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# Accounting earnings and gross domestic product ☆, ☆☆

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ABSTRACT

We document that aggregate accounting earnings growth is an incrementally significant leading indicator of growth in nominal Gross Domestic Product (GDP). Professional macro forecasters, however, do not fully incorporate the predictive content embedded in publicly available accounting earnings data. As a result, future nominal GDP growth forecast errors are predictable based on accounting earnings data that are available to professional macro forecasters in real time.



## 1. Introduction

While a large body of accounting research provides evidence on the informational role of accounting data at the firm level (see, e.g., Beaver (1998) and Kothari (2001) for reviews of related literature), the link between accounting earnings and the macroeconomy remains relatively unexplored. This study investigates the informativeness of accounting earnings for growth in Gross Domestic Product (GDP).

GDP is the key summary statistic of economic activity (e.g., Bureau of Economic Analysis, 2007) and the most important variable in analyses of economic growth (e.g., Henderson et al., 2012). It is used by the White House and Congress to prepare the Federal Budget, by the Federal Reserve to formulate monetary policy, by Wall Street as an indicator of economic activity, and by the business community as a key input for production, investment, and employment decisions. In research on forecasting GDP growth, a central finding is that professional macro forecasters outperform time-series models (e.g., Zarnowitz and Braun, 1993; Stark, 2010). However, by and large macroeconomics research has evolved independently from accounting research, which is typically conducted at the firm level, and thus there is a dearth of evidence on the informativeness of accounting earnings for GDP growth.



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One way to measure GDP is to use the income approach, which sums corporate profits, employee compensation, and taxes on production and imports. When the U.S. Bureau of Economic Analysis (BEA) measures GDP using this approach, it relies on annual tabulations of corporate income tax returns prepared by the Internal Revenue Service (IRS) as the primary source of information on corporate profits. An alternative way to measure corporate profits is to use accounting earnings data prepared according to Generally Accepted Accounting Principles (GAAP) and aggregate the data across listed firms. Although accounting earnings are different from taxable income and do not include profits from privately-held corporations, aggregate accounting earnings are an ex ante appealing proxy for corporate profits for at least two reasons. First, corporate income tax return data lack timeliness, whereas accounting earnings data are reported shortly after the quarter-end. Second, prior literature suggests that accounting earnings predict future cash flows better than do current cash flows (e.g., Dechow et al., 1998), and thus accounting earnings are likely to predict future taxable income, which is cash-based, better than current taxable income.

Our first prediction is that aggregate accounting earnings growth is informative about future GDP growth. This prediction is motivated by the following observations. First, corporate profits are a component of GDP and are likely to be correlated with other components of GDP (e.g., Fischer and Merton, 1984; BEA, 2004). Second, aggregate accounting earnings growth proxies for corporate profit growth, which is a leading driver of economic growth (e.g., BEA, 2004). In addition, listed firms are required to report accounting earnings every quarter and thus accounting earnings data are timely.

We measure aggregate accounting earnings growth using a comprehensive sample of quarterly reports over the Q1:1988 to Q2:2011 period. Our sample starts in Q1:1988 because this is the first quarter for which we have real-time accounting earnings data. Our research design carefully aligns individual firms' accounting earnings reports with the release of the BEA's GDP report schedule. In particular, we create an index of aggregate accounting earnings growth that is based solely on quarterly reports available for macro forecasting in real time.

We find that aggregate accounting earnings growth is a leading indicator of the U.S. economy. Specifically, we find that aggregate accounting earnings growth predicts GDP growth, especially for the one-quarter-ahead forecast horizon. Our findings also reveal that the predictive content of aggregate accounting earnings growth for future GDP growth is economically important and incremental to that of contemporaneous GDP growth. At the minimum, our evidence shows that aggregate accounting earnings growth is correlated with information that is not captured by contemporaneous GDP growth and that is useful for forecasting GDP growth.

Our second prediction is that professional macro forecasters do not fully incorporate the predictive content of aggregate accounting earnings growth when forecasting GDP growth. If professional macro forecasters do not fully impound accounting earnings data when forecasting GDP growth, then future GDP growth forecast errors should be predictable based on aggregate accounting earnings growth. To test this prediction, we collect consensus forecasts of GDP growth from the Survey of Professional Forecasters (SPF) available from the Federal Reserve Bank of Philadelphia. The SPF is the longest and most well-regarded publicly available survey of quarterly GDP growth forecasts in the U.S. We measure GDP growth forecast errors as the difference between realized GDP growth and the SPF consensus forecast of GDP growth, for forecast horizons ranging from one to four quarters ahead.

We find that future GDP growth forecast errors are predictable based on aggregate accounting earnings growth. Our index of aggregate accounting earnings growth is based on data that are available to SPF panelists in real time, so evidence of predictability in future GDP growth forecast errors implies that professional macro forecasters do not fully incorporate the informativeness of publicly available accounting earnings data when forecasting GDP growth. This result is important for at least two reasons. First, the SPF consensus forecasts of GDP growth are used when developing the U.S. Federal Budget. Second, the SPF consensus forecasts of GDP growth are used by the research staff of the Board of Governors of the Federal Reserve when preparing the “Greenbook” before each meeting of the Federal Open Market Committee and so are central for monetary policy.

To gain further insights, we test whether the predictive content of aggregate accounting earnings growth for future GDP growth is incremental to that of well-known leading indicators. We confirm that Treasury yields, term spreads, and quarterly stock market returns have predictive content for future GDP growth, consistent with prior research (e.g., Fama, 1981; Harvey, 1989; Ang et al., 2005). Importantly, the informativeness of aggregate accounting earnings growth for future GDP growth is incremental to that of other predictors. In addition, although professional macro forecasters fully impound the predictive content of Treasury yields, term spreads, and quarterly stock market returns, we find evidence that they underreact to the predictive content of aggregate accounting earnings growth—a previously unknown leading indicator of the U.S. economy.

Our study contributes to accounting and economics research by documenting that (i) aggregate accounting earnings growth is a significant leading indicator of GDP growth and (ii) professional macro forecasters do not fully impound the predictive content embedded in publicly available accounting earnings data. Our study also contributes to macroeconomics research by identifying aggregate accounting earnings growth as an incrementally significant predictor of GDP growth.

In particular, we extend research on the informativeness of accounting earnings data for economic activity both at the firm level and at the aggregate level. A growing body of work examines the link from macroeconomic data to firm-level accounting data, i.e., the “macro to micro” link. Konchitchki (2011) finds that aggregate price-level changes affect firms' accounting earnings and are informative for future cash flows and stock valuation. Li et al. (2012) show that combining geographic segment sales disclosures and cross-country GDP growth forecasts helps improve firm-level profitability forecasts. Our evidence that aggregate accounting earnings growth is incrementally useful for forecasting GDP growth

extends prior research by moving in the opposite direction, i.e., by examining the "micro to macro" link. Our finding that aggregate accounting earnings growth has incremental predictive content for future GDP growth also provides a micro foundation for the evidence in Ball et al. (2009) that firm-level accounting earnings contain a systematic component.

We also extend research on the stock market valuation of aggregate accounting earnings growth. Kothari et al. (2006) find a negative association between stock market returns and aggregate accounting earnings growth. Patatoukas (forthcoming) finds that aggregate accounting earnings growth is associated with not only cash flow news but also discount rate news, and that the two types of news have offsetting effects on aggregate stock market prices. Our evidence that aggregate accounting earnings growth has predictive content for future GDP growth provides a mechanism through which accounting earnings can induce investors to revise their expectations about cash flows and discount rates at the macro level and thus impact aggregate stock market prices.

In a related study, Gallo et al. (2013) find that the Federal Reserve reacts to aggregate accounting earnings growth with a lag. Our study informs the evidence in Gallo et al. (2013) by providing a mechanism through which aggregate accounting earnings growth can lead to predictability in monetary policy reactions. Specifically, we find that professional macro forecasters underreact to accounting earnings, and thus future GDP growth forecast errors are predictable based on aggregate accounting earnings growth. Because monetary policy is a function of GDP growth forecast errors (e.g., Taylor, 1993; Clarida et al., 2000), our evidence of GDP growth forecast error predictability suggests that future monetary policy reactions can also be predictable based on aggregate accounting earnings growth.

The study proceeds as follows. Section 2 presents our predictions and research design. Section 3 discusses the sample construction, provides the timeline of our research design, and presents descriptive statistics. Section 4 presents the results. Section 5 concludes.

## 2. Predictions and research design

### 2.1. Accounting earnings and future GDP growth

Our first prediction is that aggregate accounting earnings growth is informative about future GDP growth. Our prediction is motivated by the following observations. First, corporate profits are a component of GDP and are likely to be correlated with other components of GDP (e.g., Fischer and Merton, 1984; BEA, 2004). Second, aggregate accounting earnings growth proxies for corporate profit growth, which is a leading driver of economic growth (e.g., BEA, 2004). Importantly, listed firms are required to report accounting earnings every quarter and thus accounting earnings data are timely. Unlike accounting earnings, corporate profits lack timeliness. This is because the BEA's quarterly estimates of corporate profits are based on extrapolations from corporate income tax return data tabulated with a two-year lag by the IRS (e.g., BEA, 2002; Landefeld et al., 2008).

To examine the informativeness of accounting earnings data for future GDP growth, we test whether aggregate accounting earnings growth is associated with future GDP growth for horizons ranging from one to four quarters ahead using the following regression models:

$$\text{Model A}: \; g_{q+k} = \alpha_k + \beta_k \Delta X_q + \varepsilon_{q+k}$$

$$\text{Model B}: \; g_{q+k} = \alpha_k + \beta_k \Delta X_q + \gamma_k g_q + \varepsilon_{q+k}, \tag{1}$$

where $\Delta X_q$ is aggregate accounting earnings growth for quarter $q$, $g_q$ is GDP growth for quarter $q$, $g_{q+k}$ is GDP growth for quarter $q+k$, and $k=\{1, 2, 3, 4\}$.

Model A tests whether aggregate accounting earnings growth helps forecast GDP growth up to four quarters ahead, while Model B tests whether aggregate accounting earnings growth is incrementally informative about future GDP growth after controlling for contemporaneous GDP growth. The slope coefficients $\beta_k$ on $\Delta X_q$ are the coefficients of interest. For any forecast horizon $k$, an insignificant estimate of $\beta_k$ indicates that aggregate accounting earnings growth is not informative about GDP growth for quarter $q+k$, while an estimate of $\beta_k$ that is significantly different from zero for any of the horizons considered suggests that aggregate accounting earnings growth is informative about GDP growth for that horizon.

Throughout the study, we estimate our models using ordinary least squares regressions, and we base our statistical inferences on Newey and West (1987) heteroskedasticity- and autocorrelation-consistent standard errors. The Newey and West (1987) procedure is an appropriate choice for our setting because it accounts for heteroskedasticity and serial correlation of unknown form in the residuals. Following Greene (2011, p. 920), we set the lag length for the Newey and West (1987) procedure equal to the integer part of $T^{0.25}$, where $T$ is the number of observations used in the regressions. Because $T=93$ in our study, we set the lag length equal to three. Our inferences are not sensitive to using lags varying from zero (which is equivalent to using White's (1980) heteroskedasticity-consistent standard errors) to four.

It is ex ante unclear whether aggregate accounting earnings growth should necessarily be informative about future GDP growth. First, although an important driver of economic activity, corporate profits historically account for only nine percent of GDP (e.g., BEA, 2004). In addition, corporate profit growth historically explains only 40 percent of the time-series variation in contemporaneous GDP growth. Thus, even if accounting earnings perfectly proxy for corporate profits, the ability of accounting earnings to explain time-series variation in GDP depends not only on time-series variation in corporate profits but also on time-series variation in all other items comprising the remaining 91 percent of GDP. Further, even if

accounting earnings perfectly proxy for contemporaneous corporate profits, we focus on the informativeness of aggregate accounting earnings growth for future, not contemporaneous, GDP growth.

### 2.2. Accounting earnings and future GDP growth forecast errors

Notwithstanding the significant intertemporal link between aggregate accounting earnings growth and future GDP growth, it is ex ante unclear whether professional macro forecasters fully impound accounting earnings data. On the one hand, it is appealing to use accounting earnings data when forecasting GDP growth. On the other hand, macro forecasters may perceive accounting earnings data as too coarse to draw inferences regarding the prospects of the U.S. economy. Indeed, we find anecdotal evidence suggesting that macroeconomists may not use accounting earnings data. McCloskey (1993, p. 111), for instance, notes that "We economists spurn accounting—another course I never took. But we end up reinventing it. Maybe we should study the subject a little, or at least make our students learn it. After all, it's what we really, truly know." In addition, statements and minutes from the Federal Open Market Committee meetings of the Federal Reserve indicate that macro forecasters at the Federal Reserve do not refer to accounting earnings data when discussing overall economic activity.

To examine whether professional macro forecasters incorporate accounting earnings into their projections of future GDP growth, we first measure GDP growth forecast errors as follows:

$$GDP\ Growth\ Forecast\ Error_{q+k} = g_{q+k} - E_q^{SPF}(g_{q+k}), \tag{2}$$

where $g_{q+k}$ is GDP growth for quarter $q+k$, and $E_q^{SPF}(g_{q+k})$ is the mean SPF consensus forecast of GDP growth for quarter $q+k$ as of quarter $q$.

We then test whether aggregate accounting earnings growth predicts future GDP growth forecast errors. Specifically, we estimate the following regression models:

$$\begin{aligned} &\text{Model A}: \ [g_{q+k} - E_q^{SPF}(g_{q+k})] = \alpha_k + \beta_k \Delta X_q + \varepsilon_{q+k} \\ &\text{Model B}: \ [g_{q+k} - E_q^{SPF}(g_{q+k})] = \alpha_k + \beta_k \Delta X_q + \gamma_k g_q + \varepsilon_{q+k}, \end{aligned} \tag{3}$$

Model A tests whether aggregate accounting earnings growth predicts future GDP growth forecast errors up to four quarters ahead, and Model B includes GDP growth for quarter $q$ as a control variable.

The slope coefficients $\beta_k$ on $\Delta X_q$ are the coefficients of interest. In particular, for any forecast horizon $k$, if (i) aggregate accounting earnings growth is informative about GDP growth for quarter $q+k$ and (ii) professional macro forecasters fully impound this information into their predictions of future GDP growth, then GDP growth forecast errors for quarter $q+k$ will be unrelated to aggregate accounting earnings growth in quarter $q$ and the estimate of $\beta_k$ will be insignificant for that horizon. In contrast, a significantly positive (negative) estimate of $\beta_k$ indicates that professional macro forecasters underreact (overreact) to the predictive content of aggregate accounting earnings growth for future GDP growth.

Given prior literature that finds biases in sell-side analyst forecasts (e.g., Abarbanell, 1991; Bradshaw et al., 2012), one might also expect biases in macro survey forecasts. However, biases in sell-side analyst forecasts do not necessarily imply biases in the way professional macro forecasters use aggregate accounting earnings data. Professional macro forecasters differ from sell-side analysts along a few important dimensions. First, sell-side analysts provide firm-level forecasts while macro forecasters provide macro forecasts, which they sell to market participants (e.g., Baghestani and Kianian, 1993). Second, the two groups of forecasters face different incentives. Specifically, whereas sell-side analysts often face incentives to take actions that increase brokerage and investment-banking revenues, reputational costs incentivize professional macro forecasters to produce accurate forecasts of GDP growth. Third, although several studies provide evidence that sell-side analysts' forecasts are inefficient (see, e.g., Bradshaw, 2011, for a literature review), professional macro forecasters are known to outperform sophisticated time-series models (e.g., Zarnowitz and Braun, 1993; Stark, 2010).

As alternative specifications to the models in (3), we also estimate the following regression models:

$$\begin{aligned} &\text{Model A}: \ g_{q+k} = \alpha_k + \beta_k \Delta X_q + \gamma_k E_q^{SPF}(g_{q+k}) + \varepsilon_{q+k} \\ &\text{Model B}: \ g_{q+k} = \alpha_k + \beta_k \Delta X_q + \gamma_{1k} E_q^{SPF}(g_{q+k}) + \gamma_{2k} g_q + \varepsilon_{q+k}, \end{aligned} \tag{4}$$

in essence, the models in (4) do not restrict the slope coefficient on $E_q^{SPF}(g_{q+k})$ to be equal to one, as do the models in (3).

## 3. Sample, timeline, and descriptive statistics

### 3.1. Sample

We obtain real-time accounting data from the Compustat Quarterly Preliminary History dataset. For firm $i$ in quarter $q$ we measure earnings ($X_{i,q}$) as scaled quarterly net income and earnings growth ($\Delta X_{i,q}$) as the year-over-year change in scaled quarterly net income. Our inferences are not sensitive to whether we define accounting earnings using net income or income before extraordinary items. To avoid negative denominator problems, we scale accounting earnings by sales.

For a firm-quarter to be included in our sample it must have non-missing data for market value of equity, $X_{i,q}$, $\Delta X_{i,q}$, and the quarterly earnings announcement date. We obtain quarterly earnings announcement dates from Compustat. To align

fiscal quarters with calendar quarters, the sample is restricted to firms with December fiscal year-ends. To mitigate the effects of outliers, we delete firm-quarter observations that fall in the top and bottom one percentile of each quarterly cross-section of $X_{i,q}$ and $\Delta X_{i,q}$. We construct aggregate quarterly time series of earnings ($X_q$) and earnings growth ($\Delta X_q$) using value-weighted cross-sectional averages, with weights based on market capitalization as of the beginning of the quarter. Our inferences are not sensitive to whether we construct the aggregate accounting earnings series using value-weighted or equally-weighted averages.[1]

We obtain the BEA's "advance" and "final" estimates of realized GDP growth in nominal terms from the Real-Time Data Set for Macroeconomists of the Federal Reserve Bank of Philadelphia. The advance estimate of GDP growth is reported by the BEA, in its National Income and Product Accounts (NIPA), at the end of the first month after the quarter ends and is based on incomplete data (e.g., Romer and Romer, 2000; Faust and Wright, 2007; Landefeld et al., 2008). The final estimate is reported by the BEA at the end of the third month after the quarter ends and incorporates more accurate source data. We focus on nominal GDP growth because accounting earnings are not adjusted for inflation.

We obtain the mean consensus SPF forecasts of GDP growth across forecast horizons from one to four quarters ahead, denoted respectively as $E_q^{SPF}(g_{q+1})$ through $E_q^{SPF}(g_{q+4})$, from the Federal Reserve Bank of Philadelphia.[2] The SPF is the longest and most well-regarded publicly available survey of quarterly macroeconomic forecasts, and it has been widely used in prior research (e.g., Sims, 2002; Ang et al., 2007). We focus on the consensus SPF forecasts and not on individual panelists' forecasts because the consensus consistently outperforms individual panelists (e.g., Zarnowitz and Braun, 1993; Croushore, 2011). Also, consistent with the fact that the distribution of individual panelists' GDP growth forecasts is fairly symmetric around its mean, our results are insensitive to whether we use median or mean SPF consensus forecasts.

The Federal Reserve Bank of Philadelphia maintains the identity and forecast of each forecaster. Accordingly, the SPF panelists are likely to face reputational costs that provide an incentive mechanism to strive for forecast accuracy. To gain more insights into whether the SPF panelists are sufficiently incentivized, we compare the SPF projections of GDP growth with those made by macroeconomists at the Federal Reserve. The Research Staff of the Federal Reserve Board of Governors is incentivized to produce accurate projections of the U.S. economy because these projections are used for monetary policy. Unfortunately, these projections become available to the public only after a five-year embargo and thus are not within the feasible information set of the SPF panelists. Consistent with Sims (2002), we find that these projections are indistinguishably different from the SPF consensus forecasts, which indicates that the incentives of the SPF panelists are aligned with the incentives of those with the strongest incentives to produce accurate forecasts.

Following Romer and Romer (2000) and Faust and Wright (2007), we measure GDP growth forecast errors across forecast horizons from one to four quarters ahead using the BEA's final estimate of GDP growth for quarter $q+k$, available three months after the end of the quarter.[3] The final estimate of GDP growth for quarter $q+k$, denoted as $g_{q+k}$, is the appropriate series to use when measuring GDP growth forecast errors because it is based on more complete data than the advance estimate (e.g., Landefeld et al., 2008). In addition, our communication with the Federal Reserve Bank of Philadelphia indicates that the final estimate of GDP growth is preferred when evaluating the forecasting accuracy of the SPF panelists. Specifically, according to Thomas Stark, Assistant Director and Manager of the Real-Time Data Research Center, "almost no one uses the advance estimate" when measuring GDP growth forecast errors.

### 3.2. Timeline

Our study evaluates whether aggregate earnings growth can help macro forecasters predict GDP growth based on accounting earnings data that are publicly available in real time. Accordingly, we restrict our sample of firm-quarter observations to those with accounting earnings releases that were available to SPF panelists in real time when forming their expectations about future GDP growth.

The timeline of our research design carefully mimics that of the SPF. Fig. 1 shows that the timing of the SPF is geared towards the release of the BEA's advance estimate of GDP growth. Specifically, the survey questionnaires are sent to macro forecasters by the end of the first month after the quarter ends. The deadline for responses is in the middle of the second month after the quarter ends. Accordingly, to ensure real-time data availability to SPF panelists, we retain accounting earnings data only for firms with quarterly earnings announcements released by the end of the first month after the quarter ends. We note that the feasible information set of the SPF panelists includes all firms that announce their earnings by the

[1] We note that value-weighted cross-sectional averages are more meaningful when calculating accounting aggregates because they take into account the relative economic importance of each firm (e.g., Gonedes, 1973). As an additional sensitivity test, we construct our indices of aggregate accounting earnings using cross-sectional sums. Consistent with Kothari et al. (2006), we find that the value-weighted series are highly correlated with the series constructed based on cross-sectional sums. Our inferences are unchanged using aggregate series based on cross-sectional sums.

[2] As measured by the BEA and the Federal Reserve Bank (e.g., Federal Reserve Bank, 2011), both realized and forecasted GDP growth are seasonally adjusted and stated in annual rates. We note that prior to 1992, the SPF measure of economic growth is Gross National Product (GNP) growth. GNP growth and GDP growth have a correlation of 99.8 percent, and thus the distinction between the two series is not material for this study.

[3] The BEA's estimate of GDP growth for a quarter is first released at the end of the first month after the quarter ends. The first estimate of GDP growth, known as the "advance" estimate, is based on incomplete data and is subject to substantial measurement error (e.g., Romer and Romer, 2000; Faust and Wright, 2007; Landefeld et al., 2008). The advance estimate of GDP growth is revised at the end of the second month after the quarter ends (first revision), and again at the end of the third month after the quarter ends (second revision, known as the "final" estimate), as the BEA incorporates more accurate source data.

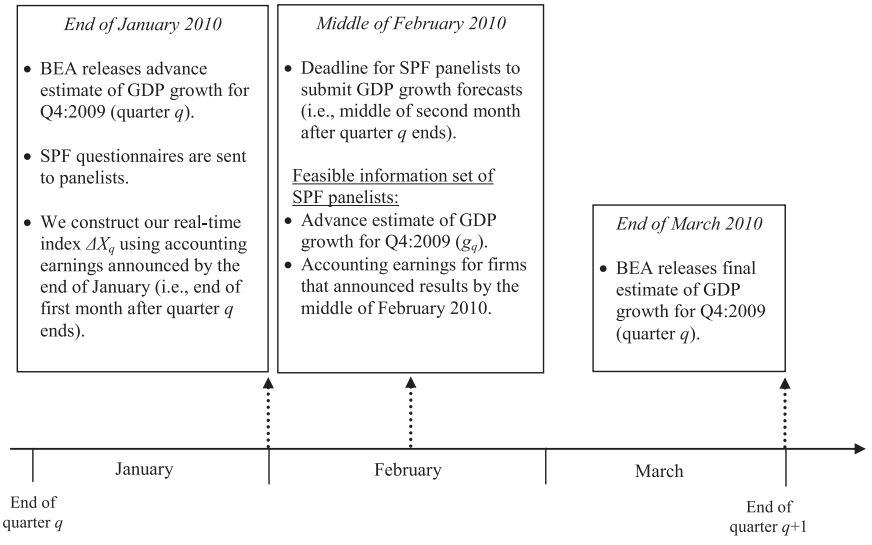
Timing of the SPF

| Survey Name | Questionnaires Sent to SPF Panelists | Last Quarter of Accounting Earnings in the SPF Panelists' Information Set | Deadline for Submission of SPF Questionnaires | Results Released to the Public |
|---|---|---|---|---|
| First Quarter | End of January (after BEA's advance GDP report) | Q4 | Middle of February (second to third week) | Middle to Late February |
| Second Quarter | End of April (after BEA's advance GDP report) | Q1 | Middle of May (second to third week) | Middle to Late May |
| Third Quarter | End of July (after BEA's advance GDP report) | Q2 | Middle of August (second to third week) | Middle to Late August |
| Fourth Quarter | End of October (after BEA's advance GDP report) | Q3 | Middle of November (second to third week) | Middle to Late November |

The figure provides details on the timeline of the SPF available from the Federal Reserve Bank of Philadelphia. Questionnaires are sent by the end of the first month after quarter $q$ ends, and the deadline for forecasters to submit their questionnaires back to the Federal Reserve Bank is the middle of the second month after quarter $q$ ends. The figure also illustrates a key aspect of our research design, namely, that the survey timing is geared towards the BEA's advance GDP report.

**Fig. 1.**

Timing of analysis: An example, first-quarter SPF for 2010




The figure provides an example that illustrates key timing aspects of our analysis.

**Fig. 2.**

middle of the second month after the quarter ends (i.e., two additional weeks of earnings announcements). However, we choose to be conservative in our research design to ensure that macro forecasters have time to process publicly available accounting data.

As an illustrative example of the timeline used in our analysis, consider the timing of the first-quarter SPF for 2010, described in Fig. 2. The advance estimate of GDP growth for Q4:2009 was released by the BEA on January 29, 2010. By the end of January 2010, the Federal Reserve Bank of Philadelphia sent the survey questionnaires to the SPF panelists. The forecasters were asked to fill out the survey questionnaires by the middle of February, i.e., before the first and second revisions of the advance estimate of GDP growth for Q4:2009 were released by the BEA on February 26, 2010 and March 26, 2010, respectively. Thus, the feasible information set available to SPF panelists by the time they received the survey

questionnaires included the advance estimate of GDP growth for Q4:2009 and accounting earnings data for Q4:2009 that were announced by the middle of February 2010.

We do not use the BEA's estimates of corporate profit growth when forecasting GDP growth because these estimates are not available to SPF panelists in real time. Specifically, the initial estimate of corporate profits for a quarter is released by the BEA only two months after the end of the quarter for interim quarters and three months after the end of the fourth quarter, and thus, unlike accounting earnings, it is not timely. To illustrate (see Fig. 2), SPF panelists were asked to fill out the survey questionnaires by the middle of February 2010. However, corporate profits for Q4:2009 were initially announced with a three-month lag on March 26, 2010. Clearly, the feasible information set available to SPF panelists by the time they filled out and submitted the survey questionnaires does not include corporate profits. This is in contrast to our real-time index of aggregate earnings growth that includes accounting earnings reports released by the end of January 2010.[4]

Recall that our objective is to test whether aggregate accounting earnings growth helps predict GDP growth after controlling for other information that is within the feasible information set of SPF panelists. With this objective in mind, we choose to use the advance estimate of GDP growth for quarter $q$, denoted as $g_q$, as a control variable across our regression models. Using the advance estimate of GDP growth ensures that information about contemporaneous GDP growth is available to SPF panelists in real time. In contrast, neither the final estimate of GDP growth nor the most recent estimate is available to SPF panelists by the time they need to fill out and submit the survey questionnaires (i.e., by the middle of the second month after the quarter ends).

Our sample covers the period from Q1:1988 to Q2:2011. Our sample starts in Q1:1988 because this is the first quarter for which we have real-time accounting data. Our sample ends in Q2:2011 because this is the last quarter for which we can calculate GDP growth forecast errors across horizons from one to four quarters ahead. In terms of the timing of the SPF, our sample period runs from the second-quarter SPF for 1988 to the third-quarter SPF for 2011. The advance estimate of GDP growth is unavailable from the Real-Time Data Set for Macroeconomists for Q4:1995 due to a government shutdown. Our sample therefore includes 93 quarters from Q1:1988 to Q2:2011.

### 3.3. Descriptive statistics

Table 1, Panel A, reports descriptive statistics for the key variables. Over the sample period, aggregate accounting earnings exhibit substantial time-series variation. Mean aggregate accounting earnings growth ($\Delta X_q$) is 0.3 percent with a standard deviation of 2.9 percent. Mean realized GDP growth is 4.7 percent with a standard deviation of 2.3 percent. For the one-quarter-ahead forecast horizon, the average GDP growth forecast error is 0.16 percent with a standard deviation of 1.64 percent. Table 1, Panel B, shows that aggregate accounting earnings growth is positively related to contemporaneous GDP growth. The Pearson correlation between aggregate accounting earnings growth and contemporaneous GDP growth is 39 percent.

## 4. Empirical results

### 4.1. Accounting earnings and future GDP growth

Table 2 reports results from the regression models of future GDP growth described in (1). The results from regressions of GDP growth in quarter $q+k$ on aggregate accounting earnings growth in quarter $q$ based on Model A show that the estimated slope coefficients ($\beta_k$) are significantly positive and equal to 0.401, 0.335, 0.181, and 0.176 for forecast horizons from one to four quarters ahead, respectively. Results based on Model B show that the predictive content of aggregate accounting earnings growth for future GDP growth is incremental to that of contemporaneous GDP growth. Specifically, our estimates of $\beta_k$ remain significantly positive for forecast horizons from one to three quarters ahead after controlling for GDP growth in quarter $q$.

Our findings show that aggregate accounting earnings growth is a significant leading indicator of future GDP growth. This is especially the case for the one-quarter-ahead forecast horizon, in terms of both the magnitude and the statistical significance of the estimated slope coefficients on aggregate accounting earnings growth. Indeed, the informativeness of aggregate accounting earnings growth for future GDP growth gradually decays as we extend the forecast horizon. Our evidence of a link between aggregate accounting earnings growth and future GDP growth is not only statistically significant but also economically important. To illustrate, a one-standard-deviation increase in aggregate accounting earnings growth is associated with a 0.8 to 1.2 percentage point increase in one-quarter-ahead GDP growth.

### 4.2. Accounting earnings and future GDP growth forecast errors

Table 3 reports results from the regression models of future GDP growth forecast errors in (3). Our key finding is that aggregate accounting earnings growth positively predicts future GDP growth forecast errors, especially for the one-quarter-ahead forecast horizon. In addition, Model B shows that our finding of predictability in future GDP growth forecast errors based on aggregate accounting earnings growth continues to hold after controlling for GDP growth in quarter $q$. Table 3 also

[4] In additional analysis, we find that even if we unrealistically assume that the BEA's estimates of corporate profit growth are available to SPF panelists in real time, these estimates are not incrementally useful for forecasting GDP growth after we control for the predictive content of aggregate accounting earnings growth.

**Table 1**
Descriptive statistics.

Panel A: Summary statistics

| | Mean | Std. dev. | Min | p10 | p25 | Median | p75 | p90 | Max |
|---|---|---|---|---|---|---|---|---|---|
| $X_q$ | 0.094 | 0.028 | −0.012 | 0.059 | 0.079 | 0.091 | 0.120 | 0.130 | 0.140 |
| $\Delta X_q$ | 0.003 | 0.029 | −0.094 | −0.028 | −0.009 | 0.002 | 0.012 | 0.032 | 0.107 |
| $g_q$ | 0.047 | 0.023 | −0.041 | 0.023 | 0.037 | 0.049 | 0.061 | 0.072 | 0.097 |
| $E_q^{SPF}(g_{q+1})$ | 0.047 | 0.017 | −0.038 | 0.032 | 0.042 | 0.049 | 0.057 | 0.064 | 0.084 |
| $E_q^{SPF}(g_{q+2})$ | 0.050 | 0.012 | −0.008 | 0.038 | 0.044 | 0.051 | 0.058 | 0.061 | 0.090 |
| $E_q^{SPF}(g_{q+3})$ | 0.052 | 0.009 | 0.020 | 0.041 | 0.046 | 0.053 | 0.057 | 0.063 | 0.080 |
| $E_q^{SPF}(g_{q+4})$ | 0.052 | 0.007 | 0.032 | 0.044 | 0.047 | 0.053 | 0.057 | 0.062 | 0.069 |
| $g_{q+1}-E_q^{SPF}(g_{q+1})$ | 0.0016 | 0.0164 | −0.0540 | −0.0171 | −0.0117 | 0.0019 | 0.0130 | 0.0216 | 0.0471 |
| $g_{q+2}-E_q^{SPF}(g_{q+2})$ | −0.0014 | 0.0209 | −0.0886 | −0.0208 | −0.0112 | −0.0013 | 0.0112 | 0.0241 | 0.0483 |
| $g_{q+3}-E_q^{SPF}(g_{q+3})$ | −0.0035 | 0.0229 | −0.0981 | −0.0293 | −0.0135 | −0.0012 | 0.0079 | 0.0210 | 0.0501 |
| $g_{q+4}-E_q^{SPF}(g_{q+4})$ | −0.0049 | 0.0248 | −0.1044 | −0.0280 | −0.0152 | −0.0045 | 0.0088 | 0.0238 | 0.0496 |

Panel B: Pearson (Spearman) pairwise correlations above (below) main diagonal, two-sided *p*-values reported in italics

| | $\Delta X_q$ | $g_q$ |
|---|---|---|
| $\Delta X_q$ | 1 | 0.39<br>*0.00* |
| $g_q$ | 0.33<br>*0.00* | 1 |

The table provides descriptive statistics for key variables. For firm $i$ in quarter $q$ we measure earnings ($X_{i,q}$) as scaled quarterly net income and growth in earnings ($\Delta X_{i,q}$) as the year-over-year change in scaled quarterly net income. We obtain real-time accounting data from the Compustat Quarterly Preliminary History. We obtain aggregate time series of earnings ($X_q$) and earnings growth ($\Delta X_q$) using value-weighted cross-sectional averages with weights based on market capitalization as of the beginning of each quarter. $g_q$ is the advance estimate of GDP growth for quarter $q$ and $g_{q+k}$ is the final estimate of GDP growth for quarter $q+k$, both obtained from the Real-Time Data Set for Macroeconomists available from the Federal Reserve Bank of Philadelphia. $E_q{}^{SPF}(g_{q+k})$ is the mean consensus SPF forecast of GDP growth for quarter $q+k$ available from the Federal Reserve Bank of Philadelphia. Both realized and forecasted GDP growth rates are stated in annual rates. $g_{q+k}-E_q{}^{SPF}(g_{q+k})$ is SPF panelists' GDP growth forecast error for quarter $q+k$. The advance estimate of GDP growth is unavailable from the Real-Time Data Set for Macroeconomists for Q4:1995 due to a government shutdown, so our sample includes 93 quarters over the period from Q1:1988 to Q2:2011.

**Table 2**
Accounting earnings and future GDP growth

$$\text{Model A}: \; g_{q+k}=\alpha_k+\beta_k\Delta X_q+\varepsilon_{q+k}$$
$$\text{Model B}: \; g_{q+k}=\alpha_k+\beta_k\Delta X_q+\gamma_k g_q+\varepsilon_{q+k}.$$

| | $k=1$ | | $k=2$ | | $k=3$ | | $k=4$ | |
|---|---|---|---|---|---|---|---|---|
| **Model:** | **A** | **B** | **A** | **B** | **A** | **B** | **A** | **B** |
| ***Intercept*** | 0.048*** | 0.030*** | 0.047*** | 0.038*** | 0.048*** | 0.044*** | 0.047*** | 0.042*** |
| *t-Statistic* | *14.98* | *5.04* | *14.65* | *6.98* | *13.46* | *7.27* | *13.04* | *6.44* |
| $\Delta X_q$ | 0.401*** | 0.281*** | 0.335*** | 0.273** | 0.181** | 0.155* | 0.176* | 0.146 |
| *t-Statistic* | *2.52* | *2.56* | *2.56* | *2.22* | *1.96* | *1.84* | *1.66* | *1.39* |
| $g_q$ | . | 0.389*** | . | 0.203** | . | 0.086 | . | 0.098 |
| *t-Statistic* | . | *3.93* | . | *2.16* | . | *0.90* | . | *0.89* |
| **Adj. $R^2$ (%)** | 21 | 31 | 15 | 17 | 4 | 3 | 3 | 3 |
| ***N* quarters** | 93 | 93 | 93 | 93 | 93 | 93 | 93 | 93 |

The table reports results from regressions of future GDP growth on current-quarter aggregate accounting earnings growth. $\Delta X_q$ is aggregate accounting earnings growth for quarter $q$. We obtain real-time accounting data from the Compustat Quarterly Preliminary History. $g_q$ is the advance estimate of GDP growth for quarter $q$ and $g_{q+k}$ is the final estimate of GDP growth for quarter $q+k$, both obtained from the Real-Time Data Set for Macroeconomists available from the Federal Reserve Bank of Philadelphia. We report $t$-statistics based on Newey and West (1987) heteroskedasticity- and autocorrelation-consistent standard errors with three lags. ***, **, And * indicate statistical significance at 1, 5, and 10 percent level, respectively, using two-tailed tests. The advance estimate of GDP growth is unavailable from the Real-Time Data Set for Macroeconomists for Q4:1995 due to a government shutdown, so our sample includes 93 quarters over the period from Q1:1988 to Q2:2011.

shows that GDP growth in quarter $q$ is unrelated to future GDP growth forecast errors across all forecast horizons. This finding suggests that professional macro forecasters impound the informativeness of contemporaneous GDP growth but not that of aggregate accounting earnings growth.

**Table 3**
Accounting earnings and future GDP growth forecast errors

$$\text{Model } A: \ [g_{q+k} - E_q^{SPF}(g_{q+k})] = \alpha_k + \beta_k \Delta X_q + \varepsilon_{q+k}$$

$$\text{Model } B: \ [g_{q+k} - E_q^{SPF}(g_{q+k})] = \alpha_k + \beta_k \Delta X_q + \gamma_k g_q + \varepsilon_{q+k}.$$

| | $k=1$ | | $k=2$ | | $k=3$ | | $k=4$ | |
|---|---|---|---|---|---|---|---|---|
| **Model:** | **A** | **B** | **A** | **B** | **A** | **B** | **A** | **B** |
| ***Intercept*** | 0.001 | 0.006 | −0.002 | 0.002 | −0.004 | 0.001 | −0.005 | −0.005 |
| *t-Statistic* | *0.81* | *1.49* | *−0.79* | *0.52* | *−1.21* | *0.15* | *−1.46* | *−0.63* |
| $\Delta X_q$ | 0.138*** | 0.168*** | 0.173** | 0.202** | 0.112 | 0.143** | 0.142 | 0.146 |
| *t-Statistic* | *3.64* | *3.84* | *2.19* | *2.28* | *1.57* | *2.26* | *1.32* | *1.58* |
| $g_q$ | . | −0.096 | . | −0.094 | . | −0.102 | . | −0.012 |
| *t-Statistic* | . | *−1.38* | . | *−1.07* | . | *−1.01* | . | *−0.09* |
| **Adj. $R^2$ (%)** | 5 | 5 | 5 | 5 | 1 | 1 | 2 | 1 |
| ***N* quarters** | 93 | 93 | 93 | 93 | 93 | 93 | 93 | 93 |

The table reports results from regressions of future GDP growth forecast errors on current-quarter aggregate accounting earnings growth. $\Delta X_q$ is aggregate accounting earnings growth for quarter $q$. We obtain real-time accounting data from the Compustat Quarterly Preliminary History. $g_q$ is the advance estimate of GDP growth for quarter $q$ and $g_{q+k}$ is the final estimate of GDP growth for quarter $q+k$, both obtained from the Real-Time Data Set for Macroeconomists available from the Federal Reserve Bank of Philadelphia. $E_q^{SPF}(g_{q+k})$ is the mean consensus SPF forecast of GDP growth for quarter $q+k$ available from the Federal Reserve Bank of Philadelphia. Both realized and forecasted GDP growth rates are stated in annual rates. $g_{q+k} - E_q^{SPF}(g_{q+k})$ is SPF panelists' GDP growth forecast error for quarter $q+k$. We report $t$-statistics based on Newey and West (1987) heteroskedasticity- and autocorrelation-consistent standard errors with three lags. ***, **, and * indicate statistical significance at 1, 5, and 10 percent level, respectively, using two-tailed tests. The advance estimate of GDP growth is unavailable from the Real-Time Data Set for Macroeconomists for Q4:1995 due to a government shutdown, so our sample includes 93 quarters over the period from Q1:1988 to Q2:2011.

Table 4 reports results from the regression models of future GDP growth on aggregate accounting earnings growth using the alternative specifications in (4) that include as a right-hand-side variable $E_q^{SPF}(g_{q+k})$, i.e., the current-quarter SPF consensus forecast of GDP growth for quarter $q+k$. Our inferences using the alternative specifications in (4) remain unchanged. Specifically, Table 4 shows that the estimated slope coefficients on aggregate accounting earnings growth are significantly positive, especially for the one-quarter-ahead forecast horizon, after controlling for contemporaneous GDP growth and the current-quarter SPF consensus forecast of future GDP growth. In addition, comparing the estimated coefficients in Table 4 to those in Table 2 reveals that the inclusion of $E_q^{SPF}(g_{q+k})$ as a right-hand-side variable (i) does not affect the predictive ability of aggregate accounting earnings growth for future GDP growth, and (ii) eliminates the predictive content of contemporaneous GDP growth for future GDP growth across all forecast horizons, suggesting that macro forecasters impound the informativeness of contemporaneous GDP growth but not that of aggregate accounting earnings growth.

Taken together, our findings in Tables 2–4 suggest that while aggregate accounting earnings growth is a significant leading indicator of future GDP growth, professional macro forecasters do not fully incorporate the predictive content of aggregate accounting earnings growth into their GDP growth forecasts. As a result, future GDP growth forecast errors are predictable based on accounting earnings data that are available to professional macro forecasters in real time.[5]

### 4.3. Robustness tests

As a robustness check, we test whether the predictive content of aggregate accounting earnings growth for future GDP growth is incremental to that of well-known leading indicators. To do so, Table 5 extends the right-hand side of our regression models of future GDP growth and future GDP growth forecast errors in (1) and (3), respectively, to include the following control variables: $Yield_q$, the yield on the one-year constant maturity Treasury bill (T-bill) measured one month after quarter $q$ ends; $Spread_q$, the yield on the ten-year constant maturity Treasury bond minus the yield on the one-year constant maturity T-bill measured one month after quarter $q$ ends; and $Return_q$, the quarterly buy-and-hold stock market return.

[5] To gain additional insights, we conduct tests using consensus forecasts of aggregate earnings growth for the S&P 500 index, available from I/B/E/S on a top-down basis for net income and operating income. Because I/B/E/S provides consensus statistics as of the middle of each month, we use the consensus forecast as of the middle of the month after each quarter ends such that the I/B/E/S forecasts of S&P 500 index earnings growth are within the feasible information set of SPF panelists. We find that these S&P aggregate earnings growth projections do not help forecast GDP growth and are unrelated to future GDP growth forecast errors across forecast horizons ranging from one to four quarters ahead. This finding is consistent with evidence of biases in aggregate earnings growth forecasts (e.g., Chung and Kryzanowski, 1999; Darrough and Russell, 2002). In a recent study, Hann et al. (2012) find that aggregate earnings forecasts by sell-side analysts can be improved based on macro forecasts. Their finding is also consistent with prior evidence of biases in aggregate earnings forecasts.

**Table 4**
Alternative specifications: Accounting earnings and future GDP growth forecast errors

Model $A$ : $g_{q+k} = \alpha_k + \beta_k \Delta X_q + \gamma_k E_q^{SPF}(g_{q+k}) + \varepsilon_{q+k}$

Model $B$ : $g_{q+k} = \alpha_k + \beta_k \Delta X_q + \gamma_{1k} E_q^{SPF}(g_{q+k}) + \gamma_{2k} g_q + \varepsilon_{q+k}$.

| | $k=1$ | | $k=2$ | | $k=3$ | | $k=4$ | |
|---|---|---|---|---|---|---|---|---|
| **Model:** | **A** | **B** | **A** | **B** | **A** | **B** | **A** | **B** |
| ***Intercept*** | 0.001 | 0.002 | 0.004 | 0.003 | 0.003 | 0.003 | 0.032 | 0.032 |
| *t-Statistic* | *0.23* | *0.39* | *0.26* | *0.26* | *0.16* | *0.14* | *1.2* | *1.2* |
| $\Delta X_q$ | 0.139*** | 0.151*** | 0.191** | 0.204** | 0.121* | 0.144** | 0.166 | 0.146 |
| *t-Statistic* | *3.98* | *4.69* | *2.23* | *2.32* | *1.75* | *2.25* | *1.63* | *1.44* |
| $E_q^{SPF}(g_{q+k})$ | 0.997*** | 1.141*** | 0.889*** | 0.972*** | 0.863** | 0.954** | 0.291 | 0.226 |
| *t-Statistic* | *8.56* | *6.57* | *3.55* | *2.89* | *2.43* | *2.37* | *0.62* | *0.46* |
| $g_q$ | . | −0.164 | . | −0.085 | . | −0.094 | . | 0.073 |
| *t-Statistic* | . | *−1.49* | . | *−0.62* | . | *−0.79* | . | *0.61* |
| **Adj. $R^2$ (%)** | 59 | 59 | 31 | 31 | 13 | 13 | 3 | 2 |
| ***N* quarters** | 93 | 93 | 93 | 93 | 93 | 93 | 93 | 93 |

The table reports results from alternative regression models for Table 3. $\Delta X_q$ is aggregate accounting earnings growth for quarter $q$. We obtain real-time accounting data from the Compustat Quarterly Preliminary History. $g_q$ is the advance estimate of GDP growth for quarter $q$ and $g_{q+k}$ is the final estimate of GDP growth for quarter $q+k$, both obtained from the Real-Time Data Set for Macroeconomists available from the Federal Reserve Bank of Philadelphia. $E_q^{SPF}(g_{q+k})$ is the mean consensus SPF forecast of GDP growth for quarter $q+k$ available from the Federal Reserve Bank of Philadelphia. Both realized and forecasted GDP growth rates are stated in annual rates. We report $t$-statistics based on Newey and West (1987) heteroskedasticity- and autocorrelation-consistent standard errors with three lags. ***, **, And * indicate statistical significance at 1, 5, and 10 percent level, respectively, using two-tailed tests. The advance estimate of GDP growth is unavailable from the Real-Time Data Set for Macroeconomists for Q4:1995 due to a government shutdown, so our sample includes 93 quarters over the period from Q1:1988 to Q2:2011.

We focus on the one-quarter-ahead forecast horizon because our earlier findings show that aggregate accounting earnings growth is especially informative for this horizon. We obtain yields from the Federal Reserve Board's H15 Report and stock market returns from the CRSP Monthly Index File. We measure yields at the end of the first month after quarter $q$ ends to ensure that the data are within the feasible information set of SPF panelists. We use the value-weighted CRSP index (including distributions) to proxy for the stock market portfolio. We measure stock market returns over the three months leading to one month after quarter $q$ ends. The return window ensures that stock market prices incorporate information within the feasible information set of SPF panelists.

Table 5, Panel A, columns 1 through 3, show that the estimated slope coefficients on $Yield_q$, $Spread_q$, and $Return_q$, are significantly positive, which is consistent with prior evidence that Treasury yields, term spreads, and stock market returns have predictive content for the macroeconomy (e.g., Fama, 1981; Harvey, 1989; Ang et al., 2005). Importantly, the estimated slope coefficients on aggregate accounting earnings growth remain significantly positive across the specifications considered. Indeed, the evidence in column 4 suggests that the informativeness of aggregate accounting earnings growth for future GDP growth is incremental to that of other predictors even after we jointly include $Yield_q$, $Spread_q$, and $Return_q$ as control variables. In columns 5 and 6, we find that our inferences are robust to including contemporaneous GDP growth and the current-quarter SPF consensus forecast of GDP growth as additional control variables.

Table 5, Panel B, columns 1 through 3, show that our finding of predictability in future GDP growth forecast errors based on aggregate accounting earnings growth continues to hold after we include $Yield_q$, $Spread_q$, and $Return_q$ as control variables. In contrast, the estimated slope coefficients on $Yield_q$, $Spread_q$, and $Return_q$ are insignificant, suggesting that macro forecasters impound the informativeness of Treasury yields, term spreads, and stock market returns but not that of aggregate accounting earnings growth. In columns 4 and 5, we find that evidence of predictability in GDP growth forecast errors based on aggregate accounting earnings is robust to jointly including $Yield_q$, $Spread_q$, $Return_q$, and contemporaneous GDP growth as control variables.

Overall, we conclude that the informativeness of aggregate accounting earnings growth for future GDP growth and GDP growth forecast errors is incremental to that of well-known leading indicators.[6]

[6] In additional analysis, we investigate whether estimates of annual taxable income using GAAP data can be useful for forecasting GDP. We estimate annual taxable income using two methods following Shevlin (1990) and Lev and Nissim (2004). When compared to accounting earnings, estimates of annual taxable income are conceptually closer to the BEA's measure of corporate profits, which is primarily based on annual tabulations of corporate income tax returns prepared by the IRS. Estimates of annual taxable income have two limitations. First, taxable income can only be estimated annually, whereas accounting earnings are reported every quarter. Second, unlike accounting earnings, estimates of annual taxable income are not available to SPF panelists in real time. Nevertheless, even if we unrealistically assume that estimates of annual taxable income are available to SPF panelists in real time, we find that the predictive content of aggregate accounting earnings subsumes the association between aggregate annual taxable income growth and future GDP growth. We also do not find evidence of predictability in GDP growth forecast errors based on aggregate annual taxable income growth. Overall, we conclude that estimates of annual taxable income using GAAP data are not incrementally useful for forecasting GDP.

**Table 5**
Incremental effects of accounting earnings.

Panel A: Accounting earnings and future GDP growth

$g_{q+1} = \alpha + \beta \Delta X_q + \gamma_1 Yield_q + \gamma_2 Spread_q + \gamma_3 Return_q + \gamma_4 g_q + \gamma_5 E_q^{SPF}(g_{q+1}) + \varepsilon_{q+1}$

| **Column:** | **1** | **2** | **3** | **4** | **5** | **6** |
|---|---|---|---|---|---|---|
| ***Intercept*** | 0.034*** | 0.055*** | 0.046*** | 0.034*** | 0.022*** | 0.011* |
| *t-Statistic* | *5.21* | *17.42* | *13.77* | *3.13* | *2.50* | *1.75* |
| $\Delta X_q$ | 0.410*** | 0.416*** | 0.324*** | 0.345*** | 0.226*** | 0.138*** |
| *t-Statistic* | *3.23* | *2.84* | *2.59* | *3.37* | *3.02* | *3.77* |
| $Yield_q$ | 0.320*** | . | . | 0.285* | 0.165 | −0.096 |
| *t-Statistic* | *2.56* | . | . | *1.66* | *1.08* | *−0.93* |
| $Spread_q$ | . | 0.482** | . | −0.016 | −0.091 | 0.271 |
| *t-Statistic* | . | *2.16* | . | *−0.06* | *−0.41* | *1.47* |
| $Return_q$ | . | . | 0.099** | 0.082** | 0.096** | 0.030 |
| *t-Statistic* | . | . | *2.14* | *1.97* | *2.14* | *1.27* |
| $g_q$ | . | . | . | . | 0.333*** | −0.156 |
| *t-Statistic* | . | . | . | . | *3.02* | *−1.45* |
| $E_q^{SPF}(g_{q+1})$ | . | . | . | . | . | 1.116*** |
| *t-Statistic* | . | . | . | . | . | *6.81* |
| **Adj. $R^2$ (%)** | 29 | 25 | 27 | 33 | 38 | 59 |
| ***N* quarters** | 93 | 93 | 93 | 93 | 93 | 93 |

Panel B: Accounting earnings and future GDP growth forecast errors

$[g_{q+1} - E_q^{SPF}(g_{q+1})] = \alpha + \beta \Delta X_q + \gamma_1 Yield_q + \gamma_2 Spread_q + \gamma_3 Return_q + \gamma_4 g_q + \varepsilon_{q+1}$

| **Column:** | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|
| ***Intercept*** | 0.002 | 0.002 | 0.001 | 0.008 | 0.012* |
| *t-Statistic* | *0.54* | *1.02* | *0.34* | *1.55* | *2.01* |
| $\Delta X_q$ | 0.138*** | 0.141*** | 0.107*** | 0.110*** | 0.147*** |
| *t-Statistic* | *3.47* | *3.75* | *3.84* | *3.32* | *4.37* |
| $Yield_q$ | −0.013 | . | . | −0.107 | −0.069 |
| *t-Statistic* | *−0.19* | . | . | *−1.38* | *−0.77* |
| $Spread_q$ | . | 0.083 | . | 0.210 | 0.234 |
| *t-Statistic* | . | *0.61* | . | *1.26* | *1.38* |
| $Return_q$ | . | . | 0.040 | 0.041 | 0.037 |
| *t-Statistic* | . | . | *1.44* | *1.40* | *1.26* |
| $g_q$ | . | . | . | . | −0.105 |
| *t-Statistic* | . | . | . | . | *−1.52* |
| **Adj. $R^2$ (%)** | 4 | 4 | 7 | 6 | 6 |
| ***N* quarters** | 93 | 93 | 93 | 93 | 93 |

The table reports regression results after the inclusion of additional control variables. Panel A presents results from regressions of future GDP growth. Panel B presents results from regressions of future GDP growth forecast errors. $\Delta X_q$ is aggregate accounting earnings growth for quarter $q$. We obtain real-time accounting data from the Compustat Quarterly Preliminary History. $Yield_q$ is the yield on the one-year Treasury bill with constant maturity measured one month after quarter $q$ ends, and $Spread_q$ is the yield on the ten-year minus the yield on the one-year Treasury note with constant maturity measured one month after quarter $q$ ends. $Return_q$ is the buy-and-hold stock market return earned over the three months leading to one month after quarter $q$ ends. $g_q$ is the advance estimate of GDP growth for quarter $q$ and $g_{q+1}$ is the final estimate of GDP growth for quarter $q+1$, both obtained from the Real-Time Data Set for Macroeconomists available from the Federal Reserve Bank of Philadelphia. $E_q^{SPF}(g_{q+1})$ is the mean consensus SPF forecast of GDP growth for quarter $q+1$ available from the Federal Reserve Bank of Philadelphia. Both realized and forecasted GDP growth rates are stated in annual rates. $g_{q+1} - E_q^{SPF}(g_{q+1})$ is SPF panelists' GDP growth forecast error for quarter $q+1$. We report $t$-statistics based on Newey and West (1987) heteroskedasticity- and autocorrelation-consistent standard errors with three lags. ***, **, And * indicate statistical significance at 1, 5, and 10 percent level, respectively, using two-tailed tests. The advance estimate of GDP growth is unavailable from the Real-Time Data Set for Macroeconomists for Q4:1995 due to a government shutdown, so our sample includes 93 quarters over the period from Q1:1988 to Q2:2011.

## 5. Discussion

Overall, we find that aggregate accounting earnings growth has predictive content for future GDP growth, especially for the one-quarter-ahead forecast horizon. Additional tests show that the predictive content of aggregate accounting earnings growth for future GDP growth is incremental to that of other leading indicators including Treasury yields, term spreads, quarterly stock market returns, contemporaneous GDP growth, as well as the current-quarter SPF consensus forecast of future GDP growth. Importantly, we find that although professional macro forecasters fully impound the predictive content

of other leading indicators, they underreact to the predictive content of aggregate accounting earnings growth—a previously unknown leading indicator of the U.S. economy. As a result, future GDP growth forecast errors are predictable based on accounting earnings data that are available to macro forecasters in real time.

Macro forecasters' underreaction to aggregate accounting earnings growth could have a number of explanations. One could be that macro forecasters believe that accounting earnings data are too coarse to draw inferences regarding future GDP growth. Another explanation could be that collecting a comprehensive sample of quarterly accounting earnings reports in real time imposes nontrivial costs on macro forecasters. It is also possible that the potential benefits from aggregating accounting earnings data have been previously unknown and hence the perceived net benefits for macro forecasting have been underestimated. To the extent that the benefits from incorporating aggregate accounting earnings data outweigh the costs, we predict that professional macro forecasters are likely to become more attentive to accounting earnings and, as a result, evidence of predictability in GDP growth forecast errors should decay over time.

## 6. Conclusion

Our study contributes to the accounting and economics literature by shedding light on the informativeness of accounting earnings for GDP growth. We show that aggregate accounting earnings growth is a leading indicator of future GDP growth, especially for the one-quarter-ahead forecast horizon. However, professional macro forecasters do not fully incorporate aggregate accounting earnings growth when forecasting GDP growth. As a result, future GDP growth forecast errors are predictable based on accounting earnings data that are available to professional macro forecasters in real time. A direction for additional research is to aggregate accounting data in a cost-effective way and identify which accounting data are more useful for macro forecasting. A related direction for additional research is to probe the link between aggregate accounting data, subsequent GDP growth, revisions of GDP growth forecasts, and stock valuation. In follow-up studies, we investigate these directions.

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