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HOW PREDICTION MARKETS HELP US UNDERSTAND EVENTS` IMPACT ON THE VOTE IN US PRESIDENTIAL ELECTIONS[1]

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ABSTRACT

In this paper we argue that pre-election polls and prediction markets reflect two different processes which, by analyzing them together, can help us understand if and how key events which occur during an election campaign influence the final outcome. While polls can be seen as reflecting the voters' enlightening process towards realizing their vote preferences, prediction markets have this process incorporated into their prediction. We study the movements of weekly poll ratings and IEM market predictions and measure the impact selected events have on these in the run-up to the US 2004 and 2008 presidential elections. We conclude that the Swift Boat ad campaign in 2004 was an enlightening event which moved poll ratings in favor of President Bush, towards the level the IEM market had predicted already before the Swift Boat event. The financial crisis in 2008, on the other hand, was an enlightened event. It came as news to both market traders and poll respondents, sealing the victory for Obama.

INTRODUCTION

Can events that unfold during an election campaign really change the outcome on Election Day? Or are they merely part of an anticipated process where the outcome can be foreseen on beforehand? In this paper we try to answer this question by studying movements in poll ratings and in prediction market prices in the run-up to the 2004 and 2008 US presidential elections. We argue that poll ratings and market predictions reflect two distinct

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processes, and that by analyzing the two barometers in combination we may enhance our understanding about if and how events have an impact on the election result.

The paper starts with a theoretical discussion about the link between enlightening and enlightened events, poll ratings and prediction markets. It concludes with a typology with four categories which the events can fall into. Next, we introduce the events that are to be analyzed for the two elections, followed by a presentation of method and data. In the analysis we find that the Swift Boat Veterans ad campaign in 2004 was an event that helped Bush boost his poll ratings, while it did not affect the market predictions which already were lying at the level the polls later reached. In 2008 the financial crisis came as an unexpected shock into the election campaign and pushed both poll ratings and market predictions in disfavor of the incumbent Republican Party's candidate.

(a) Enlightening and enlightened processes

In their article "*Why Are Presidential Election Polls So Variable When Votes Are So Predictable*?", Gelman and King (1993) argue that election campaigns are enlightening processes which help the voters realize their political preferences. They support their argument by showing that the pre-election polls are more variable and inaccurate at the beginning of the election campaign while steadily becoming more accurate towards the end. There exist fundamental variables that "decide" the vote, but the voters are not aware of these variables at the start of the campaign. The role of the campaigning parties (and the media) is therefore to provide the information about these issues, so that "voters gradually improve their knowledge of their fundamental variables and generally have sufficient information by election day"(Gelman and King 1993: 435). Those with knowledge of these fundamental variables should hence be able to predict the movement of the voters several weeks or months in advance of the election.

Holbrook (1996) makes a similar argument as Gelman and King: Each presidential election has according to Holbrook an *equilibrium level* of support for presidential candidates. This equilibrium level resembles Converse's (1966) *normal election* in the sense that in each election there exists an outcome toward which the public is naturally predisposed (Holbrook 1996). This equilibrium outcome is believed to be a function of prevailing national conditions. The role of the campaigners is to generate information to the voters, so that they gradually increase their awareness of these national conditions. The equilibrium level is however not certain to be reached, because it presupposes an equally strong campaign by both parties. If a party launches a bad campaign, its candidate is likely to receive fewer voters than the equilibrium level indicates.

Exactly what these "fundamental variables" are is a source of dispute among researchers, but generally vote forecasting models include variables measuring the national state of the economy and political variables such as party/candidate incumbency (Lewis-Beck and Stegmaier 2000; Campbell 2005; Abramowitz 2008) and whether or not the country is at war (Fair 2002). The assumption is that while there is a stable party-loyal base, the change in the aggregate vote outcome from one American presidential election to another is a product of a few key variables. Based on empirical analyses of previous elections, researchers identify variables which ex post are able to explain the variance of the vote share on Election Day. The vote varies between elections, but it varies predictably according to the values on variables such as for example unemployment, GDP growth, war/peace and incumbency dummies.

But is it true that all shifts in opinion in the pre-election period are merely reflecting the voters' enlightening process towards their fundamental political preferences? Does not the unique context in which each election takes place influence the outcome? When Campbell, Converse, Miller, and Stokes (1966) introduced the concept of "the normal vote", they argued that the normal vote consists of both a long-term and a short-term component. The long-term component was a simple reflection of the distribution of underlying party loyalties, a distribution that is stable over substantial periods of time (Campbell et al. 1966)**.** On top of this baseline vote division there are short-term factors that also influence the voters' choices. For each specific election there may be current deviations from the norm, reflecting the voters' reactions to contextual circumstances such as the candidates' personalities or important events unfolding during the election campaign. The final vote is thus an interplay of basic dispositions and short-run influences (Campbell et al. 1966). In other words, the political preferences of the voters may change during the pre-election period not only as a result of an enlightening campaign which guides them towards their fundamental preferences; but also as a consequence of true preference changes connected to that particular election. Hence, before an election it is possible that voters undergo both an enlightening process steering them towards their fundamental preferences, as well as an "enlightened" process, in the meaning that voters acquire new, unique knowledge about the particular election which influences their vote decisions, but is not part of their enlightening process. Below we argue that these processes can be distinguished by analyzing poll ratings and election market predictions.

(b) Pre-election polls and prediction markets

Prior to an important election, polling activity normally increases substantially (Wlezien and Erikson 2002). The increased interest in polls in the period before an election comes from the belief that they have valuable information about how the election will turn out. Although some scholars stress that pre-election polls not are suited as prediction tools (Worcester 1996), they are used for that purpose by the media, scholars, and the industry itself (Berg et al. 2003; Buchanan 1986; Traugott 2001). In fact, the current polling methods had their break-through 70 years ago exactly because they were able to predict the 1936 US Presidential election better than the dominating methods at that time. However, pre-election polls measure the *current* political preferences among potential voters, not what they will vote on Election Day. Therefore, raw polls may not predict the outcome very well weeks ahead of an election, but can be a good tool to measure the voters' decision making process in the run-up to the election. [2]

Prediction markets, as defined by Berg, Forsythe, Nelson and Rietz (2001) are internet-based financial markets run with the purpose of using the information content in market values to make predictions about specific future events. The intention with these markets is to show the traders' best collective guess about the outcome of future events, in our case political election results. In these markets values of traded contracts depend directly on future outcomes and, hence, prices give information about these outcomes (Berg et al. 2001: 79).

Traders in a prediction market are participants who self-select into the market and have a direct economic motivation to obtain relevant information about the election. If they are to profit from their trades, they must be able to separate political news which is relevant to the election outcome from those that are not. If they possess unique information, or if they act upon new public information quicker than other traders do, they can make money in the prediction market. Equally important is the traders' ability *not* to react if the "news" is not relevant for the election, if the "news" is old news, or if its effect on the voters evaporates before they cast their vote. These are considerations respondents in polls do not – and are not supposed to – make. While pre-election polls might reflect the voters' perceptions at the time the respondents were surveyed, the events they react to in the campaign may not be the same events which in the end make a difference on the election result.

2 Though the question to what extent opinion polls actually reflect the views of the population they measure is well-known in social sciences (Croves 1989; Beck et al. 2006; Crespi 1988; Wlezien and Erikson 2002).

Both Shaw and Roberts (2000) as well as Kou and Sobel (2004) have previously argued for the benefits of analyzing prediction markets in relation to election campaigns. During the last years we have witnessed a rise in interest for this methodology also in political science, but few have utilized it for electoral research.[3] Kou and Sobel (2004) offer theoretical arguments that market prices will be more accurate in predicting election results than polls will, given the reasonable assumption that market traders are aware of the polls and use their information when trading in the prediction market. Their claim is supported by 20 years of empirical evidence that market predictions are more accurate than raw polls both in the long and short run (Berg et al. 2003, 2008). Shaw and Roberts used daily IEM winner takes all prices to study the effect of campaign events the last few months before the elections in 1992 and 1996. Prediction market prices are better suited to study campaign events, because "movement in the [IEM]… reflects the independent (non-predictable) impact of campaigning and campaign events." (Shaw 2000: 264). Within the frames of Gelman and King's characterization of campaigns, Shaw and Roberts assert that the movement of the market prices represents an enlightened process, as opposed to the enlightening process that the voters undergo.[4]

Polls and prediction markets thus reflect two distinct processes which yield different information from the pre-election period. By analyzing them together, we may learn how events influence the voters' choice on Election Day. Table 1 depicts the four categories an event can fall into. An event is classified as enlightening if it has an impact on the poll ratings but not on the market predictions. If the event impacts both poll ratings and market

[3] An exception is Malhotra and Snowberg (2011), who have used conditional market contracts to analyze the influence of primary and caucus results on the candidates' chances in the general election, and to assess whether or not states with early primaries have a disproportionate impact on the nomination process.

[4] Having said this, we acknowledge that what we are studying are the *traders'* perceptions of the candidates' likely vote share on Election Day. If the prediction changes from one day to another, all we know is that the traders then have changed their beliefs about the outcome. Since the only reference point for the predictions is the result on Election Day, it is not possible to determine for sure whether or not a movement of the market prediction at a given time point actually represents a true movement for the candidates' share of the popular vote. Likewise, it cannot be ruled out that the polls are in fact yielding better predictions than the prediction markets at any given moment. For example, if a poll 100 days before the election is five percentage points off from the election result and the market prediction is right on target the same day, we cannot rule out that the poll prediction was correct and the market prediction wrong at that moment, but that changes that took place the last 100 days altered the conditions for the candidates and modified the election outcome.

Table 1. Types of Events

		Market reaction?	
		Yes	No
Poll reaction?	Yes	Enlightened event	Enlightening event
	No	Early reaction by markets for enlightened event (Or error/manipulation)	Irrelevant event (or method unable to detect reaction)

predictions (in the same direction), then it is an enlightened event. If the event only has an impact on the market predictions, then the markets may react early to an event that is not reflected in the same way in the poll ratings, or the effect on the prediction is a market error/manipulation. If an event has no impact on either poll ratings or market predictions, then the event is irrelevant for the aggregate vote outcome.

THE TWO ELECTIONS – CONTEXTS AND EVENTS

The extensive literature on presidential voting focuses among other factors on the economy (Tufte 1978; Lewis-Beck and Stegmaier 2000; Erikson and Wlezien 2008) and incumbency (Abramowitz 2008; Holbrook 2008) as determinants of the election outcome. Whether or not the nation is at war is another factor in the literature (Hibbs 2000; Fair 2002). How these factors are operationalized varies, but the main findings suggest that a worsening economy hurts the incumbent candidate, that presidential incumbency favors the candidate but party incumbency does not, and that a "rally around the flag" effect is an advantage for the sitting president if he is candidate for the coming election. The events we have picked out for the two elections all deal with one or more of these three topics, as we will see below.

(a) 2004 Election

Though the Iraqi invasion in 2003 initially was a military success, the occupation thereafter did not go according to the Bush administration's plan. The troops seemed to have walked into a quagmire from which it was impossible to get out of, and opposition against the war (or at least the handling of it) was on the rise among American voters. The post 9/11 feeling of unity among the Americans was waning, and when the long campaign for his second term had started, George W. Bush had become a polarizing political figure. The 2004 election would therefore become a referendum on the incumbent president, and the theme would mainly circle around Iraq and other measures that the Bush Administration had initiated against terrorism. Two of the three events analyzed for this election deal directly with the Iraq war, while the third deals with the presidential candidates' credibility as a leader in war time.

The first event was an unforeseen event which exploded in the media. On April 29th 2004, pictures depicting American soldiers humiliating Iraqi prisoners in the Abu Ghraib prison were revealed. This was a great humiliation to the Iraqi people, and a tough pill to swallow for those who saw the American-lead troops as liberators rather than enemy occupying forces. The photos came at a time when the American-led coalition was struggling in Iraq and popular opinion was turning against the war.

The second event happened two months later with the handover of power to Iraq. What was supposed to be a moment of celebration for the president on June 30th instead once again turned the world media and the American voters' attention to a troublesome area for the President. Though the handover was handled in a low-key manner (and two days earlier than scheduled), the fierce critique of Bush, and his arguable lack of control with the situation in Iraq might have scored points for Kerry, who was in stark opposition to the Administration's handling of the occupation.

The third event deals with the Swift Boat Veterans. The Swift Boat Veterans were a group of Vietnam War veterans that through a series of ads – starting August 5 – called into question Kerry's accomplishments during the war in Vietnam (Caesar and Busch 2005). Among other accusations, they contested the legitimacy of the purple heart Kerry had received, and they generally discredited his effort in the military service. Before the Swift Boat Veterans entered the campaign, Kerry had strongly emphasized his service in Vietnam in an effort to show the voters that he was not the weak leader that his opponents suggested he was. He was now challenged on the core of his character, and this issue became the main topic in the media for weeks to come. Bush had the advantage of being the incumbent president, and the voters knew what they had in him, but did not know what they would get with Kerry.

(b) 2008 Election

The two events included in our analysis of the 2008 campaign are the selection of Sarah Palin as Republican Vice Presidential candidate, and the collapse of the Lehman Brothers bank. The Republican Party elected Senator John McCain, a moderate and experienced politician who had considerable experience from Washington but also could represent a change in direction from the Bush era. Up until Clinton's concession the campaign period had been dominated by the Democratic show-down, and McCain had struggled to get attention. This would however change on August 29th when the VP candidate was announced right before the Republican Convention were to take place in Minneapolis-St. Paul. The surprising selection was made in an effort to appeal to the base of the Republican Party, as well as to compensate for criticism against McCain's age (Caesar et al. 2009). Sarah Palin was however inexperienced with politics at the national level, and this became evident as she was exposed in the media. Even though Palin was new to national politics, she represented much of what was associated with the Bush administration.

In the background throughout the campaign period was the dire economic straits the US economy was moving into. With the collapse of the investment bank Lehman Brothers, it moved to the forefront of media and campaign attention. The collapse of Lehman Brothers signified in many ways the event when the U.S. and the world realized that the financial crisis that had lasted about a year was both broader and more severe than first thought. From being treated as an isolated crisis based on rotten American subprime loans, the financial downturn evolved into a discussion about the sustainability of the existing form of the market economy. It became clear that the growth in the U.S. – and to some extent the rest of the (mainly Western) world – for the past decade largely had been based on creative financial innovations that did not diminish risk as they were supposed to, but rather hid them behind a veil of financial packages. Subprime loans were split up and spread around the increasingly integrated world of finance, but no one new exactly where the rotten apples were. The result was a lack of confidence in the financial system as such. Though the realization of the magnitude of the crisis was an evolving process, the collapse of the reputed Lehman Brothers certainly marked a collective awakening about the scope of the economic problems that lay ahead. The date Lehman Brothers filed for bankruptcy, September 15th, 2008 marked the date when the voters realized that the financial crisis would turn into an economic downturn which would batter both Wall Street and Main Street in the years to come.

METHOD AND DATA

We analyze the impact of the events using weekly averaged observations of polls and market predictions in the campaign period of the two elections. Having weekly observation points allows us to track developments closely. Super Tuesday is usually the day when both candidates of the two major parties in effect have been nominated, and thus the start of the "long campaign"(Caesar and Busch 2005: 107-109). In 2004 this was March 2nd. In 2008, however, the Democratic nomination would last far longer than Super Tuesday, until June 5th. In order to maintain a sufficient number of observations, we nonetheless define both campaign periods as starting in the first week of March. Each of the series has 35 observations.

There are mainly two types of election markets: The vote share market, and the winner-takes-all market (WTA). The former is a market where the traders invest in their expectations of how big a share one of the candidates will receive of the popular vote (i.e. John McCain will get 48% of the votes). The latter is a market where the traders invest in the probability that one of the candidates will win the presidency (i.e. John McCains chances in becoming president is 40%). [5] In this study we prefer vote share market prices rather than winner-takes-all prices for two reasons. First, vote share prices are directly comparable to polls, as they both estimate the vote share of the competing candidates. Second, all other being equal, for each day the election approaches WTA prices should increase the probability of winning for the favorite candidate and decrease the probability of winning for the other candidate(s). This is so because the "window of opportunity" for unexpected events to occur steadily becomes narrower. Vote share prices on the other hand, remain put at the same level if no unexpected events occur. The time component which must be included in an analysis of WTA prices is not

[5] These two types of expectations should not be confused. There is not a fixed probability prediction attached to the predicted vote share level. If a trader believes that McCain is likely to get 48% of the popular vote, her estimated probability that he wins the election depends on how hard she thinks it would be for McCain to get from 48 per cent to above 50 per cent. In an election with many swing voters this achievement will be easier than in an election where the parties and the voters are very polarized, hence the probability that he will win will differ in these two contexts even though the vote share estimate is the same. Or, as Campbell et al. (Campbell et al. 1966: 22) put it; "responsiveness to short-term forces varies inversely with the strength of party identification."

necessary in an analysis of vote share prices, and therefore less complicated to use.

The data will be analyzed visually and statistically. We test whether any of our coded events have had an impact on the values of our weekly poll and market series. Our two models to be tested expressed in general terms as

$$Y_t = \alpha + \beta_1 Y_{t-1} + \beta_2 I_t + \varepsilon_t, \tag{1}$$

where α is a constant, Y_{t-1} is the dependent variable at time t_{-1}, I_t is the intervention variable, and ε_t is the noise component. For each event included in the analysis two dummy variables were created. One was a step function variable coding the week of the event and all subsequent events with the value 1 and the rest with the value 0. The other was a pulse function variable coding the week of the event with the value 1 and all other weeks with the value 0. This allows us to separate temporary effects from permanent effects. If a step function variable has a statistically significant effect on Y_t, the maximum magnitude of the permanent effect can be calculated as $\beta_2 / (1 - \beta_1)$.

The effect of each individual variable is analyzed controlling for the values of the observation point Y_{t-1}. The benefit of including the dependent variable's lagged value is that it controls for all unobserved effects already incorporated in the polls or market predictions and thus compensates for an underspecified model. This is an advantage in our situation where we have weekly observations which do not allow us to control for standard economic variables such as inflation and GDP growth. If any of our dummy variables have a statistically significant impact we therefore then know that this is new information which has been added to the poll ratings or market predictions at that specific observation point. Incorporating the lagged dependent variable also gives an indication of whether the series is non-stationary.

The Iowa Electronic Market (IEM) is the only prediction market which has publicly available data for the two elections we analyze, and therefore we use their vote share market data in the analysis. Their vote share market prices have been retrieved from their internet site http://www.biz.uiowa.edu/iem/. The IEM series for the two elections represent the weekly predictions of the two-party vote share for the incumbent party's candidates in 2004 and in 2008. Daily observations of the closing prices have been allocated into weekly averaged prices. Since the market by definition is a two-party race, the total should theoretically always sum up to 100 percent. Hence, the prices have not been standardized.[6]

[6] We shall later see that this assumption is not empirically supported for all observations.

All opinion poll data for the 2004 election are collected from the internet sites of the pollster magazine Polling report, 170 polls in total. [7] Pollingreport.com is partly free of use and open for everybody. Presented there are all the major national polls and each poll's exact question wording. Data for 2008 were retrieved from the site realclearpolitics.com. [8] A total of 293 polls are included in the analysis from the 2008 election. The poll series for the two elections are weekly averaged poll ratings for the incumbent party's candidate. The last day of polling determines which week the polls belong to. Furthermore, all polls are standardized so that they reflect the relative strength between the two dominant Republican and Democratic parties. The total poll score of the Republican and the Democratic candidate always sum to 100 per cent.

ANALYSIS

(a) 2004: One Election, Two Stories

Figure 1 displays the weekly support for Bush as president and IEM's predicted two-party vote share for the Republicans. The polls linger around the fifty-percent mark, with a series mean of 49.9 percent. Out of the 35 weekly observations, ten were one percentage point or less away from the actual outcome of 51.2 percentage points Bush two-party vote share. In only six out of thirty six weeks do the polls measure his support above the 51.2 percent he received on Election Day. The final observation landed at 50.6 percent.

The series mean market prediction is exactly the same as the outcome; 51.2 percent. In all but two observations the predictions were within one percentage point of the outcome, and the final observation predicted 51.3 percent vote share for Bush. The market prediction climbs over the fifty-percent mark already after the first observation, and remains at or above it for the rest of the period. The traders did not lose the confidence that the Republicans would win the popular vote, but they believed it would be a rather close race.

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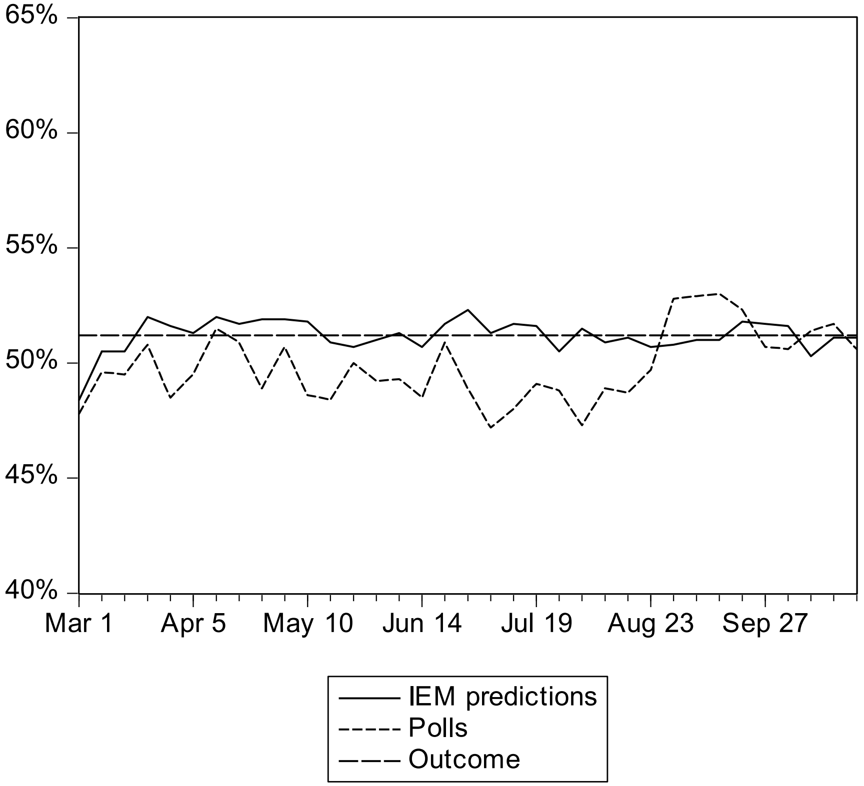
[7] Data for 2004 were collected in the period May-November 2004. Whenever there were two versions of the same poll – one with registered voters and one with likely voters – the versions with registered voters were excluded.

[8] Data collected in November 2008. Link as of May 15, 2009: http://www.realclearpolitics.com/epolls/2008/president/us/general_election_mccain_vs_obama-225.html#polls

Figure 1
2004 US Presidential Election
Weekly Poll Ratings And IEM Predictions
Two-party Vote Share for Bush



A visual inspection of Figure 1 above shows that the polls and the IEM market tell two different stories about the development of the election campaign in 2004. Reacting more vividly to current events, the polls told a more dramatic story about the campaign than the IEM market did; the weekly ups and downs were greater, and the race was closer in the polls than in the prediction market. Most striking is the relative stability of the market predictions. With the exception of the first observation at 48.3 percent, all observations vary within three percentage points, from 50.3 to 52.8. The standard deviation of the market predictions is 0.82, considerably lower than the polls' 1.57. Furthermore, the market prediction lies consistently higher than the polls do, except for the end of the period, where the picture is more mixed.

The Abu Ghraib scandal in the week of April 26 does not seem to have had a lasting negative impact for Bush's poll ratings, as their slip is recovered the week after. The handover of power in Iraq however coincides with a sharp drop in the ratings for Bush. Within two weeks Bush fell 3.7 percentage points at the polls, reaching his lowest level ever for the period, at 47.2 percentage points. The start of the Swift Boat Veterans ad campaign in the week of August 2 is followed by a four week long surge for the President. Bush's poll ratings soared from his second-lowest score at 47.3 to his second highest level of 52.8 percentage points. If the causes of these poll changes are those here pointed to, we read out of the polls that war issues were central throughout the campaign.

The IEM market did not tell the same story. After a low-scoring first week for Bush, his vote share prediction rose within few weeks to around 52 percent, and never again dipped below the 50 percent mark. In contrast to the polls' roller-coaster ride under and above the 50 percent mark, the prediction market floated around 51 percent throughout the period, minimally affected by the topics that dominated the campaign. None of our three events seems to have affected the election market predictions. The war issue did not stand out as a significant factor.

(1) Impact assessment

None of the events had a statistically significant impact on the weekly market predictions. Neither did the Abu Ghraib scandal or the Iraqi handover of power have any effect on the poll ratings. This is not to say that the Iraq war was not a central matter for the voters, but rather that these two events concerning the war did not manifest themselves as factors that influenced the aggregate vote on Election Day in November.

The Swift Boat Veteran ads were however positively influencing President Bush's poll ratings, with a permanent effect lasting until Election Day:

According to the analysis of the polls, the Swift Boat Veteran ads were needed in order for Bush to surge and subsequently win majority on Election Day. The last week before voting day they ended up fairly close to the election result (see Figure 1).

The market prediction also came very close to the result the final week, but they never experienced any surge caused by the Swift Boat campaign identified in the polls. They were stably predicting the vote share that the polls reached only after the Republican convention and the Swift Boat campaign.

Table 2. Impact assessment of events during the 2004 US presidential election.

	Polls n = 35		IEM n = 35	
	First models [9]	Final model	First models	Final model
Constant		29.33 (4.09)		30.93 (5.06)
Y_{t-1}		0.40 (2.78)		0.40 (3.34)
Abu Ghraib (pulse)	-1.71 (-1.34)		0.15 (0.26)	
Abu Ghraib (step)	-0.33 (-0.60)		-0.32 (-1.33)	
Iraq Handover(pulse)	-1.71 (-1.34)		1.11 (1.92)	
Iraq Handover (step)	0.08 (0.18)		-0.25 (-1.32)	
Swift Boat (pulse)	-0.02 (-1.68)		0.00 (0.62)	
Swift Boat (step)	1.21 (2.55)	1.21 (2.55)	-0.31 (-1.50)	
Adj. R^2		0.43		0.11
AIC		3.24		1.49
LM test (4 lags), Prob. F		0.93		0.49

t-statistics in parentheses

What did the market traders know that the poll respondents only realized after the Swift Boat campaign? If the equilibrium level hypothesis is true, then the traders must have known that the Swift Boat ads would run and that they would boost the ratings of the incumbent president. This is unlikely since the ad campaign was initiated by a previously unknown group supposedly

[9] The first models have been estimated with a constant, $Y_{t-1,}$, and one dummy variable on the right hand side. Those with a significant effect in the first models have been considered in the final model.

unattached to the Republican Party. However, the Swift Boat ads should not be interpreted as an isolated event that saved the campaign of the incumbent president. Rather, it should be seen as an event that released a vote potential which was already there for George W. Bush to exploit. Presidential incumbency is as previously mentioned a great advantage for the candidate, and when the nation after all is at war in both Afghanistan and Iraq, voters may be reluctant to gamble on an unknown card when push comes to shove. Hence, it is not the ads as such that convince the voters. Rather, the ads and the following attention surrounding them help enlighten the voters about their true preferences. Had not the Swift Boat ads been run, the effective campaign of the President and his staff would probably have found another way to put Senator Kerry's credibility into question.

(b) 2008: One Election, One Story

A quick glance at Figure 2 reveals two outlying observations on the IEM series for the weeks of May 5 and 12. These values are a product of a market error and have been treated as such in our analysis. [10]

The mean value of weekly poll ratings is 48.1, with a standard deviation of 1.42. Of the 35 weekly observations, 30 are below the 50 per cent mark, while five are above it. When the outliers are replaced with interpolated values the mean value of the market predictions is 47.5 and the standard deviation is 1.25. They are somewhat closer to the actual two-party vote result for McCain than the poll ratings are, and a bit less volatile as well. However, the general picture for 2008 is that the two series follow each other quite closely compared to the election in 2004. [11]

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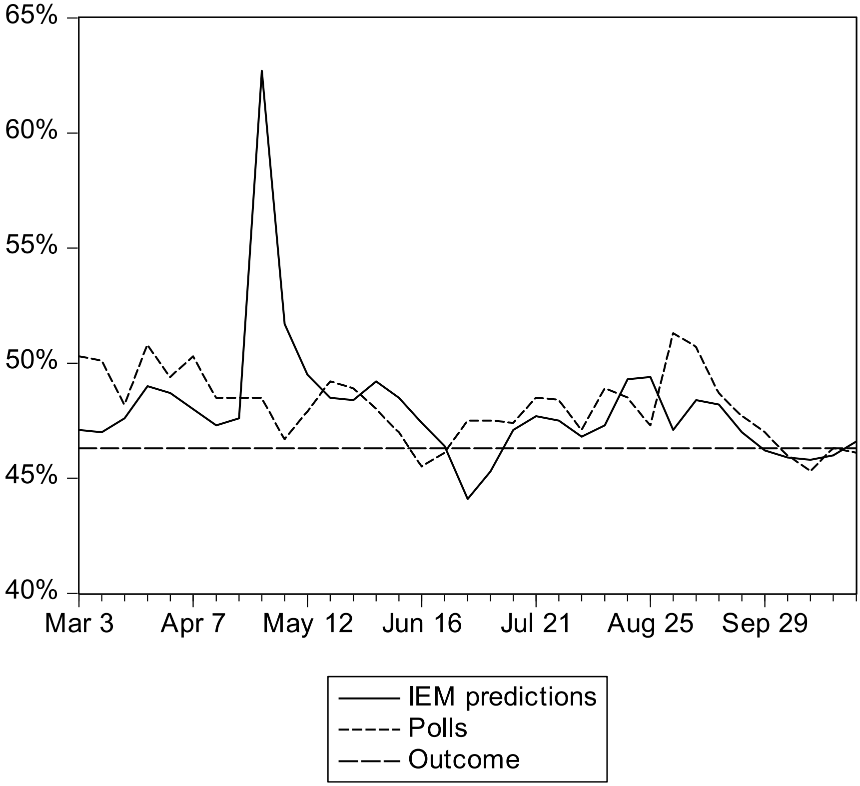
[10] The price history data from IEM show that the reason for the sudden and dramatic rise was one single trade which pushed up the closing price from 47.6 to 74.0 for the Republican candidate. It was the last trade of the day, and the following three days there were no new trades in the market. Therefore, the price remained at 74.0 for four out of the seven days of the week. At the same period of time, the Democrat's contract was traded at 50.1. Hence, the price that theoretically should always equal 100 now predicted that the Democrats and the Republicans in total would win 124.1 per cent of the votes! Also the following week there was heavy trade on McCain, which momentarily pushed the price up to 58.5, while the Democratic contract remained stable at 51.0. This price was however corrected the following day. In our impact assessment these two observations have been accounted for by creating a dummy variable called "ERROR", which takes the value 1 on weeks of May 5 and 12, and 0 for all other observations.

[11] When the two extreme values on the market series are replaced by interpolated values, the two series are correlated at 0, 1, and 2 lags with the polls as leading

Figure 2
2008 US Presidential Election
Weekly Poll Ratings And IEM Predictions
Two-party Vote Share for McCain



Poll ratings and market predictions move in different directions at the time when Sarah Palin is presented as VP candidate. The polls indicate a temporary gain in support for McCain, while the market traders lower their expectations of the Republican candidate’s vote share on Election Day.

The Lehman Brothers collapse in the week of September 15 corresponds with a sharp fall in poll ratings for McCain, and a smaller fall in the market predictions. The sharp drop in poll ratings might partly be due to the fallback

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variable. This could be an indication that the market absorbs information from the poll ratings.

from a convention bounce after the Republican Convention, but the ratings do not recover before they fall to the second lowest level for the whole period, at 45.6 points in the week of October 6. On the last week before Election Day, the candidate of the incumbent party has recovered slightly in the polls and end up at 46.1%. The fall in the market prediction has the same development during and in the aftermath of the Lehman Brothers event, though with less extreme values. McCain's predicted vote share fell five consecutive weeks for a total of 2.6 percentage points, before it recovered marginally the last couple of weeks and ended up at 46.6.

(1) Impact assessment

The collapse of Lehman Brothers had a significant and permanent negative effect on both poll ratings and market predictions for John McCain, while the selection of Palin as VP had no influence on either the polls or market predictions (Table 3). The Republican candidate's winning chances might have been grim irrespective of the financial crisis, but that event seems to have been the nail in the coffin for senator McCain. According to our typology the Lehman collapse was an enlightened event, meaning that the event was not helping voters realizing their political preferences, but rather changed them.

As described earlier, September 15th 2008 marked a dramatic shift with regards to the perception of the American economy. It is indeed possible that some voters would reassess their political preferences in the face of the economic challenges the nation had to brace itself for. Though it can be debated to what extent the Republican Party as such is to blame for the system deficiencies that led to the financial crisis, "more of the same" politics might not be what the voters perceived as the right approach towards the challenges ahead. The mood in the election campaign coincided well with Barack Obama's main message of change. Although we can speculate that he most likely would have won the majority of the votes regardless of the financial crisis, the event of Lehman Brothers' collapse helped him securing the victory.

Table 3. Impact assessment of events during the 2008 US presidential election.

	Polls n = 35		IEM n = 35	
	First models [12]	Final model	First models	Final model
Constant		23.47 (3.54)		32.05 (11.71)
Y_{t-1}		0.51 (3.76)		0.33 (5.78)
Market error			15.25	15.07 (15.46)
Palin VP (pulse)	-0.30 (-0.25)		1.41 (-1.40)	
Palin VP (step)	-0.39 (-0.90)		-0.42 (-1.11)	
Lehman collapse (pulse)	-0.83 (-0.69)		0.49 (0.47)	
Lehman collapse (step)	-1.07 (-2.29)	-1.07 (-2.29)	-0.83 (-2.01)	-0.83 (-2.01)
Adj. R^2		0.45		0.89
AIC		3.04		2.86
LM test (4 lags), Prob F.		0.89		0.07 [13]

t-statistics in parentheses

[12] The first models have been estimated with a constant, Y_{t-1}, the "error" dummy, and one dummy variable on the right hand side. Those with a significant effect in the first models have been considered in the final model.

[13] At lag one the test is significant at 5% level, but not at 1% level. This indicates that the results may be somewhat optimistic, and that they should be interpreted with caution.

DISCUSSION AND CONCLUSION

Table 4 summarizes all events for both elections and indicates which category they fall into. Our analysis has shown that few events unfolding during the two campaigns could on their own influence the voters' decisions on Election Day. The majority of the voters have most likely made up their mind long time in advance, and the undecided vote on a basis of many considerations which cannot be directly connected to any single event. For each of the 2004 and the 2008 elections however, we were indeed able to detect one such event.

Table 4. Events 2004 and 2008

		Market reaction?	
		Yes	No
Poll reaction?	Yes	Enlightened event: LEHMAN BROTHERS COLLAPSE	Enlightening events: SWIFT BOAT VETERANS
	No	Early reaction by markets for enlightened event (or error/ manipulation): MARKET ERROR	Irrelevant events (or method unable to detect reaction): ABU GHRAIB IRAQ HANDOVER PALIN VP

The stable IEM predictions in 2004, which turned out to be very close to the actual outcome, indicate that the traders were aware of which conditions the voters in the end would emphasize, and therefore that the market predictions represented the equilibrium level for the 2004 presidential election. The only event that significantly changed the poll ratings – the Swift Boat ads – moved the ratings up to the level where the market predictions had been lying stably throughout the campaign. It may seem as a paradox that an event which moved the polls permanently to a higher level contains no relevance for the outcome. In reality, it was indeed relevant, but already priced into the prediction. The news would be if Bush *had not* been able to capitalize on his advantages as incumbent president in war time, against an opponent with which the voters were less familiar with and thus more suspicious towards.

During the 2008 election campaign, the Lehman Brothers collapse lead to a sudden change of focus in the election campaign, putting the state of the economy at the very top of the agenda. As we have seen from our analysis these extraordinary circumstances not only affected the poll ratings, but also the vote share predictions of the Iowa Electronic Market. While poll ratings reflect the voters' enlightening process, this market reacts in theory only to "real" news. If it is true that the voters undergo enlightenment during the campaign period, then rational traders should already in advance have incorporated this process into their expectations. The fact that they had not done so with this event suggests that the situation the American voters suddenly found themselves in during the last few weeks of the election campaign was something new and particular to that election.

In hindsight it is evident that a financial crisis was about to unfold. Before September 15th, however, this was apparent to only a very few. And that it should happen just a few weeks before the presidential election was more a matter of coincidence than anything else. Once the Lehman Brothers collapsed the effects both on the poll ratings and market predictions were immediate, permanent, and in favour of Obama. In contrast to the Swift Boat ads, the Lehman collapse hence was an enlightened event which by its own virtue changed the vote share outcome of the election.

This paper has demonstrated the benefits of studying price movements in prediction markets in combination with poll movements during the US presidential campaigns. We have identified two events which have had an impact on the last two presidential elections. By analyzing poll ratings and IEM predictions together, we have also shown that one event moved the vote towards the expected level, while the other changed the level.

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