

Partisan Impacts on the Economy: Evidence from Prediction Markets and Close Elections

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This Draft: December 14, 2005

Abstract

Political economists interested in discerning the effects of election outcomes on the economy have been hampered by the problem that the economy also influences elections. We sidestep these problems by analyzing movements in economic indicators caused by clearly exogenous changes in expectations about the likely winner during Election Day. Analyzing financial fluctuations on November 2 and 3 in 2004, we find that markets anticipated higher equity prices, interest rates and oil prices and a stronger dollar under a Bush presidency than under Kerry. We also found a similar pattern holds for the 2000 Bush-Gore contest. Prediction market based analyses of elections from 1880 to 2000 also suggest that electing a Republican President raises equity valuations by roughly 2.5 percent.

The authors would like to thank Gerard Daffy, John Delaney, Paul Rhode and Koleman Strumpf for data, Paul Rhode, Cameron Shelton and Alicia Tan for useful conversations and Bryan Elliot for programming assistance.

Introduction

Do elections affect economic aggregates? Two distinguished traditions suggest opposing conclusions. Rational-choice political science models, such as Downs (1957), predict policy convergence, while “partisan business cycle models” posit that different political parties have different preferences over inflation, interest rates, output and the capital and labor shares, yielding different policy choices under different political parties.

Empirical evidence is mixed. While Alesina, Roubini and Cohen (1997) document that Democratic administrations have tended to have higher output growth (particularly in the first half of their administrations), they also appear to have governed during periods of lower inflation, suggesting that this is not due to differences in aggregate demand policies. The difficulty of establishing stylized facts with any confidence is increased by the limited number of presidential electoral cycles. Beyond the difficulty in separating effects of partisanship from other macroeconomic shocks, there is a fundamental difficulty in establishing causation: Do elections shock economic expectations, or do economic expectations shape electoral choices?

Financial and prediction market data have provided useful insights. For instance, Herron (2000) tracked the betting odds in the weeks leading up to the 1992 British election, finding that changes in the probability of a Labour victory were negatively correlated with changes in the FTSE 100, leading him to infer that the election of Labour would have led stock prices to be 5 percent lower. Yet we will show evidence below that—at least for the 2004 U.S. election—changing expectations about the economy also drive changing expectations about the re-election of the incumbent party. Knight (2006) seeks to identify a causal effect by examining the cross section of returns, specifically the relative returns to a series of “Pro-Bush” and “Pro-Gore” stocks and their correlation with the probability of Bush being elected as measured by the Iowa Electronic market. Such a study seems less likely to exhibit reverse-causality, as it is less likely that an improvement

in the economic outlook for a particular group of companies (e.g., defense) would increase the re-election chances of an incumbent. Even so, the identification of partisan effects in this setting relies on the absence of unobserved factors affecting both the pricing of these portfolios and re-election prospects, and this might be questionable.¹

We employ an alternative identification strategy that exploits two recent financial market developments: 1) the electronic trading of equity index and other futures while votes are being counted on election night,² and 2), for the 2004 election, the emergence of a liquid prediction market tracking the election outcome.³ Our analysis also benefits from natural experiments created by flawed, but widely believed, exit polling. In 2004, exit polls released around 3pm Eastern time predicted a Bush defeat, and the price of a security paying \$10 if he was reelected fell from \$5.5 to \$3. As votes were counted that evening, the same security rallied and reached \$9.5 by midnight. Similar events occurred in 2000, although without a prediction market precisely tracking changes in beliefs.

Unlike pre-Election Day shifts in reelection probabilities, Election-Day probability shifts reflect the revelation of information about voting decisions that had generally been made. Combined with high-frequency data on the value of financial assets, they allow us to make precise

¹ For instance, suppose that an election features a pro- and anti- war candidate, and the pro-war candidate is viewed as being more capable of executing a war, should the need arise. If we observe prices of shares in defense contractors increasing in value when the pro-war candidate's electoral prospects increase, one might be tempted to conclude that the defense contractor's stocks are worth more *because* there is a higher chance of the pro-war candidate will be elected. However there may be that a third factor—such as threatening actions from a terrorist group or another nation—that have lead both numbers to appreciate: the defense contractor's from their increased sales in an increasingly likely war, and the pro-war candidate's from his country's increased need of his leadership in wartime.

² Overnight trading of equity index futures began on the Chicago Mercantile Exchange's Globex platform in 1993. Prior to 1984, U.S. equity and bond markets were closed on election day.

³ Our prediction markets data (for 2004) come from a market run by Tradesports.com. Contracts with a notional value of over \$3.5 million were traded in 13,366 separate trades on Election Day and the early hours of the following day. As another measure of liquidity, the average bid-ask spread on election day was 5 cents (or 0.5 percentage points) on a contract that would pay either \$0 or \$10. In contrast, for the Iowa Electronic Market on the winner of the popular vote in 2000 (there was no prediction market security on the Electoral College winner), Election Day volume totaled less than \$20,000.

and unbiased inferences of the effect of Bush's election on many economic variables. (The cost of this precision is generality, as we can speak only to partisan effects for these particular elections.)

We proceed by analyzing the 2004 election, comparing the results from our high-frequency analysis with a more traditional pre-Election analysis of daily data. This allows to learn the sign and approximate magnitude of any bias in the latter. We then conduct brief analyses of the 2000 election, and analyze event returns surrounding elections back to 1880, which confirm our finding of partisan effects.

The 2004 Election

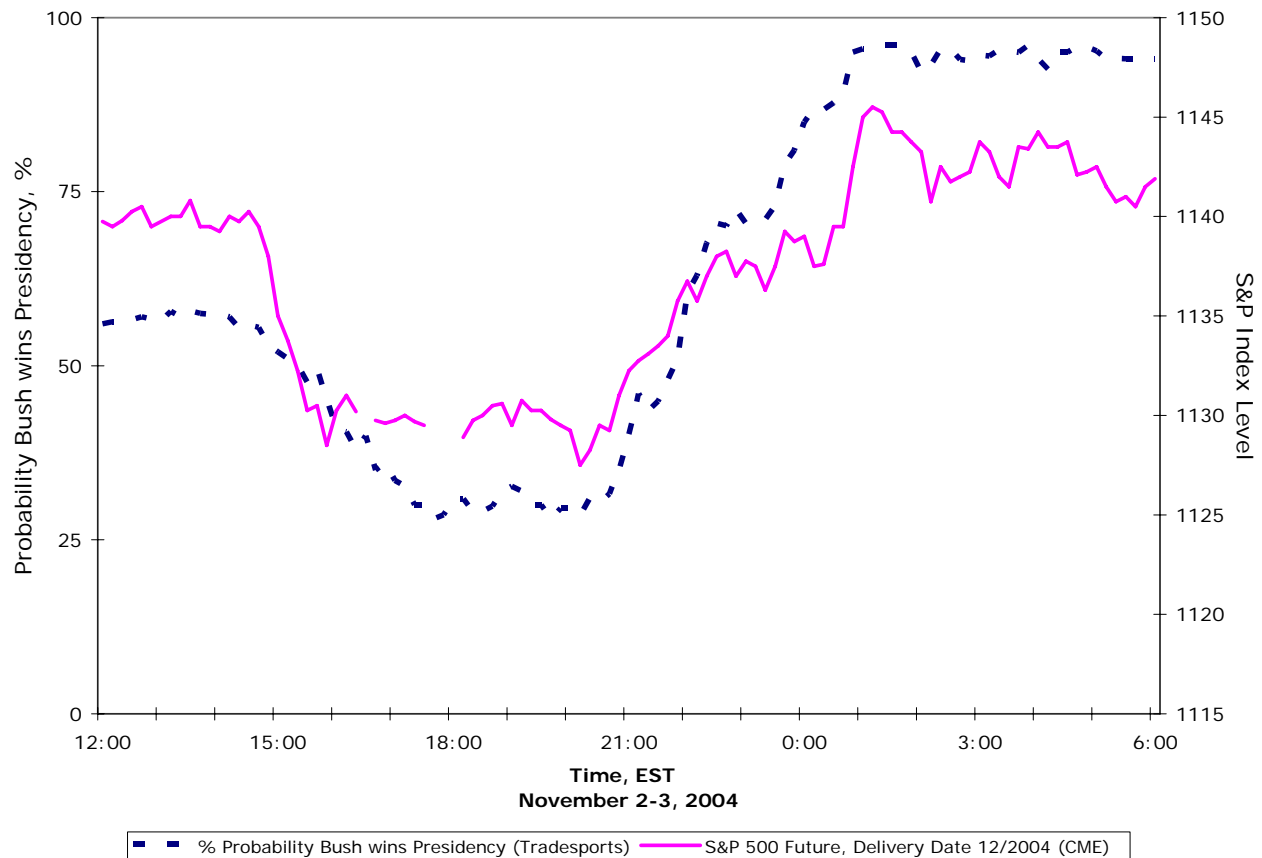
During the 2004 election cycle, TradeSports.com created a contract that would pay \$10 if Bush were elected President, and zero otherwise. The price of this security yields a market-based estimate of the probability that Bush will win the election.⁴ We collected data on the last trade and bid-ask spread every 10 minutes during election day until the winner was determined in the early hours of the following morning. We pair this data with the price of the last transaction in the same 10 minute period for the December 2004 contract of various financial futures (the CME S&P 500 and Nasdaq 100 futures, CME currency futures, the CBOT Dow and 2 and 10 year Treasury Note futures, and the NYMEX Light Crude Oil future), along with longer term oil future contracts, recording a missing observation if there was no futures trade in that 10 minute window.⁵

Figure 1 shows the re-election probability and the value of the S&P 500 future through our sample (noon EST on November 2nd through to 6am, November 3rd, 2004).

⁴ A key assumption we make is that traders do not use prediction markets to hedge the wealth effects of the election, which seems reasonable given the depth of even the 2004 markets. For more on inferring probabilities from Prediction Market Securities see Wolfers and Zitzewitz (2005).

⁵ We analyze futures rather than the actual indices in order to analyze the period after regular trading hours.

Figure 1: The S&P 500 is higher under a Bush versus Kerry presidency



The prices track each other quite closely. The probability of Bush winning the election starts near 55 percent. When the exit poll data was leaked, the markets quickly incorporated this information, sending Bush's probability of election to 30 percent and stocks down about one percent. When it became clear that the earlier exit poll data was faulty, Bush's chances rose to 95 percent and stocks rebounded. This suggests that equities are more valuable under a Bush Presidency than if Kerry had been elected. In order to get a precise of just how much higher, we can regress changes in the S&P 500 on changes in Bush's chances of re-election. Specifically, we estimate the model:

$$\Delta \text{Log}(\text{Financial variable}_t) = \alpha + \beta \Delta \text{Re-election probability}_t + \varepsilon_t$$

There are some 10-minute intervals with no observations. In these cases we use longer differences. We weight observations by the inverse of the number of periods the difference spans

to correct for heteroskedasticity from unequal period lengths and calculate White (1980) standard errors to allow for any that remains.

The timing of market movements in Figure 1 suggests that the timing of incorporation of information into prices may be different in equity and prediction markets. To allow for this possibility, we also estimate a version of the above model that uses 30-minute differences.⁶

Table 1 shows the result of regressions using a number of different market prices. The coefficients can be interpreted as the percentage point difference in that indicator resulting from a Bush presidency instead of a Kerry Presidency.

⁶ Alternative specifications, such as 60-minute differences and Scholes-Williams (1977) regressions, yielded coefficients of similar magnitude to the 30-minute differences.

Table 1: Effects of Bush versus Kerry on Financial Variables

Financial Variable	10 Minute Intervals		30 Minute Intervals		
	Estimate	N	Estimate	N	
	Dependent Variable: $\Delta \text{Log} (\text{Price Financial Variable})$				
S&P 500	0.016*** (0.004)	104	0.020*** (0.005)	35	
Dow Jones Industrial Average	0.014*** (0.005)	84	0.016*** (0.005)	29	
Nasdaq 100	0.019*** (0.005)	104	0.024*** (0.008)	35	
Dollar (vs. Trade- Weighted Currency)	0.004 (0.003)	84	0.005** (0.002)	34	
	Dependent Variable: $\Delta (\text{Price})$				
Light Crude Oil Futures	Dec 04	1.068*** (0.350)	88	1.634*** (0.592)	29
	Dec 05	0.642* (0.346)	85	1.032* (0.558)	28
	Dec 06	-0.281 (0.751)	63	-0.901 (0.782)	21
	Dependent Variable: $\Delta (\text{Yield})$				
2 Year T-Note Future	0.095* (0.057)	84	0.105** (0.044)	30	
10 Year T-Bill Future	0.108** (0.048)	91	0.116** (0.049)	31	

Notes: ***, **, * denotes statistically significant at 1%, 5% and 10%, respectively.

Election probabilities are most recent transaction prices collected every ten minutes from Tradesports.com. Equity and foreign exchange futures are from the Chicago Mercantile Exchange; bond futures are from the Chicago Board of Trade, while oil futures data from the New York Mercantile Exchange. Equity, bond and currency futures have December 2004 delivery dates. The trade-weighted currency portfolio includes five currencies with CME-traded futures (the Euro, Yen, Pound, A\$, C\$, and Swiss Franc).

The results for the S&P 500 suggest a quite precisely estimated effect, with the Bush presidency yielding equity prices that are 1½ to 2 percent higher; other stock indices yield similar estimates. We cannot discern whether the equity market effects reflect expectations of stronger output growth, or of policy changes that are expected to favor returns to equity holders over debt holders, current over future taxpayers, or capital over labor. Thus we cannot draw firm welfare conclusions from these results.

Figure 2: Interest rates are lower, and bond prices higher under a Kerry presidency⁷

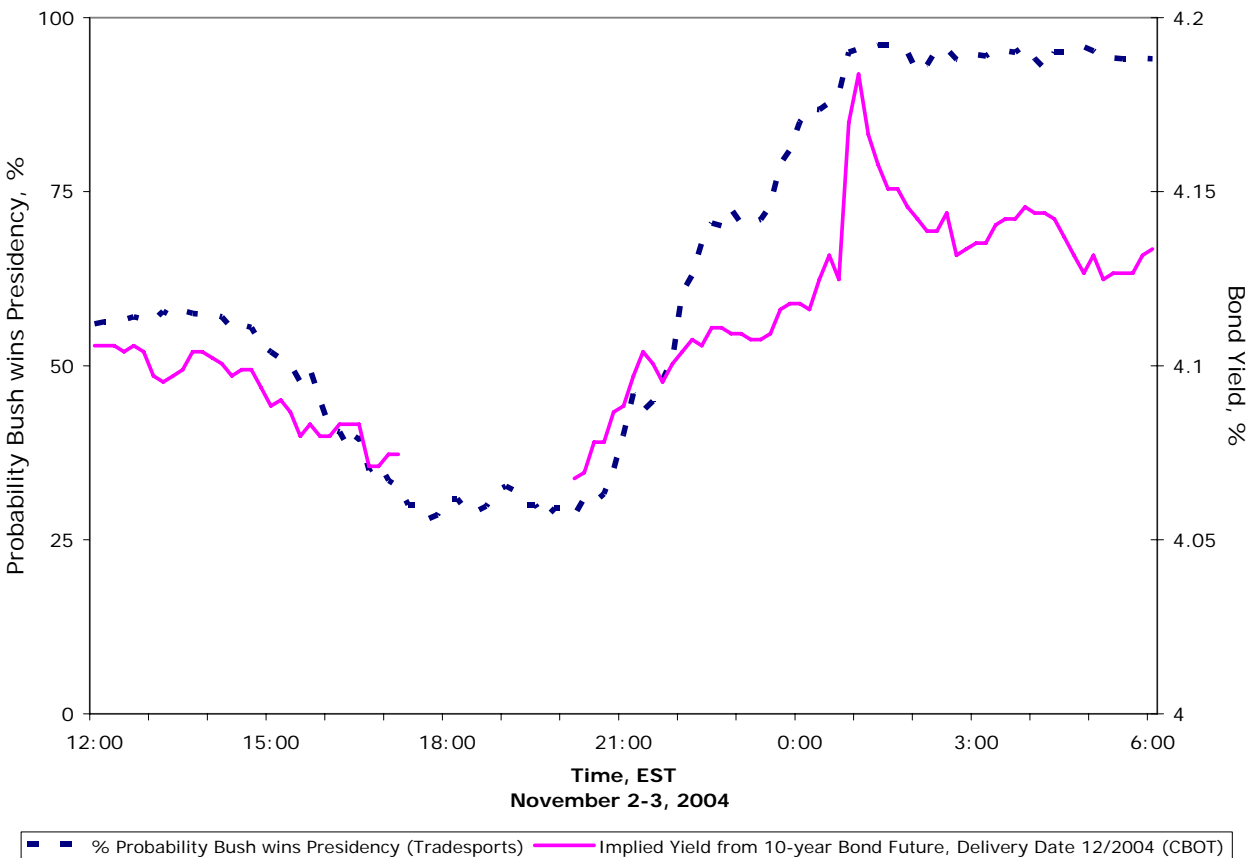


Figure 2 plots the price of the CBOT 10 year T-bill future. We are missing data for the three hours in which the bond futures market was closed, but fortunately this was the period between the leaking of the exit polls, and the subsequent reversal of Bush's fortunes. The regressions in Table 1 suggest that 10-year bond yields would be 12 basis points higher and 2-year bond yields 10 basis points higher under a Bush administration. Ideally one would like to separate the effect of changes in expected inflation from changes in expected real interest rates. While there was no overnight trading inflation-protected Treasury bills, but we do observe the value of a closely related asset—the iShares Lehman TIPS exchange traded fund (“TIP”)—at 3 pm, 4 pm, and 9:30 am the next morning. The changes in the price of this fund implies that expected real yields

⁷ We calculated the effect of reelection on yields by indexing the price to the closing yield of the bond future price and dividing changes by the duration of the bond future, as reported on the CBOT web site.

declined 1.9 basis points as Bush's reelection probability fell from 52 to 40 percent from 3 to 4 pm and then increased 6.0 basis points as the probability increased from 40 to 95 percent from 4 pm to 9:30 am the next day. Changes in the price of the iShares Lehman 7-10 Year Treasury exchange-traded fund ("IEF") suggest that expected nominal yields moved by of -1.9 and +8.3 basis over for the same time periods, respectively.⁸ While these data are obviously sparser than we would like, they both confirm the approximate magnitude of the effect estimated in Table 1 and suggest that almost all of the changes in nominal bond yields were due to changes in expected real interest rates, not expected inflation. Table 1 also suggests that a Bush reelection would increase the value of the dollar and the short-term price of oil.

Our Election-night natural experiment yields different results from the pure time series methods previously employed in the literature. Table 2 reports regressions of daily closing prices for financial variables on the most recent trade in the Bush reelection contract as of 4 pm Eastern time from the start of prediction market trading in June 2003 to October 31, 2004. As above, we analyze longer differences to allow for slow incorporation of information into the Bush reelection contract, which traded less liquidly during the 17 months leading up to Election Night (total volume during these months was about \$11.4 million, about half of which was concentrated in September and October 2004).

⁸ The duration of the holdings of "TIP" and "IEF" is 5.9 and 6.6 years respectively, as calculated by Morningstar as of December 2004.

Table 2: Re-election Probabilities and Financial Variables Through the Campaign

Financial Variable	Daily Differences	5-day Differences	20-day Differences
Dependent Variable: $\Delta \text{Log}(\text{Price})$			
S&P 500	0.087*** (0.034)	0.128** (0.062)	0.243*** (0.065)
Dow Jones Industrial Average	0.093*** (0.032)	0.145** (0.064)	0.275*** (0.090)
Nasdaq 100	0.143*** (0.062)	0.212** (0.098)	0.299*** (0.107)
Dollar (vs. Trade-Weighted Currency Portfolio)	0.040** (0.019)	0.017** (0.022)	0.021 (0.044)
Dependent Variable: $\Delta(\text{Price})$			
Light Crude Oil Futures (Near Month)	0.468 (4.210)	-7.269** (3.586)	-12.570*** (3.213)
Dependent Variable: $\Delta(\text{Yield})$			
10 Year T-Bill Yield	0.214 (0.299)	0.967* (0.523)	0.202 (0.598)

Notes: ***, **, * denotes statistically significant at 1%, 5% and 10%, respectively. Time period is June 2003 to October 2004. Newey-West (1987) standard errors allowing for 1, 5, and 20 lags respectively are reported in parenthesis. Financial variables are daily closing prices. The dollar is relative to a trade-weighted basket of the same currencies as in Table 1 (Euro, Yen, Pound, A\$, and C\$).

The estimated “effect” of Bush’s reelection on the stock market in this analysis is roughly a factor of 10 larger than in Table 1. This suggests the bias in a traditional analysis is large, and that most of the correlation between equities markets and Bush’s re-election probability in pre-Election data is not due to a causal effect of Bush’s policies on the value of equities, but rather due to reverse causation (e.g., higher stock prices help Bush) or third-factor causation (e.g., a stronger economy helps both). For oil prices, these biases appear to cause a sign reversal. Low oil prices presumably help Bush’s reelection chances, both directly and via their effect on the economy. This causal mechanism appears to be the dominant source of variation in the pre-Election data, producing the negative correlation. The contrasting estimates in Tables 1 and 2 highlight the

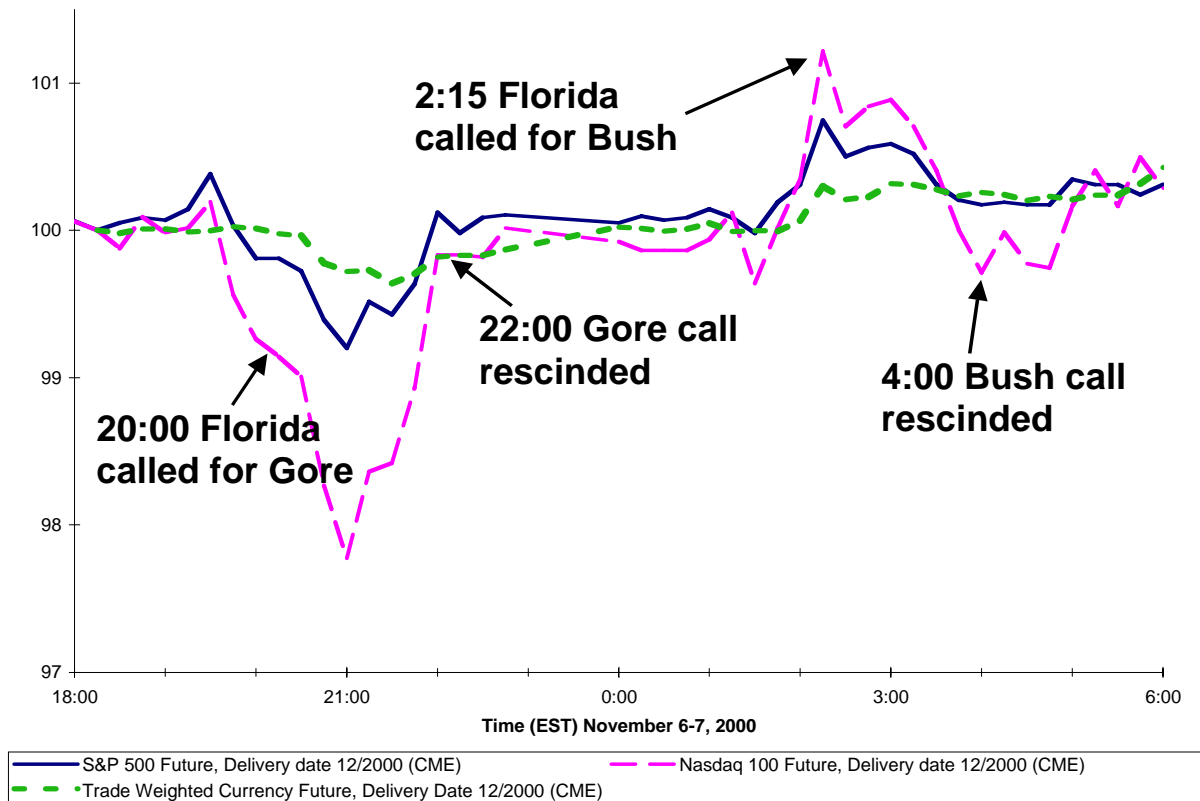
inadequacies of estimates of partisan effects that simply reflect the correlation between economic and electoral conditions.

Bush versus Gore

Our analysis of the 2004 election in Table 1 alone does not allow us to disentangle whether the estimated effects are due to the election of a Republican (and hence reflect partisan effects), or the re-election of a sitting president (reflecting stability). As such, we would like to be able to repeat this analysis for the 2000 election, in which there was no incumbent candidate running, and the incumbent party was the Democrats. As Figure 4 illustrates, the major financial indicators moved sharply when there were sharp shocks to assessments of the probability of Bush winning.

Unfortunately, we do not have an accurate estimate of the probability of victory of either candidate since there were no contracts that tracked this. The Iowa Electronic markets only tracked the anticipated (popular) vote share of each candidate, as well as the probability that one candidate would win a plurality of the popular vote. Since the winner of the popular vote (Gore) did not win the election, and it was quite clear early on Election Night that this was likely, the Iowa market price cannot be used as an estimate of the probability that a given candidate would win the election. Centrebet, an Australian gambling site, did trade an appropriate contract, but closed their market on the morning of the election. Their election-morning odds suggested that Bush had a ~60% chance of winning the election. We can use this number to bound the effect of Bush versus Gore on economic indicators.

Figure 3: Bush had similar effects on economic indicators compared to Kerry or Gore.⁹



If we assume that the prices of the various indicators at the beginning of our sample period correspond to a 60% chance of Bush winning, then the decline observed at 9:00 PM cannot represent more than a 60% decrease in the chance of a Bush victory. From this we infer a lower bound on the effect of Bush versus Gore on the variables in question and find that a Bush presidency caused at least a 1.3% increase in the S&P 500, a 3.7% increase in the Nasdaq 100 and a 0.6% appreciation of the dollar versus a trade weighted currency portfolio. After Florida was moved back to the undecided category, the prices of all of the economic indicators reverted to their original levels. When Florida was later called for Bush, we can then assume that this lead to no more than a 40% increase in the chance of Bush winning, and once again bound the effect of Bush

⁹ Timing of events on the graphs are taken from: http://www.pbs.org/newshour/media/election2000/election_night.html

versus Gore. We find that this gives lower bounds of 1.9%, 3.0% and 0.7% with respect to the three indicators above.

The estimates from these two experiments in 2000 are consistent both with each other and with the effects observed over the two analogous experiments in 2004. This gives additional weight to our claim that we are measuring the actual effect of the candidates themselves on the economy, and not, for example, the costs of transferring from an incumbent regime to a new one.

A Century of Elections

Because the 2000 and 2004 elections are the only two close elections since overnight trading began, we cannot replicate the above analysis for earlier elections. However, we can perform a more traditional event study, comparing aggregate returns from the pre-election close to the post-election close. Naturally the identifying assumption in this case – that markets are responding to election returns rather than other news – is more tenuous. Indeed, Santa-Clara and Valkanov (2003) have previously analyzed such returns, finding no consistent pattern. A major shortcoming of examining event returns in this manner is that it gives as much weight to stock returns following elections which transmit essentially no news (such as a market rally coinciding with Clinton's widely expected re-election), as to elections involving large shocks (Truman surprisingly beating Dewey in 1948).

Thus we once again turn to prediction markets in order to highlight the relationship between equity market movements and electoral surprises. In order to compile a long-run series, we analyze movements in Schwert's (1990) daily equity returns data (which attempts to replicate returns on a value-weighted total return index) supplemented by returns on the CRSP-value-weighted portfolio

since 1962, and data from Kalinke (2004) prior to 1888. Data on the magnitude of the electoral surprise were pieced together from a variety of sources.¹⁰

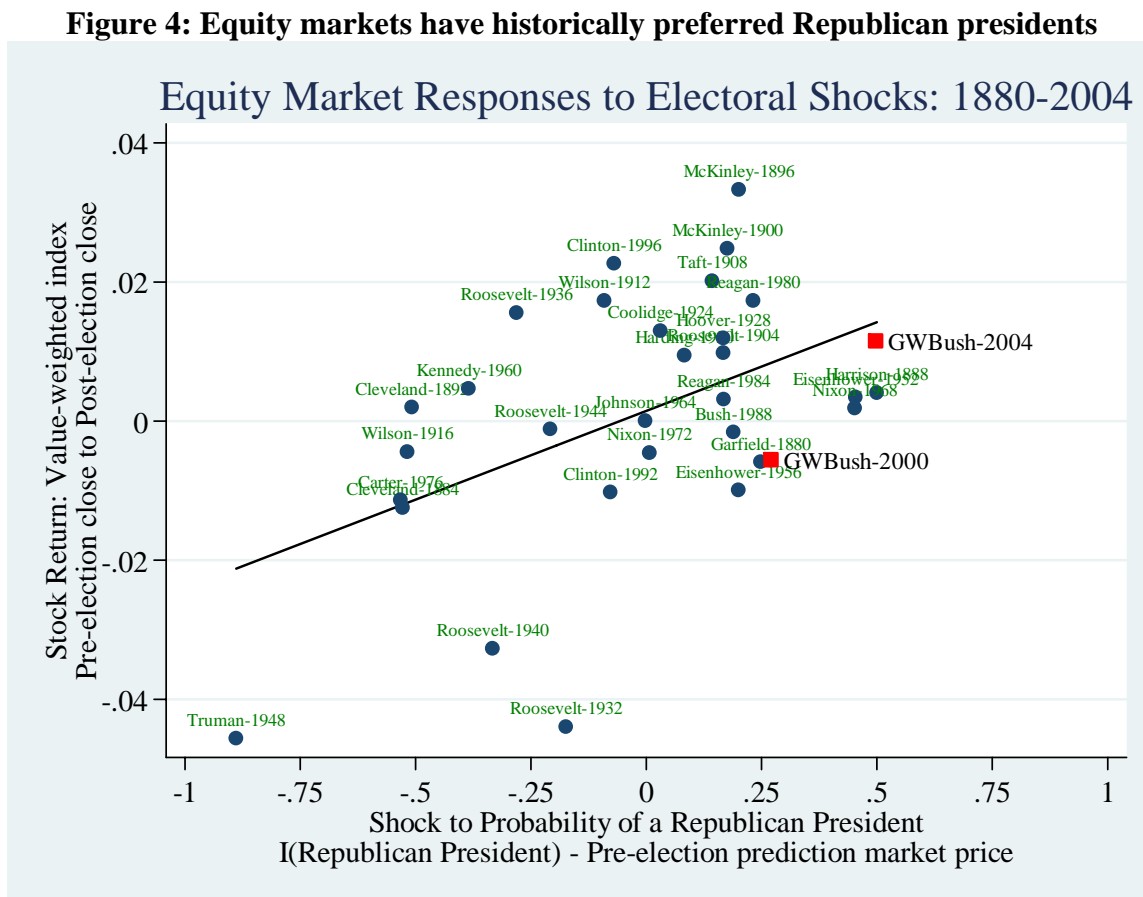


Figure 4 shows that historically equity markets have risen when Republican presidents have been elected, and the larger the surprise, the more they rise. This is in apparent conflict with Santa-

¹⁰ Under the assumption that the election winner is known by the end of the event window (which is only really problematic for the 1916 and 2000 elections) the change in the probability of a Republican President is: $I(\text{Republican President elected}) - \text{Pre-election probability of a Republican President}$. The pre-election probabilities come from a number of sources: For 1880-1960, we data provided to us by Rhode and Strumpf who collected press reports of the Curb Market on Wall Street. For 1976-1988, we rely on press reports of betting odds with British bookmakers; for 1992-1996, we use data from the Iowa Electronic Markets (although these are predictions of the winner of the popular vote). In 2000 we turn instead to data provided by Centrebet, an online bookmaker and for 2004 we use Tradesports data. We were unable to obtain prediction market data for the 1964-1972; our probability assessments for these periods are derived by estimating the following relationship between prediction market prices and two-party predicted vote shares from the final pre-election Gallup poll:

$$\text{Prediction market price} = \Phi^{-1}(\text{Poll} - 0.5/\sigma), \text{ where } \Phi^{-1}(\cdot) \text{ is the inverse normal cdf.}$$

Using non-linear least squares, we estimated $\sigma=4.9$, with a standard error of 1.0. Note that for our method for estimating a probability is not crucial; in 1964 and 1972 the eventual winner was at least 20 points ahead in front in the final Gallup poll, while the final poll in 1968 was a dead heat.

Clara and Valkanov (2003), who conduct a similar analysis, but of the relationship of equity returns and sign of the electoral surprise (i.e., the election outcome).

Table 3: The effect of a Republican on value-weighted equity returns

	Dependent variable: Pre-election to post-election return			
	1928 - 1996	1928 - 1996	1880 - 2004	1880 - 2004
GOP President	0.0129 (0.0089)			
Δ Prob(GOP President)		0.0297*** (0.0118)	0.0255*** (0.0082)	0.0248*** (0.0084)
Δ Prob(Incumbent)				-0.0046 (0.0084)
Constant	-0.0038 (0.0044)	-0.0027 (0.0040)	-0.0015 (0.0028)	0.0014 (0.0028)

Notes: ***, **, * denotes statistically significant at 1%, 5% and 10%, respectively.

Table 3 attempts to reconcile the two results, starting by analyzing the return-sign relationship for Santa-Clara and Valkanov’s time period of 1928-1996. We find a positive, but insignificant relationship. If instead we account for the magnitude of the electoral surprise by exploiting pre-election prediction market prices, our results are significant, and they are slightly more so when we expand to the full 1880 to 2004 time period for which we can obtain the needed data. A final specification that separately controls for surprise favoring the GOP and the incumbent party suggest that the market reacts positively to a Republican win, but not an incumbent win, consistent with our Election Night results for 2000 and 2004.

Thus, this analysis finds further evidence of statistically partisan effects on equity markets ($p=0.006$). Moreover, the estimated magnitude is remarkably similar to our assessments based on intra-day movements in the 2000 and 2004 elections, with the election of a Republican president

calculated to have typically been associated with a 2-3 percent rise in equity prices.¹¹ The statistical power of our Election-Night approach is illustrated by the relative precision of the estimates in Tables 1 and 3: our estimate of partisan effects from a single night (11/2/2004) is more than three times more precise than our estimate using daily data from the last 124 years of Presidential elections.

Discussion

Large natural experiments caused by flawed Election-Night psephology yielded large and plausibly exogenous shocks to the perceived probability of Bush winning both the 2000 and 2004 elections, enabling us to estimate the causal effect of alternative Presidential candidates on various financial indices.

Our estimates are informative for various questions in the political economy literature. Specifically, partisan political business cycle models specify that parties have different intrinsic policy goals. An immediate implication of these theories is that changes in election probabilities generate shocks to expectations about macroeconomic policy, and indeed we find that changes in the perceived probability of electing a Republican President caused changes in expected bond yields, equity returns and oil prices. A closer inspection of our results yielded somewhat more surprising insights. The finding that equity values were 2-3 percent higher under Bush are easily reconciled with expectations of favored treatment of capital over labor or equity over bond holders, or expectations of stronger real activity. Long bond yields were expected to be 10 to 12 basis points higher under Bush, a finding at odds with the usual characterization of right-wing parties as more strongly committed to balancing the budget, even if the cost is lower economic activity.

¹¹ Unfortunately we do not have sufficiently good daily Treasury bond data before 1962 to repeat the same exercise for bond yields.

Finally, while the literature so far has focused on partisan elections as generating monetary or fiscal shocks, our oil price results suggest that “supply shocks” might also reflect partisan preferences.

An older strand of the literature claims that candidates and parties will converge to the same policy—that of the median voter. Under this view, changing policies reflect changing preferences by voters, not changing preferences of officeholders, and disentangling the two makes falsification of the theory all the more difficult. Our analysis suggests that financial markets do not believe that such convergence occurs. While Knight (2006) has shown evidence of partisanship affecting particular groups of firms differentially, our data speak to broader macroeconomic effects.

The reason that we have emphasized the importance of analyzing the effects of exogenous shocks to the probability of re-election is that under retrospective economic voting a simple time series regression of financial prices on re-election probabilities will confound the causal effects of an incumbent’s policies on financial markets, with the effects of expectations about the economy changing expectations about the incumbent’s re-election prospects. Our natural experiments allow us to isolate the former, and the fact that this yields substantially different results from the longer time series points to the importance of the economic voting channel highlighted by Fair (1978).

Our results are counter to the findings of Santa-Clara and Valkanov (2003) who find larger excess returns under Democratic than Republican administrations, and no sharp changes on Election Day. Three possible reconciliations are that: 1) Past Democratic Presidents pursued policies that were more beneficial for equity returns, but investors have not noticed; 2) Past Democratic Presidents have pursued beneficial policies, but investors do not expect future ones to do so; and 3) Partisan effects are small relative to the variance of equity returns during a Presidential term, and past Democratic Presidents have simply been lucky in this regard.

Finally, our results speak directly to the question asked by Jones and Olken (2005) as to whether leaders matter. They also emphasize the fact that a country’s leaders both determine and

are determined by their economic performance and hence analyze the effects of clearly exogenous shocks caused by unexpected leader deaths. Similarly, Fisman (2001) analyzes financial market implications of shocks to President Suharto's health. Our approach is similar in that we analyze the effects of unexpected changes to beliefs about election outcomes.

While our results are informative in a wide variety of settings, it is also important to point out their shortcomings. In that we limit ourselves to U.S. Presidential elections, our analysis has sacrificed generality for precision. Our observations reflect changing expectations among financial market traders, rather than actual partisan differences; the partisan differences we estimate for 2000 and 2004 reflect the particularities of Bush versus Gore or Kerry rather than the more general leanings of the Democratic or Republican parties; and the complexity of the platforms of Kerry and Bush do not permit us to draw strong conclusions about which policies lead to the effects we observe.

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