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PARTISAN IMPACTS ON THE ECONOMY: EVIDENCE FROM PREDICTION MARKETS AND CLOSE ELECTIONS

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ABSTRACT

Political economists interested in discerning the effects of election outcomes on the economy have been hampered by the problem that economic outcomes also influence 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 high frequency 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. A similar Republican-Democrat differential was also observed for the 2000 Bush-Gore contest. Prediction market based analyses of all Presidential elections since 1880 also reveal a similar pattern of partisan impacts, suggesting that electing a Republican President raises equity valuations by 2-3 percent, and that since Reagan, Republican Presidents have tended to raise bond yields.

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Introduction

Do elections affect the macroeconomy? Two distinguished traditions suggest opposing conclusions. Canonical 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, partly reflecting the difficulty of establishing robust stylized facts from a small number of Presidential election cycles.[1] 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 election betting odds in the weeks leading up to the 1992 British ballot, 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, potentially muddying his inference. 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" stock portfolios and their correlation with the probability of Bush winning the 2000 election, as measured by the Iowa Electronic market. Such a study seems less subject to concerns about reverse-causality, as it is less likely that an improvement in the economic outlook for

[1] For a useful review of the US evidence, see Alesina, Roubini and Cohen (1997), who document faster economic growth under Democratic administrations (particularly in the first half of an administration), although Democrats also appear to have governed during periods of lower inflation, casting doubt on the interpretation that these differences reflect differences in aggregate demand management.

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.[2] Moreover, by design, this empirical strategy cannot speak to the effects of alternative candidates on aggregates.

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;[3] and 2), for the 2004 election, the emergence of a liquid prediction market tracking the election outcome.[4] 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.

While changes in election prospects through the campaign period may both reflect and cause changes in economic expectations, those changes in re-election probabilities revealed by election-day exit polling (and the subsequent official count) yield a clearer causal chain, reflecting the revelation of information about voting decisions that had generally already occurred. Combined

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[2] 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 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.

[3] 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.

[4] 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.

with high-frequency data on the value of financial assets, these sharp shifts in expectations about the election outcome allow us to make precise 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 us to learn the sign and approximate magnitude of any bias in the latter. We then conduct a related analysis of the 2000 election, finding results consistent with our analysis of the 2004 election. We then turn to a longer sample, analyzing event returns surrounding elections back to 1880, finding a remarkably consistent pattern of partisan effects. This historical analysis suggests that financial markets respond quite predictably to election shocks, a finding at odds with Santa-Clara and Valkanov (2003).

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.[5] 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 these data with the price of the last transaction in the same 10 minute period for the December 2004 futures contract of various financial variables: the CME S&P 500 and Nasdaq 100 futures, CME currency futures, the CBOT Dow and 2 and 10 year Treasury Note futures, and a series of NYMEX Light Crude Oil futures, recording a missing

[5] 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).

observation if there was no futures trade in that 10 minute window.[6] The precision of our estimates is enhanced by the low volatility of markets after normal trading hours. From 1996 - 2004, the standard deviation of the change in CME S&P 500 futures from 4pm to 3am the following morning is 0.37% on weeknights, which is small relative to the election-induced shocks that we analyze.[7]

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

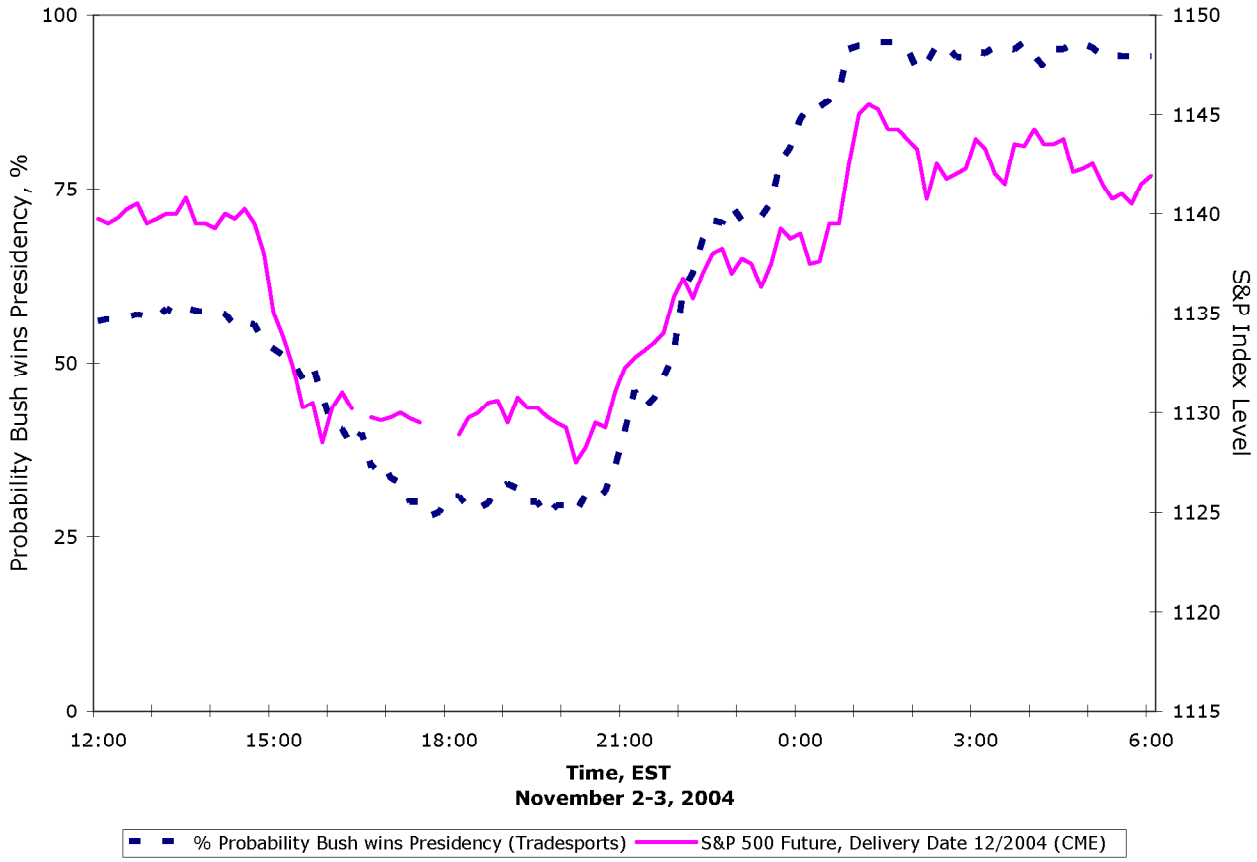


Figure 1 shows the prediction market assessment of the probability of Bush's re-election and the value of the S&P 500 future through our sample (noon EST on November 2nd through to 6am, November 3rd, 2004). The prices track each other quite closely. The probability of Bush winning the election starts 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

[6] We analyze futures rather than the actual indices because only the futures are actively traded in the period after regular trading hours. The need to analyze data after the main U.S. markets closed also constrains the set of financial variables we can analyze.

[7] Moreover, the following day's business press appears to confirm a virtual absence of other sources of economic news that might have affected markets during the time period we analyze.

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 estimate 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:

$$\Delta Log(Financial\ variable_t) = \alpha + \beta\, \Delta Re\text{-}election\ probability_t + \varepsilon_t$$

There are some 10-minute intervals with no observations and in these cases we analyze longer differences, weighting observations by the inverse of the number of periods the difference spans so as to correct for heteroskedasticity arising from unequal period lengths.

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.[8]

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

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.[9,10] It seems likely that this effect is partially explained by differences in tax policy: Bush's policies reduced taxes on income from equities (dividends and capital gains) while Kerry

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

[9] Since our first natural experiment occurred while polls were still open, it is possible that there was a feedback whereby market movements led to changes in voting behavior, although this would only occur if voters use changes in economic variables on election day in their voting decisions. To test for such reverse causation, we split our sample at 8pm EST (when the second natural experiment began) or 10pm EST (when polls closed in all swing states), finding no significant differences in the coefficients during the two periods. This gives us confidence that our first experiment is not biased and it is appropriate to combine the two experiments (and indeed, comparing the outcomes across these two experiments can be thought of as an overidentification test).

[10] Our results are also robust to adding controls for the probability of control of the house or senate changing (by including the prices of the relevant Tradesports contracts as additional regressors).

stated a desire to overturn these policies. That said, our formal analysis 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.

Table 1: Effects of Bush versus Kerry on Financial Variables

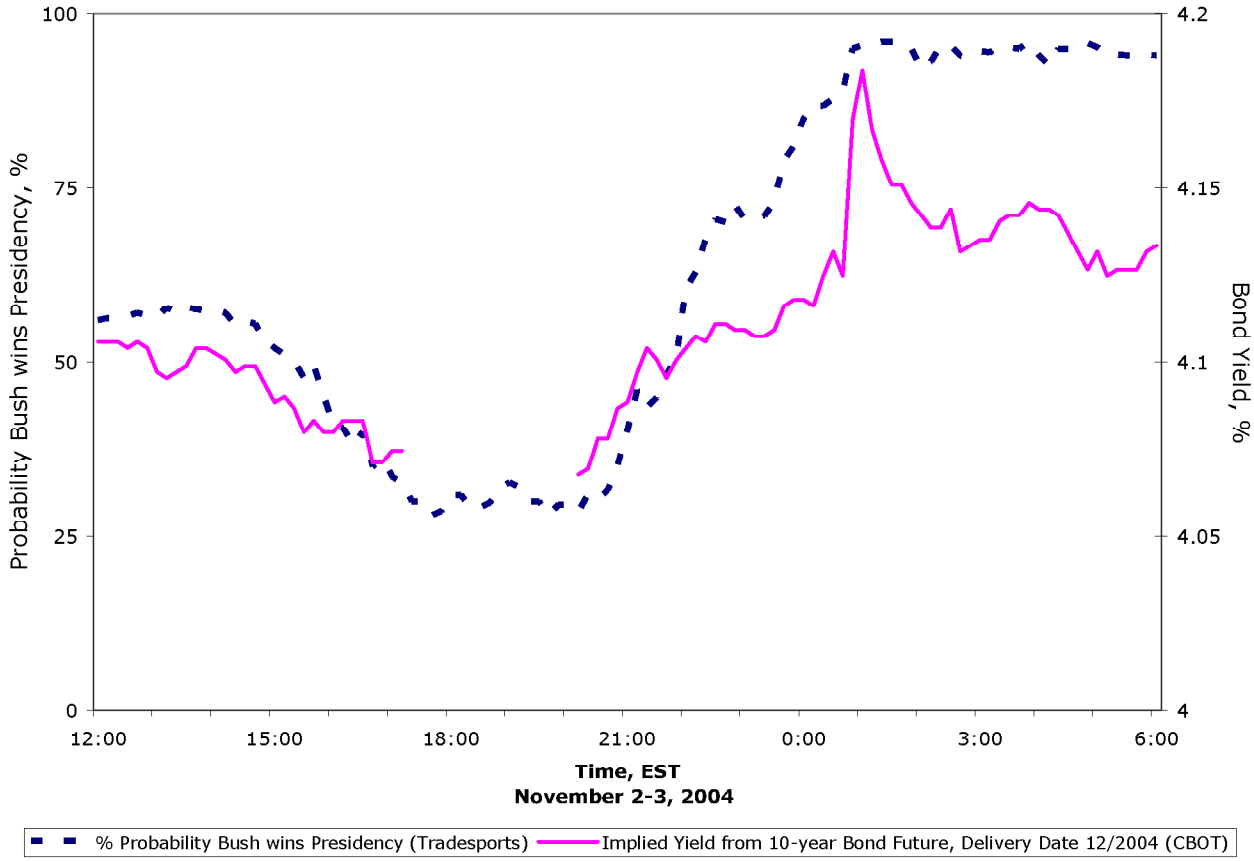
Dependent Variable		10 Minute First Differences		30 Minute First Differences	
		Estimated Effect of Bush Presidency	n	Estimated Effect of Bush Presidency	n
		Dependent Variable: *ΔLog(Financial Index)*			
S&P 500		0.016***	104	0.020***	35
		(.004)		(.005)	
Dow Jones Industrial Average		0.014***	84	0.016***	29
		(.005)		(.005)	
Nasdaq 100		0.019***	104	0.024***	35
		(.005)		(.008)	
U.S. Dollar (vs. Trade-weighted basket)		0.004	84	0.005**	34
		(.003)		(.002)	
		Dependent Variable: *ΔPrice*			
Light Crude Oil Futures	**December '04**	1.068***	88	1.634***	29
		(.350)		(.592)	
	December '05	0.642*	85	1.032*	28
		(.346)		(.558)	
	December '06	-0.281	63	-0.901	21
		(.751)		(.782)	
		Dependent Variable: *ΔYield*			
2 Year T-Note Future		0.095*	84	0.105**	30
		(.057)		(.044)	
10 Year T-Note Future		0.108**	91	0.116**	31
		(.048)		(.049)	

Notes: ***, **, * denote statistically significant at 1%, 5% and 10%, respectively. (White standard errors in parentheses.) Election probabilities are the 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 are from the New York Mercantile Exchange. Equity, bond and currency futures have December 2004 delivery dates. The trade-weighted currency portfolio includes six currencies with CME-traded futures (the Euro, Yen, Pound, Australian and Canadian dollars, and the Swiss Franc).

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, which means that we lose

very little useful variation. The regressions in Table 1 suggest that 10-year bond yields would be 11-12 basis points higher and 2-year bond yields 10 basis points higher under a Bush administration.

Figure 2: Interest rates are lower, and bond prices higher under a Kerry presidency[11]



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, 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. Changes in the price of this fund imply that expected real yields declined 1.9 basis points as Bush's reelection probability fell from 52 to 40 percent from 3 to 4 pm; real yields then increased 6.0 basis points as the probability of a Bush presidency 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

[11] 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.

expected nominal yields moved by -1.9 and +8.3 basis points over for the same time periods, respectively.[12] The ratio of the change in yields to the change in expectations yields a Wald estimator of the effects of Bush winning the election, and the first experiment (leaked exit polls) suggests that real yields would be 16 basis points higher under Bush, while the second experiment suggests an effect of 11 basis points, with roughly similar effects on nominal yields of 16 and 15 basis points, respectively. These data are sparser than we would like but they 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. Coupled with the strengthening of the dollar under Bush, this suggests that the move in interest rates is due to expansionary fiscal policies, rather than an increased risk of default.

Our election-night natural experiment yields different results from the pure time series methods previously employed in the literature. Table 2 reports regressions explaining changes in daily closing prices of various financial variables with changes in the 4pm price of the Bush reelection contract, over a sample running 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). The observed relationship between election and economic expectations through this period likely confounds the effects of politics on the economy with the effects of economic conditions on the election.

The estimated "effect" of Bush's reelection on the stock market in this analysis is roughly a factor of ten larger than in Table 1. This suggests the bias in traditional time series analysis is large, and that much of the correlation between equity markets and Bush's re-election probability in pre-

[12] 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.

election data reflects reverse causation (e.g., higher stock prices help Bush) or third-factor causation (e.g., a stronger economy helps both Bush and the stockmarket).

For oil prices, these biases appear to cause a sign reversal. While Table 1 showed that Bush's re-election was expected to lead to higher oil prices, the results in Table 2 also reflect the reverse channel, whereby lower oil prices helped Bush's reelection chances, both directly and via their effect on the economy, and this reverse channel 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.

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

Independent Variable: ΔBush election probability	**Daily differences**	**5-day differences**	**20-day differences**
	Dependent Variable: *ΔLog(Financial Index)*		
S&P 500	0.087***	0.128**	0.243***
	(.034)	(.062)	(.065)
Dow Jones Industrial Average	0.093***	0.145**	0.275***
	(.032)	(.064)	(.090)
Nasdaq 100	0.143***	0.212**	0.299***
	(.062)	(.098)	(.107)
U.S. Dollar (vs. Trade-weighted basket)	0.040**	0.017	0.021
	(.019)	(.022)	(.044)
	Dependent Variable: *ΔPrice*		
Light Crude Oil Futures (Near month)	0.468	-7.269**	-12.570***
	(4.210)	(.3.586)	(3.213)
	Dependent Variable: *ΔYield*		
10 Year T-Bill Yield	0.214	0.967*	0.202
	(.299)	(.523)	(.598)

Notes: ***, **, * denote statistically significant at 1%, 5% and 10%, respectively. Newey-West (1987) standard errors in parentheses, allowing for autocorrelation over 1, 5 and 20 lags, respectively. Financial variables are daily closing prices. The U.S. dollar is measures relative to a trade-weighted basket of the same currencies as in Table 1.
Sample covers all trading days from June 2003 to October 2004.

Given that the results in Table 1 reflect the effects of Bush on the economy, while those in Table 2 reflect both the effects of Bush on the economy and the effects of the economy on Bush, it seems reasonable to infer that we can combine these analyses to learn something about the effect of

the economy on Bush's chances of re-election. We start by noting the following structural equations:

$$\Delta Log(Financial\ variable_t) = \beta\, \Delta Re\text{-}election\ probability_t + \varepsilon_t \qquad [1]$$

$$\Delta Re\text{-}election\ probability_t = \gamma\, \Delta Log(Financial\ variable_t) + \eta_t \qquad [2]$$

$$\varepsilon_t \sim D(0, \sigma_\varepsilon^2);\ \ \eta_t \sim D(0, \sigma_\eta^2);\ \ E[\varepsilon_t \eta_t] = \rho_{\eta\varepsilon}\sigma_\varepsilon\sigma_\eta \qquad [3];\ [4];\ [5]$$

Note that this system involves five unknowns (β, γ, σ_ε^2, σ_η^2 and $\rho_{\eta\varepsilon}$) while we observe only three relevant moments (the variance of the financial variable and the re-election probability, and their covariance). Separately, our analysis of election-day shocks gives us an estimate of β, implying that only one further assumption (about the correlation between the two structural shocks, $\rho_{\eta\varepsilon}$) is required to recover estimates of the effect of the economy on Bush's re-election prospects (γ).

To show the relevant intuition, if we estimate equation *(2)* by OLS, we obtain:

$$\gamma_{OLS} = \nu\gamma + (1-\nu)\beta^{-1} \text{ where } \nu = \frac{\sigma_{\varepsilon_t}^2 + \beta\rho_{\varepsilon_t\eta_t}\sigma_{\varepsilon_t}\sigma_{\eta_t}}{\sigma_{\varepsilon_t}^2 + 2\beta\rho_{\varepsilon_t\eta_t}\sigma_{\varepsilon_t}\sigma_{\eta_t} + \beta^2\sigma_{\eta_t}^2} \qquad [6]$$

Since we know that β is small, if the correlation between the political and economic shocks ($\rho_{\eta\varepsilon}$) is also small then ν (which can be roughly interpreted as the share of financial market movements due to non-political factors) will be close to one, and hence the OLS estimate of the effects of shocks to the economy on Bush's re-election probability will suffer only a small bias. Running these regressions (using either daily or 5-day first differences) suggests that a 10 percent rise in the S&P 500 would raise Bush's re-election prospects by 2.3 and 3.3 percentage points, respectively (with standard errors of 0.8 and 1.3 percentage points). While statistically significant, these estimated effects seem rather small relative to the larger magnitudes found in the economic voting literature. Equally, OLS estimates of the effect of elections on the economy get larger as the election approaches and reliably statistically significant results are only obtained in the two quarters

leading up to the election, potentially providing some support to the finding in Fair (1978) that economic factors are particularly relevant for electoral outcomes the nearer is election day.[13]

That said, it seems likely that political and economic shocks are in fact correlated. If the correlation between the shocks is non-negative (for example when good news about foreign affairs causes rallies in both the stockmarket and Bush's re-election prospects), then the OLS regression provides a useful upper bound, as the true causal effect of economic conditions, γ, will lie below γ_{OLS}.[14]

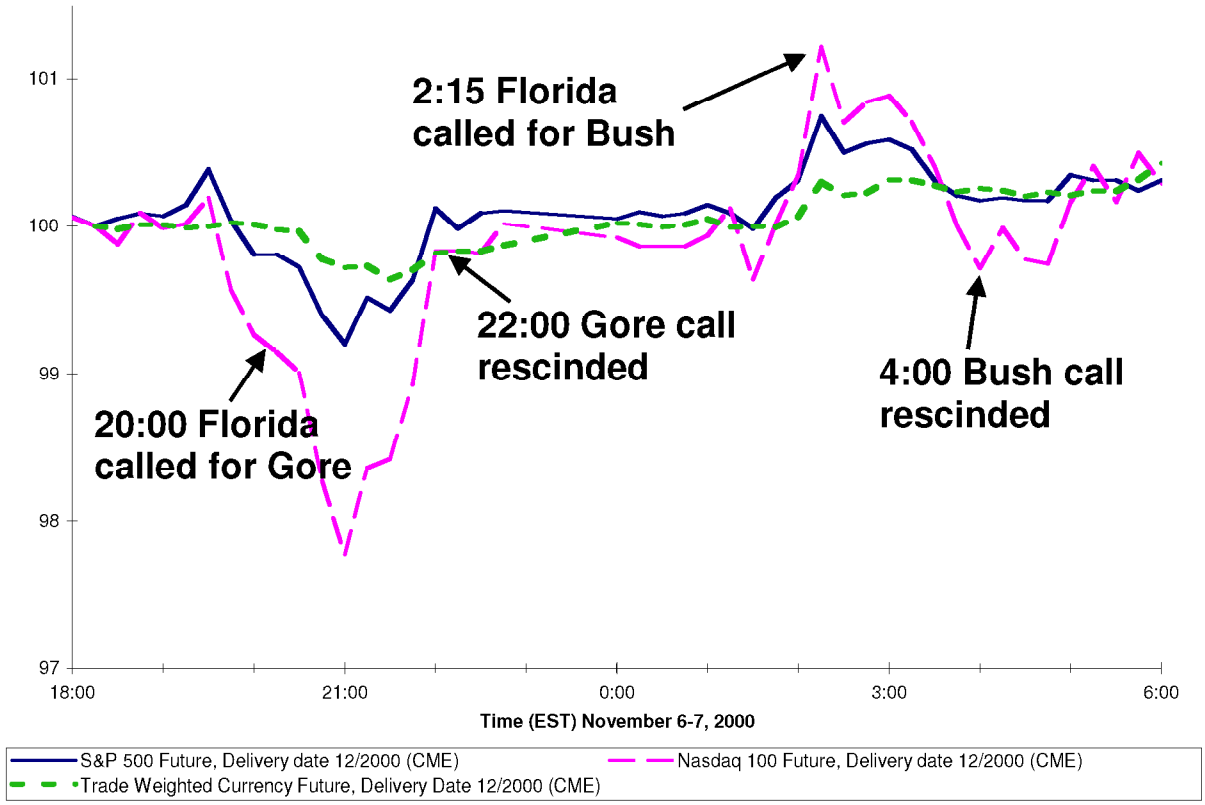
Bush versus Gore

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 the benefits of 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.

[13] Ideally to determine the effect of the economy on electoral outcomes we would rely on an instrumental variables strategy that isolated economic shocks that did not also change the political environment directly. We have considered and discarded many such possible instruments, and leave this as an open question for future research.

[14] Another way to show this logic is to note that equations *[1]-[5]* imply that:
$\gamma = \left(\beta\sigma^2_{Bush} - Cov(Bush,\ Economy) + E[\varepsilon\eta]\right)\left(\beta Cov(Bush,\ Economy) - \sigma^2_{Economy}\right)$ yielding an estimate of γ for any assumption about the only unobservable, $E[\varepsilon,\eta]$. This implies that one needs to impose at least some further assumptions about $E[\varepsilon\eta]$ for our data to impose bounds on possible values of γ.

Figure 3: Bush had similar effects on economic indicators compared to Kerry or Gore.[15]



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 bookmaker, 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.

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

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 Wald Estimator of the effect of Bush versus Gore on the variables in question, finding 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 led to no more than a 40% increase in the chance of Bush winning, and once again bound the effect of Bush 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 (the narrowest possible event window given that historically equity markets were closed on election day). Naturally the identifying assumption in this case – that markets are responding to election returns rather than other news – is more tenuous over this longer event window. 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 in 1996) 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. Data on election betting back to 1880 were pieced together from a variety of sources, and Paul Rhode and Koleman Strumpf were particularly helpful.[16] Combining these prediction market data with election outcomes yields a simple measure of the resulting partisan shock:[17]

$$Partisan\ Shock_t = I(Republican\ President\ elected_t) - Probability\ of\ a\ Republican\ president_{t-1}.$$

In order to compile a long-run series of daily stock returns, 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.

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-Clara and Valkanov (2003), who conduct a related analysis finding no systematic relationship, albeit between equity returns and the *sign* of the electoral surprise (i.e., *whether* a Republican is elected).

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[16] Our pre-election probabilities come from a number of sources: For 1880-1960, we analyze 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:

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

Using non-linear least squares, we estimated σ=4.9, with a standard error of 1.0. Note that our method for estimating a probability is not crucial to the results, since 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.

[17] This measure of the partisan shock revealed by the vote count is valid only if the election winner is known by the end of the event window. W have checked press reports of each election, and this assumption is only potentially problematic for the 1916 and 2000 elections.

Figure 4: Equity markets have historically preferred Republican presidents

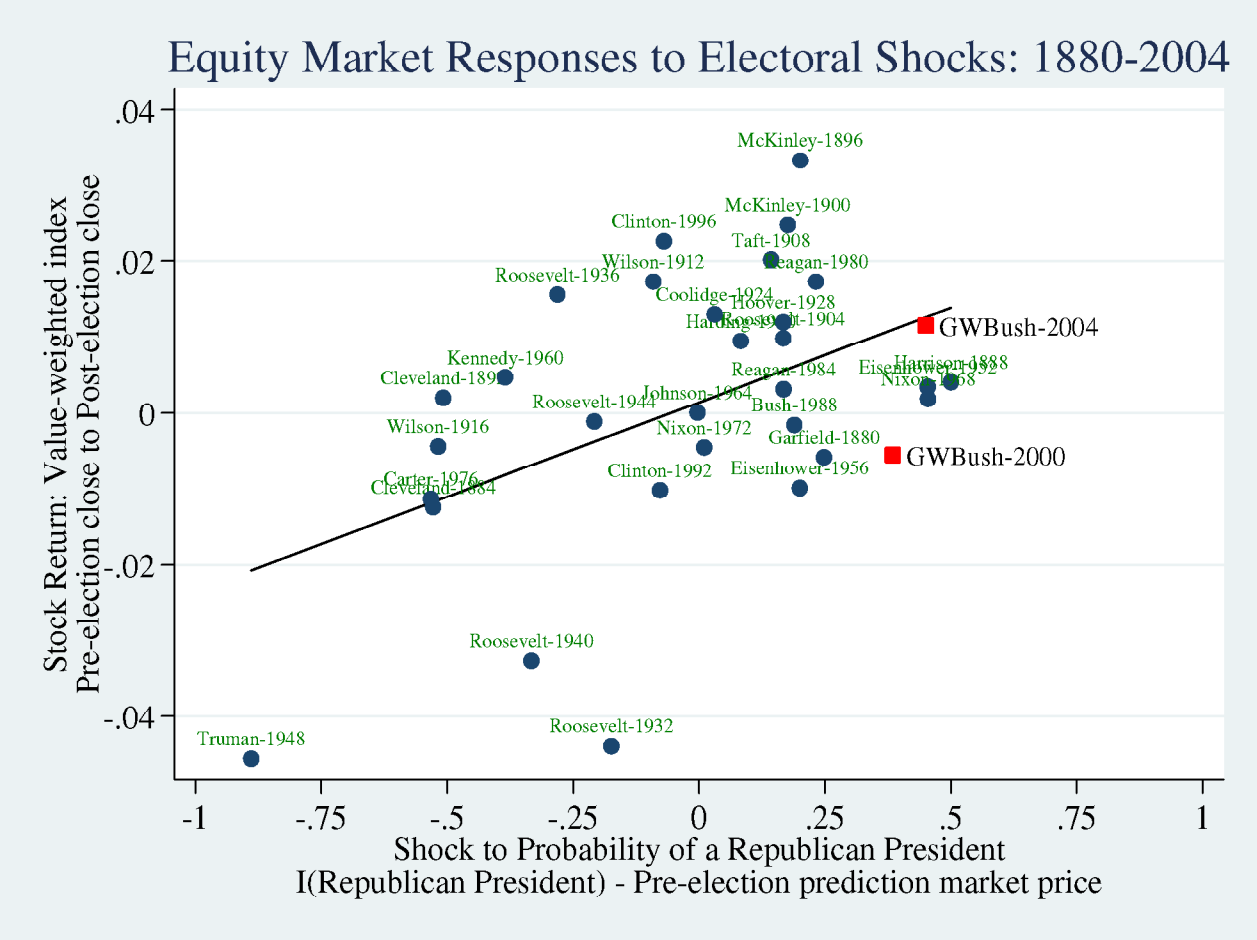


Table 3 attempts to reconcile these two results, starting by analyzing the return-sign relationship for Santa-Clara and Valkanov's 1928-1996 sample. As with their analysis, we find a positive, but insignificant relationship when only analyzing which party wins the election. If instead we account for the magnitude of the electoral surprise, as suggested by Shelton (2005), exploiting pre-election prediction market prices, our results are clearly 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 jointly analyzes both our variable describing the partisan shock (measured as the change in beliefs that a Republican would be elected) and the change in expectations that the

incumbent party would be re-elected, again finding strong evidence that partisanship, rather than incumbency effects are driving our results.[18]

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

	Dependent Variable: Stock returns from election-eve close to post-election close			
I(GOP President)	0.0129			
[*As in Santa-Clara and Valkanov*]	(.0089)			
ΔProb(GOP President)		0.0297**	0.0255***	0.0248***
		(.118)	(.0082)	(.0084)
ΔProb(Incumbent party elected)				-0.0046
				(.0084)
Constant	-0.0038	-0.0027	-0.0015	0.0014
	(.0044)	(.0040)	(.0028)	(.0028)
Sample	1928 – 1996	1928 – 1996	1880 – 2004	1880 – 2004

Notes: ***, ** and * denote statistically significant at 1%, 5% and 10%. (White standard errors in parentheses.)

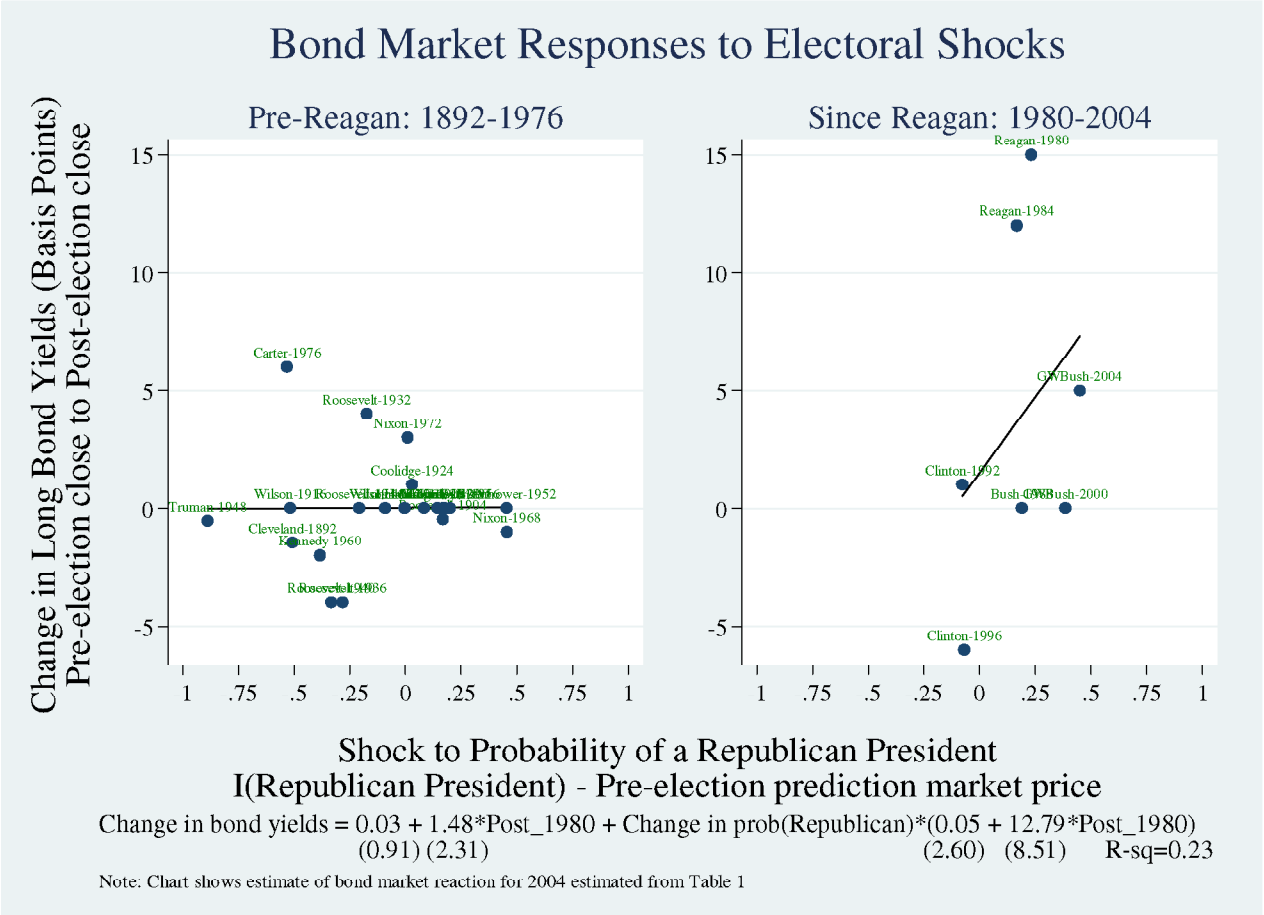
Thus, this analysis finds further evidence of statistically partisan effects on equity markets.[19] Moreover, the estimated magnitude is remarkably similar to our assessments based on intra-day movements in the 2000 and 2004 elections, with the election of a Republican president calculated to have typically been associated with a 2-3 percent rise in equity prices. The statistical power of our election-night approach is illustrated by the relative precision of the estimates in Tables 1 and Table 3: our estimate of partisan effects from a single night (11/2/2004) is three times more precise than our estimate using daily data from the last 124 years of Presidential elections, reflecting the fact that over a ten-minute period there are fewer unrelated shocks to financial markets creating noise. Equally, the analysis of historical data is also likely shaped by the fact that there is heterogeneity in the quality of the specific Republican candidates, and this heterogeneity is not present in the single-election case studies.

[18] There are many ways to define incumbency from incumbent parties to the incumbency of a particular candidate. We tested several specifications along this spectrum and found all yielded nearly identical conclusions.

[19] We are unable to test the effect of party in control of congress since this would require knowledge of the market's assessment of the probability of a change in congressional control. Prediction markets did not track this before 1994. If we assume that a certain proportion of seats going into an election would give a party near certainty of maintaining congressional control we can test whether a President winning with control of Congress creates different returns then winning without. We varied the necessary margin of control from 0.5 to 0.72 in increments of 0.01 and found that at no level was there a statistically significant effect of winning with control of Congress versus winning without.

Figure 5 turns to bond yields showing that they were historically quite unresponsive to political shocks until the election of Reagan in 1980 when the yield on the 10-year Treasury bill increased 15 basis points. Prediction markets viewed the chances of his election at 80%. Regressing changes in bond yields on the change in probability of a Republican president as in Table 3 reveals that there was no statistically or economically significant difference in the reaction of bond markets to Democratic or Republican candidates from 1920 to 1976. From 1980 onward a Republican President increased the 10-year bill yield 13 basis points (p=0.15). Although we have few observations, this pattern is consistent with both the relatively low national debt before 1980 and a re-alignment of the political parties with regard to government debt after 1980.

Figure 5: Bond markets before 1980 did not react to elections



Discussion

Large natural experiments caused by flawed election-evening 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. That said, this finding is consistent with observed higher deficits under Republicans since the 1980s. Finally, while the literature so far has focused on partisan elections as generating monetary or fiscal shocks, our oil price results suggest that macroeconomic "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 of voters, rather than changes in the officeholder, and disentangling the two makes falsification of the theory all the more difficult. Our analysis suggests that financial markets do not believe that

policy 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 contrary to the findings of Santa-Clara and Valkanov (2003) who find no sharp changes on Election Day, but large excess returns under Democratic administrations. The greater statistical power of our approach resolves our differences regarding the former observation, while reconciliations of the latter include the possibility 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, finding large effects on growth. 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 our 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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