutional_{i,t-1} + \gamma_5 Diversified_{i,t-1} + \sum \beta_j Control_{j,i,t-1} + \sum \alpha_l Year - Industry_l + \varepsilon_{i,t}$$

$Diversified_{i,t-1}$ is the ratio of the outstanding shares held by diversified institutional investors to the outstanding shares held by all institutional investors for firm i in year t-1. $(Shock \times Diversified)_{i,t-1}$ represents the interaction term between $Shock_{i,t-1/t}$ (a dummy variable) and $Diversified_{i,t-1}$. In Model (4) of Table (8), I fail to find that bellwether firms owned by many diversified institutional investors change their disclosure policy differently from

other firms. Bellwether firms owned by many institutional investors continue showing a significant increase in their disclosure frequencies.

In summary, results in both the association setting and the exogenous setting present robust evidence that bellwether firms, on average, disclose less frequently than non-bellwether firms. However, bellwether firms owned by many institutional investors disclose more frequently than other bellwether firms.

## 5. Conclusions

This study provides robust evidence that forward-looking information by bellwether firms predicts GDP growth and aggregate earnings in the subsequent quarters. It also shows that bellwether firms, on average, disclose less frequently than non-bellwether firms, but that bellwether firms owned by many institutional investors disclose more frequently than other bellwether firms. These results suggest that although bellwether firms' timely disclosures are useful in predicting macroeconomic trends, these firms are reluctant to provide these timely disclosures unless they face pressures from their institutional investors. It is because investors can either use bellwether firms' timely disclosures to predict GDP or use the announced GDP to gauge the performance of bellwether firms. Since providing disclosures incurs preparation and proprietary costs, bellwether firms are not willing to issue frequent disclosures.

More broadly, this paper demonstrates that the nature of business determines the type of information (i.e., firm-specific information vs. common information) endowed with a firm's managers. When a firm produces or sources commodities in a large cyclical sector of the economy, its disclosures are likely to have macroeconomic content and provide implications for many other firms in the market. This notion is similar to the research question explored by

Hutton, Lee, and Shu (2012). They analyze how different natures of business affect the information sets faced by managers and analysts.

This study also provides implications for policy makers and academic researchers. Without mandatory disclosure requirements, some bellwether firms voluntarily provide frequent disclosures that potentially serve as a valuable public good. That is, these frequent disclosures may be beneficial to investors who do not have a direct stake in these bellwether firms because they can use the disclosed information to evaluate other firms in the market. It remains debatable whether the market needs all bellwether firms or only one bellwether firm to disclose since they possess the common information regarding the economy.

## Illustration A: High-macro-info Industries

High-macro-info industries are identified by the number of member firms having an earnings $R^2$ greater than 0.29 (the 90$^{th}$ percentile). Industries with the most high earnings $R^2$ firms are listed as the first for a year, the second most high earnings $R^2$ firms are listed as the second for a year, etc... Earnings $R^2$ is estimated by regressing a firm's earnings on aggregate earnings using twenty quarters of data. I use Global Industry Classification Standard to define 67 industries.

| 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|
| Chemicals | Metals & Mining | Chemicals | Machinery | Health Care Equipment & Supplies |
| Health Care Equipment & Supplies | Thrifts & Mortgage Finance | Metals & Mining | Insurance | Software |
| Oil, Gas & Consumable Fuels | Machinery | Biotechnology | Health Care Equipment & Supplies | Biotechnology |
| Machinery | Biotechnology | Machinery | Electronic Equipment, Instruments & Components | Insurance |
| Biotechnology | Commercial Banks | Commercial Banks | Semiconductors & Semiconductor Equipment | Semiconductors & Semiconductor Equipment |
| | | | Commercial Banks | |

| 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|
| Biotechnology | Media | Electronic Equipment, Instruments & Components | Semiconductors & Semiconductor Equipment | Biotechnology |
| Insurance | Computers & Peripherals | Communications Equipment | Biotechnology | Semiconductors & Semiconductor Equipment |
| Health Care Equipment & Supplies | Internet Software & Services | Semiconductors & Semiconductor Equipment | Communications Equipment | Internet Software & Services |
| Semiconductors & Semiconductor Equipment | Semiconductors & Semiconductor Equipment | Internet Software & Services | Internet Software & Services | Insurance |
| Commercial Banks | Communications Equipment | Software | Software | Software |
| | Software | | | |

| 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|
| Insurance | Software | Internet, software, services | Media | capital markets |
| Internet Software & Services | Oil, Gas & Consumable Fuels | Software | Semiconductors & Semiconductor Equipment | Media |
| Semiconductors & Semiconductor Equipment | Real Estate Investment Trusts (REITs) | Communications Equipment | Thrifts & Mortgage Finance | Electronic Equipment, Instruments & Components |
| Software | Semiconductors & Semiconductor Equipment | Commercial Banks | Oil, Gas & Consumable Fuels | Commercial Banks |
| Real Estate Investment Trusts (REITs) | Commercial Banks | Semiconductors & Semiconductor Equipment | Commercial Banks | Oil, Gas & Consumable Fuels |
| Commercial Banks | | | | Semiconductors & Semiconductor Equipment |

## Illustration B: Example of Information Content in Bellwether Firms' Disclosures

From Texas Instruments 2010 Q3 Mid-quarter Management Forecast Conference Call Transcript

*<Q – Tristan Gerra>: Quick one. Are you willing to give us an update on the inventory trends directionally, specifically for what you have in consignment?*

*<A – Ron Slaymaker>: That's a very detailed question that I wouldn't even venture to start down on. I don't know that I even typically have that detail at the end of the quarter. But I'll make some general comments on inventory. Some I can maybe be of use and others I may not at this point in the quarter.*

*Let me first of all just talk about inventory trends, maybe at customers. So I think if you look at some of the areas that I already identified, specifically consumer TVs and PCs, and PCs again including associated hard disk drives. In fact, we're seeing an inventory adjustment that really tie[s] to* ***weaker-than-expected end demand by our customers for their products****. I think the PC market has a history of sharp, but relatively quick corrections and we believe that, in fact, is what we're in.*

*For TVs, I think the correction really ties to lower-than-expected flat screen demand that was associated with the World Cup, as well as what I would characterize as tepid consumer acceptance of some of the new 3D television models. But in both markets* ***I think those adjustments are resulting from lower-than-expected demand and not from an excessive build of semiconductor components****. I think in terms of our own inventory trends, which is part of what you were asking with respect to consignment, I don't have a projection on our trends at this point in the quarter. Again, we'll have those details for you in October.*

*Maybe the only other one I can comment on would be distribution and just in general****, distribution is tracking our overall results pretty closely. And I say that both from the standpoint of resales or sales out of that channel, as well as our shipments in****. So with respect to distribution inventory, it's been managed very lean, partly because of the structural benefit of the consignment program that we've referenced and we really see that we would characterize distribution inventory today as lean as well.*

# Illustration C: Examples of Regular Mid-Quarter Management Forecasts

TEXAS INSTRUMENTS

**TI updates third-quarter 2010 business outlook**

**--Conference call on TI website at 4:30 p.m. Central time today --www.ti.com/ir**

DALLAS, Sept 09, 2010 /PRNewswire via COMTEX News Network/ -- In a scheduled update to its business outlook for the third quarter of 2010, Texas Instruments Incorporated (TI) (NYSE: TXN) today revised its expected ranges for revenue and earnings per share (EPS).

The company currently expects its financial results to be within the following ranges:

- Revenue: $3.62 - $3.78 billion, compared with the prior range of $3.55 - $3.85 billion
- EPS: $0.66 - $0.72, compared with the prior range of $0.64 - $0.74.

The company will hold a conference call at 4:30 p.m. Central time today to discuss this update. This conference call will be available live at www.ti.com/ir. TI's original third-quarter outlook was published in the company's second-quarter 2010 earnings release on July 19, available at www.ti.com/ir. TI's third quarter ends on September 30.

## News Release

View printer-friendly version

**Landstar Announces Its Mid-quarter Conference Call**

JACKSONVILLE, Fla., May 20, 2014 /PRNewswire/ -- Landstar System, Inc. (NASDAQ: LSTR), a worldwide, asset-light provider of integrated transportation management solutions delivering safe, specialized transportation logistics services, announced today it will provide a live webcast of its mid-quarter conference call for its 2014 second quarter on Tuesday, June 3rd at 2:00 p.m. ET. To access the webcast, visit the Company's website at **www.landstar.com**; click on "Investor Relations" and "Webcasts," then click on "Landstar's Mid-Second Quarter 2014 Conference Call."

For those unable to participate in the live call or for those who do not have access to the Internet, the call will be available on telephone replay for 48 hours. The telephone replay number for the U.S. and Canada is (800) 879-5510 and for international calls is (203) 369-3990.

**About Landstar:**
**Landstar** System, Inc. is a worldwide, asset-light provider of integrated transportation management solutions delivering safe, specialized transportation logistics services to a broad range of customers utilizing a network of agents, third-party capacity owners and employees. All Landstar transportation services companies are certified to ISO 9001:2008 quality management system standards and RC14001:2008 environmental, health, safety and security management system standards. Landstar System, Inc. is headquartered in Jacksonville, Florida. Its common stock trades on The NASDAQ Stock Market® under the symbol LSTR.

SOURCE Landstar System, Inc.

James Gattoni, Landstar System, Inc., www.landstar.com, 904-398-9400

# Illustration D: Definitions for Variables Used in Tables 7-8 Propensity Analysis

| Variable | Definition | Source | Reference |
|---|---|---|---|
| Forecast frequency | the number of management earnings forecasts issued in a year | First Call | |
| High-macro-info firm | equals one if a firm is in the top 20% of the $R^2$ distribution estimated by regressing a firm's earnings on aggregate earnings using twenty quarters of data (at least ten quarters are required). Earnings are quarterly income before extraordinary items deflated by the beginning market capitalization. Aggregate earnings are the sum of all Compustat firms' quarterly income before extraordinary items divided by the sum of all Compustat firms' beginning market capitalization. | CRSP, Compustat | Bonsall, Bozanic, and Fischer (2013) |
| Well-connected firm | equals one if a firm is in the top 20% of the distribution of connectedness, which is measured as the number of firms to which a firm connects. | Hoberg and Phillips Library | Aobdia, Caskey, and Ozel (2014) |
| Bellwether firm | equals one for firms being both high-macro-info and well-connected firms. | | |
| Size | the natural logarithm of market capitalization. | CRSP | Leftwich, Watts, and Zimmerman (1981) |
| Market-to-book | the natural logarithm of the market-to-book ratio. | CRSP, Compustat | Fu, Kraft, and Zhang (2012) |
| Property, plant, equipment | the book value of property, plant, and equipment deflated by the beginning total assets. | Compustat | Leftwich, Watts, and Zimmerman (1981) |
| Leverage | the book value of long-term debt divided by the beginning total assets. | Compustat | Leftwich, Watts, and Zimmerman (1981) |
| Return-on-assets | income before extraordinary items divided by the beginning total assets. | Compustat | McNichols and Manegold (1983) |
| Portion of peers forecasting | the sales-weighted portion of firms providing management forecasts in a SIC four-digit industry. | First Call, Compustat | Botosan and Harris (2000) |
| Herfindahl index | based on the SIC three-digit industry. | Compustat | Botosan and Harris (2000) |
| NYSE firm | equals one for firms listed on NYSE. | Compustat | Leftwich, Watts, and Zimmerman (1981) |
| Dividend paying firm | equals one if paying dividends in a year. | CRSP | McNichols and Manegold (1983) |
| Institutional investor holdings | the percentage of outstanding shares held by institutional investors, defined as those required to file the 13F. | Thomson Reuters, CRSP | Bushee and Noe (2000) |
| Intensity of investor activism | the natural logarithm of the number of 13D filings in a year. | Audit Analytics | |
| Number of analysts following | the natural logarithm of the average number of analysts in a year. | IBES | Botosan and Harris (2000) |
| Analyst forecast dispersion | the average of daily standard deviations of analyst forecasts in a year. | IBES | Botosan and Harris (2000) |
| Number of public offerings | the natural logarithm of the number of public equity and debt issuances in a year. | Thomson Reuters SDC Platinum | Botosan and Harris (2000) |
| Number of M&A deals | the natural logarithm of the number of M&A transactions in a year. | Thomson Reuters SDC Platinum | Botosan and Harris (2000) |

## Table 1: Summary Statistics of Variables Used in the Prediction Analysis

There are 33,158 guidance events with non-missing inputs to calculate earnings forecast surprise during the sample period from 1997Q1-2010Q4 (total 56 quarters). Management earnings forecasts are from the First Call's Corporate Issued Guidance database. GDP growths are from real-time data research center at Federal Reserve Bank of Philadelphia. Earnings forecast surprise is measured as the midpoint of management earnings forecast announced in quarter q minus the median consensus of analysts' earnings forecasts issued during the thirty days prior to the announcement of this management earnings forecast. Aggregate earnings are the seasonally-adjusted changes in the sum of quarterly operating income (Compustat: OIADPQ) to the sum of lagged total assets. Twelve-month cumulative aggregate stock return (CRSP: VWRETD) is up till the end of quarter q. Earnings $R^2$ is estimated by regressing a firm's earnings on aggregate earnings using twenty quarters of data prior to quarter q. The number of firms to which a firm connects is based on textual analysis on business descriptions in 10-K issued prior to quarter q.

| | N | Mean | $10^{th}$ | $25^{th}$ | $50^{th}$ | $75^{th}$ | $90^{th}$ | Std. dev. |
|---|---|---|---|---|---|---|---|---|
| First released real GDP growth for q+1 | 33,158 | 2.25 | -0.25 | 1.12 | 2.46 | 3.53 | 4.82 | 2.46 |
| Final released real GDP growth for q+1 | 33,158 | 1.80 | -1.91 | 0.36 | 2.30 | 3.69 | 4.76 | 2.89 |
| First released nominal GDP growth for q+1 | 33,158 | 4.20 | 1.78 | 3.37 | 4.26 | 5.95 | 6.76 | 2.66 |
| Final released nominal GDP growth for q+1 | 33,158 | 3.94 | -0.46 | 3.18 | 4.63 | 5.77 | 7.32 | 3.35 |
| Aggregate earnings growth for q+1 | 33,158 | 0.15 | -0.23 | -0.05 | 0.21 | 0.27 | 0.39 | 0.30 |
| Earnings $R^2$ | 33,158 | 0.11 | 0.01 | 0.02 | 0.06 | 0.16 | 0.29 | 0.12 |
| Number of connected firms | 33,158 | 82 | 7 | 17 | 49 | 104 | 181 | 105 |
| Earnings forecast surprise | 33,158 | 0.01 | -0.04 | 0.00 | 0.00 | 0.01 | 0.05 | 2.51 |
| Twelve-month cumulative returns | 33,158 | 0.06 | -0.26 | -0.11 | 0.11 | 0.18 | 0.31 | 0.22 |

Table 2: Multivariate Analysis on Whether Bellwether Firms' Earnings Forecasts Predict Future *Real* GDP Growth

Dependent variable is the first-released or final-released real GDP growth for quarter q+1, q+2 q+3, or q+4. Earnings forecast surprise is the midpoint of management earnings forecast announced in quarter q minus the median consensus of analysts' earnings forecasts issued during the thirty days prior to the announcement of this management earnings forecast. Control variables are the first-released real GDP growth for quarter q (announced after the end of quarter q), aggregate earnings announced during quarter q, and twelve-month cumulative aggregate stock return (CRSP: VWRETD) up till the end of quarter q. The event sample for Panels A and B includes management earnings forecasts by high-macro-info and well-connected firms issued in the third month of a calendar quarter. The event sample for Panels C and D includes management earnings forecasts by small high-macro-info and well-connected firms issued in the second or third months of a calendar quarter and these small bellwether firms have their market capitalization less than $1 billion. Bellwether firms' management forecasts are pooled in a panel and standard errors are clustered by firm and quarter to account for correlations among firms and across time periods. The sample period spans from 1997Q1-2010Q4. High-macro-info firms are those having an earnings $R^2$ greater than 0.29 (the $90^{th}$ percentile). Well-connected firms are those connecting to more than 181 firms (the $90^{th}$ percentile). High-macro-info and well-connected firms are the intersection of the two. Market capitalization is the product of stock price and outstanding shares (both from CRSP). "Std. Coeff." stands for standardized coefficient.

**Panel A**

**Sample firms:** High-macro-info and well-connected firm
**Months:** Mar, Jun, Sept, and Dec

| **Dependent variable:** | Model (1) First released real GDP growth for q+1 | | | Model (2) First released real GDP growth for q+2 | | | Model (3) First released real GDP growth for q+3 | | | Model (4) First released real GDP growth for q+4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. |
| **Earnings forecast surprise** | **-1.72** | **<.0001** | **-0.33** | **-2.57** | **<.0001** | **-0.41** | **-0.86** | **<.0001** | **-0.14** | **0.47** | **0.02** | **0.08** |
| First real GDP growth for q | 0.08 | 0.56 | 0.08 | 0.19 | 0.17 | 0.17 | 0.00 | 0.98 | 0.00 | 0.39 | 0.05 | 0.36 |
| Aggregate earnings growth q | -0.86 | 0.30 | -0.12 | 1.02 | 0.41 | 0.12 | -0.03 | 0.98 | 0.00 | 2.39 | 0.03 | 0.27 |
| 12-month aggregate return | 1.95 | 0.07 | 0.21 | -2.23 | 0.34 | -0.21 | 2.62 | 0.17 | 0.25 | -5.21 | 0.01 | -0.48 |
| Intercept | 2.47 | <.0001 | | 2.24 | <.0001 | | 2.30 | 0.00 | | 1.09 | 0.13 | |
| N | 85 | | | 85 | | | 85 | | | 85 | | |
| Adj. $R^2$ | 0.15 | | | 0.16 | | | 0.05 | | | 0.07 | | |

**Panel B**

**Sample firms:** High-macro-info and well-connected firm
**Months:** Mar, Jun, Sept, and Dec

| **Dependent variable:** | Model (1) Final released real GDP growth for q+1 | | | Model (2) Final released real GDP growth for q+2 | | | Model (3) Final released real GDP growth for q+3 | | | Model (4) Final released real GDP growth for q+4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. |
| **Earnings forecast surprise** | **-2.83** | **<.0001** | **-0.39** | **-2.21** | **<.0001** | **-0.29** | **-0.62** | **0.01** | **-0.08** | **0.19** | **0.82** | **0.01** |
| First real GDP growth for q | 0.22 | 0.13 | 0.17 | 0.12 | 0.37 | 0.09 | 0.22 | 0.29 | 0.17 | 0.05 | 0.81 | 0.43 |
| Aggregate earnings growth q | 0.80 | 0.29 | 0.08 | 2.39 | 0.09 | 0.22 | 0.09 | 0.95 | 0.01 | 0.58 | 0.01 | 0.07 |
| 12-month aggregate return | 0.71 | 0.62 | 0.06 | -1.80 | 0.49 | -0.14 | 0.67 | 0.77 | 0.05 | 0.73 | 0.51 | -0.45 |
| Intercept | 1.77 | 0.00 | | 1.57 | 0.00 | | 1.55 | 0.04 | | -5.95 | 0.01 | |
| N | 85 | | | 85 | | | 85 | | | 85 | | |
| Adj. $R^2$ | 0.22 | | | 0.09 | | | 0.01 | | | 0.08 | | |

**Panel C**

**Sample firms:** High-macro-info and well-connected firm with market cap. < 1 billion
**Months:** excl. Jan, Apr, Jul, and Oct

| **Dependent variable:** | Model (1) First released real GDP growth for q+1 | | | Model (2) First released real GDP growth for q+2 | | | Model (3) First released real GDP growth for q+3 | | | Model (4) First released real GDP growth for q+4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. |
| **Earnings forecast surprise** | **-1.10** | **0.05** | **-0.28** | **-1.98** | **0.00** | **-0.40** | **-0.75** | **0.09** | **-0.16** | **0.35** | **0.12** | **0.11** |
| First real GDP growth for q | 0.29 | <.0001 | 0.39 | 0.10 | 0.39 | 0.11 | -0.24 | 0.01 | -0.27 | 0.08 | 0.35 | 0.13 |
| Aggregate earnings growth q | -0.12 | 0.86 | -0.02 | -0.49 | 0.76 | -0.07 | -1.84 | 0.07 | -0.29 | -0.92 | 0.29 | -0.22 |
| 12-month aggregate return | 0.64 | 0.62 | 0.08 | 0.28 | 0.93 | 0.03 | 4.84 | 0.03 | 0.53 | 0.66 | 0.69 | 0.11 |
| Intercept | 1.73 | <.0001 | | 2.61 | <.0001 | | 3.53 | <.0001 | | 2.39 | <.0001 | |
| N | 53 | | | 53 | | | 53 | | | 53 | | |
| Adj. $R^2$ | 0.26 | | | 0.12 | | | 0.04 | | | -0.04 | | |

**Panel D**

**Sample firms:** High-macro-info and well-connected firm with market cap. < 1 billion
**Months:** excl. Jan, Apr, Jul, and Oct

| **Dependent variable:** | Model (1) Final released real GDP growth for q+1 | | | Model (2) Final released real GDP growth for q+2 | | | Model (3) Final released real GDP growth for q+3 | | | Model (4) Final released real GDP growth for q+4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. |
| **Earnings forecast surprise** | **-2.26** | **0.00** | **-0.41** | **-1.51** | **0.03** | **-0.25** | **-0.59** | **0.08** | **-0.13** | **-0.15** | **0.48** | **-0.04** |
| First real GDP growth for q | 0.23 | 0.03 | 0.22 | 0.02 | 0.88 | 0.02 | -0.13 | 0.20 | -0.15 | 0.29 | 0.00 | 0.37 |
| Aggregate earnings growth q | 0.93 | 0.31 | 0.12 | 1.10 | 0.53 | 0.13 | -2.17 | 0.11 | -0.34 | -2.59 | 0.01 | -0.46 |
| 12-month aggregate return | 1.28 | 0.50 | 0.12 | 1.15 | 0.75 | 0.10 | 4.62 | 0.10 | 0.51 | -0.94 | 0.53 | -0.12 |
| Intercept | 1.69 | <.0001 | | 1.92 | <.0001 | | 2.95 | <.0001 | | 1.85 | <.0001 | |
| N | 53 | | | 53 | | | 53 | | | 53 | | |
| Adj. $R^2$ | 0.35 | | | 0.06 | | | 0.02 | | | 0.17 | | |

Table 3: Multivariate Analysis on Whether Bellwether Firms' Earnings Forecasts Predict *Nominal* GDP Growth

Dependent variable is the first-released or final-released nominal GDP growth for quarter q+1, q+2 q+3, or q+4. Earnings forecast surprise is the midpoint of management earnings forecast announced in quarter q minus the median consensus of analysts' earnings forecasts issued during the thirty days prior to the announcement of this management earnings forecast. Control variables are the first-released nominal GDP growth for quarter q (announced after the end of quarter q), aggregate earnings announced during quarter q, and twelve-month cumulative aggregate stock return (CRSP: VWRETD) up till the end of quarter q. The event sample for Panels A and B includes management earnings forecasts by high-macro-info and well-connected firms issued in the third month of a calendar quarter. The event sample for Panels C and D includes management earnings forecasts by small high-macro-info and well-connected firms issued in the second or third months of a calendar quarter and these small bellwether firms have their market capitalization less than $1 billion. Bellwether firms' management forecasts are pooled in a panel and standard errors are clustered by firm and quarter to account for correlations among firms and across time periods. The sample period spans from 1997Q1-2010Q4. High-macro-info firms are those having an earnings $R^2$ greater than 0.29 (the $90^{th}$ percentile). Well-connected firms are those connecting to more than 181 firms (the $90^{th}$ percentile). High-macro-info and well-connected firms are the intersection of the two. Market capitalization is the product of stock price and outstanding shares (both from CRSP). "Std. Coeff." stands for standardized coefficient.

**Panel A**

**Sample firms:** High-macro-info and well-connected firm
**Months:** Mar, Jun, Sept, and Dec

| **Dependent variable:** | Model (1) First released nominal GDP growth q+1 | | | Model (2) First released nominal GDP growth q+2 | | | Model (3) First released nominal GDP growth q+3 | | | Model (4) First released nominal GDP growth q+4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. |
| **Earnings forecast surprise** | **-2.26** | **<.0001** | **-0.38** | **-2.34** | **<.0001** | **-0.35** | **-1.31** | **<.0001** | **-0.20** | **-0.04** | **0.82** | **-0.01** |
| First nominal GDP growth q | 0.10 | 0.37 | 0.11 | 0.28 | 0.01 | 0.26 | 0.10 | 0.37 | 0.09 | 0.46 | <.0001 | 0.41 |
| Aggregate earnings growth q | -0.70 | 0.45 | -0.08 | 2.02 | 0.08 | 0.21 | -1.03 | 0.39 | -0.11 | 1.27 | 0.19 | 0.13 |
| 12-month aggregate return | 3.36 | 0.01 | 0.32 | -2.12 | 0.29 | -0.18 | 3.40 | 0.04 | 0.30 | -3.08 | 0.04 | -0.25 |
| Intercept | 4.15 | <.0001 | | 3.33 | <.0001 | | 3.85 | <.0001 | | 1.98 | 0.01 | |
| N | 85 | | | 85 | | | 85 | | | 85 | | |
| Adj. $R^2$ | 0.27 | | | 0.17 | | | 0.11 | | | 0.09 | | |

**Panel B**

**Sample firms:** High-macro-info and well-connected firm
**Months:** Mar, Jun, Sept, and Dec

| **Dependent variable:** | Model (1) Final released nominal GDP growth q+1 | | | Model (2) Final released nominal GDP growth q+2 | | | Model (3) Final released nominal GDP growth q+3 | | | Model (4) Final released nominal GDP growth q+4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. |
| **Earnings forecast surprise** | **-3.37** | **<.0001** | **-0.44** | **-2.58** | **<.0001** | **-0.31** | **-1.46** | **<.0001** | **-0.18** | **-0.95** | **<.0001** | **-0.11** |
| First nominal GDP growth q | 0.28 | 0.01 | 0.23 | 0.25 | 0.05 | 0.19 | 0.14 | 0.23 | 0.10 | 0.61 | <.0001 | 0.43 |
| Aggregate earnings growth q | 0.83 | 0.27 | 0.08 | 2.98 | 0.03 | 0.26 | 0.01 | 1.00 | 0.00 | -0.26 | 0.80 | -0.02 |
| 12-month aggregate return | 1.80 | 0.10 | 0.14 | -1.58 | 0.52 | -0.11 | 2.51 | 0.20 | 0.18 | -4.25 | 0.02 | -0.28 |
| Intercept | 3.30 | <.0001 | | 2.98 | <.0001 | | 3.59 | <.0001 | | 1.21 | 0.15 | |
| N | 85 | | | 85 | | | 85 | | | 85 | | |
| Adj. $R^2$ | 0.35 | | | 0.16 | | | 0.07 | | | 0.10 | | |

**Panel C**

**Sample firms:** High-macro-info and well-connected firm with market cap. < 1 billion
**Months:** excl. Jan, Apr, Jul, and Oct

| **Dependent variable:** | Model (1) First released nominal GDP growth q+1 | | | Model (2) First released nominal GDP growth q+2 | | | Model (3) First released nominal GDP growth q+3 | | | Model (4) First released nominal GDP growth q+4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. |
| **Earnings forecast surprise** | **-1.57** | **0.04** | **-0.33** | **-1.58** | **0.03** | **-0.27** | **-1.19** | **0.02** | **-0.26** | **0.14** | **0.62** | **0.04** |
| First nominal GDP growth q | 0.26 | 0.02 | 0.30 | 0.26 | 0.04 | 0.24 | 0.15 | 0.05 | 0.17 | 0.21 | 0.01 | 0.31 |
| Aggregate earnings growth q | -0.61 | 0.54 | -0.09 | -0.23 | 0.89 | -0.03 | -2.69 | 0.00 | -0.42 | -0.95 | 0.40 | -0.19 |
| 12-month aggregate return | 2.80 | 0.10 | 0.30 | 1.27 | 0.71 | 0.11 | 2.68 | 0.07 | 0.30 | 1.10 | 0.59 | 0.15 |
| Intercept | 3.21 | <.0001 | | 3.42 | <.0001 | | 4.49 | <.0001 | | 3.57 | <.0001 | |
| N | 53 | | | 53 | | | 53 | | | 53 | | |
| Adj. $R^2$ | 0.33 | | | 0.12 | | | 0.11 | | | 0.05 | | |

**Panel D**

**Sample firms:** High-macro-info and well-connected firm with market cap. < 1 billion
**Months:** excl. Jan, Apr, Jul, and Oct

| **Dependent variable:** | Model (1) Final released nominal GDP growth q+1 | | | Model (2) Final released nominal GDP growth q+2 | | | Model (3) Final released nominal GDP growth q+3 | | | Model (4) Final released nominal GDP growth q+4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. |
| **Earnings forecast surprise** | **-2.48** | **0.01** | **-0.40** | **-1.72** | **0.03** | **-0.24** | **-1.17** | **0.02** | **-0.22** | **-0.78** | **0.05** | **-0.16** |
| First nominal GDP growth q | 0.33 | 0.00 | 0.29 | 0.31 | 0.01 | 0.24 | 0.05 | 0.59 | 0.05 | 0.40 | <.0001 | 0.44 |
| Aggregate earnings growth q | 0.47 | 0.62 | 0.05 | 0.99 | 0.59 | 0.10 | -2.23 | 0.10 | -0.31 | -3.10 | 0.01 | -0.45 |
| 12-month aggregate return | 3.23 | 0.06 | 0.27 | 1.42 | 0.69 | 0.10 | 4.49 | 0.08 | 0.44 | 0.10 | 0.96 | 0.01 |
| Intercept | 2.90 | <.0001 | | 2.86 | <.0001 | | 4.69 | <.0001 | | 3.12 | <.0001 | |
| N | 53 | | | 53 | | | 53 | | | 53 | | |
| Adj. $R^2$ | 0.46 | | | 0.16 | | | 0.09 | | | 0.21 | | |

## Table 4: Multivariate Analysis on Whether Bellwether Firms' Earnings Forecasts Predict Aggregate Earnings

Dependent variable is aggregate earnings growth, measured as the seasonally-adjusted change in the sum of quarterly operating income (Compustat: OIADPQ) to the sum of lagged total assets), announced in quarter q+1, q+2 q+3, or q+4. Earnings forecast surprise is the midpoint of management earnings forecast announced in quarter q minus the median consensus of analysts' earnings forecasts issued during the thirty days prior to the announcement of this management earnings forecast. Control variables are the first-released nominal GDP growth for quarter q (announced after the end of quarter q), aggregate earnings announced during quarter q, and twelve-month cumulative aggregate stock return (CRSP: VWRETD) up till the end of quarter q. The event sample for Panels A and B includes management earnings forecasts by high-macro-info and well-connected firms issued in the third month of a calendar quarter. The event sample for Panels C and D includes management earnings forecasts by small high-macro-info and well-connected firms issued in the second or third months of a calendar quarter and these small bellwether firms have their market capitalization less than $1 billion. Bellwether firms' management forecasts are pooled in a panel and standard errors are clustered by firm and quarter to account for correlations among firms and across time periods. The sample period spans from 1997Q1-2010Q4. High-macro-info firms are those having an earnings $R^2$ greater than 0.29 (the $90^{th}$ percentile). Well-connected firms are those connecting to more than 181 firms (the $90^{th}$ percentile). High-macro-info and well-connected firms are the intersection of the two. Market capitalization is the product of stock price and outstanding shares (both from CRSP). "Std. Coeff." stands for standardized coefficient.

**Panel A**

**Sample firms:** High-macro-info and well-connected firm
**Months:** Mar, Jun, Sept, and Dec

| **Dependent variable:** | Model (1) Aggregate earnings growth announced in q+1 | | | Model (2) Aggregate earnings growth announced in q+2 | | | Model (3) Aggregate earnings growth announced in q+3 | | | Model (4) Aggregate earnings growth announced in q+4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. |
| **Earnings forecast surprise** | **-0.06** | **<.0001** | **-0.08** | **-0.19** | **<.0001** | **-0.24** | **-0.14** | **<.0001** | **-0.18** | **-0.13** | **<.0001** | **-0.16** |
| First nominal GDP growth q | 0.03 | 0.02 | 0.22 | 0.01 | 0.35 | 0.08 | 0.02 | 0.36 | 0.11 | -0.01 | 0.81 | -0.04 |
| Aggregate earnings growth q | 0.55 | <.0001 | 0.55 | 0.21 | 0.04 | 0.21 | 0.11 | 0.37 | 0.11 | -0.11 | 0.41 | -0.11 |
| 12-month aggregate return | 0.27 | 0.06 | 0.19 | 0.54 | 0.00 | 0.38 | 0.27 | 0.19 | 0.19 | 0.40 | 0.09 | 0.29 |
| Intercept | -0.10 | 0.01 | | -0.13 | 0.00 | | -0.10 | 0.06 | | -0.07 | 0.36 | |
| N | 85 | | | 85 | | | 85 | | | 85 | | |
| Adj. $R^2$ | 0.67 | | | 0.44 | | | 0.14 | | | 0.04 | | |

**Panel B**

**Sample firms:** High-macro-info and well-connected firm
**Months:** Mar, Jun, Sept, and Dec

| **Dependent variable:** | Model (1) Aggregate earnings growth announced in q+1 | | | Model (2) Aggregate earnings growth announced in q+2 | | | Model (3) Aggregate earnings growth announced in q+3 | | | Model (4) Aggregate earnings growth announced in q+4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. |
| **Earnings forecast surprise** | **-0.08** | **<.0001** | **-0.10** | **-0.20** | **<.0001** | **-0.25** | **-0.15** | **<.0001** | **-0.18** | **-0.13** | **<.0001** | **-0.16** |
| First nominal GDP growth q | 0.02 | 0.08 | 0.18 | 0.01 | 0.44 | 0.07 | 0.01 | 0.37 | 0.10 | 0.00 | 0.86 | -0.03 |
| Aggregate earnings growth q | | | | | | | | | | | | |
| 12-month aggregate return | 0.76 | <.0001 | 0.55 | 0.72 | <.0001 | 0.52 | 0.36 | 0.05 | 0.26 | 0.30 | 0.10 | 0.22 |
| Intercept | -0.16 | 0.00 | | -0.16 | <.0001 | | -0.11 | 0.03 | | -0.05 | 0.50 | |
| N | 85 | | | 85 | | | 85 | | | 85 | | |
| Adj. $R^2$ | 0.48 | | | 0.42 | | | 0.14 | | | 0.04 | | |

**Panel C**

**Sample firms:** High-macro-info and well-connected firm with market cap. < 1 billion
**Months:** excl. Jan, Apr, Jul, and Oct

| **Dependent variable:** | Model (1) Aggregate earnings growth announced in q+1 | | | Model (2) Aggregate earnings growth announced in q+2 | | | Model (3) Aggregate earnings growth announced in q+3 | | | Model (4) Aggregate earnings growth announced in q+4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. |
| **Earnings forecast surprise** | **-0.07** | **0.00** | **-0.10** | **-0.16** | **0.00** | **-0.24** | **-0.11** | **0.08** | **-0.18** | **-0.14** | **0.00** | **-0.27** |
| First nominal GDP growth q | 0.01 | 0.40 | 0.05 | 0.00 | 0.64 | -0.03 | -0.01 | 0.68 | -0.05 | -0.04 | 0.03 | -0.41 |
| Aggregate earnings growth q | 0.57 | <.0001 | 0.56 | 0.43 | <.0001 | 0.45 | 0.27 | 0.05 | 0.30 | 0.03 | 0.78 | 0.04 |
| 12-month aggregate return | 0.42 | 0.01 | 0.31 | 0.45 | 0.00 | 0.36 | 0.29 | 0.17 | 0.24 | 0.38 | 0.05 | 0.37 |
| Intercept | -0.03 | 0.52 | | -0.06 | 0.10 | | -0.01 | 0.91 | | 0.11 | 0.05 | |
| N | 53 | | | 53 | | | 53 | | | 53 | | |
| Adj. $R^2$ | 0.76 | | | 0.66 | | | 0.23 | | | 0.12 | | |

**Panel D**

**Sample firms:** High-macro-info and well-connected firm with market cap. < 1 billion
**Months:** excl. Jan, Apr, Jul, and Oct

| **Dependent variable:** | Model (1) Aggregate earnings growth announced in q+1 | | | Model (2) Aggregate earnings growth announced in q+2 | | | Model (3) Aggregate earnings growth announced in q+3 | | | Model (4) Aggregate earnings growth announced in q+4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. |
| **Earnings forecast surprise** | **-0.06** | **0.04** | **-0.08** | **-0.15** | **0.00** | **-0.23** | **-0.10** | **0.12** | **-0.17** | **-0.14** | **0.00** | **-0.27** |
| First nominal GDP growth q | 0.01 | 0.19 | 0.11 | 0.00 | 0.80 | 0.02 | 0.00 | 0.87 | -0.02 | -0.04 | 0.03 | -0.41 |
| Aggregate earnings growth q | | | | | | | | | | | | |
| 12-month aggregate return | 0.94 | <.0001 | 0.70 | 0.84 | <.0001 | 0.68 | 0.54 | 0.01 | 0.45 | 0.41 | 0.01 | 0.40 |
| Intercept | -0.14 | 0.00 | | -0.15 | 0.00 | | -0.06 | 0.28 | | 0.10 | 0.09 | |
| N | 53 | | | 53 | | | 53 | | | 53 | | |
| Adj. $R^2$ | 0.63 | | | 0.57 | | | 0.21 | | | 0.14 | | |

## Table 5: Univariate Analysis on Whether Bellwether Firms' Earnings Forecasts Predict Future Real GDP Growth

Dependent variable is the first-released real GDP growth for quarter q+1. Earnings forecast surprise is measured as the midpoint of management earnings forecast announced in quarter q minus the median consensus of analysts' earnings forecasts issued during the thirty days prior to the announcement of this management earnings forecast. Bellwether firms' management forecasts are pooled in a panel and standard errors are clustered by firm and quarter to account for correlations among firms and across time periods. The sample period spans from 1997Q1-2010Q4. High-macro-info firms are those having an earnings $R^2$ greater than 0.29 (the 90$^{th}$ percentile). Well-connected firms are those connecting to more than 181 firms (the 90$^{th}$ percentile). High-macro-info and well-connected firms are the intersection of the two. Market capitalization is the product of stock price and outstanding shares (both from CRSP).

**Panel A**

| | Model (1) | | | Model (2) | | | Model (3) | | | Model (4) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sample firms:** | High-macro-info firm | | | Well-connected firm | | | High-macro-info AND well-connected firm | | | Low-macro-info AND less-connected firm | | |
| Months: | Twelve months in a year | | | Twelve months in a year | | | Twelve months in a year | | | Twelve months in a year | | |
| | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. |
| **Earnings forecast surprise** | **0.33** | **0.55** | **0.02** | **0.00** | **-0.76** | **-0.01** | **-1.02** | **0.19** | **-0.08** | **-0.04** | **0.97** | **0.00** |
| Intercept | 2.26 | <.0001 | | 2.27 | <.0001 | | 2.26 | <.0001 | | 2.59 | <.0001 | |
| N | 3,380 | 10% | | 3,800 | 11% | | 465 | 0.014 | | 241 | 0.0073 | |
| Adj. $R^2$ | 0.000 | | | 0.000 | | | 0.004 | | | -0.004 | | |

**Panel B**

| | Model (1) | | | Model (2) | | | Model (3) | | | Model (4) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample firms: | High-macro-info AND well-connected firm | | | High-macro-info AND well-connected firm | | | High-macro-info AND well-connected firm | | | Low-macro-info AND less-connected firm | | |
| **Months:** | **Jan, Apr, Jul, and Oct** | | | **Feb, May, Aug, and Nov** | | | **Mar, Jun, Sept, and Dec** | | | **Mar, Jun, Sept, and Dec** | | |
| | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. |
| **Earnings forecast surprise** | **1.75** | **0.74** | **0.03** | **2.75** | **0.14** | **0.17** | **-1.94** | **<.0001** | **-0.37** | **1.95** | **0.76** | **0.06** |
| Intercept | 2.15 | <.0001 | | 2.16 | <.0001 | | 2.70 | <.0001 | | 2.50 | <.0001 | |
| N | 269 | | | 111 | | | 85 | | | 41 | | |
| Adj. $R^2$ | -0.003 | | | 0.019 | | | 0.127 | | | -0.021 | | |
| | 58% | | | 24% | | | 18% | | | | | |

**Panel C**

| | Model (1) | | | Model (2) | | | Model (3) | | | Model (4) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample firms: | High-macro-info AND well-connected firm | | | High-macro-info AND well-connected firm | | | High-macro-info AND well-connected firm | | | Low-macro-info AND less-connected firm | | |
| Months: | excl. Jan, Apr, Jul, and Oct | | | excl. Jan, Apr, Jul, and Oct | | | excl. Jan, Apr, Jul, and Oct | | | excl. Jan, Apr, Jul, and Oct | | |
| **Firm size restriction:** | **No** | | | **Market cap. < 2 billion** | | | **Market cap. < 1 billion** | | | **Market cap. < 1 billion** | | |
| | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. |
| **Earnings forecast surprise** | **-1.22** | **0.063** | **-0.15** | **-1.37** | **0.014** | **-0.28** | **-1.45** | **0.009** | **-0.37** | **3.58** | **0.256** | **0.19** |
| Intercept | 2.43 | <.0001 | | 2.44 | <.0001 | | 2.69 | <.0001 | | 3.16 | <.0001 | |
| N | 196 | | | 69 | | | 53 | | | 37 | | |
| Adj. $R^2$ | 0.018 | | | 0.066 | | | 0.118 | | | 0.010 | | |

## Table 6: Disclosure Practices and Summary Statistics of Variables Used in the Propensity Analysis

"No forecasts" means that a firm does not issue any management earnings forecasts in a year. "Unbundled only" means that a firm issues only unbundled forecasts, defined as those issued outside of the five-day earnings announcement window. "Bundled only" means that a firm issues only bundled forecasts, defined as those issued within two days of its actual earnings announcements. "Additional mid-quarter" means that a firm issues mid-quarter forecasts in addition to its quarterly bundled forecasts. The initial sample includes all CRSP-Compustat firms that are not missing book values or market values of equities.

**Panel A: Number of firms by disclosure practices and the initial sample**

| | Number of firms by disclosure practices | | | | CRSP-Compustat firms with non-missing BVE and MVE |
|---|---|---|---|---|---|
| | No forecasts | Unbundled only | Bundled only | Add mid-quarter | |
| 1997 | 4,717 | 825 | 112 | 102 | 5,756 |
| 1998 | 4,299 | 1,142 | 137 | 229 | 5,807 |
| 1999 | 4,010 | 1,063 | 241 | 315 | 5,629 |
| 2000 | 3,834 | 931 | 271 | 372 | 5,408 |
| 2001 | 3,247 | 733 | 405 | 897 | 5,282 |
| 2002 | 3,276 | 531 | 544 | 890 | 5,241 |
| 2003 | 3,215 | 384 | 625 | 824 | 5,048 |
| 2004 | 3,049 | 268 | 680 | 906 | 4,903 |
| 2005 | 3,070 | 204 | 644 | 787 | 4,705 |
| 2006 | 2,964 | 174 | 732 | 779 | 4,649 |
| 2007 | 2,969 | 117 | 708 | 690 | 4,484 |
| 2008 | 3,005 | 91 | 566 | 691 | 4,353 |
| 2009 | 3,124 | 96 | 554 | 543 | 4,317 |
| 2010 | 2,949 | 78 | 587 | 518 | 4,132 |

**Panel B: Transition matrix**

| Pre Reg FD (1996-2000) | | year t+1 | | | |
|---|---|---|---|---|---|
| | | No forecasts | Unbundled only | Bundled only | Add mid-quarter |
| year t | No forecasts | **85%** | 11% | 2% | 2% |
| | Unbundled only | 47% | **38%** | 5% | 10% |
| | Bundled only | 44% | 24% | **16%** | 16% |
| | Add mid-quarter | 23% | 30% | 13% | **33%** |
| Post Reg FD (2001-2010) | | year t+1 | | | |
| | | No forecasts | Unbundled only | Bundled only | Add mid-quarter |
| year t | No forecasts | **92%** | 3% | 3% | 2% |
| | Unbundled only | 43% | **30%** | 10% | 18% |
| | Bundled only | 17% | 3% | **48%** | 32% |
| | Add mid-quarter | 9% | 5% | 27% | **60%** |

**Panel C: Summary statistics of variables used in the propensity analysis**

Final sample includes regular forecasting firms, defined as firms issuing bundled-only forecasts or firms issuing additional mid-quarter forecasts for the period 2001-2010. Forecast frequency is the number of management earnings forecasts in a year. Earnings $R^2$ is estimated by regressing a firm's earnings on aggregate earnings using twenty quarters of data. Connectedness is measured as the number of firms to which a firm connects. Please refer to Appendix D for detailed variable definitions.

| | N | Mean | $25^{th}$ | $50^{th}$ | $75^{th}$ | Std. dev. |
|---|---|---|---|---|---|---|
| Regular forecast frequency | 13,570 | 6.04 | 3.00 | 5.00 | 8.00 | 4.21 |
| Earnings $R^2$ | 13,570 | 0.12 | 0.02 | 0.07 | 0.17 | 0.12 |
| Number of connected firms | 13,570 | 83 | 15 | 46 | 103 | 112 |
| Size | 13,570 | 6.96 | 5.83 | 6.88 | 8.04 | 1.72 |
| Market-to-book | 13,570 | 0.78 | 0.29 | 0.74 | 1.22 | 0.79 |
| Property, plant, equipment | 13,570 | 0.21 | 0.05 | 0.14 | 0.30 | 0.21 |
| Leverage | 13,570 | 0.18 | 0.01 | 0.14 | 0.29 | 0.17 |
| Return-on-assets | 13,570 | 0.04 | 0.01 | 0.05 | 0.09 | 0.20 |
| Portion of peers forecasting | 13,570 | 0.71 | 0.57 | 0.79 | 0.92 | 0.26 |
| Herfindahl index | 13,570 | 0.17 | 0.06 | 0.12 | 0.20 | 0.16 |
| NYSE firm | 13,570 | 0.51 | 0.00 | 1.00 | 1.00 | 0.50 |
| Dividend paying firm | 13,570 | 0.47 | 0.00 | 0.00 | 1.00 | 0.50 |
| Institutional investor holdings | 13,570 | 0.61 | 0.42 | 0.69 | 0.86 | 0.31 |
| Intensity of investor activism | 13,570 | 0.11 | 0.00 | 0.00 | 0.00 | 0.36 |
| Number of analysts following | 13,570 | 1.53 | 0.76 | 1.67 | 2.29 | 0.97 |
| Analyst forecast dispersion | 13,570 | 0.04 | 0.01 | 0.03 | 0.05 | 0.05 |
| Number of public offerings | 13,570 | 0.08 | 0.00 | 0.00 | 0.00 | 0.31 |
| Number of M&A deals | 13,570 | 0.80 | 0.00 | 0.00 | 1.00 | 1.39 |

## Table 7: The Propensity to Issue Frequent Forecasts

Final sample includes regular forecasting firms, defined as firms issuing bundled-only forecasts or firms issuing additional mid-quarter forecasts for the period 2001-2010. The dependent variable is disclosure frequency, measured as the number of management earnings forecasts. High-macro-info firms are those in the top 20% of the $R^2$ distribution—estimated by regressing a firm's earnings on aggregate earnings using twenty quarters of data. Well-connected firms are those in the top 20% of the distribution of connectedness, which is measured as the number of firms to which a firm connects. Bellwether firms are those being both high-macro-info and well-connected firms. Institutional investor ownership is the percentage of outstanding shares held by institutional investors, defined as those required to file the 13F. Diversified institutional investor holdings is the ratio of the outstanding shares held by diversified institutional investors to the outstanding shares held by all institutional investors. All regressions include industry and year fixed effects. Standard errors are clustered by firm and year. "Std. Coeff." stands for standardized coefficient. Please refer to Appendix D for detailed variable definitions.

| | Model (1) | | | Model (2) | | | Model (3) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. |
| **Bellwether firm** | **-0.90** | **<.0001** | **-0.30** | **-0.91** | **<.0001** | **-0.30** | **-0.87** | **<.0001** | **-0.29** |
| **Bellwether firm × Inst. investor holdings** | | | | **0.52** | **0.04** | **0.02** | **0.22** | **0.50** | **0.01** |
| **Bellwether firm × Diversified inst. Investor** | | | | | | | **0.26** | **0.28** | **0.01** |
| Size | 0.46 | <.0001 | 0.19 | 0.45 | <.0001 | 0.19 | 0.34 | <.0001 | 0.14 |
| Market-to-book | 0.26 | <.0001 | 0.06 | 0.26 | <.0001 | 0.06 | 0.23 | <.0001 | 0.06 |
| Property, plant, equipment | 0.54 | <.0001 | 0.05 | 0.54 | <.0001 | 0.04 | 0.55 | <.0001 | 0.05 |
| Leverage | 0.71 | <.0001 | 0.04 | 0.73 | <.0001 | 0.04 | 0.74 | 0.00 | 0.04 |
| Return-on-assets | 0.71 | 0.00 | 0.04 | 0.71 | 0.00 | 0.04 | 0.74 | 0.00 | 0.03 |
| Portion of peers forecasting | 1.26 | <.0001 | 0.08 | 1.26 | <.0001 | 0.08 | 1.33 | <.0001 | 0.08 |
| Herfindahl index | 0.35 | 0.06 | 0.01 | 0.35 | 0.05 | 0.01 | 0.20 | 0.32 | 0.01 |
| NYSE firm | 0.25 | 0.00 | 0.03 | 0.26 | 0.00 | 0.03 | 0.32 | 0.00 | 0.04 |
| Dividend paying firm | -0.04 | 0.59 | 0.00 | -0.04 | 0.63 | 0.00 | 0.03 | 0.67 | 0.00 |
| Institutional investor holdings | 0.93 | <.0001 | 0.08 | 0.91 | <.0001 | 0.08 | 1.02 | <.0001 | 0.08 |
| Intensity of investor activism | -0.11 | 0.23 | -0.01 | -0.11 | 0.23 | -0.01 | -0.09 | 0.35 | -0.01 |
| Number of analysts following | 0.06 | 0.27 | 0.01 | 0.06 | 0.29 | 0.01 | 0.29 | <.0001 | 0.06 |
| Analyst forecast dispersion | -3.59 | <.0001 | -0.04 | -3.62 | <.0001 | -0.04 | -3.49 | <.0001 | -0.04 |
| Number of public offerings | -0.12 | 0.31 | -0.01 | -0.12 | 0.30 | -0.01 | -0.09 | 0.46 | -0.01 |
| Number of M&A deals | 0.09 | 0.00 | 0.03 | 0.09 | 0.00 | 0.03 | 0.11 | <.0001 | 0.04 |
| Diversified inst. investor holdings | | | | | | | -0.18 | 0.38 | -0.01 |
| N | 13,570 | | | 13,570 | | | 13,570 | | |
| Adj. $R^2$ | 0.1892 | | | 0.1894 | | | 0.1851 | | |

## Table 8: Changes in Forecast Frequency after Exogenous Coverage Shocks

If a firm suffers exogenous analyst coverage terminations as a result of brokerage closures or mergers in year t or t-1, "exogenous coverage shock" equals one. The dependent variable is disclosure frequency, measured as the number of management earnings forecasts. The sample used for Models (1) and (2) includes regular forecasting firms, defined as firms issuing bundled-only forecasts or firms issuing additional mid-quarter forecasts for the period 2001-2010. The sample used for Model (3) is restricted to only bellwether firms. Bellwether firms are those being both high-macro-info and well-connected firms. High-macro-info firms are those in the top 20% of the $R^2$ distribution—estimated by regressing a firm's earnings on aggregate earnings using twenty quarters of data, and well-connected firms are those in the top 20% of the distribution of connectedness, which is measured as the number of firms to which a firm connects. Institutional investor ownership is the percentage of outstanding shares held by institutional investors, defined as those required to file the 13F. Diversified institutional investor holdings is the ratio of the outstanding shares held by diversified institutional investors to the outstanding shares held by all institutional investors. All regressions include industry and year fixed effects. Standard errors are clustered by firm and year. "Std. Coeff." stands for standardized coefficient. Please refer to Appendix D for detailed variable definitions.

| | Model (1) | | | Model (2) | | | Model (3) | | | Model (4) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample firms: | All regular forecasting firms | | | All regular forecasting firms | | | Bellwether Firms | | | Bellwether Firms | | |
| | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. | Coeff. | P-value | Std. Coeff. |
| **Shock** | **0.49** | **<.0001** | **0.05** | **0.51** | **<.0001** | **0.05** | **-0.32** | **0.73** | **-0.05** | **0.23** | **0.52** | **0.09** |
| **Shock × Bellwether firms** | | | | **-0.71** | **0.11** | **-0.01** | | | | | | |
| **Shock × Inst. investor holdings** | | | | | | | **2.72** | **0.07** | **0.30** | **3.14** | **0.05** | **0.36** |
| **Shock × Diversified inst. Investor** | | | | | | | | | | **-1.16** | **0.45** | **-0.13** |
| Bellwether firms | | | | -0.90 | 0.00 | -0.03 | | | | | | |
| Size | 0.50 | <.0001 | 0.19 | 0.51 | <.0001 | 0.19 | 0.10 | 0.61 | 0.06 | 0.34 | 0.17 | 0.23 |
| Market-to-book | 0.35 | <.0001 | 0.06 | 0.36 | <.0001 | 0.06 | -0.11 | 0.70 | -0.03 | 0.04 | 0.90 | 0.01 |
| Property, plant, equipment | 0.08 | 0.81 | 0.00 | 0.06 | 0.85 | 0.00 | -1.26 | 0.63 | -0.03 | 0.11 | 0.95 | 0.00 |
| Leverage | 1.63 | <.0001 | 0.05 | 1.60 | <.0001 | 0.05 | -1.17 | 0.42 | -0.05 | -1.18 | 0.36 | -0.07 |
| Return-on-assets | 0.93 | <.0001 | 0.03 | 0.87 | 0.00 | 0.03 | 2.17 | 0.10 | 0.13 | 1.55 | 0.26 | 0.14 |
| Portion of peers forecasting | 1.50 | <.0001 | 0.08 | 1.49 | <.0001 | 0.08 | 0.07 | 0.96 | 0.00 | 1.14 | 0.39 | 0.10 |
| Herfindahl index | -1.38 | <.0001 | -0.05 | -1.40 | <.0001 | -0.05 | 1.16 | 0.73 | 0.04 | 0.59 | 0.77 | 0.02 |
| NYSE firm | 0.38 | <.0001 | 0.04 | 0.37 | 0.00 | 0.04 | -0.06 | 0.92 | -0.01 | 0.05 | 0.94 | 0.01 |
| Dividend paying firm | 0.00 | 0.98 | 0.00 | -0.01 | 0.95 | 0.00 | 0.04 | 0.96 | 0.00 | -1.11 | 0.24 | -0.19 |
| Institutional investor holdings | 1.82 | <.0001 | 0.12 | 1.80 | <.0001 | 0.12 | 0.42 | 0.69 | 0.04 | 0.13 | 0.91 | 0.01 |
| Intensity of investor activism | -0.22 | 0.02 | -0.02 | -0.22 | 0.02 | -0.02 | 0.46 | 0.37 | 0.05 | 0.94 | 0.07 | 0.11 |
| Number of analysts following | -0.22 | 0.00 | -0.05 | -0.21 | 0.00 | -0.04 | -0.37 | 0.30 | -0.12 | -0.84 | 0.13 | -0.22 |
| Analyst forecast dispersion | -5.66 | <.0001 | -0.07 | -5.61 | <.0001 | -0.07 | -9.61 | 0.00 | -0.16 | -14.77 | <.0001 | -0.27 |
| Number of public offerings | -0.11 | 0.44 | -0.01 | -0.10 | 0.46 | -0.01 | 0.46 | 0.37 | 0.06 | 0.85 | 0.15 | 0.12 |
| Number of M&A deals | 0.06 | 0.04 | 0.02 | 0.06 | 0.03 | 0.02 | 0.14 | 0.21 | 0.09 | 0.14 | 0.21 | 0.09 |
| Diversified inst. Investor | | | | | | | | | | 1.41 | 0.42 | 0.09 |
| N | 12,836 | | | 12,836 | | | 211 | | | 211 | | |
| Adj. $R^2$ | 0.114 | | | 0.115 | | | 0.078 | | | 0.143 | | |

## References


An, Heng and Ting Zhang, 2013, Stock price synchronicity, crash risk, and institutional investors, *Journal of Corporate Finance*, 21, 1-15.

Anilowski, Carol, Mei Feng, and Douglas J. Skinner, 2007, Does earnings guidance affect market returns? The nature and information content of aggregate earnings guidance, *Journal of Accounting and Economics*, 44(1-2), 36-63.

Aobdia, Daniel, Judson Caskey, and N. Bugra Ozel, 2014, Inter-industry network structure and the cross-predictability of earnings and stock returns, *Review of Accounting Studies*, 19(2), 1191-1224.

Armstrong, Christopher S., Snehal Banerjee, and Carlos Corona, 2013, Factor-loading uncertainty and expected returns, *Review of Financial Studies*, 26(1), 158-207.

Balakrishnan, Karthik, Mary B. Billings, Bryan Kelly, and Alexander Ljungqvist, 2014, Shaping liquidity: On the causal effects of voluntary disclosure, *Journal of Finance*, 69(5), 2237-2278.

Bonsall, Samuel B., Zahn Bozanic, and Paul E. Fischer, 2013, What do management earnings forecasts convey about the macroeconomy? *Journal of Accounting Research*, 51(2), 225-266.

Botosan, Christine A. and Mary S. Harris, 2000, Motivations for a change in disclosure frequency and its consequences: An examination of voluntary quarterly segment disclosures, *Journal of Accounting Research*, 38(2), 329-353.

Bushee, Brian J. and Christopher F. Noe, 2000, Corporate disclosure practices, institutional investors, and stock return volatility, *Journal of Accounting Research*, 38, 171-202.

Bushee, Brian J. and Gregory S. Miller, 2012, Investor relations, firm visibility, and investor following, *The Accounting Review*, 87(3), 867-897.

Bushee, Brian J., 1998, The influence of institutional investors on myopic R&D investment behavior, *The Accounting Review*, 73(3), 305-333.

Bushee, Brian J., 2004, Identifying and attracting the "right" investors: Evidence on the behavior of institutional investors, *Journal of Applied Corporate Finance*, 16(4), 28-35.

Callen, Jeffrey L. and Xiaohua Fang, 2013, Institutional investor stability and crash risk: Monitoring versus short-termism? *Journal of Banking and Finance*, 37, 3047-3063.

Carleton, Willard T., James M. Nelson, and Michael S. Weisbach, 1998, The influence of institutions on corporate governance through private negotiations: Evidence from TIAA-CREF, *Journal of Finance*, 53(4), 1335-1362.

Chen, Xia, Jarrad Harford, and Kai Li, 2007, Monitoring: Which institutions matter? *Journal of Financial Economics*, 86(2), 279-305.

Chuk, Elizabeth, Dawn Matsumoto, and Gregory S. Miller, 2013, Assessing methods of identifying management forecasts: CIG vs. researcher collected, *Journal of Accounting and Economics*, 55(1), 23-42.

Cossette, Jeff, 2008, Scrapping mid-quarter updates, *IR Magazine*.

Fu, Renhui, Arthur Kraft, and Huai Zhang, 2012, Financial reporting frequency, information asymmetry, and the cost of equity, *Journal of Accounting and Economics*, 54, 132-149.

Hoberg, Gerard and Gordon Phillips, 2014, Product market uniqueness, organizational form, and stock market valuations, *working paper*.

Hutton, Amy H., Lian Fen Lee, and Susan Z. Shu, 2012, Do managers always know better? The relative accuracy of management and analyst forecasts, *Journal of Accounting Research*, 50(5), 1217-1244.

Jung, Michael J., 2013, Investor overlap and diffusion of disclosure practices, *Review of Accounting Studies*, 18(1), 167-206.

Kalay, Alon, 2014, Investor sophistication and disclosure clienteles, *working paper*.

Konchitchki, Yaniv and Panos N. Patatoukas, 2014a, Accounting earnings and gross domestic product, *Journal of Accounting and Economics*, 57(1), 76-88.

Konchitchki, Yaniv and Panos N. Patatoukas, 2014b, Taking the pulse of the real economy using financial statement analysis: Implications for macro forecasting and stock valuation, *The Accounting Review*, 89(2), 669-694.

Kothari, S. P., Susan Shu, and Peter D. Wysocki, 2009, Do managers withhold bad news? *Journal of Accounting Research*, 47(1), 241-276.

Kothari, S.P., Lakshmanan Shivakumar, and Oktay Urcan, 2013, Aggregate earnings surprises and inflation forecasts, *working paper*.

Leftwich, Richard W., Ross L. Watts, and Jerold L. Zimmerman, 1981, Voluntary corporate disclosure: The case of interim reporting, *Journal of Accounting Research*, 19, 50-77.

Marinovic, Ivan and Felipe Varas, 2013, The timing and frequency of corporate disclosures, *working paper*.

McNichols, Maureen and James G. Manegold, 1983, The effect of the information environment on the relationship between financial disclosure and security price variability, *Journal of Accounting and Economics*, 5, 49-74.

Nallareddy, Suresh and Maria Ogneva, 2015, Predicting restatements in macroeconomic indicators using accounting information, *working paper*.

Rogers, Jonathan L., Douglas J. Skinner, and Andrew Van Buskirk, 2009, Earnings guidance and market uncertainty, *Journal of Accounting and Economics*, 48(1), 90-109.

Skinner, Douglas J., 1994, Why firms voluntarily disclose bad news, *Journal of Accounting Research*, 32(1), 38-60.

Smith, Michael P., 1996, Shareholder activism by institutional investors: Evidence from CalPERS, *Journal of Finance*, 51(1), 227-252.

Van Nieuwerburgh, Stijn and Laura Veldkamp, 2010, Information acquisition and under-diversification, *Review of Economic Studies*, 77(2), 779-805.

Verrecchia, Robert E., 1983, Discretionary disclosure, *Journal of Accounting and Economics*, 5, 179-194.