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Aggregate earnings and market expectations in United States presidential election prediction markets

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ABSTRACT

This study uses election futures market data to provide the first empirical evidence that aggregate earnings conveys timely "election-relevant" information effecting betting market participants' expectations about the likely outcomes of United States presidential election campaigns. I document that aggregate earnings news is associated with multiple facets of U.S. economic health affecting voter utility. I then use high-frequency data from the Iowa Electronic Political Prediction Market (IEM) to document that aggregate earnings news, including cash flow news, is significantly related to changes in the expected outcomes of U.S. presidential elections and incremental of other measures of economic health.

1. Introduction

A recent literature on aggregate accounting information assesses the macroeconomic implications and information content of accounting numbers (Ball, Sadka, & Sadka, 2009; Choi, Kalay, & Sadka, 2016; Cready & Gurun, 2010; Gallo, Hann, & Li, 2016; Konchitchki & Patatoukas, 2014a; Kothari, Lewellen, & Warner, 2006). Historically, aggregate economic conditions account for a good deal of the variation in candidate support in U.S. presidential election campaigns (Lewis-Beck & Stegmaier, 2000). Conceivably, the informativeness of accounting numbers extends beyond traditionally examined capital market outcomes to other fundamental economic decisions and outcomes such as expected election outcomes. This study provides the first evidence on the informativeness of aggregate accounting information in an important real outcome setting – the expected outcomes of U.S. presidential election campaigns. Specifically, I assess whether aggregate accounting news is a source of "election relevant" information in presidential elections incremental to other sources of economic information.

At first glance, it is not obvious that accounting information is informative when assessing or setting expectations about eventual electoral outcomes. However, theoretical work in the economics and political science literatures provides the thread that neatly links these two constructs (i.e., the notion that economic conditions effect voter choice). To date, no prior attempt has been made to associate aggregate accounting information with the likelihood an election outcome occurs. This paper relies on theoretical examination on the impact of macroeconomic conditions on voter choice, and prior accounting research linking aggregate accounting information and macroeconomic indicators, to motivate an examination of the informativeness of aggregate earnings news when explaining changes in expected electoral outcomes.

To address this question, measures of aggregate earnings are analyzed with high-frequency data from U.S. political prediction markets. I first establish that aggregate earnings capture timely information about the broader economic conditions affecting U.S. voters by empirically associating earnings news with future macroeconomic indicators. I then examine the relation between aggregate earnings news and contemporaneous changes in expectations of voters' electoral preferences as reflected in the Iowa Electronic Political Prediction Market (IEM). I predict and find a positive association between earnings news and changes in the market's assessment that the incumbent party will retain the presidency. Furthermore, I show that this association is primarily driven by cash flow news corresponding with expectations about near term U.S. economic growth likely to benefit voters.

Decades of empirical and theoretical research in economics and political science offers support for anecdotal claims made by campaigns and political pundits that aggregate economic conditions are a central, and sometimes decisive, determinant of electoral outcomes in the United States, particularly at the presidential level (Abramowitz, 1988; Fair,

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1978; Hibbs, 1986).[1] Empirically, this suggests that information implicit in observable economic indicators can be used to proxy for voters' perceptions about the competence of the incumbent governing party. However, econometric limitations and differential macroeconomic concerns around election cycles have resulted in little agreement among scholars as to which economic indicators serve as either the best proxy of voters' assessments of economic performance or as a particular information source used to appraise a candidate or party's economic stewardship.

Traditionally, empirical work tackles the impact of economic conditions on elections using measures of fundamental economic conditions that are subject to noise, calculated with a reasonable degree of measurement error, and/or lack timeliness. For instance, many popular fundamental macroeconomic measures, such as the Gross Domestic Product (GDP) and unemployment rate, are reported sporadically, reported with a good deal of lag, or subject to economically meaningful revisions in future periods (Gallo et al., 2016). Researchers must also be concerned with the overfitting of statistical models due to very few post-World War II presidential election outcome observations. This limits studies to one, possibly, two variables proxying for voters' economic concerns. Consequently, many empirical models are specified with variables that are generated using ad hoc statistical transformations or selected to achieve the best "fit" with the data (Erikson & Wlezien, 2008b).

Aggregate accounting constructs, by contrast, possess a number of empirical and intrinsic properties that comprehensively proxy for a number of different aspects of economic activity including consumption, prices, investment, employment and wages, and general economic productivity (Ball & Sadka, 2015; Konchitchki & Patatoukas, 2014a; Konchitchki & Patatoukas, 2014b). Additionally, aggregated accounting numbers are more timely than many other metrics of economic health. Aggregated accounting numbers also lack the substantial revisions that plagues other indicators, in part because accounting numbers are generated and reported by individual firms (or by intermediaries following a particular firm or firms) on a regular basis and are not gathered by time- and resource-constrained governmental agencies. As a result, accounting information can provide a strong indication of what individuals concerned with the direction of the economy are weighing in real-time. This does not imply that voters are necessarily informed about actual earnings numbers or forecasts. Rather, accounting information should reflect the aggregate economic conditions voters experience or observe around them.

Relatedly, positive aggregate earnings news is likely associated with positive shifts in economic demand, higher prices, higher output, or with future firm production and growth, because these numbers reflect strategic decisions by sophisticated decision-makers in the context of both current and future macroeconomic assessments. These positive earnings innovations are also likely to lead to greater investment, and increased hiring and consumption, all real outcomes likely to contribute to overall voter utility. Therefore, aggregate accounting information can serve as a summary measure that is informative not only about current conditions and trends but also about voters' prospective economic concerns related to anticipated future production, rising prices, or employment and wages.

A growing literature examines the macroeconomic content of aggregate accounting information. However, establishing the specific economic information embedded in aggregate accounting news remains an empirical question (Ogneva, 2013; Shivakumar, 2007). Thus, the first part of my study tests whether aggregate earnings information relates to various facets of economic activity. To test whether aggregate accounting measures are representative of the overall economy, and thus voters' general economic concerns, a measure of aggregate forecast revisions and a measure of realized aggregate earnings growth are associated with one- and two-month ahead levels and changes in six common but distinct macroeconomic indicators – unemployment, inflation, personal income, industrial production, consumer sentiment, and GDP growth. Generally, my findings imply that accounting measures are a timely, leading indicator of future economic activity. Collectively, these results support evidence in the prior literature on the macroeconomic information content and predictive ability of aggregate earnings measures (Choi et al., 2016; Gallo et al., 2016; Konchitchki & Patatoukas, 2014a).

This preliminary analysis, establishing an association between accounting information and future economic outcomes likely related to voter utility, helps motivate my primary tests on the association between aggregate accounting information and changes in election expectations. Unlike most studies in economics and political science, which use actual elections outcomes at the presidential level and afford researchers very few observations, I leverage election futures prices from political prediction markets. Specifically, I use changes in Iowa Electronic Markets (IEM, formerly Iowa Political Stock Market) consensus expectations to proxy for changes in expected voter preferences. The IEM provides daily price data on the market's election expectations for the 1992–2016 presidential campaigns. This substantially increases the number of available observations over both public opinion surveys and realized electoral results, potentially allowing for more precise statistical inferences.

The IEM offers a number of advantages beyond additional data points. First, scholars have found that prediction market prices generate accurate forecasts of eventual election outcomes (Berg, Nelson, & Reitz, 2008; Rhode & Strumpf, 2004; Rothschild, 2009). In contrast with public opinion polling, which indicates voter intentions at a particular point in time, prediction markets provide expectations about what will happen on election day.[2] Also, by reflecting consensus expectations about future outcomes, the IEM possesses certain parallels with capital markets. For instance, prediction market prices should efficiently incorporate all information in public polling plus private information from experts and political economy models (Kou & Sobel, 2004).[3] Thus, the theoretical value of turning to a market-based alternative to opinion polls is fairly straightforward – the prospect of arbitraging away the money of relatively uninformed traders attracts politically sophisticated users to the market who ensure market prices reflect the best estimate of the probability of a given election outcome (Roberts & Werner, 2014). The market price not only incorporates information of the traders, it also

[1] In 1992, campaign strategist James Carville coined a slight variation of the phrase "it's the economy, stupid." At that time, Carville was attempting to emphasize the importance of the struggling economy in then-candidate Bill Clinton's 1992 presidential campaign.

[2] In 1988, Gallup polling following the Democratic National Convention gave Governor Michael Dukakis a 17-point lead over Vice President George H.W. Bush, a lead far greater than conventional wisdom or the fundamentals would have indicated. (Bush would later win the election by about seven percentage points.) In isolation, polling provides snapshots in time (although polling certainly has predictive value). Prediction markets should, in theory, see beyond any transitory "bounces" or biases in polling data.

[3] Some scholars have highlighted the drawbacks of the IEM including overestimation of likelihood of unlikely events (i.e., bias towards losers) or demographic bias of market participants. For example, Forsythe et al. (1992) shows that the individuals who participate in these markets are more likely to be white, higher income, conservative, and Republican. Forsythe et al. (1999) also shows that traders in these markets tend to invest in the candidate or party they support. However, in spite of evidence that many traders invest in their favorites, these individuals do not drive the market. Instead, the market price is strongly influenced by a group of "marginal traders" with no preference bias in their portfolios. Marginal traders invest twice as much as average traders, making prices rather than taking them. Forsythe et al. (1999) shows that these traders correct imbalances that may be related to preference-oriented investment and helps explain why market prices across several elections do not exhibit a particular partisan bias.

assigns more weight to high quality information.

The use of IEM data enables mapping of aggregate earnings measures to changes in election probabilities. Hence, the second portion of my study examines how monthly aggregated earnings information correlates with monthly changes in market expectations about the incumbent party's probability of electoral success. Overall, univariate results attest to a positive association between aggregate earnings measures and changes in expected voter preferences. This result is consistent with the view that economic optimism (pessimism) helps (hinders) the incumbent party's election chances. My findings further imply that aggregate earnings capture news related to macroeconomic activity of concern to voters.

Yet several factors potentially attenuate the association between aggregate earnings measures and changes in expected voter preferences. Kothari et al. (2006) and Cready and Gurun (2010) document a negative association between contemporaneous aggregate earnings surprises and stock returns, suggesting that aggregate earnings convey discount rate news. In multivariate tests, empirical specifications controlling for changes in the price-earnings (PE) ratio are used to isolate the potentially offsetting impacts of discount rate news from cash flow news when assessing voters' economic concerns. Furthermore, one could argue that stock returns are a timelier source of information than earnings. Yet, more so than earnings, stock prices have timing implications extending far beyond the immediate time horizon of concern to voters. Equity prices are also more likely to be affected by investors' expectations about anticipated election outcomes.[4] Nevertheless, I show that the election-relevant information content of aggregate earnings measures is incremental to that of the monthly return on the S&P 500 index. Overall, multivariate empirical specifications confirm that cash flow news appears to drive the positive association between changes in election expectations and earnings news.

This study contributes to the growing literature on aggregate accounting information and has potential implications for the political economy literature on determinants of voter choice. Importantly, this is the first attempt to link these two distinct literatures. Although prior economics and political science research documents a correlation between economic conditions and electoral outcomes, few attempts have been made to link accounting information with electoral outcomes.[5] Moreover, there has there been an attempt at articulating the benefits of accounting information over other macroeconomic fundamentals within such a context. Relatedly, my study is the first to introduce accounting elements into analyses explaining and understanding election expectations. This paper reinforces the call by Ball and Sadka (2015) to address research topics that "note that accounting earnings, viewed as an economic variable, possesses several research advantages."

In addition, my work is the first to document the determinants of changes in the consensus expectations of political prediction markets. Prior studies use prediction market expectations in deriving forecasts of expected final election outcomes (Rothschild, 2015). Others use prediction market prices as explanatory variables, to proxy for uncertainty in the underlying political or policy environment (Goodell & Bodey, 2012). My examination is the first to provide empirical support on the effects of economic conditions on continual changes in prediction market prices using similarly high frequency data on economic/accounting news.

Importantly, this paper does not attempt to predict presidential election outcomes. Instead, it attempts to document whether aggregate economic news affects *changes* in the expected outcomes of these elections. There are two reasons for this research design. First, the political science literature has made numerous attempts at forecasting voting outcomes with at best mixed success. The dynamics of individual election cycles (i.e., candidate quality, demographic shifts, coalition changes, etc.) make designing a generalizable vote prediction model difficult and beyond the scope of a paper emphasizing the usefulness of accounting information. Second, the presidential election cycles covered in this study (1992–2016) were close campaigns (Democrats averaged 52% of the two-party vote share and Republicans 48%). Thus, undertaking the different approach of examining how accounting news is correlated with shifts in sentiment regarding an election outcome has important consequences over this period, since the implications of this news can impact the incumbent party's chances of winning the election even while their actual vote share is ultimately affected by only tenths of a percentage point.

The remainder of the paper is organized as follows. Section 2 summarizes relevant prior literature and presents theoretical justifications for the predicted association between expected voter preferences and accounting information. Section 3 describes the data sources and variable definitions to be used in subsequent analyses. Section 4 summarizes empirical tests and results. And, finally, Section 5, concludes.

2. Theoretical framework and hypothesis

2.1. Macroeconomic voting

At least at the presidential level, there is general agreement in the economics and political science literatures that aggregate economic considerations frequently impact voters' prospective and retrospective evaluations of candidates. These literatures present evidence of a robust correlation between economic outcomes and voters' decisions to retain incumbent party officeholders. Simply observing conditions surrounding even the earliest presidential elections would indicate that such a finding is both rationally and theoretically logical.

Nevertheless, Fair's (1978) seminal work on presidential vote choice in the U.S. is the first to empirically and theoretically frame "economic voting" as being driven by utility maximization. This implies that voters support the incumbent party if the utility associated with that party exceeds the utility associated with the opposition. Simplistically, utilities are based on some set of readily observable prior outcomes or future projections, which voters use to infer useful information about unobservable post-election outcomes (Hibbs, 2006). Utility maximization implies that voters will support the incumbent party if observed or actual contemporaneous outcomes are viewed as more favorable in comparison to what the opposition's unobserved performance would likely have been or will be if elected (Wolfers, 2007). Future expectations about the utility acquired from the election of a particular candidate are conditioned by the combination of cumulative and prospective evaluations voters form about each party's candidate over time. Simply put, a voter who feels they are or will be better off financially, or who sees the nation as a whole as better off, will reward the incumbent party's candidate.[6]

Unfortunately, identifying with specificity which macroeconomic fundamentals voters consider to be relevant has been a challenge, given the dangers of overfitting statistical models and heterogeneous economic concerns surrounding various elections. Some studies rely on real GDP growth, others on income growth, and others on subjective surveys

[4] Bowes (2018) finds that election uncertainty (as reflected in IEM prices) leads to greater volatility in stock market prices.

[5] To date, Moss and Wang (2021) is the only related study in this space. They document a positive association between earnings growth reported in the earnings announcements made prior to the November election (i.e., the September 30th announcements) and the odds stock owners will cast a vote for the incumbent party.

[6] Frequently absent from this framework is the idea that voter's opportunity set includes more than a choice between two rival candidates or parties. For instance, voters can, and many do, simply chose not to vote.

(Abramowitz, 2008; Campbell, 2008; Campbell & Garand, 2000; Holbrook, 1996). In all, researchers have thousands of plausible economic variables to choose from.[7] Unfortunately, many of these variables in isolation exhibit only modest, and, at times, inconsistent associations with actual election outcomes.

Making broad inferences about the appropriateness of specific fundamental variables is difficult when the proxies being used are noisy and tested against very few observations. Most studies on presidential elections are limited to seventeen post-World War II observations. Thus, researchers must avoid overfitting empirical models. Consequently, many empirical models appear as if the researcher has searched for variables that best "fit" the data, or used ad hoc statistical transformations to achieve the best "fit" with the data (Erikson & Wlezien, 2008b).

Finally, measures of fundamental economic conditions are fraught with noise and/or calculated with a reasonable degree of measurement error.[8] Many popular economic variables are subject to revisions that can occur months or years after the fact and be economically significant.[9] Furthermore, many fundamental indicators are not reported in a timely fashion and are thus lagging as opposed to leading gauges of macroeconomic health. For instance, GDP is updated once per quarter even though economic downturns or upturns are often evident long before quarterly indicators are finally reported and available for input into econometric models. Other timelier fundamentals, such as the unemployment rate, have implications for just a small number of voters, are subject to frequent revision, and, again, tend to be lagging rather than leading indications of economic activity.

Overall, this literature lends robust but flawed empirical and theoretical support to preconceived notions that macroeconomic conditions are an essential determinant of a particular candidate's electoral fortunes. Still, examination of any statistical association between macroeconomic conditions or expectations and electoral outcomes would benefit from timely, higher frequency proxies for both constructs.

2.2. Accounting information and the macroeconomy

A segment of the accounting literature emphasizes how aggregate accounting information simultaneously functions as a timely record of prior performance and a leading indicator of future macroeconomic performance. This association is perhaps unsurprising given the dominant role of the private sector in the overall U.S. economy. Although accounting numbers tend to be thought of as a general recording of past business transactions and events and are, thus, predominantly historical, this retrospective property of accounting numbers still has important macroeconomic implications. Current or prior accounting performance provides leading indications about future economic performance because it exposes real events in firms. Current firm profitability indicates the profitability of future investments in property, plant and equipment, research and development, and human resources for the firm itself and for its competitors, suppliers, and other firms (Ball & Sadka, 2015; Kothari, Shivakumar, & Urcan, 2013). Corporate earnings also indirectly affect firms' capital investments in the economy. Increases in corporate profitability result in lower lending risk and, consequently, greater investing due to a reduction in financing frictions and an increase in the availability of funds from financial institutions (Hennessy, Levy, & Whited, 2007; Lewellen & Lewellen, 2016).

At the aggregate level, Kothari et al. (2006) documents that earnings surprises are negatively correlated with contemporaneous stock market returns. This relation is consistent with aggregate earnings expectations signaling movement in future discount rates that appears to subsume shocks to expected future cash flows in aggregate stock returns. This finding, along with corroborating findings of Shivakumar (2007) and Cready and Gurun (2010), suggest that aggregate earnings convey inflation news.

Empirical evidence on the macroeconomic information content of aggregate accounting news extends beyond the inflation news component of earnings surprises. A number of studies expound on the associations between earnings information and overall economic health. Patatoukas (2021) notes that the macroeconomic content of aggregate earnings surprises is not solely isolated to errors in GDP deflator forecasts, which capture inflation news, but extends to errors in real GDP growth forecasts. Konchitchki and Patatoukas (2014a) predicts and finds that aggregate accounting earnings growth is a leading indicator of future GDP growth, given that corporate taxable income is one component of GDP. Furthermore, aggregate earnings seem to provide incremental predictive value over other macroeconomic indicators. Another study by Konchitchki and Patatoukas (2014b) shows that aggregated corporate profitability has value when predicting real GDP growth. This predictive value does not appear to be subsumed by stock market returns, suggesting that corporate performance is incrementally useful in forecasting real economic activity. Finally, Gallo et al. (2016) finds that aggregate earnings growth can predict future changes in inflation and unemployment but reports mixed evidence regarding real GDP growth.

However, realized accounting numbers are not the only source of macroeconomic information. Earnings forecasts and guidance also contain economic news. Bonsall, Bozanic, and Fischer (2013) presents findings suggesting that earnings guidance from a few "bellwether" firms provides timely macroeconomic information. Moreover, this information is not isolated to a particular industry and seems to contain shocks to the broader economy. However, identifying which macroeconomic indicators drive the information being conveyed by earnings guidance is an empirical question (Ogneva, 2013). Hess and Kreutzmann (2009) provides evidence that six macroeconomic indicators significantly impact analysts' earnings forecast revisions. Correspondingly, upward revisions in economic activity lead to significant upward revisions of analysts' earnings projections. These results provide evidence that analysts rationally incorporate macroeconomic information into their forecasts. Lastly, Choi et al. (2016) tests whether analysts forecast revisions reflect the overall macroeconomy. The authors document a statistical association between forecast revisions and the macroeconomic indicators of GDP growth and changes in industrial production. Collectively, their findings suggest that forecast revisions are correlated with overall macroeconomic activity.

If, as this stream of literature suggests, aggregate earnings information contains properties reflective of past, current, and future macroeconomic performance, then aggregate earnings expectations should provide insights into voter utility and choice. I extend the literature on aggregate accounting information by predicting that the incumbent party's likelihood of electoral success is positively associated with contemporaneous aggregate earnings news, in particular the cash flow news component of aggregate earnings.

From an empirical perspective, accounting information has a number intrinsic properties making it reflective of voter concerns. First and perhaps most importantly, accounting information potentially serves as

[7] In fact, the Federal Reserve's Web site now publishes about 45,000 economic statistics (https://www.fdlp.gov/all-newsletters/community-insights/1323-fred).

[8] Justin Wolfers documents a GDP specific "first-quarter effect," in which first quarter GDP exhibits "by far" the weakest growth. This occurs despite the use of a seasonal adjustment algorithm which should produce no systematic differences in one quarter versus the others. This gives some indication that there may in fact be issues with the government's computation of GDP figures (https://www.nytimes.com/2015/04/24/upshot/why-you-cant-put-faith-in-reports-of-first-quarter-economic-slumps.html).

[9] In one recent instance, the GDP growth in the second quarter of 2015 was revised to 3.7%, up from the initial estimate of growth at a 2.3% clip. These severe revisions can potentially turn a quarter that was originally thought to provide average growth in to a recession, or vice versa (https://www.reuters.com/article/us-usa-economy/u-s-second-quarter-gdp-growth-revised-sharply-higher-to-3-7-percent-idUSKCN0QW1IF20150827)

a comprehensive proxy of a number of different facets of economic activity.[10] Valuably, it is not simply that accounting information comprehensively reflects a number of economic concerns impacting voter choice, but that it does so in a timely fashion. For instance, accounting data (be it reported numbers or forecasted expectations) are released and/or revised at higher frequency than government reported statistics, thereby providing a timelier indication of what voters and more sophisticated observers of the economy are weighing in real time. Furthermore, because it can be hard to decipher which economic variables are most pertinent to voters in a particular election cycle, it is empirically advantageous to have a variable that comprehensively aggregates a number of potential voter concerns rather than arbitrarily selecting one. Thus, the use of timely, high-frequency accounting data can yield important statistical insights, particularly when paired with high-frequency data on tracking election probabilities.

3. Data and variable construction

3.1. Political prediction markets

Flexibility in market design structures has aided in formation and development of prediction markets. These markets exist to predict and provide payoffs on a variety of unknown future events, including sporting outcomes, economic outcomes, Hollywood events, and other general current events. These markets afford a number of advantages. At a minimum, sophisticated prediction markets meet the standards of weak-form efficiency by rapidly reflecting new information (Wolfers & Zitzewitz, 2004). Furthermore, attempts at manipulation appear to fail and few arbitrage opportunities appear to exist (Camerer, 1998; Rhode & Strumpf, 2004). Additionally, high publicity, high entertainment value markets, like political markets, have more information enabling (potential) investor disagreement (Wolfers & Zitzewitz, 2004).

One of the most prominent prediction markets is the Iowa Electronic Market (IEM), created and operated by the University of Iowa. During the 1992 presidential election, IEM introduced its winner-take-all (WTA) market. This market developed as an alternative to traditional public opinion surveys for the purpose of predicting election outcomes (Forsythe, Nelson, & Wright, 1992). These contracts are used to measure the consensus expectations about a particular candidate's likelihood of victory, and prices fluctuate in accordance with changes in those consensus expectations.[11] Under appropriate market efficiency assumptions, the value of a contract at a particular point in time should reflect the probability the candidate to whom the contract is linked will win the election (Roberts & Werner, 2014). Post-election, the winning candidate's contract is worth one dollar and the losing candidates' contracts are worth nothing.[12] Appendix B provides additional information on the IEM.

Beyond offering the compelling market incentives to correctly price likely election outcomes, the price data generated by the market is available on a daily basis. At the presidential level, this dramatically increases the number of available observations over public opinion surveys or actual election results, potentially allowing for more precise statistical inferences.

To discern the impact of aggregate earnings on electoral probabilities, I leverage this price data from the IEM WTA market. This market covers the 1992, 1996, 2000, 2004, 2008, 2012, and 2016 presidential elections. Because empirical analyses are conducted at the calendar month level, daily closing prices are used to compute the monthly percentage change (or return) in the incumbent president's party's probability of retaining the presidency from the beginning of the month to the end of the month.[13] Formally, the monthly change is computed as follows:

$$\Delta Prob\_Inc\_Win_t = \frac{Incumbent\ Party\ Price_t – Incumbent\ Party\ Price_{t-1}}{Incumbent\ Party\ Price_{t-1}}$$

3.2. Aggregate earnings measures

To assess the electoral-relevance of accounting information, I use two aggregate earnings proxies. These variables contain both retrospective and prospective economic implications. Both aggregate earnings constructs are imperfect as both measures include only earnings information of publicly traded companies. Although these companies tend to be bellwethers for private firms, the performance of non-public companies is likely to contain economic signals effecting voter utility. Appendix A discusses the rationale behind the use of accounting earnings over other accounting-based measures.[14]

3.2.1. Aggregate earnings expectations

I use aggregated revisions in analysts' forecasts as a measure of aggregate earnings expectations. These revisions potentially capture immediate pre- or post-election market-wide economic expectations. Additionally, forecast revisions are an attractive way to measure earnings news because they are timely with respect to news (Choi et al., 2016). This study focuses on earnings news derived from monthly consensus forecasts of one-year-ahead earnings. Whether the actual annual earnings are announced prior to election day or sometime thereafter, these analysts' forecasts reflect both realized prior information (in the sense that revisions impound the actual performance realizations of prior quarterly earnings numbers) and any revisions in response to changes in expected future market-wide conditions.

I obtain firm-level forecast data from the Institutional Brokers' Estimate System (IBES) summary file. In a specific month, I include a firm in the aggregate measure if it meets the following requirements: (i) the firm has recorded IBES data on the number of monthly shares outstanding, (ii) the firm has Compustat identifier information, (iii) the firm has a consensus earnings per share (EPS) forecast in the IBES summary file for the prior month to allow computation of monthly forecast revisions.

I follow an approach similar to the one employed by Choi et al. (2016): (i) To compute firm-level earnings expectations, the average firm-level EPS consensus forecasts for months *t* and *t-1* are multiplied by the number of shares outstanding from the prior month, *t-1*.[15] (ii) The sum across all the firms in the sample is computed to derive a market-wide earnings expectation for each month. Formally, (i) and (ii) yield the following:

$$\text{Aggregate Fct}_t = \Sigma\left(\text{Avg.Consensus EPS Fct}_{i,t}{}^{*}\ \text{Shares Outstanding}_{i,t-1}\right)$$

[10] It is true that certain macroeconomic fundamentals tend to move in tandem (such as economic growth and unemployment) and, thus, the need to control for multiple economic fundamentals is perhaps somewhat redundant. However, during the recent economic crisis and corresponding election cycles, some of the traditional associations have not held (Erikson & Wlezien, 2012).

[11] These contracts operate under the assumption that investors are generally risk-neutral as the sums wagered in prediction markets are typically small. Given the small amounts wagered, it is reasonable to assume that investors are averse to any idiosyncratic risk involved (Wolfers & Zitzewitz, 2004).

[12] The IEM has a $500 limit on individual investments

[13] Due to potential noise in IEM daily prices and to afford significant time for the incorporation of relevant accounting information, changes are computed using the average of the incumbent party candidate's daily closing prices for the last week of month *t* and the first week of the following month, *t + 1*.

[14] Empirical associations and the "election relevance" of aggregate earnings figures could, potentially, be improved by focusing on aggregated accounting information for those industries of high salience to voters. However, given heterogenous concerns across election cycles and lack of ex ante methods of selecting voter relevant industries, analyses in this paper consider all applicable firms regardless of industry.

[15] Results are quantitatively and qualitatively similar if the median consensus forecast is substituted for the average consensus forecast.

$$\text{Aggregate Fct}_{t-1} = \Sigma\left(\text{Avg.Consensus EPS Fct}_{i,t-1}{}^{*}\ \text{Shares Outstanding}_{i,t-1}\right)$$

(iii) The month-to-month percentage change in market wide expectations is computed to measure forecast revisions. The process is as follows:

$$Fct\_Revision_t = \frac{Aggregate\ Fct_t - Aggregate\ Fct_{t-1}}{Aggregate\ Fct_{t-1}}$$

3.2.2. Change in aggregate earnings

I employ a measure of aggregate realized earnings news using quarterly earnings before extraordinary items available from Compustat. Unfortunately, sample composition resulting from the clustering of earnings periods (around March, June, September, and December quarter ends) constricts time-series analyses and leads to a sample of firm performance that is potentially unrepresentative of the broader economic concerns facing voters. To rectify this issue, I construct a monthly measure of firm-level earnings using linear interpolation of firm's quarterly earnings figures. At the firm level, I follow a linear interpolation method identical to the one used in earnings data compiled by Robert Shiller.[16] Linear interpolation unfortunately requires "look ahead" to the subsequent quarter to derive interpolated figures. Since my concern is with documenting associations between aggregate earnings shocks and retrospective election expecations and not predicting election outcomes, I do not believe this "look ahead" is much of a detriment in my setting. After generating monthly firm-level earnings estimates, the sum across all the firms in the sample is computed to derive a measure of aggregate earnings for each month. Finally, I calculate the monthly percentage change in aggregate-level earnings as follows:

$$\Delta Earnings_t = \frac{Earnings_t - Earnings_{t-1}}{Earnings_{t-1}}$$

3.3. Macroeconomic indicators

The first portion of my study documents an association between aggregate accounting measures and future changes in economic performance. To facilitate comparisons, all associations are examined using monthly data on several economic indicators defined below.[17] The rationale behind the selection of these indicators is twofold. First, many of these indicators are weighted heavily by investors and economists when gauging the country's economic performance and forming expectations about future governmental monetary policy. These indicators also reflect different aspects of the economy without much overlap. Second, prior academic election models frequently use a number of these indicators in empirical analyses.

3.3.1. Unemployment

The civilian unemployment rate represents the number of unemployed as a percentage of the labor force and is published monthly by the U.S. Bureau of Labor Statistics (BLS). It is often argued that voters choose the candidates and officeholders best suited to "create jobs." Consequently, researchers often turn to the change in the election year unemployment rate to explain election outcomes at both the national and state level (Hibbs, 1986; Kramer, 1971).

3.3.2. Inflation

Prices have implications on citizens' demand for goods and consumption, making inflation one of the most visible economic measures, particularly given its influence on monetary policy. Therefore, I use the year-over-year percent growth in Consumer Price Index released by the BLS in a particular month. The CPI is indicative of both prices paid by consumers and the buying habits of these consumers. Importantly, food and fuel prices, which are particularly salient to voters, are reflected in the CPI. This measure has been used as an explanatory variable in some of the most notable election models and also can exhibit a generally strong correlation with political outcomes (Fair, 1996).

3.3.3. Industrial production

The industrial production index is the government's broadest measure of output in manufacturing and related fields like mining, electric, and gas. It is generally timed well to the business cycle and is compiled on a monthly basis by the Board of Governors of the Federal Reserve System. The index brings attention to short-term changes in industrial production and measures movements in production activity and fundamental developments in the macroeconomy.

3.3.4. Personal income

Personal income reflects the different income streams coming to voters. It includes income received in wages and bonuses from employment, stock dividends, and rental income. Personal income is reported on a monthly, seasonally-adjusted basis by the U.S. Bureau of Economic Analysis (BEA). When forced to choose an economic indicator, many researchers opt to use this variable in election models given its documented statistical power (Hibbs, 1986; Kramer, 1971; Peltzman, 1987; Wolfers, 2007).

3.3.5. Consumer confidence

I use the Michigan Consumer Confidence Index as a prospective measure of citizens' economic sentiment. This index is calculated monthly by the Michigan Consumer Research Center. It is based on survey responses of 500 telephone participants to questions about participants' current and prospective financial and economic well-being. Electoral studies using this measure show that prospective personal finances are a statistically significant predictor of presidential vote intention (Lewis-Beck & Stegmaier, 2000).

3.3.6. Gross domestic product

Reported by the BEA, real GDP is a key summary statistic of overall economic activity and traditionally the most important variable in analyses of economic growth (Konchitchki & Patatoukas, 2014a). As such, it is also commonly used by researchers in election prediction models (Erikson, 1990; Fair, 1978). Like earnings, GDP is generated on quarterly basis. Thus, to permit comparisons with aggregate earnings and IEM prices, monthly GDP estimates are generated using a linear interpolation method analogous to the one used to generate monthly earnings figures.

3.4. Other variables

3.4.1. Price-earnings ratio

The PE ratio divides the company's share price by the company's annual earnings. My study relies on data on composite price from the inflation-adjusted Standard and Poor's (S&P) Composite Stock Price Index divided by the corresponding ten-year trailing moving average of aggregate earnings of companies in the corresponding S&P index, as compiled by Robert Shiller. The PE ratio can be seen as a gauge of

[16] Shiller computes earnings figures using S&P four-quarter totals for the quarter since 1926, with linear interpolation to monthly figures. Available for download at http://www.econ.yale.edu/~shiller/data.htm. The use of Shiller's earnings figures in place of Compustat figures yields qualitatively similar (though statistically weaker) results. This study implements the same linear interpolation approach as Shiller on Compustat earnings (ibq). To generate next month's earnings figure, the current quarter is multiplied by 2/3 and the next quarter's figure is multiplied by 1/3. For two months ahead, the current quarter is weighted by 1/3 and next quarter gets a 2/3 weight.

[17] Time-series data on the monthly unemployment rate, consumer price index, industrial production index, and personal income were collected using the Federal Reserve Bank of St. Louis' Economic Research website (https://research.stlouisfed.org)

Table 1
Aggregate earnings and macroeconomic information.

Descriptive Statistics						
	N	Mean	Std. Dev.	p25	Median	p75
Fct_Revision$_t$	322	−0.01	0.01	−0.01	−0.01	0.00
ΔEarnings$_t$	322	0.00	0.48	−0.04	0.00	0.04
Unemployment$_t$	322	6.06	1.55	4.90	5.60	6.90
ΔUnemployment$_t$	322	0.00	0.16	−0.10	0.00	0.10
Inflation$_t$	322	2.49	1.32	1.68	2.60	3.18
ΔInflation$_t$	322	−0.01	0.41	−0.21	−0.01	0.20
Ind_Prod$_t$	322	89.38	13.54	78.51	93.60	100.61
ΔInd_Prod$_t$	322	0.12	0.58	−0.15	0.17	0.46
Personal_Income$_t$	322	51.26	8.73	42.80	51.66	57.98
ΔPersonal_Income$_t$	322	0.09	0.39	−0.02	0.10	0.20
Consumer_Sent$_t$	322	86.44	12.54	77.30	88.40	94.20
ΔConsumer_Sent$_t$	322	−0.01	4.07	−2.40	−0.20	2.30
GDP_Growth$_t$	322	0.00	0.00	0.00	0.00	0.00

This table presents summary statistics on aggregate accounting measures and future levels or changes in economic output. The sample period covers January 1990 to October 2016. *Fct_Revision*$_t$ equals the monthly percentage change in aggregate analyst forecasts. *ΔEarnings* is the monthly percentage change in aggregate-level earnings. *Unemployment* is the monthly level in the unemployment rate. *ΔUnemployment* is the monthly change in the unemployment rate. *Inflation* is the monthly level in year-over-year percent growth in CPI. *ΔInflation* is the monthly change in year-over-year percent growth in CPI. *Ind_Prod* is the monthly level in the industrial production index. *ΔInd_Prod* is the monthly change in the industrial production index. *Personal_Income* is the monthly level in real personal income. *ΔPersonal_Income* is the monthly change in real personal income. *Consumer_Sent* is the monthly level in the Michigan Consumer Confidence Index of citizens' economic sentiment. *ΔConsumer_Sent* is the monthly change in the Michigan Consumer Confidence Index of citizens' economic sentiment. *GDP_Growth* is the monthly change in real Gross Domestic Product.

expectations that incorporates assessments of both future risk and future growth rates. Monthly movements in PE ratios reflect variation in discount rates, which embed both risk premiums and growth opportunities and reflect the cash-flow and earnings generating capacity of firms. Using Shiller's data, I compute the monthly change in PE ratio to proxy for discount rate news (Campbell, Polk, & Vuolteenaho, 2010; Pettit & Westerfield, 1972). I use the change in the PE ratio to isolate discount rate news from cash flow news when assessing voters' economic concerns.

3.4.2. Monthly stock returns

A convincing argument can suggest that equity prices are a preferable source of economic information than earnings when trying to assess "macroeconomic voting." However, returns may endogenously reflect market expectations about anticipated election results. This type of endogeneity is less of a concern when using one-year ahead aggregate earnings forecasts (or some similar measure) as the policy impacts from the election of a particular candidate are unlikely manifest in immediate earnings realizations. Also, stock prices likely reflect expectations about future cash flows for periods extending far beyond the president's four-year (or even eight-year) term in office. Nevertheless, I control for the information content of shocks to equity prices. To do so, my main regressions use the CRSP S&P 500 monthly index return.[18]

3.4.3. Changes in presidential approval ratings

Many studies geared to forecasting election outcomes include presidential approval ratings as a regressor (Abramowitz, 1988; Erikson, 1990). Approval ratings and other poll readings of voter sentiments provide information on the electorates' attitudes about the incumbent President, their party, and candidates in elections. Furthermore, changes in these ratings correspond to shocks in voters' assessment of

[18] Results are also robust to the use of equal- or value-weighted monthly index returns on the NYSE.

Table 2
Aggregate earnings and macroeconomic information

Pearson correlations among accounting measures and future economic outcomes

		1		2		3		4		5		6		7		8		9		10		11		12		13		14
1	*Fct_Revision*$_t$	1.00																										
2	*ΔEarnings*$_t$	0.31	***	1.00																								
3	*ΔUnemployment*$_{t+1}$	−0.36	***	−0.14	**	1.00																						
4	*ΔUnemployment*$_{t+2}$	−0.31	***	−0.13	**	0.15	***	1.00																				
5	*ΔInflation*$_{t+1}$	0.27	***	0.19	***	−0.11	*	−0.13	**	1.00																		
6	*ΔInflation*$_{t+2}$	0.17	***	0.05		−0.03		−0.11	*	0.38	***	1.00																
7	*ΔInd_Prod*$_{t+1}$	0.37	***	0.25	***	−0.35	***	−0.30	***	0.12	**	0.07		1.00														
8	*ΔInd_Prod*$_{t+2}$	0.32	***	0.23	***	−0.27	***	−0.35	***	0.17	***	0.12	**	0.24	***	1.00												
9	*ΔPersonal_Income*$_{t+1}$	0.08		0.01		−0.07		−0.04		−0.20	***	−0.05		0.14	**	0.04		1.00										
10	*ΔPersonal_Income*$_{t+2}$	0.19	***	0.11	**	−0.25	***	−0.07		−0.05		−0.20	***	0.09	*	0.14	**	−0.14	**	1.00								
11	*ΔConsumer_Sent*$_{t+1}$	−0.03		−0.04		−0.04		−0.11	*	−0.19	***	−0.01		−0.07		0.10	*	0.10	*	0.10	*	1.00						
12	*ΔConsumer_Sent*$_{t+2}$	−0.08		0.01		−0.05		−0.05		−0.06		−0.19	***	0.11	**	−0.07		−0.01		0.10	*	−0.03	1.00					
13	*GDP_Growth*$_{t+1}$	0.29	***	0.20	***	−0.29	***	−0.32	***	0.06		0.14	**	0.47	***	0.45	***	0.11	**	0.11	**	0.08	0.11	*	1.00			
14	*GDP_Growth*$_{t+2}$	0.23	***	0.20	***	−0.23	***	−0.29	***	0.03		0.06		0.41	***	0.47	***	0.16	***	0.11	**	0.08	0.08	0.08	0.81	***	1.00	

This table presents bivariate correlations between aggregate accounting measures and future levels or changes in economic output. The sample period covers January 1990 to October 2016. Fct_Revisiont equals the monthly percentage change in aggregate analyst forecasts. ΔEarnings is the monthly percentage change in aggregate-level earnings. Unemployment is the monthly level in the unemployment rate. ΔUnemployment is the monthly change in the unemployment rate. Inflation is the monthly level in year-over-year percent growth in CPI. ΔInflation is the monthly change in year-over-year percent growth in CPI. Ind_Prod is the monthly level in the industrial production index. ΔInd_Prod is the monthly change in the industrial production index. Personal_Income is the monthly level in real personal income. ΔPersonal_Income is the monthly change in real personal income. Consumer_Sent is the monthly level in the Michigan Consumer Confidence Index of citizens' economic sentiment. ΔConsumer_Sent is the monthly change in the Michigan Consumer Confidence Index of citizens' economic sentiment. GDP_Growth is the monthly change in real Gross Domestic Product. ***, **, and * indicate two-tailed statistical significance at the 1%, 5%, and 10% levels, respectively.

presidential performance, which may or may not relate to corresponding economic events. For example, scandal or war-induced deterioration of presidential support would be reflected in approval rating polls.[19]

4. Results

This section discusses my empirical findings on the association between aggregate accounting information, macroeconomic indicators, and changes in anticipated election outcomes.

4.1. Aggregate accounting measures and future macroeconomic information

The first set of tests documents whether accounting information is a timely indicator of future macroeconomic activity. The purpose of these test is to provide preliminary support for the two aggregate earnings constructs used in the main analyses. Namely, that these constructs are in fact leading indicators of macroeconomic information. To match the measurement and frequency of the accounting measures, I test these associations using economic indicators available on a monthly basis. Specifically, aggregate accounting measures calculated in month t are associated with future monthly economic performance in $t + k$, where $k = \{1,2\}$. The sample period is January 1990 to October 2016. I choose this time period to overlap with subsequent electoral analyses that cover the 1992 to 2016 presidential campaigns. It also ensures that the lower quality IBES data of earlier time periods is excluded from the analyses.

Table 1 presents summary statistics for the 322 monthly observations. In Table 2, I present summary correlations to determine if there are consistent patterns and relations among the two measures of aggregate earnings news and the six economic indicators. Generally, correlations are in the expected direction. Accounting information is negatively associated with future unemployment. Also, accounting information is negatively associated with changes in consumer sentiment, although these unpredicted correlations lack significance. Accounting measures are generally positively related to future inflation, industrial production, and personal income. Finally, aggregate earnings measures display a positive association with monthly percentage change in GDP. Overall, the aggregate earnings forecast revision measure tends to exhibit stronger statistical relations with future economic activity then the aggregate earnings change variable.

To further examine the informativeness of accounting measures on future economic activity, I test whether aggregate accounting measures are associated with the six economic indicators for one-month or two-month ahead horizons using the following regression model:

$$\Delta Econ_{t+k} = \delta_0 + \delta_1 \Delta Acc_t + \delta_2 \Delta Econ_t + \mu \quad (1)$$

where ΔAcc_t is the current aggregate accounting measure, represented by either monthly percentage change in earnings forecasts or monthly growth in aggregate earnings, $Econ_t$ is the current monthly level or change in the specific macroeconomic indicator, $Econ_{t+k}$ is the monthly future level or change in the specific macroeconomic indicator, where $k = \{1, 2\}$.

These models use ordinary least squares regressions and I base my statistical inferences on Newey and West (1987) heteroskedasticity- and autocorrelation-consistent standard errors. This procedure is an appropriate choice for this setting because it accounts for heteroskedasticity and time-series correlation in the residuals. Following Konchitchki and Patatoukas (2014a), I set the lag length for the Newey and West (1987) procedure equal to the integer portion of $T^{0.25}$, where T is the number of observations used in the regressions. Because there are 322 observations in these regressions, I set the lag length equal to four.

Table 3 reports results using the changes specification in Eq. (1).[20] Results are generally consistent with the univariate evidence and corresponding predictions. Panel A of Tables 3 reports that aggregate earnings forecast changes are significantly negatively associated with future unemployment changes. Panel B of Table 3 reports that aggregate forecasts revisions are significantly positively related to future inflation changes. In Panels A and B, aggregate change in earnings displays just marginal significance in the predicted direction. In Panel C, both measures show a positive and significant association with future changes in industrial production. Relatedly, the earnings variables are positively related to two-month ahead change in real personal incomes (Panel D). Associations between changes in future consumer sentiment and aggregate earnings measures have the opposite of the predicted sign (Panel E). For the change in earnings measure, this association is significant in the t + 2 specification. Finally, Table 3, Panel F, reports the association between aggregate earnings and future GDP growth. Aggregate earnings variables display no statistical relation with GDP growth.[21]

Collectively, these empirical findings indicate that current aggregate earnings are a timely reflection of different facets of future macroeconomic conditions. This does not necessarily imply that accounting information is predictive of any one economic indicator or characteristic. However, it does show that aggregate earnings numbers capture information about broader economic performance. As a result, earnings information may serve as a timely, comprehensive reflection of the economic conditions voters observe around them, conditions that potentially influence voters' preferences for one candidate over another.

4.2. Aggregate earnings expectations and changes in voter preferences

Given that aggregate earnings correlate with future economic outcomes, this section explores the contemporaneous association between aggregate earnings measures and market assessments of voters' support for incumbent party presidential candidates. If, as prior literature indicates, voters' preferences are influenced by aggregate economic conditions, then changes in aggregate earnings should be positively related to changes in the incumbent party's probability of victory. To test this association, I use monthly changes in IEM WTA contracts on the incumbent party's probability in retaining the presidency. These contracts cover seven election cycles from 1992 to the 2016 campaign.

Table 4 reports summary statistics for the 101 monthly observations used in this analysis. On average, there is no month-to-month decline in the incumbent party's likelihood of victory (median 0.01). For the sample months, the mean change in PE ratio is −0.07 (median 0.11). The average monthly S&P 500 index return is zero (median 0.01). The mean and median change in monthly earnings forecast revisions are −0.01. Relatedly the average monthly change in aggregate realized earnings is −0.02 (median 0.00). On average, the incumbent president's monthly approval rating does not change. Finally, averages of monthly changes in five of the six economic indicators for this 101-month sample are similar to those reported in Table 1 for the much larger sample. The exceptions are changes in consumer confidence, which is significantly more negative for this sample (mean of −0.17 versus mean of −0.01 for the larger sample) and industrial production (mean of 0.02 versus mean of 0.12 for the larger sample).

I provide univariate evidence of an association between contemporaneous aggregate earnings and changes in IEM prices in Table 5. The correlation between the forecast revision variable and election

[19] Approval data is hand collected using Real Clear Politics (www.realclearpolitics.com)

[20] Results using levels of a specific economic variable as opposed to changes are qualitatively similar, though statistical associations are often weaker.

[21] The R-squared values reported in Table 3 are quite high. This is an artifact of controlling for the lagged values of each economic characteristic. Prior research, such as Choi et al. (2016), documents similarly high explanatory values.

Table 3
Regressions of future changes in macroeconomic information on aggregate earnings.

	Prediction	ΔUnemployment$_{t+1}$				ΔUnemployment$_{t+2}$			
Panel A: Association between aggregate accounting measures and future changes in unemployment (monthly)									
Fct_Revision$_t$	−	−4.06	***			−2.87	***		
		(0.00)				(0.00)			
ΔEarnings$_t$	−			−0.04	*			−0.03	
				(0.06)				(0.17)	
ΔUnemployment$_t$	+	0.02		0.13	*	0.17	***	0.25	***
		(0.77)		(0.08)		(0.01)		(0.00)	
Intercept	?	−0.03	***	−0.00		−0.02	**	−0.00	
		(0.00)		(0.86)		(0.03)		(0.87)	
Adj. R^2 (%)		12.4%		3.1%		11.5%		7.1%	
N		322		322		322		322	
Panel B: Association between aggregate accounting measures and future changes in inflation (monthly)									
Fct_Revision$_t$	+	4.44	**			5.89	***		
		(0.01)				(0.00)			
ΔEarnings$_t$	+			0.06				0.06	*
				(0.11)				(0.09)	
ΔInflation$_t$	+	0.32	***	0.35	***	−0.11	*	−0.06	
		(0.00)		(0.00)		(0.07)		(0.37)	
Intercept	?	0.03		−0.01		0.03		−0.01	
		(0.28)		(0.79)		(0.21)		(0.67)	
Adj. R^2 (%)		15.5%		14.1%		2.9%		0.0%	
N		322		322		322		322	

	Prediction	*ΔInd_Prod$_{t+1}$*				*ΔInd_Prod$_{t+2}$*			
Panel C: Association between aggregate accounting measures and future changes in industrial production (monthly)									
Fct_Revision$_t$	+	14.23	***			10.78	***		
		(0.00)				(0.00)			
ΔEarnings$_t$	+			0.27	***			0.23	***
				(0.00)				(0.00)	
ΔInd_Prod$_t$	+	0.12		0.21	*	0.19	***	0.25	***
		(0.27)		(0.08)		(0.01)		(0.00)	
Intercept	?	0.21	***	0.10	**	0.18	***	0.09	***
		(0.00)		(0.02)		(0.00)		(0.01)	
Adj. R^2 (%)		14.5%		10.0%		12.8%		10.9%	
N		322		322		322		322	
Panel D: Association between aggregate accounting measures and future changes in personal income (monthly)									
Fct_Revision$_t$	+	2.51	*			5.41	***		
		(0.09)				(0.01)			
ΔEarnings$_t$	+			−0.01				0.08	***
				(0.83)				(0.01)	
ΔPersonal_Income$_t$	+	−0.14		−0.14		−0.10		−0.08	
		(0.39)		(0.40)		(0.25)		(0.38)	
Intercept	?	0.12	***	0.10	***	0.14	***	0.10	***
		(0.00)		(0.00)		(0.00)		(0.00)	
Adj. R^2 (%)		2.0%		1.3%		3.8%		1.2%	
N		322		322		322		322	

	Prediction	ΔConsumer_Sent$_{t+1}$				ΔConsumer_Sent$_{t+2}$			
Panel E: Association between aggregate accounting measures and future changes in consumer sentiment (monthly)									
Fct_Revision$_t$	+	−9.32				−22.91			
		(0.60)				(0.19)			
ΔEarnings$_t$	+			−0.37				0.08	
				(0.33)				(0.81)	
ΔConsumer_Sent$_t$	+	−0.03		−0.03		−0.11	**	−0.11	**
		(0.66)		(0.67)		(0.04)		(0.03)	
Intercept	?	−0.08		−0.01		−0.18		−0.01	
		(0.76)		(0.96)		(0.47)		(0.96)	
Adj. R^2 (%)		−0.1%		0.0%		1.2%		0.6%	
N		322		322		322		322	

(*continued on next page*)

Table 3 (*continued*)

	Prediction	ΔConsumer_Sent$_{t+1}$				ΔConsumer_Sent$_{t+2}$			
Panel F: Association between aggregate accounting measures and future changes in GDP (monthly)									
Fct_Revision$_t$	+	0.01				0.01			
		(0.16)				(0.32)			
ΔEarnings$_t$	+			0.00	***			0.00	***
				(0.01)				(0.00)	
GDP_Growth$_t$	+	0.79	***	0.80	***	0.60	***	0.60	***
		(0.00)		(0.00)		(0.00)		(0.00)	
Intercept	?	0.00	***	0.00	***	0.00	***	0.00	***
		(0.00)		(0.00)		(0.00)		(0.00)	
Adj. R^2 (%)		65.0%		65.1%		37.5%		38.0%	
N		322		322		322		322	

This table presents the estimation of Eq. (1) on the associations between future changes in economic output and aggregate accounting measures. The sample period covers 1990–2016. *Fct_Revision$_t$* equals the monthly percentage change in aggregate analyst forecasts. *ΔEarnings* is the monthly percentage change in aggregate-level earnings. *ΔUnemployment* is the monthly change in the unemployment rate. *ΔInflation* is the monthly change in year-over-year percent growth in CPI. *ΔInd_Prod* is the monthly change in the industrial production index. *ΔPersonal_Income* is the monthly change in real personal income. *ΔConsumer_Sent* is the monthly change in the Michigan Consumer Confidence Index of citizens' economic sentiment. Standard errors are estimated using Newey-West adjustment for autocorrelation. In parentheses, *p*-values are presented. *GDP_Growth* is the monthly change in real Gross Domestic Product. ***, **, and * indicate two-tailed statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 4
Aggregate earnings, macroeconomic information, and changes in the probability of incumbent party victory in U.S. Presidential Elections.

Descriptive Statistics						
	N	*Mean*	*Std. Dev.*	*p25*	*Median*	*p75*
ΔProb_Inc_Win$_t$	101	0.00	0.11	−0.04	0.01	0.06
Fct_Revision$_t$	101	−0.01	0.01	−0.01	−0.01	0.00
ΔEarnings$_t$	101	−0.02	0.16	−0.06	0.00	0.03
ΔPE$_t$	101	−0.07	0.84	−0.30	0.11	0.49
Return$_t$	101	0.00	0.04	−0.02	0.01	0.02
ΔApproval$_t$	101	0.00	0.02	−0.01	0.00	0.01
ΔUnemployment$_t$	101	−0.01	0.15	−0.10	0.00	0.10
ΔInflation$_t$	101	−0.01	0.39	−0.18	−0.01	0.19
ΔInd_Prod$_t$	101	0.02	0.65	−0.29	−0.01	0.37
ΔPersonal_Income$_t$	101	0.08	0.35	−0.05	0.09	0.19
ΔConsumer_Sent$_t$	101	−0.17	3.69	−2.50	−0.50	2.50
GDP_Growth$_t$	101	0.00	0.00	0.00	0.00	0.00

This table presents summary statistics of the aggregate earnings news and election variables. The sample period covers the 1992, 1996, 2000, 2004, 2008, 2012, and 2016 presidential elections. *ΔProb_Inc_Win$_t$* is the monthly change in the probability of incumbent party victory compiled using Iowa Electronic Market winner-take-all contracts. *Fct_Revision$_t$* equals the monthly percentage change in aggregate analyst forecasts. *ΔEarnings$_t$* is the monthly percentage change in aggregate-level earnings. *ΔPE$_t$* equals the monthly change in price-earnings ratio derived from data reported on Robert Shiller's website. *Return$_t$* is the monthly index return on the S&P 500. *ΔApproval$_t$* is the monthly change in the incumbent president's average approval rating. *ΔUnemployment$_t$* is the monthly change in the unemployment rate. *ΔInflation$_t$* is the monthly change in year-over-year percent growth in CPI. *ΔInd_Prod$_t$* is the monthly change in the industrial production index. *ΔPersonal_Income$_t$* is the monthly change in real personal income. *ΔConsumer_Sent$_t$* is the monthly change in the Michigan Consumer Confidence Index of citizens' economic sentiment. *GDP_Growth$_t$* is the monthly change in real Gross Domestic Product.

expectations is positive and significant with a Pearson correlation of 0.33. The correlation between changes in realized earnings and IEM probabilities is 0.49. These correlations are consistent with the hypothesis that positive earnings news improves the incumbent party's reelection chances. Changes in expected voter preferences are also strongly positively related to discount rate news (or changes in the PE ratio) and monthly stock returns. This indicates that decreases in discount rates positively impact the incumbent party's election chances. Since earnings convey news about cash flows and discount rates, the relation between the cash flow innovations and expected voter preferences may be attenuated due to the countervailing effects of discount rate news. As such, I turn to multivariate tests controlling for the impacts of discount rate news and other factors.

To examine the relevance of aggregate earnings expectations on election probabilities, I estimate the following general model:

$$\Delta Prob\_Inc\_Win_t = \beta_0 + \beta_1 \Delta Acc_t + \beta_2 Controls + \varepsilon \quad (2)$$

where ΔAcc_t represents the aggregate accounting measure. This model is estimated (i) using only the Acc_t variable, (ii) using the Acc_t and ΔPE_t variables, (iii) using the Acc_t and $Return_t$ variables (iv) using Acc_t, ΔPE_t, and $\Delta Approval_t$ variables, and (v) using Acc_t, $Return_t$, and $\Delta Approval_t$ variables. Because monthly data is likely to exhibit autocorrelation, statistical inferences are based on the use of robust standard errors which are clustered by election cycle.

Table 6 reports all results from the estimation of Eq. (2). Column 1 of Panel A regresses the change in monthly probability of incumbent party victory, *ΔProb_Inc_Win$_t$*, on changes in contemporaneous aggregate earnings forecasts, *Fct_Revision$_t$*. The coefficient on *Fct_Revision$_t$* is positive and marginally significant and corroborates univariate findings reported in Table 5. Aggregate earnings expectations alone appear to explain just over 10 % of the variation in prediction market expectations. Column 2 of Panel A controls for the potential countervailing effects of discount rate news. The coefficient on the discount rate news proxy is, as predicted, positive and significant implying that voters respond adversely to increases in inflation. Importantly, after controlling for news on discount rates, the coefficient on the aggregate earnings expectations variable remains positive and marginally significant, suggesting that cash flow news is associated with expected voter preferences.

Column 3 of Panel A in Table 6 adds a control for the contemporaneous monthly index return on the S&P 500. The coefficient on the stock return variable is positive and significant. However, the aggregate forecast revisions appear to convey incremental information above the information content reflected in returns as the *Fct_Revision$_t$* variable remains significantly positive. Finally, Columns 4 and 5 of Panel A include changes in the incumbent president's approval rating. This regressor is designed to capture the electorates' attitudes about the incumbent President and their party. Any growth in approval rating is likely to reflect voters' appraisal of presidential response(s) to events both within and outside the president's control, which may or may not relate to shocks to economic conditions. In Panel A, this variable is positive and significant. However, the introduction of this variable does not impact the significance or direction of the coefficients on the *Fct_Revision$_t$*, *ΔPE$_t$*, or *Return$_t$* variables. Panel B of Table 6 reports results using realized

Table 5
Aggregate earnings, macroeconomic information, and changes in the probability of incumbent party victory in U.S. Presidential Elections.

Pearson correlations among aggregate earnings, election, and economic variables

	1	2	3	4	5	6	7	8	9	10	11
1 ΔProb_Inc_Win $_t$	1.00										
2 Fct_Revision $_t$	0.33 ***	1.00									
3 ΔEarnings $_t$	0.49 ***	0.36 ***	1.00								
4 ΔPE $_t$	0.41 ***	0.16	0.37 ***	1.00							
5 Return $_t$	0.37 ***	0.19 *	0.37 ***	0.75 ***	1.00						
6 ΔApproval $_t$	0.27 ***	0.06	0.23 **	0.16	0.16	1.00					
7 ΔUnemployment $_t$	−0.14	−0.08	−0.22 **	−0.17 *	−0.19 *	0.12	1.00				
8 ΔInflation $_t$	0.15	0.05	0.23 **	0.03	0.06	−0.07	0.05	1.00			
9 ΔInd_Prod $_t$	0.07	0.16	0.01	0.00	0.10	0.06	−0.15	0.11	1.00		
10 ΔPersonal_Income $_t$	−0.07	0.10	−0.03	0.19 *	0.16	0.00	0.02	−0.35 ***	0.04	1.00	
11 ΔConsumer_Sent $_t$	0.16	0.14	0.20 **	0.25 **	0.09	0.12	−0.15	−0.13	−0.26 ***	0.05	1.00
12GDP_Growth $_t$	0.27 ***	0.31 ***	0.45 ***	0.35 ***	0.41 ***	0.16	−0.39 ***	0.00	0.47 ***	0.08	0.07

This table presents bivariate correlations between variables. The sample period covers the 1992, 1996, 2000, 2004, 2008, 2012, and 2016 presidential elections. $\Delta Prob\_Inc\_Win_t$ is the monthly change in the probability of incumbent party victory compiled using Iowa Electronic Market winner-take-all contracts. $Fct\_Revision_t$ equals the monthly percentage change in aggregate analyst forecasts. $\Delta Earnings_t$ is the monthly percentage change in aggregate-level earnings. ΔPE_t equals the monthly change in price-earnings ratio derived from data reported on Robert Shiller's website. $Return_t$ is the monthly index return on the S&P 500. $\Delta Unemployment_t$ is the monthly change in the unemployment rate. $\Delta Inflation_t$ is the monthly change in year-over-year percent growth in CPI. ΔInd_Prod_t is the monthly change in the industrial production index. $\Delta Personal\_Income_t$ is the monthly change in real personal income. $\Delta Consumer\_Sent_t$ is the monthly change in the Michigan Consumer Confidence Index of citizens' economic sentiment. GDP_Growth_t is the monthly change in real Gross Domestic Product. ***, **, and * indicate two-tailed statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 6
Regressions of monthly changes in the probability of incumbent party victory in U.S. Presidential Elections on aggregate earnings and controls.

	Prediction	(1)		(2)		(3)		(4)		(5)	
Panel A: Association between changes in expected voter preferences and aggregate earnings forecast revisions											
$Fct\_Revision_t$	+	3.63	*	2.98	*	2.96	**	2.89	**	2.88	**
		(0.08)		(0.06)		(0.04)		(0.04)		(0.03)	
ΔPE_t	+			0.05	***			0.04	***		
				(0.00)				(0.01)			
$Return_t$	+					0.92	**			0.83	**
						(0.01)				(0.01)	
$\Delta Approval_t$	+							1.19	*	1.22	**
								(0.08)		(0.05)	
Intercept	?	0.02	*	0.02	**	0.01	*	0.02	**	0.01	*
		(0.08)		(0.01)		(0.10)		(0.01)		(0.09)	
Adj. R^2 *(%)*		9.9%		22.0%		19.0%		25.1%		22.3%	
N		101		101		101		101		101	
Panel B: Association between changes in expected voter preferences and aggregate earnings growth											
$\Delta Earnings_t$	+	0.34	**	0.28	**	0.29	**	0.25	*	0.27	*
		(0.04)		(0.05)		(0.04)		(0.06)		(0.06)	
ΔPE_t	+			0.03	*			0.03			
				(0.09)				(0.11)			
$Return_t$	+					0.64	**			0.60	**
						(0.02)				(0.02)	
$\Delta Approval_t$	+							0.87		0.87	
								(0.12)		(0.11)	
Intercept	?	0.00		0.00		−0.00		0.00		−0.00	
		(0.90)		(0.77)		(0.85)		(0.87)		(0.72)	
Adj. R^2 *(%)*		23.0%		28.1%		26.5%		29.4%		27.8%	
N		101		101		101		101		101	

This table reports the estimation of Eq. (2) on the relation between changes in Iowa Electronic Market election expectations and aggregate earnings. The sample period covers the 1992, 1996, 2000, 2004, 2008, 2012, and 2016 presidential elections. The dependent variable in each regression is $\Delta Prob\_Inc\_Win_t$, the monthly change in the probability of incumbent party victory compiled using Iowa Electronic Market winner-take-all contracts. $Fct\_Revision_t$ equals the monthly percentage change in aggregate analyst forecasts. $\Delta Earnings_t$ is the monthly percentage change in aggregate-level earnings. ΔPE_t equals the monthly change in price-earnings ratio derived from data reported on Robert Shiller's website. $Return_t$ is the monthly index return on the S&P 500. $\Delta Approval_t$ is the monthly change in the incumbent president's average approval rating. Standard errors are clustered by election cycle. In parentheses, p-values are presented. ***, **, and * indicate two-tailed statistical significance at the 1%, 5%, and 10% levels, respectively.

monthly earnings changes, $\Delta Earnings_t$. Inferences related to election-relevance of aggregate earnings remain qualitatively similar to those reported in Panel A, although the discount rate news proxy is now insignificant when paired with changes in presidential approval, which is also insignificant. The explanatory power of realized earnings changes is also higher than that of the forecast revisions, with $\Delta Earnings_t$ alone explaining just over 23 % of the variation in prediction market expectations.[22]

Table 7 examines the incremental informativeness of aggregate earnings on prediction market expectations after controlling for changes in six economic statistics. In column 1, I regress changes in the probability of incumbent party victory on the six macroeconomic indicators excluding the aggregate earnings, change in PE, and stock return variables. The coefficient on change in inflation is statistically significant (the coefficient on GDP growth is significant if change in industrial production is omitted from the regression). This specification yields an adjusted R-squared value of 11.7%.

Columns 2 and 3 add the aggregate earnings forecast and change in aggregate realized earnings, respectively, as additional regressors to the specification in column 1. The coefficient on the forecast revision variable remains positive and significant indicating that, after controlling for changes in other facets of economic activity, aggregate earnings forecast information remains incrementally relevant in explaining changes in election probabilities, although change in realized earnings is no longer statistically significant. The explanatory power of the model is also improved, from 11.7% in column 1 to 17.1% and 21.6 in columns 2 and 3, respectively. Columns 4–7 add either the change in PE ratio or monthly index return to the model. In spite of the introduction of these variables, the aggregate earnings forecast news variable (and, in columns 4 and 5, the change in earnings variable) remains incrementally informative.

5. Additional tests

5.1. The 2016 election

As far as modern presidential campaigns are concerned, the 2016 presidential election was unique. Featuring historically unpopular candidates, the election often seemed to be dominated by both major candidates' personal statements and/or scandals as opposed to a more traditional debate of domestic and foreign policy issues. Thus, given the dynamics of the election, it is possible to argue that the impact of aggregate economic concerns on voter choice (and, relatedly, how extensively economic conditions are weighed by IEM investors over the course of the 2016 campaign) may be less pronounced than in prior election years. This may materially impact the previously reported empirical results given the sample size of the tests and the overall reliance of the sample composition on the 2016 election. On the other hand, the influence of economic concerns on voter choice in the 2016 election may not be so easily dismissed given that much of the post-election analysis has focused on voters' cultural and economic "anxieties" and the broader countervailing trend of increased economic optimism over the same time period (Sides, Tesler, & Vavreck, 2017).

To examine the influence of the 2016 election on my overall findings. I reexamine the findings documented in Section 4 after dropping observations pertaining to the 2016 election. Thus, the sample now includes just the 1992, 1996, 2000, 2004, 2008, and 2012 presidential elections. In doing so, the sample size is reduced from 101 monthly observations to 78 monthly observations. Table 8 reports correlations between aggregate earnings measures and changes in the expectation that the incumbent party will hold the White House. Correlations between earnings variables and IEM data are somewhat stronger when the 2016 election is excluded from the sample (0.39 versus 0.33 for the earnings forecast variable and 0.58 versus 0.49 for the change in earnings variable). In multivariate settings reported in Table 9, the reestimation of regressions contained in Table 6 shows that with the 2016 election is excluded, results remain qualitatively similar to those reported in the earlier tables. The coefficient on the aggregate earnings variables is positive and significant in all specifications. Interestingly, the significance of the coefficients and explanatory power of the regressions is higher when the 2016 campaign is excluded. This could result from a higher weight now placed on election cycles where economic concerns are particularly salient (e.g., 1992 and 2008). It may also comment on the increased focus/weight on the candidates' personal scandals in relation to voters' economic concerns on the 2016 elections (IEM probabilities, for instance, were significantly impacted by news related to Mrs. Clinton's email server and Mr. Trump's attitude towards women). Unreported tests reestimate Table 7 after dropping the 2016 election from the sample. Here, again, results are stronger than those reported in Table 7 as both aggregate earnings variables are positive and significant (significance levels from $p < 0.10$ to $p < 0.01$ depending on specification) when controlling for economic indicators in all specifications.

5.2. Monthly sample composition and changes in voter preferences

Depending on the election cycle, investors are afforded the opportunity to buy and sell shares on the IEM up to two years before a scheduled general election date. Given the inherent uncertainty regarding prevailing political and economic conditions so far in advance of the general elections, the IEM is often very thinly traded in the days and months prior to an election year. The main analyses shown in Section 4 includes all available IEM data irrespective of the month or year. If the market was active for that month-year period (e.g., June of 2015 – a non-election year data point), then that data is included in the sample. To eliminate the effects of these thinly traded, potentially noisy observations, I rerun tests after restricting the sample to monthly observations in the year of the general election only. In this period, the market is considerably more active and some uncertainty is resolved (e.g., eventual party nominees are usually identified by March of an election year). A consequence of the specification is reduced sample size (from 101 to 52 and from 78 to 42 if the 2016 election is excluded).

Unreported correlations between variables after confining the monthly sample to the year of the election are similar to those reported in Table 5. Notably, the correlations between changes in IEM probabilities and both aggregate earnings measures are higher after applying this restriction (0.39 for the aggregate earnings news variable and 0.59 for the change in aggregate earnings). Table 10 reports the results of reestimating the regressions reported in Table 6 on the relevance of aggregate earnings expectations on election probabilities for the constrained sample. The coefficients on both the earnings forecast revision and change in earnings variables remain positive and at least marginally significant. Importantly, in all cases, the explanatory power is higher than those for the corresponding specification reported in Table 6. Given the small sample size, these results should be interpreted cautiously, but seem to indicate that the implications of earnings/economic changes are weighed more heavily by market participants in the IEM's more active periods (the months leading up to the November election).

5.3. Firm composition and changes in voter preferences

It is likely that the performance of certain firms is more indicative of

[22] Using non-stationary time series data in basic time-series regression models may yield unreliable and spurious results. Because my empirical specifications rely on changes variables and graphical examination of the data does not indicate any obvious non-stationarity, I do not believe that empirical findings are spurious due to a non-stationary time-series. However, to alleviate concerns on this issue, I implemented an autoregressive integrated moving average (ARIMA) model of the specifications in Table 6. Untabulated results using this approach were statistically identical to the results reported in Table 6.

Table 7
Regressions of monthly changes in the probability of incumbent party victory in U.S. Presidential Elections on aggregate earnings, macroeconomic indicators, and controls.

Association between changes in expected voter preferences, aggregate earnings, and economic indicators														
	(1)		(2)		(3)		(4)		(5)		(6)		(7)	
$Fct\_Revision_t$			2.86	**			2.79	**			2.71	**		
			(0.04)				(0.04)				(0.04)			
$\Delta Earnings_t$					0.28				0.25				0.25	
					(0.15)				(0.13)				(0.14)	
ΔPE_t							0.04	**	0.04	*				
							(0.03)		(0.07)					
$Return_t$											0.76	**	0.66	**
											(0.03)		(0.03)	
$\Delta Unemployment_t$	−0.06		−0.07		−0.04		−0.06		−0.03		−0.06		−0.03	
	(0.48)		(0.44)		(0.64)		(0.47)		(0.68)		(0.46)		(0.68)	
$\Delta Inflation_t$	5.12	**	4.46	***	1.74		3.10	*	0.98		3.31	***	1.04	
	(0.02)		(0.01)		(0.38)		(0.08)		(0.58)		(0.01)		(0.53)	
ΔInd_Prod_t	−0.01		−0.01		0.01		−0.00		0.01		−0.01		0.01	
	(0.60)		(0.49)		(0.72)		(0.92)		(0.50)		(0.73)		(0.60)	
$\Delta Personal\_Income_t$	−0.01		−0.02		−0.01		−0.04	**	−0.03	*	−0.03	***	−0.03	
	(0.67)		(0.20)		(0.49)		(0.04)		(0.07)		(0.01)		(0.10)	
$\Delta Consumer\_Sent_t$	0.00		0.00		0.00		0.00		0.00		0.00		0.00	
	(0.22)		(0.35)		(0.17)		(0.70)		(0.39)		(0.33)		(0.22)	
GDP_Growth_t	11.47		7.61		1.10		1.50		−2.97		2.24		−2.75	
	(0.18)		(0.40)		(0.93)		(0.88)		(0.78)		(0.82)		(0.81)	
$\Delta Approval_t$	1.45	**	1.46	**	1.02	*	1.26	*	0.90		1.27	**	0.89	
	(0.04)		(0.04)		(0.09)		(0.05)		(0.12)		(0.03)		(0.12)	
Intercept	−0.02	**	0.00		−0.00		0.02		0.01		0.01		0.00	
	(0.04)		(0.82)		(0.97)		(0.27)		(0.46)		(0.50)		(0.75)	
Adj. R^2 *(%)*	11.7%		17.1%		21.6%		24.8%		26.9%		22.0%		25.0%	
N	101		101		101		101		101		101		101	

This table reports the estimation of Eq. (2) on relation between changes in Iowa Electronic Market election expectations, aggregate earnings, and economic statistics. The sample period covers the 1992, 1996, 2000, 2004, 2008, 2012, and 2016 presidential elections. The dependent variable in each regression is $\Delta Prob\_Inc\_Win_t$, the monthly change in the probability of incumbent party victory compiled using Iowa Electronic Market winner-take-all contracts. $Fct\_Revision_t$ equals the monthly percentage change in aggregate analyst forecasts. $\Delta Earnings_t$ is the monthly percentage change in aggregate-level earnings. ΔPE_t equals the monthly change in price-earnings ratio derived from data reported on the website of Robert Shiller. $Return_t$ is the monthly index return on the S&P 500. $\Delta Unemployment_t$ is the monthly change in the unemployment rate. $\Delta Inflation_t$ is the monthly change in year-over-year percent growth in CPI. ΔInd_Prod_t is the monthly change in the industrial production index. $\Delta Personal\_Income_t$ is the monthly change in real personal income. $\Delta Consumer\_Sent_t$ is the monthly change in the Michigan Consumer Confidence Index of citizens' economic sentiment. GDP_Growth_t is the monthly change in real Gross Domestic Product. Standard errors are clustered by election cycle. $\Delta Approval_t$ is the monthly change in the incumbent president's average approval rating. In parentheses, p-values are presented. ***, **, and * indicate two-tailed statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 8
Aggregate earnings, macroeconomic information, and changes in the probability of incumbent party victory in U.S. Presidential Elections.

Pearson correlations among aggregate earnings, election, and economic variables (excluding 2016 election)												
	1	2	3	4	5	6	7	8	9	10	11	12
1 $\Delta Prob\_Inc\_Win_t$	1.00											
2 $Fct\_Revision_t$	0.39 ***	1.00										
3 $\Delta Earnings_t$	0.58 ***	0.55 ***	1.00									
4 ΔPE_t	0.43 ***	0.26 **	0.56 ***	1.00								
5 $Return_t$	0.41 ***	0.26 **	0.52 ***	0.74 ***	1.00							
6 $\Delta Approval_t$	0.27 **	0.12	0.19 *	0.20 *	0.21 *	1.00						
7 $\Delta Unemployment_t$	−0.19	−0.12	−0.31 ***	−0.24 **	−0.25 **	0.14	1.00					
8 $\Delta Inflation_t$	0.16	0.11	0.28 **	0.05	0.08	−0.04	0.06	1.00				
9 ΔInd_Prod_t	0.10	0.23 **	0.03	0.05	0.14	0.06	−0.18	0.07	1.00			
10 $\Delta Personal\_Income$	−0.07	0.06	−0.01	0.19 *	0.17	−0.01	0.04	−0.31 ***	0.10	1.00		
11 $\Delta Consumer\_Sent_t$	0.21 *	0.12	0.30 ***	0.29 **	0.12	0.13	−0.12	−0.11	−0.25 **	0.03	1.00	
12 GDP_Growth_t	0.28 **	0.40 ***	0.53 ***	0.37 ***	0.44 ***	0.17	−0.44 ***	0.04	0.51 ***	0.07	0.07	1.00

This table presents bivariate correlations between variables. The sample period covers the 1992, 1996, 2000, 2004, 2008, and 2012 presidential elections. $\Delta Prob\_Inc\_Win_t$ is the monthly change in the probability of incumbent party victory compiled using Iowa Electronic Market winner-take-all contracts. $Fct\_Revision_t$ equals the monthly percentage change in aggregate analyst forecasts. $\Delta Earnings_t$ is the monthly percentage change in aggregate-level earnings. ΔPE_t equals the monthly change in price-earnings ratio derived from data reported on Robert Shiller's website. $Return_t$ is the monthly index return on the S&P 500. $\Delta Approval_t$ is the monthly change in the incumbent president's average approval rating. $\Delta Unemployment_t$ is the monthly change in the unemployment rate. $\Delta Inflation_t$ is the monthly change in year-over-year percent growth in CPI. ΔInd_Prod_t is the monthly change in the industrial production index. $\Delta Personal\_Income_t$ is the monthly change in real personal income. $\Delta Consumer\_Sent_t$ is the monthly change in the Michigan Consumer Confidence Index of citizens' economic sentiment. GDP_Growth_t is the monthly change in real Gross Domestic Product. ***, **, and * indicate two-tailed statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 9
Regressions of monthly changes in the probability of incumbent party victory in U.S. Presidential Elections on aggregate earnings and controls – excluding 2016 election.

	Prediction	(1)	(2)	(3)	(4)	(5)
Panel A: Association between changes in expected voter preferences and aggregate earnings forecast revisions						
Fct_Revision $_t$	+	5.20 *** (0.01)	3.98 ** (0.03)	4.07 *** (0.01)	3.82 ** (0.02)	3.92 *** (0.01)
ΔPE $_t$	+		0.05 ** (0.02)		0.04 ** (0.03)	
Return $_t$	+			1.02 *** (0.00)		0.92 *** (0.00)
ΔApproval $_t$	+				1.05 (0.18)	1.06 (0.14)
Intercept	?	0.02 (0.12)	0.02 ** (0.03)	0.01 (0.21)	0.02 ** (0.02)	0.01 (0.17)
Adj. R ^{2} *(%)*		14.3%	24.9%	23.4%	26.6%	25.2%
N		78	78	78	78	78
Panel B: Association between changes in voter preferences and aggregate earnings growth						
ΔEarnings $_t$	+	0.49 *** (0.00)	0.42 *** (0.00)	0.42 *** (0.01)	0.40 *** (0.00)	0.41 ** (0.01)
ΔPE $_t$	+		0.02 (0.34)		0.02 (0.39)	
Return $_t$	+			0.45 (0.21)		0.38 (0.27)
ΔApproval $_t$	+				0.92 (0.19)	0.92 (0.16)
Intercept	?	0.01 (0.70)	0.00 (0.67)	0.00 (0.90)	0.00 (0.70)	0.00 (0.92)
Adj. R ^{2} *(%)*		32.5%	33.3%	34.6%	33.2%	34.4%
N		78	78	78	78	78

This table reports the estimation of Eq. (2) on the relation between changes in Iowa Electronic Market election expectations and aggregate earnings. The sample period covers the 1992, 1996, 2000, 2004, 2008, and 2012 presidential elections. The dependent variable in each regression is $\Delta Prob\_Inc\_Win_t$, the monthly change in the probability of incumbent party victory compiled using Iowa Electronic Market winner-take-all contracts. $Fct\_Revision_t$ equals the monthly percentage change in aggregate analyst forecasts. $\Delta Earnings_t$ is the monthly percentage change in aggregate-level earnings. ΔPE_t equals the monthly change in price-earnings ratio derived from data reported on Robert Shiller's website. $Return_t$ is the monthly index return on the S&P 500. $\Delta Approval_t$ is the monthly change in the incumbent president's average approval rating. Standard errors are clustered by election cycle. In parentheses, p-values are presented. ***, **, and * indicate two-tailed statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 10
Regressions of monthly changes in the probability of incumbent party victory in U.S. Presidential Elections on aggregate earnings and controls in the year of the presidential election.

	Prediction	(1)	(2)	(3)	(4)	(5)
Panel A: Association between changes in expected voter preferences and aggregate earnings forecast revisions						
Fct_Revision $_t$	+	4.76 * (0.10)	3.53 * (0.08)	3.22 * (0.08)	3.52 * (0.08)	3.12 * (0.07)
ΔPE $_t$	+		0.07 *** (0.00)		0.06 *** (0.00)	
Return $_t$	+			1.29 ** (0.02)		1.21 ** (0.02)
ΔApproval $_t$	+				1.23 (0.25)	1.48 (0.18)
Intercept	?	0.03 (0.19)	0.03 (0.13)	0.03 (0.16)	0.02 (0.25)	0.02 (0.33)
Adj. R ^{2} *(%)*		13.4%	30.5%	24.7%	31.7%	26.9%
N		52	52	52	52	52
Panel B: Association between changes in voter preferences and aggregate earnings growth						
ΔEarnings $_t$	+	0.41 *** (0.00)	0.31 *** (0.01)	0.33 ** (0.02)	0.28 ** (0.01)	0.30 * (0.05)
ΔPE $_t$	+		0.05 ** (0.02)		0.04 ** (0.03)	
Return $_t$	+			0.77 (0.12)		0.77 (0.13)
ΔApproval $_t$	+				0.88 (0.38)	1.00 (0.35)
Intercept	?	−0.01 (0.66)	−0.00 (0.98)	−0.01 (0.67)	−0.00 (0.91)	−0.01 (0.60)
Adj. R ^{2} *(%)*		30.9%	36.2%	33.2%	36.2%	33.5%
N		52	52	52	52	52

Note: This table reports the estimation of Eq. (2) on the relation between changes in Iowa Electronic Market election expectations and aggregate earnings. The sample period covers the 1992, 1996, 2000, 2004, 2008, 2012, and 2016 presidential election years. The dependent variable in each regression is $\Delta Prob\_Inc\_Win_t$, the monthly change in the probability of incumbent party victory compiled using Iowa Electronic Market winner-take-all contracts. $Fct\_Revision_t$ equals the monthly percentage change in aggregate analyst forecasts. $\Delta Earnings_t$ is the monthly percentage change in aggregate-level earnings. ΔPE_t equals the monthly change in price-earnings ratio derived from data reported on Robert Shiller's website. $Return_t$ is the monthly index return on the S&P 500. $\Delta Approval_t$ is the monthly change in the incumbent president's average approval rating. Standard errors are clustered by election cycle. In parentheses, p-values are presented. ***, **, and * indicate two-tailed statistical significance at the 1%, 5%, and 10% levels, respectively.

voter's economic concerns or sentiments. To explore how differences in sample compositions relate to monthly changes in expected voter preferences, I examine the relation between market prediction market prices and firms in the S&P 500 versus non-S&P 500 firms. *Ex ante*, one might expect a stronger association between S&P 500 firms and electoral preferences as these firms are likely to be major drivers of overall economic activity, and the accounting performance of these firms is likely indicative of the performance of similarly positioned smaller firms. In line with this expectation, in untabulated results for the 1992–2016 campaigns, I find that correlations between changes in expected voter preferences and S&P 500 firms are stronger than the correlation between non-S&P 500 firms and prediction market prices for both earnings variables. Multivariate tests also show that for both aggregate earnings measures, only S&P 500 firms display a positive and statistically significant association with changes in expected voter preferences. However, when analysis is restricted to the 1992–2012 campaigns the opposite effect is documented—the correlations between changes in expected voter preferences and non-S&P 500 firms is stronger than the correlation between S&P 500 firms and prediction market prices. Thus, the drivers of these different and inconsistent associations warrants further exploration.[23]

5.4. Political affiliation, incumbency, and changes and voter preferences

In untabulated tests, I examine the interactive role changes in aggregate earnings and incumbency and partisan affiliation of the incumbent president's party have on changes in expected voter preferences. The 1992, 1996, 2004, and 2012 election cycle are coded as

[23] It is possible that the S&P 500 has a higher composition of industries where performance may be less salient or "election relevant" to voters, such as financial services, healthcare, and technology firms. Furthermore, S&P 500 firms may be more geographically concentrated then the broader cross-section of firms. This statistical disparity may also explain the differences in explanatory power between the two earnings variables documented in the main tests, since firms with analysts following tend to be larger and these larger firms display a weaker statistical association with the likelihood of incumbent party retention.

Table 11
Regressions of three-month change in the probability of incumbent party victory in U.S. Presidential Elections on aggregate earnings and controls.

Prediction		(1)	(2)	(3)
.Panel A: Association between changes in expected voter preferences and aggregate earnings forecast revisions				
Fct_Revision $_t$	+			
ΔPE $_t$	+	5.35 **(0.04)	4.32 ** (0.03)	4.43 * (0.06)
Return $_t$	+		0.07 *** (0.00)	
Intercept	?			1.10 * (0.07)
		0.07 (0.11)	0.06 * (0.08)	0.06 (0.17)
Adj. R ^{2} *(%)*	12.1%	24.8%	18.9%	
N	87	87	87	
Panel B: Association between changes in voter preferences and aggregate earnings growth				
ΔEarnings $_t$	+	0.45 ** (0.02)	0.35 ** (0.02)	0.39 ** (0.02)
ΔPE $_t$	+		0.05 ** (0.01)	
Return $_t$	+			0.71 * (0.08)
Intercept	?	0.04 (0.23)	0.04 (0.16)	0.03 (0.24)
Adj. R ^{2} *(%)*		23.6%	29.1%	25.6%
N		87	87	87

This table reports the estimation of Eq. (3) on the relation between changes in Iowa Electronic Market election expectations and aggregate earnings. The sample period covers the 1992, 1996, 2000, 2004, 2008, 2012, and 2016 presidential elections. The dependent variable in each regression is $\Delta Prob\_Inc\_Win_{t/t-3}$, the change from month *t-3* to *t* in the probability of incumbent party victory compiled using Iowa Electronic Market winner-take-all contracts. $Fct\_Revision_t$ equals the monthly percentage change in aggregate analyst forecasts. $\Delta Earnings_t$ is the monthly percentage change in aggregate-level earnings. ΔPE_t equals the monthly change in price-earnings ratio derived from data reported on Robert Shiller's website. $Return_t$ is the monthly index return on the S&P 500. Standard errors are clustered by election cycle. In parentheses, p-values are presented. ***, **, and * indicate two-tailed statistical significance at the 1%, 5%, and 10% levels, respectively.

having a sitting incumbent president seeking reelection. I find no statistical evidence of an asymmetry between campaigns featuring an incumbent officeholder and those that do not, although an indicator variable for incumbency, in isolation, positively impacts the likelihood that the incumbent president will be reelected. Relatedly, I find no evidence that the political affiliation of the incumbent president has an interactive effect.

5.5. Informational efficiency of the Iowa electronic market

Since Beaver, Lambert, and Morse (1980), capital markets research in accounting has explored the informational efficiency of past equity prices with respect to earnings information (Kothari, 2001; Kothari & Sloan, 1992; Kothari & Zimmerman, 1995). These studies find that prices "lead" earnings because earnings are comprised of both surprise and stale components, the latter of which should already be reflected in equity prices (Collins, Kothari, Shanken, & Sloan, 1994; Kothari & Zimmerman, 1995). Whether the theoretical implications of this literature also extend to the elections futures market remains an open question. Therefore, to test the information efficiency of the IEM, I estimate the following regression model:

$$\Delta Prob\_Inc\_Win_{t/t-3} = \beta_0 + \beta_1 \Delta Acc_t + \beta_2 Controls + \varepsilon \quad (3)$$

where $\Delta Prob\_Inc\_Win_{t/t-3}$ is the percentage change from month *t-3* to *t* in the incumbent party candidate's IEM price. It should be noted that the sample size is smaller for these tests.

Table 11 presents results from the estimation of Eq. (3). In general, the results obtained show informational timeliness between returns in the IEM and aggregate earnings. Column 1 of Panels A and B shows that aggregate earnings measures retain the positive and significant association with the market's expectations regarding election outcomes for the longer return period. This finding remains robust to the introduction of either the changes in PE ratio or index return variables. In all, these results indicate that IEM traders appear to anticipate some of the economic information content contained in future aggregate earnings.

6. Conclusion

Documenting and understanding the determinants of voter choice is one of the most important tasks in social science research given the far-reaching economic and social consequences of elected officeholders on laws, regulatory oversight and policy. No study can comprehensively explain or predict something as variable and dynamic as voters' choice for president. But there can be little doubt that economic concerns influence voter decisions. Therefore, finding measures that capture a comprehensive cross-section of voters' economic concerns can yield important statistical insights on associations with electoral outcomes. My study provides the first empirical evidence of a positive association between aggregate earnings information and changes in election futures market expectations in presidential campaigns. As such, this suggests one setting in which aggregate earnings expectations advantageously convey timely, high-frequency "election-relevant" macroeconomic information compared to conventionally-used economic indicators. First, I show that aggregate accounting measures are correlated with multiple facets of future economic activity that potentially influence voters' perceptions of aggregate economic conditions. After establishing this relation, I use monthly changes in election prediction market probabilities to show that cash flow news appears to help drive the positive association between changes in election expectations and changes in earnings news.

This study is not immune to some of the criticisms levied against prior research. Although, through the use of the IEM, sample sizes have been greatly improved over those of similar studies, the number of observations remains small. This fact, coupled with noise in both accounting and IEM measures, means that I can only comment on the strong statistical associations between the two constructs and I make no assertions regarding causality. Moreover, as noted, these associations only capture the earnings information of publicly-traded companies and therefore are imperfect with respect to economic news. Nevertheless, these findings do provide insights and motivation for research linking voter choice with accounting information. Accounting studies traditionally examine the impact of the political environment on accounting information or regulation. My findings indicate that accounting is informative in the other direction, signifying that the broad macroeconomic information content of aggregate accounting information can be relevant in assessing expected voter preferences. Future studies can leverage this finding in similar settings.

Declaration of Competing Interest

None.

Data availability

Data will be made available on request.

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Appendix A. On the use of aggregate accounting earnings

It is possible to motivate and justify the use alternative accounting-based metrics of macroeconomic performance (in addition to aggregate earnings measures) likely to capture voters' attitudes/concerns about the economy or to be associated with voter utility. Many financial statement items conceivably proxy for management sentiment about the direction of either the broader macroeconomic environment or an industry's economic health. For example, the use of aggregate (or sectoral) changes in corporate investment, selling, general, and administrative, and research and development expenses are potential proxies for management's economic sentiment. Additionally, textual analysis techniques could be used to quantify changes in management's tone about the business environment. A tenuous motivation can justify simply investigating changes in the number of employees as reported by Compustat.

Perhaps the most intuitive alternative accounting-based metric is aggregate sales. Sales numbers reflect the performance of an industry, price-level activity as a whole, and the current state of the economy. Importantly, aggregate sales figures provide a gauge of personal consumption and, by extension, those voters' and nonvoters' economic sentiments. Relatedly, the productivity literature frequently emphasizes the concept of gross output rather than net output (i.e., value added). For example, idiosyncratic shocks to large, dominant firms can lead to nontrivial volatility at the aggregate level, thus effecting GDP (Gabaix, 2011). According to Hulten (1978), the general importance of firms and industries can be approximated by their sales. This reflects the fact that productivity growth in a firm generates an increase in the social value of all the inputs it uses. Firm sales are the proper statistic for that social value. However, the use of sales (or size) as a proxy for importance has limitations as sales values ignore potential “spill-over” effects from interconnected firms (Baqaee, 2018). Highly connected firms have nontrivial effects on economic output. A firm that may seem like a small player, when measured by sales, can have potentially large impacts on aggregate economic outcomes.

Related to the productivity literature, this paper strives to utilize measures that capture the total economic value created by firms. Advantageously, of the potential aggregated accounting-based measures, aggregated accounting earnings best reflect how value is created and economic wealth grows. The gains from this wealth theoretically flow to various parties, including the firm's employees, customers, and shareholders. Additionally, the most obvious support for the use of aggregate earnings measures to proxy for macroeconomic conditions is that tax-based corporate profits are a variable component of GDP.

Accounting earnings, viewed as an economic variable, possess several advantages. Among those advantages is that earnings shocks are better measures of current period shocks to production and demand (Ball & Sadka, 2015). Furthermore, real investment is correlated with both current and expected profitability, highlighting the role of earnings as an information variable in investment decisions. Importantly, the macro-accounting literature motivates the use of aggregate earnings-based measures. Although many of these studies are concerned with the earnings-return relation, the implications of these studies highlight the macro importance of aggregate earnings figures. That is, they emphasize how aggregate accounting earnings can be decomposed into news about aggregate cash flows and aggregate risk (discount rate), something that cannot be said of other accounting-based metrics. Both the cash flow and risk components are likely to be associated with voters' economic utilities.

Finally, many potential accounting metrics are reported on a similar basis (i.e., quarterly or annually). Thus, there does not appear to be a timeliness argument in favoring the use of other accounting metrics over earnings numbers. In fact, simply considering two variables, sales and earnings values, earnings forecasts are released at a higher frequency and in greater abundance than sales forecasts. In comparison to other accounting metrics, earnings are the timeliest and most prevalent metric (i.e., earnings numbers are often released or forecasted long before more granular financial statement items).

Appendix B. Political prediction markets

B.1. The Iowa electronic market (IEM)

The Iowa Electronic Market is a prediction market operated by the University of Iowa. These markets are small-scale, real-money futures markets where contract payoffs depend on the occurrence of certain economic and political events. The IEM is the oldest continuously running prediction market on politics in the U.S.

The IEM is open to traders worldwide. Traders can open accounts for $5 to $500. They then use their funds to buy and sell contracts. Traders therefore have the opportunity to profit from their trades but must also bear the risk of losing money. The IEM is operated as a not-for-profit venture. No commissions or transactions fees are charged, and the method of issuing contracts and making final payoffs on these contracts ensures that the IEM does not realize financial profits or suffer losses from market transactions.

The IEM launched a vote-share market in 1988. In 1992, it introduced a winner-takes-all (WTA) market. This type of market trades binary options which pay, for example, one dollar if the chosen candidate wins and nothing otherwise. Thus, an investor who pays $0.60 for a Democrat to Win contract, and holds the contract through Election Day, earns $0.40 if the Democrat wins and loses $0.60 if the Democrat loses. The trader should be willing to pay up to the price that equals their estimated probability of the Democrat winning the election. The market price is the value at which, if a marginal investor were willing to buy above it, investors would sell the contract and drive the price back down to that market price (and vice-versa if an investor were willing to sell below it); thus, the price is an aggregation of the subjective probability beliefs of all investors (Rothschild, 2009).

Fig. 1A reports daily prices for the IEM WTA market for the 2008 election campaign from August 2008 to November 2008. It illustrates how market prices react to both political (e.g., the Republican Convention) and economic events (e.g., the Lehman Collapse and Great Recession).

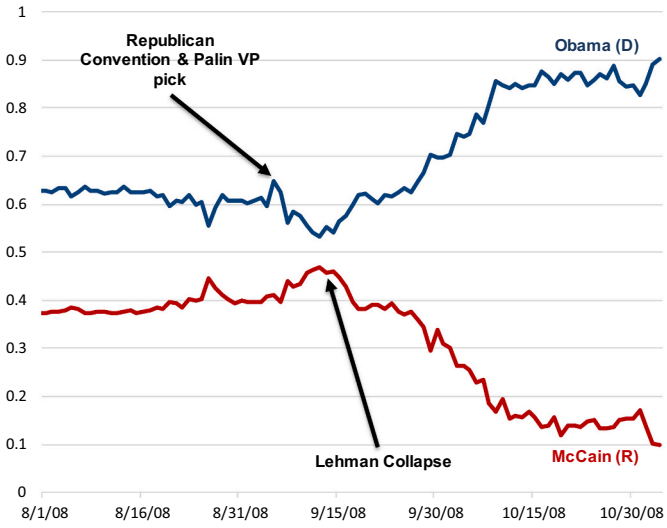

Fig. 1A. Iowa electronic market winner-take-all data from August 2008 through November 2008.

B.2. Advantages and biases of election futures markets' data

As noted, the IEM has a $500 limit on individual investments, potentially limiting efficiency of the market. Other comparable markets do not feature such dollar limitations. However, empirical evidence documents that these markets, regardless of structure, exhibit similar degrees of informational efficiency and accuracy. Researchers highlight the transaction and opportunity costs of investing in prediction markets. These studies document how investors in prediction markets behave as if they were risk-loving (Wolfers & Zitzewitz, 2006).

The WTA market tends to overestimate the degree to which unexpected or longshot events can overtake the market's expectation of the point spread. In other words, the market greatly overvalues longshots. For instance, throughout most of Bill Clinton's two victorious presidential campaigns, the Iowa market overestimated the Republican nominee's chance of catching up compared to what a reasonable interpretation of the election fundamentals would suggest (Erikson & Wlezien, 2008a).

Interestingly, the degree to which market prices deviate from the correct vote share or outcome varies from election cycle to election cycle. Prediction markets' worst performances tend to be concentrated in the early years. For the Iowa Electronic Market, in 1992, the WTA market's first year, the market waited for a Republican trend that never arrived. In tossup elections, whenever the poll projection wandered far from a tossup, the market price would typically be, correctly, more in the direction of an even split.

One might object to using election futures markets data due to a believe that it is subject to partisan or participant bias, because the universe of market participants is limited. The potential for partisan bias exists due to the demographic composition of market participants. For example, the individuals who participate in these markets are more likely to be white, higher income, conservative, and Republican (Forsythe et al., 1992). Also traders in these markets tend to be biased towards the candidate or party they support (Forsythe, Rietz, & Ross, 1999). However, a growing literature demonstrates that there is no partisan bias in the market price, suggesting that election futures markets are more reliable than polls for predicting election outcomes. For example, the election-eve IEM forecast has a lower mean prediction error than polls in fifteen elections for which data on both exist. Also, when comparing major poll predictions of U.S. Presidential election outcomes to prices in the prediction market, the IEM was closer to the election outcome 76% of the time and was not susceptible to predictable surges and declines that were observed in polling data (Berg et al., 2008). The literature on these markets suggests that futures prices are currently the best available data for measuring election expectations. Thus, given that market prices are informed by both polls and additional information beyond the polls, markets are effective for forecasting elections (Erikson & Wlezien, 2008a). Moreover, market participants can take into account other information that extends beyond the public's current period preferences. In fact, they have the incentive to do so.

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