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The 2000 presidential election and the information cost of sensitive versus non-sensitive S&P 500 stocks ☆

Yan He[a], Hai Lin[b], Chunchi Wu[c], Uric B. Dufrene[a,*]

[a] *Indiana University Southeast, USA*
[b] *Xiamen University, China*
[c] *University of Missouri at Columbia, USA*

Abstract

We investigate the information cost of stock trading during the 2000 presidential election. We find that the uncertainty of the election induces information asymmetry of politically sensitive firms under the Bush/Gore platforms. The unusual delay in election results creates a significant increase in the adverse selection component of the trading cost of politically sensitive stocks. Cross-sectional variations in bid-ask spreads are significantly and positively related to changes in information cost, controlling for the effects of liquidity cost and stock characteristics. This empirical evidence is robust to different estimation methods.

JEL classification: G0; G14

Keywords: Presidential election; Information asymmetry; Transaction costs; Bid-ask spreads; Adverse selection cost

1. Introduction

Numerous studies have shown that political elections affect stock markets. Herbst and Slinkman (1984), Huang (1985), Hensel and Ziemba (1995), and Santa-Clara and

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*Corresponding author. Tel.: +1 812 941 2308; fax: +1 812 941 2672.
E-mail address: yanhe@ius.edu (U.B. Dufrene).

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Valkanov (2003) analyze the difference in stock returns under Republican and Democratic presidents of the United States.[1] Pantzalis, Stangeland, and Turtle (2000) show that stock markets are affected around political election dates across 33 countries. Nippani and Medlin (2002) document an initial negative return in market indices due to the delay in the results of the 2000 presidential election. Knight (2006) reports that policy platforms of Gore and Bush are capitalized into equity prices for a sample of 70 politically sensitive firms during the 2000 U.S. presidential election. Mattozzi (2005) finds, similarly, that policy platforms are factored into the prices of politically sensitive stocks. These studies focus on issues such as whether the market reacts to election news and whether policy platforms are capitalized into equity prices. Given all the findings, however, not much effort has been made to understand the information assimilation process of stock markets and the adverse selection cost of trading at the intraday level in relation to polls and elections.

In standard microstructure models, information asymmetry typically arises when a trader possesses private information. However, recent studies have shown that information asymmetry can also be associated with a public information release.[2] This type of information asymmetry may come from two major sources. One is heterogeneous interpretation of public information (see Green, 2004; Brandt and Kavajecz, 2004). Even though traders observe the same set of public information, they vary in their abilities to analyze it. In the present case, the public news related to polls, elections, and recounts can create a significant information disparity among traders. Stocks that are more subject to the influence of election results may therefore experience higher information asymmetry and a larger informed trading component of transaction costs. The other important source of information asymmetry is inventory information. Cao, Evans, and Lyons (2006) show that compensation for bearing inventory risk introduces a link between order flow and prices even if customer order flow is uninformed. In this case, order flow provides information as to whether the price for a particular security should be higher or lower even if trading provides no fundamental information about the security's value. By observing investors' order flows, dealers possess valuable private information for forecasting future prices. News announcements on the pending presidential election impact stock prices and generate hedging demands. Dealers with larger customer order flows hold a greater informational advantage and so information asymmetry would be higher following an important election news announcement.

The 2000 presidential election offers a unique opportunity for us to study the effects of polls, elections, and recounts on stock trading. This event is different from elections in any other years. Normally the election outcome would be clear by the end of the election day or the following day. For the 2000 presidential election, however, there was no clear winner by the end of November 7th or the next morning. Florida's electoral votes were too close

[1]Recently, Fair (2006) employs the data from political betting markets to measure election uncertainty not revealed in the polling data.

[2]Krinsky and Lee (1996) report that the adverse selection cost component of bid-ask spreads significantly increases surrounding the public announcements of earnings. Ito, Lyons, and Melvin (1998) provide evidence of private information in the foreign exchange market of Tokyo. Balduzzi, Elton, and Green (2001) investigate the effects of scheduled macroeconomic announcements on prices, trading volume, and bid-ask spreads of Treasury securities. Green (2004) examines the impact of trading on government bond prices after the release of macroeconomic news, and documents a significant increase in the informational role of trading following economic news announcements.

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to call, and so a recount was started. The uncertainty continued for 36 days until Al Gore publicly conceded the presidency on December 13. This unprecedented event resulted in tremendous uncertainty for the election outcome over a period of 36 days which were full of news reports for petitions, recounting, halting, and restarting of ballot recounts. These announcements might have set off various interpretations among traders and investors and thus induce informational heterogeneity. In addition, this unusual event strictly pertains to the presidential election, not Congressional races. It thus allows us to control for other factors and to focus exclusively on the effects of information releases for the presidential election on stock trading.

In this paper, we investigate whether the presidential election affects the informational role of stock trading during the period of July to December of 2000. Specifically, we examine three types of firms that are possibly subject to the influence of election results, i.e., partisan industries, top donors, and favored firms under the Bush/Gore political platforms. Using the three test samples of stocks and a control sample, we examine the components of intraday trading costs in the base period (7/1/2000–8/31/2000), the polling period (9/1/2000–11/6/2000), the election & recount period (11/7/2000–12/13/2000), and the post-recount period (12/14/2000–12/31/2000).

Our paper documents several interesting findings. First, we find that the political uncertainty in the 2000 presidential election causes information asymmetry in the financial market. As a consequence, the adverse-selection component of trading cost for the politically sensitive stocks under the Bush/Gore political platforms increases significantly during the election & recount period and the post-recount period. This effect is particularly strong for the stocks belonging to the group of favored firms compiled by financial analysts during the campaign. The politically favored stocks are recommended by financial analysts in three securities firms based on the expected performance of the stocks under the Bush/Gore administrations. These stocks tend to be followed more closely by investors and speculators during the election. Second, there is evidence that the returns of the politically sensitive firms are tied to the fortune of the party that subsequently came to power, and the election news has impacts on both expected cash flow and discount rate of these firms. Finally, controlling for the effect of the liquidity cost and stock characteristics, the cross-sectional change in bid-ask spreads is significantly related to the change in the information cost. This finding confirms that the uncertainty of the 2000 presidential election induces significant information asymmetry that increases the adverse selection component of trading cost.

The remainder of the paper is organized as follows. Section 2 discusses the data sample. Section 3 describes a transaction-level model of price formation, a regression model of changes in bid-ask spreads, and the empirical methodology. Section 4 presents empirical results. Finally, Section 5 summarizes the main findings of the paper.

2. Data

During the 2000 presidential campaign, Texas Governor George W. Bush accepted the Republican Party's nomination on August 3, and Vice President Al Gore, Jr. accepted the Democratic Party's nomination on August 17. The Gallup tracking poll data, which gauge public opinion of the presidential race over 2- to 3-day intervals, were first released on September 7, and then reported every day until the election day of November 7.[3] Before

[3]The poll data released on September 7, 2000 were based on the poll conducted during September 4–6.

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the election day, Bush and Gore were neck-and-neck in the polls. After the election day, Florida's electoral votes were too close to call so that a ballot recount was started, as mandated by the Florida state legislature. Later, the U.S. Supreme Court overturned the Florida Supreme Court's earlier decision, which put an end to any further recount. On December 13, Gore publicly conceded the presidency.

Our sample period for the intraday data ranges from 7/1/2000 to 12/31/2000, which is further divided into 4 subperiods. Period I (the base period) is from 7/1/2000 to 8/31/2000. Period II (the polling period) is from 9/1/2000 to 11/6/2000. Period III (the election & recount period) is from 11/7/2000 to 12/13/2000. Period IV (the post-recount period) is from 12/14/2000 to 12/31/2000.

Our initial sample contains all the S&P 500 stocks obtained from the Compustat database. We then choose stocks from this sample according to the following criteria. (1) The average close price is between \$1 and \$200. (2) Changes in the amount of shares outstanding are less than 10% from 7/1/2000 to 12/31/2000. (3) The primary exchanges are the NYSE and AMEX.[4] (4) The minimum tick is \$1/16. During our sample period, some stocks were included in the decimal pricing pilot program and were traded on decimals with the minimum tick of \$0.01, while the rest of NYSE-listed stocks were traded on fractions with the minimum tick of \$1/16.[5] Since stocks traded on fractional and decimal systems tend to differ in transaction costs, we select stocks traded on fractions only. The data of close price, shares outstanding, exchange, and minimum tick are obtained from the Trade and Quote (TAQ) database. After filtering, we end up with 346 stocks in the sample.

As certain industries and/or firms have more or less stake in the outcome of elections, we construct three test samples and one control sample based on the 346 stocks. The three test samples include the partisan contributing industry sample, the top donor sample, and the politically favored firm sample. We categorize the firms in all three samples as politically sensitive firms which are closely associated with one political party and may be particularly affected by the uncertainty surrounding the election.

The information on the partisan contributing industries is collected from Shon (2006). Data reported by Shon (2006), such as the top contributing industries to Bush and Gore and the relative proportion of contributions made to Bush and Gore by industries, were originally collected from the Center for Responsive Politics (CRP).[6] The most Bush-partisan contributing industries that overlap with our 346-stock sample include Oil & Gas, Forestry & Forest Products, Tobacco, Automotive, Building Materials & Equipment, Chemical & Related Manufacturing, Mining, Finance/Credit Companies, and Trucking. The most Gore-partisan contributing industries that overlap with our 346-stock sample include Environment and TV/Movies/Music. Using the industry codes for these industries,[7] we were able to construct an initial partisan industry sample of 69 stocks that fall into this category, among which 61 are from the Bush-partisan industries and 8 from the Gore-partisan industries.

[4]Studies find that bid-ask spreads are significantly higher on Nasdaq than on the NYSE. See Christie and Schultz (1994), Huang and Stoll (1996), Bessembinder and Kaufman (1997), and Weston (2000).

[5]The conversion from fractional to decimal trading in the U.S. markets has significantly reduced bid-ask spreads. See Chakravarty, Harris, and Wood (2001a, 2001b), Chung, Van-Ness, and Van-Ness (2001), Bacidore, Battalio, Jennings, and Farkas (2001), Gibson, Singh, and Yerramilli (2002), Bessembinder (2003), and He and Wu (2005).

[6]See Table 2 of Shon (2006).

[7]These are based on the industry codes used in the TAQ database.

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Moreover, we search the partisan industry firms directly from the website of the Center for Responsive Politics. The Center for Responsive Politics publishes information for major contributing firms for each of the 20 most partisan industries in the 2000 U.S. presidential election.[8] The contribution data reported for each company represent total bundled contributions from the firm's Political Action Committee (PAC), soft-money, and individuals associated with the firm. We select companies among the top contributing firms which had at least 80% of their contribution going to one political party but were not included in our initial 69-stock sample described above. Crossing with our 346 S&P stock sample, we identify 26 new most partisan firms. In addition, from Cheng (2005), we identify another 7 firms from oil, major drugs, and defense industries which were widely believed to benefit significantly from the Bush platform but were not included in the initial sample. In all, we add 33 firms to the initial 69-stock sample.[9] The final sample of the partisan industry category includes 102 firms.

The second sample is constructed based on the information for the top 100 donors. The proportion of donations of the top 100 donors made to Bush and Gore is collected from the Center for Responsive Politics.[10] Like the partisan industry firm data, the top donor data include all three sources of campaign contributions. Crossing the top donors with our 346-stock sample, we obtain 16 Bush-partisan firms and 3 Gore-partisan firms. Thus, a total of 19 stocks are in the category of top donors.

The third sample includes a group of firms favored under Bush or Gore platforms in the 2000 presidential election. The information on the favored firms under the Bush/Gore political platforms was collected from Knight (2006), who originally collected it from the financial analyst reports of Lehman Brothers, Prudential Securities, and International Strategy and Investment. These reports were produced by analysts of the three companies for politically sensitive individual firms during the 2000 campaign, which were likely to perform well under either a Bush or Gore administration. They identified 41 firms likely to fare well under a Bush administration and 29 firms likely to fare well under a Gore administration. Crossing the favored firms with our 346-stock sample, we have 21 firms likely to perform well under the Bush platform and 11 firms likely to perform well under the Gore platform. Thus, a total of 32 sample stocks are in the category of favored firms under the Bush/Gore political platforms. Finally, the remaining 223 S&P 500 stocks that do not belong to any of the above three test samples are included in the control sample.

The three test samples have different features. The data for the favored firms were compiled by analysts from the three securities firms independently prior to the election date of November 7, 2000.[11] Thus, these data represent ex-ante categorizations. By contrast, the data of the partisan industry firms and top donors were released after the

[8]The website is www.opensecrets.org/bigpicture/index.asp which supplies the historical data under the election overview (big picture).

[9]Some of the 33 additional partisan firms were not identified in the initial sample due to the difference in industry classification codes. We use the industry code in TAQ to identify the firms in an industry that is considered as partisan. We find that some firms in the CRP website are in the same industry but have a different industry code from that provided in TAQ.

[10]Again, the data for the donation of each top donor represent the total amount of contributions, including PAC, soft-money, and individual contributions. The top donors considered in this study are categorized by the CRP as the top overall donors.

[11]See Knight (2006, p. 759). In fact, using the favored-firm data, Knight (2006) only covers a period before the election date, i.e., from September 7–November 6, 2000.

election. Some of these data were released on October 1, 2001 while others were released on January 3, 2002.[12] Although these data were released after the election, there are reasons to believe that they are unlikely to be subject to a serious ex-post classification problem, i.e., politically sensitive firms were chosen because they responded to political fluctuations. First of all, the classification of the partisan industry and top donors was based on the contributions made during the campaign. These contributions were made and reported to the Federal Election Commission (FEC) before the election date and the ex-post release of the information for top donors and most partisan industries merely reflects the past fact. Furthermore, major partisan industries can be easily identified by the public before the election through news reports, candidate press releases, advertisements sponsored by political parties, and the presidential debates. For example, from press releases, television advertisements, and quotes from the three presidential debates, one can easily learn that pharmaceuticals, defense, oil & gas, and tobacco industries will fare quite well under the Bush administration (see Knight, 2006).[13] Top donors are also often publicized by news agencies.[14] Thus, the potential endogeneity problem arising from firms being chosen as partisan firms by their response to political fluctuations ex post is likely to be negligible.

Nevertheless, the partisan contributing industry and top donor data are expected to be noisier than the favored firm data. The contribution amount and proportion of contribution by each firm and individual donor to each presidential candidate were generated from the filings mandated by Federal Election Campaign Act. Since the specific amount of contributions was released by the Federal Election Commission after the election, investors would not have complete knowledge of the exact amount of contributions by each firm and individual over our sample period. This imperfection will introduce noise to the partisan contributing industry and top donor data samples because stock price will not completely reflect the precise amount of contributions by companies and individual donors. As a consequence, the empirical evidence for these two groups of firms may be somewhat weakened.

In summary, among the 346 S&P 500 stocks, 123 are in the three test samples and 223 are in the control sample. Table 1 provides the list of the 123 test firms as well as the categories which they belong to. The partisan industry category contains 102 stocks, the top donor category contains 19 stocks, and the favored firm category contains 32 stocks. In addition, 25 firms belong to more than one category; 20 firms belong to two of the three categories, and 5 firms belong to all three.

Intraday data are collected from the Trade and Quote (TAQ) database for all the 346 stocks in the sample. Trade data consist of transactions coded as regular trades. Trades and quotes outside normal market hours (9:30 a.m. to 4:00 p.m. Eastern Standard Time) are excluded. The first trade in a trading day is deleted. Small trades transacted at the same price within a second are lumped into one trade. Quotes and trades are matched concurrently in our empirical estimation. That is, we pair each trade with the quote posted concurrently or earlier but within the same trading day. Quote data are used to sign the trade initiation variable (x). A trade at or above the ask price is classified as

[12]See the website of the CRP.

[13]The original paper by Knight in the NBER working paper series provides quotes from the three Presidential debates taken from www.issues-2002.org and candidate press releases in Washington Post, August 31 and October 10, 2000.

[14]For example, Enron, through Kenneth Lay, was well known as a major donor to Bush during the campaign.

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Table 1
Test Samples. This table provides a list of 123 stocks in three test samples. The three test samples are: partisan contributing industries, top partisan donors, and favored firms under the Bush/Gore political platforms. "X" indicates that a stock belongs to a specific sample category. "B" indicates Bush and "G" indicates Gore partisan firms.

Total (123)	Partisan industries (102)	Top donors (19)	Favored firms (32)	Gore or Bush
AA	X			B
ABT	X			B
AET			X	B
AGC			X	G
AHC	X			B
AN	X			B
AL	X			B
APA	X			B
APC	X			B
APD	X			B
ASH	X			B
ATI	X			B
AW	X			G
BA	X		X	B
BCC	X			B
BHI	X		X	B
BLS		X		B
BMY	X		X	B
CAG	X			B
CAT	X			B
CB			X	G
CCE	X			B
CCR	X			B
CCU	X			G
CHV	X			B
COF	X			B
COP	X			B
CTX	X			B
DE			X	G
DIS	X	X		G
DOW	X			B
DYN	X			B
EC	X			B
EK	X			G
EMN	X			B
ENE		X		B
EPG	X		X	B
FBF		X	X	G
FCX	X			B
FLR	X			B
FNM	X		X	B/G[a]
FO	X			G
FRE	X	X	X	B/G[a]
GD	X		X	B
GE	X	X		B
GLK	X			B
GM	X			B
GP	X		X	B

Table 1 (*continued*)

Total (123)	Partisan industries (102)	Top donors (19)	Favored firms (32)	Gore or Bush
GT	X			B
HAL	X			B
HAS	X			G
HDI	X			G
HI			X	B
HIG			X	G
HM	X			B
HPC	X			B
HRB			X	G
IFF	X			B
IP	X	X		B
ITT	X			B
JCI	X			B
JNJ	X			B
KBH	X			B
KMG	X			B
LEG	X			B
LEH	X			B
LLL	X			B
LLY	X	X	X	B
LMT	X			B
LNC			X	G
LPX	X			B
LTR	X		X	B
MAS	X			B
MBI			X	B
MEA	X			B
MET		X		G
MO	X	X	X	B
MRK	X		X	B
MRO	X			B
MWD		X		B
NE	X			B
NEM	X			B
NOC	X		X	B
NUE	X			B
ONE		X	X	B/G[a]
OXY	X			B
P	X			B
PCH	X			B
PCL	X			B
PD	X			B
PDG	X			B
PFE	X	X	X	B
PHA	X	X	X	B
PHM	X			B
PX	X			B
Q		X		B
RD	X			B
RDC	X			B
RIG	X			B
ROH	X			B

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Table 1 (*continued*)

Total (123)	Partisan industries (102)	Top donors (19)	Favored firms (32)	Gore or Bush
SBC			X	B
SGP	X		X	B
SLM			X	B
SO		X		B
SUN	X			B
SWK	X			B
TOS	X			B
TX	X			B
TYC	X			B
UCL	X			B
UNP	X	X		B
UST	X	X		B
UTX	X			B
W	X			B
WLL	X			B
WLP			X	B
WMB	X			B
WMI	X			G
WOR	X			B
WPI			X	G
WY	X		X	B
X	X			B
XOM	X	X		B

[a]FNM is a Bush-partisan industry stock, but a favored firm under the Gore platform. FRE is a Bush-partisan industry stock and a Bush-partisan top donor, but a favored firm under the Gore platform. ONE is Bush-partisan top donor, but a favored firm under the Gore platform.

a buyer-initiated trade, and we assign 1 to the trade initiation variable. A trade at or below the bid price is classified as a seller-initiated trade, and we assign −1 to the trade initiation variable. For a trade that crosses within the prevailing bid-ask spread, we assign 0 to the trade initiation variable.

In addition to the intraday data, we collect daily stock prices from the CRSP tape for firms in the sample over the period from July 1, 1995 to December 31, 2000. These daily data will be used later to perform an event-study analysis to determine whether the firms in the test samples are indeed politically sensitive firms. The period from July 1, 1995 to June 2000 is the estimation period, over which we obtain the historical estimate of beta to control for the systematic risk in the calculation of abnormal returns. The period from July 1 to December 31 is the testing period, and it is further divided into four subperiods as the case for intraday data.

3. Empirical methods

3.1. Bid-ask spread components: information and liquidity costs

Transaction costs are measured by quoted and effective bid-ask spreads. Market microstructure theory suggests that transaction cost is a compensation for market making by specialists or dealers. Market makers face the problem of adverse selection and bear liquidity/inventory costs when they execute incoming buy and sell orders. Hence, the higher the information cost and/or the liquidity cost, the larger the quoted and effective bid-ask spreads.

To understand the effect of a presidential election on transaction costs, we estimate both the information and liquidity cost components of the bid-ask spread by employing the quasi-structural model of Madhavan, Richardson, and Roomans (1997, hereafter MRR). This model is a generalization of earlier microstructural models of Glosten and Milgrom (1985) and Stoll (1989). The MRR model is more structural because it accommodates unexpected public information and microstructural effects, and serial correlation in order flow. In the MRR model, the revision in beliefs is linked to the innovations in order flows and public information shocks. In addition to the informational impacts, the model incorporates the effect of stochastic rounding errors induced by price discreteness or time-varying returns. The following is a brief description of the MRR model.

Let Δp_t be the transaction price change from time $t-1$ to t. θ is the parameter which measures the degree of information asymmetry or the permanent effect of order flow innovations on prices, and ϕ measures the transitory effect of order flow on prices. ε_t is the revision in beliefs due to new public information, and ξ_t is the effect of price rounding errors. Both ε_t and ξ_t are independent and identically distributed. In addition, denote x_t as an indicator variable for trade initiation, where x_t equals $+1$ if a trade is buyer initiated, -1 if it is seller initiated, and 0 if the trade crosses within the prevailing bid-ask spread. The variance of x_t is normalized to one. Order flow (x_t) may be serially correlated where ρ is the first-order autocorrelation. Given this setting, MRR show that price changes can be characterized by the following process:

$$\Delta p_t = (\phi + \theta)x_t - (\phi + \rho\theta)x_{t-1} + u_t, \tag{1}$$

where $u_t = \varepsilon_t + \xi_t - \xi_{t-1}$, θ measures the extent of information asymmetry, and ϕ represents the compensation for liquidity provision and order process costs. ϕ captures the temporary effect of order flow on prices whereas θ captures the permanent effect associated with fundamental information. When order flow is autocorrelated, only the innovations reveal information. Hence, the autocorrelation parameter ρ can be used to determine the expectation and innovations of order flow. Based on (1), we can calculate the model-implied bid-ask spread (ISPR) as

$$\text{ISPR} = 2(\theta + \phi). \tag{2}$$

We use the Generalized Method of Moments (GMM) to estimate ρ, θ, and ϕ. The Newey and West (1987) procedure is adopted to account for the autocorrelation and conditional heteroskedasticity in observed price changes. In empirical investigation, we jointly estimate the model parameters by pooling the intraday data over the four subperiods from July 1 to December 31, 2000 to increase estimation efficiency. This procedure allows the microstructural parameters to vary over the four subperiods. Specifically, the estimated model is

$$\Delta p_t = \sum_{i=1}^{4} (\phi_i + \theta_i) I_i x_t - (\phi_i + \rho_i \theta_i) I_i x_{t-1} + u_t, \tag{3}$$

where $I_i = 1$ if the transaction takes place in period i and 0 otherwise. Let $v_t = \sum_{i=1}^{4} I_i (x_t - \rho_i x_{t-1})$. The following moment conditions exactly identify the parameters to be estimated:

$$E\begin{bmatrix} v_t I_1 x_{t-1} \\ v_t I_2 x_{t-1} \\ v_t I_3 x_{t-1} \\ v_t I_4 x_{t-1} \\ u_t \\ u_t I_1 x_t \\ \vdots \\ u_t I_4 x_t \\ u_t I_1 x_{t-1} \\ \vdots \\ u_t I_4 x_{t-1} \end{bmatrix} = 0, \tag{4}$$

where $u_t = \Delta p_t - [\sum_{i=1}^{4}(\phi_i + \theta_i)I_i x_t - (\phi_i + \rho_i\theta_i)I_i x_{t-1}]$. The first set of moment conditions defines the first-order autocorrelation in order flow. The second set of moment conditions requires that the mean of residuals in (1) be zero. The third and fourth sets of conditions maintain that these residuals are independent from the trade initiation variables in current and lagged-one periods.

3.2. Tests of cross-sectional variation in changes of bid-ask spreads

To examine the transaction costs of stocks in relation to their spread components and stock features, we regress the change in the bid-ask spread over two periods against changes in stock features, information cost, and liquidity cost for test and control sample stocks. The testing model is

$$\begin{aligned} \Delta Y = {} & n_0 + n_1\Delta P + n_2\Delta \mathrm{VOLA} + n_3\Delta \mathrm{DV} + n_4\Delta\theta + n_5\Delta\phi \\ & + D(s_0 + s_1\Delta P + s_2\Delta \mathrm{VOLA} + s_3\Delta \mathrm{DV} + s_4\Delta\theta + s_5\Delta\phi), \end{aligned} \tag{5}$$

where Y can be the quoted (SPR) or effective bid-ask spread (ESPR), P is the average close price, VOLA is the absolute daily change in the log of close price, DV is the daily dollar volume, θ is the information cost parameter, and ϕ is the liquidity cost parameter. Δ represents the log change in a variable. For example, from the base period to the polling period, ΔP is equal to the log price of the polling period minus the log price of the base period. Parameters n_1, n_2, n_3, n_4, and n_5 are the coefficients of log changes in P, VOLA, DV, θ, and ϕ, respectively. D is a dummy variable, where $D = 1$ for test sample firms and 0 for control sample firms. Parameter s_0 represents the difference between the test and control firms in the change of bid-ask spread, with the control of log changes in P, VOLA, DV, θ, and ϕ. Parameters s_1, s_2, s_3, s_4, and s_5 represent the differences between the test and control firms in the coefficients on changes in P, VOLA, DV, θ, and ϕ, respectively. We use the Generalized Method of Moments (GMM) to estimate the parameters of the regression model in (5).

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3.3. Tests of the relation between spread and information cost using the portfolio approach

The above cross-sectional regression approach includes regressors (θ and ϕ) estimated from the MRR model. While the estimated coefficients of $\Delta\theta$ and $\Delta\phi$ are still unbiased, the estimated standard errors may be inconsistent (see Pagan, 1984). To resolve this problem, we employ a portfolio approach suggested by Daniel and Titman (1997) to test the relation between changes in spreads and changes in information and liquidity costs. Using this approach, we form bivariate portfolios based on $\Delta\theta$ and $\Delta\phi$, and report the differences in spread changes associated with high and low $\Delta\theta(\Delta\phi)$ groups. This enables us to examine the cross-sectional variation in spread changes over the election periods due to changes in information and noninformational (liquidity) cost components without a regression specification. This portfolio approach is thus robust to the generated regressor problem encountered in the cross-sectional regression.

3.4. Impacts of election news on stock returns

Intuitively, the Bush firms should experience positive returns and the Gore firms should have negative returns following the announcement of favorable news for Bush. Previous studies (see Cheng, 2005; Shon, 2006; Knight, 2006) have documented this relation using either polling or electronic market data. All of these studies have implicitly attributed the stock return to changes in expected future cash flows. However, strictly speaking, stock price changes can be due to either cash flow or discount rate changes.[15]

One way to separate the impacts of election news on cash flow and discount rate is to decompose the price change due to the news announcement into the components associated with these two variables. We can first estimate the change in discount rate in a period surrounding the event and then adjust the return for the change in the discount rate (or required return) for that period. The adjusted return should then reflect the change in cash flows. If this adjusted return is significantly positive surrounding the event, it would suggest that election news impacts the cash flow underlying the security favorably.

To examine whether the discount rate of politically sensitive stocks changes over the election period, we estimate the following market model with dummy variables:

$$R_{it} = \alpha_i + \beta_{0i} R_{mt} + \beta_{1i} D_1 R_{mt} + \beta_{2i} D_2 R_{mt} + \beta_{3i} D_3 R_{mt} + \beta_{4i} D_4 R_{mt} + \varepsilon_t, \quad (6)$$

where D_j, $j = 1, 2, 3$, and 4, equals 1 if an observation falls into period j and zero, otherwise. β_{0i} is the historical (base) beta for stock i and the beta for current period j is equal to $\beta_{0i}+\beta_{ji}$. In empirical estimation, we use return data from July 1, 1995 to December 31, 2000. The historical period runs from July 1, 1995 to June 30, 2000. For this period, $D_j = 0$ and the beta risk equals β_{0i}. For any of the four election periods, the beta risk is equal to the historical betaβ_{0i} plus an incremental beta ($D_j\beta_{ji}$) for that period (j). If the beta risk changes over the election periods, it implies that the discount rate also changes. By accounting for the beta change in each period, we can provide a better picture of whether the election news has an impact on the cash flow of politically sensitive firms.

[15] This contrasts with Treasury coupon bonds where cash flow is fixed and virtually risk free, and so Treasury bond returns are predominantly associated with changes in the discount rate (see Green, 2004).

For each stock in each election period j, we calculate the abnormal return for an individual stock in each day t as follows:

$$\mathrm{AR}_{it} = R_{it} - \alpha_i - (\beta_{0i} + \beta_{ji} D_j) R_{mt}. \tag{7}$$

The calculation of this abnormal return differs from the traditional event-study method which employs historical beta estimated from the data prior to the event window. Instead, we use the beta estimated for each period to capture the potential impacts of beta changes during the 2000 presidential election period. Since returns are adjusted for the change in beta risk (and discount rate) associated with the election event, a significant abnormal return will imply that the return of the politically sensitive stock derives also from changes in the expected cash flow. That is, there is a significant stock price change over and beyond what is accounted for by the change in the discount rate.

The cumulative abnormal return over the event window for each individual stock is calculated as follows:

$$\mathrm{CAR}_{it} = \sum_{j=-T_1}^{t} \mathrm{AR}_{ij}, \tag{8}$$

where $t = -T_1$ to T_1. In our empirical investigation, we set $T_1 = 3$ and $t = 0$ is the event day. The individual abnormal returns and cumulative abnormal returns are then averaged across firms to generate the average abnormal return and cumulative abnormal returns associated with a particular event:

$$\mathrm{AR}_t = \frac{1}{N} \sum_{i=1}^{N} \mathrm{AR}_{it} \tag{9}$$

and

$$\mathrm{CAR}_t = \frac{1}{N} \sum_{i=1}^{N} \mathrm{CAR}_{it}, \tag{10}$$

where N is the number of stocks in a sample. In the empirical investigation, we focus on two clear-cut event days: the election date and the Supreme Court's decision date to stop the Florida ballot recount.

4. Empirical results

4.1. Stock features and transaction costs

We report the mean and standard deviation of stock features and bid-ask spreads for stocks in the partisan industry, top-donor, favored-firm, and control samples, respectively, in Panels A–D of Table 2. To examine the effects of the presidential election on stock features and bid-ask spreads, we compare the log change in a variable over two periods for test sample stocks with the log change in the same variable over the same two periods for control sample stocks by conducting the t-tests and the Wilcoxon sign tests in Panels A–C of Table 2. Each later period (the polling period, the election & recount period, or the post-recount period) is compared with the base period. The log change is defined as the log value of a variable in a later period minus the log value of a variable in the base period. The t-statistic is on the mean difference between the test and control samples in the log

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Table 2
Stock features and bid-ask spreads. This table provides statistics on the features of 102 partisan contributing industry stocks in Panel A, 19 top-donor firms in Panel B, 32 favored firms under the Bush/Gore political platforms in Panel C, and 223 control stocks in Panel D. Period I (the base period) is from 7/1/2000 to 8/31/2000, Period II (the polling period) is from 9/1/2000 to 11/6/2000, Period III (the election & recount period) is from 11/7/2000 to 12/13/2000, and Period IV (the post-recount period) is from 12/14/2000 to 12/31/2000. *P* is the close price, MV is the market capitalization, *V* is the daily share volume, DV is the daily dollar volume, *T* is the daily number of trades, VOLA is the absolute daily change in the log of close price, SPR ($) is the quoted bid-ask spread in dollars, ESPR ($) is the effective bid-ask spread in dollars, SPR (%) is the quoted bid-ask spread in percentage, and ESPR (%) is the effective bid-ask spread in percentage. The *t*-statistic is on the mean difference between one of the test samples and the control sample in the log change of a variable from Period I to Period II (III or IV), and the Wilcoxon sign test statistic (*z*-score) is on the median difference between the two samples in the log change of a variable from Period I to Period II (III or IV). *Indicates significance at the 5% level.

		Period I	Period II	*t*-Value *z*-score	Period III	*t*-Value *z*-score	Period IV	*t*-Value *z*-score
Panel A. Partisan industry stocks (102)								
P ($)	Mean	39.12	40.54	$t = 0.06$	40.79	$t = -0.35$	42.21	$t = 0.57$
	Std. Dev.	21.63	22.47	$z = -0.56$	21.54	$z = -0.89$	22.13	$z = -0.34$
MV ($1000)	Mean	29,421,198	27,842,007	$z = 0.06$	31,407,979	$z = -0.35$	31,579,765	$z = 0.57$
	Std. Dev.	74,893,341	72,374,158	$z = -0.56$	77,117,403	$z = -0.89$	74,736,885	$z = 0.34$
V	Mean	1,363,058	1,689,041	$z = 0.18$	1,653,497	$z = 1.06$	1,695,040	$z = 0.64$
	Std. Dev.	1579571	1952307	$z = -0.05$	1937377	$z = 0.72$	1,955,548	$z = 0.70$
DV ($1000)	Mean	64,599,385	78,904,922	$z = 0.17$	80,889,880	$t = 0.66$	83,601,096	$t = 0.76$
	Std. Dev.	89,251,172	107,757,925	$z = 0.68$	113,506,129	$z = -0.11$	112,142,584	$z = 0.47$
T	Mean	565	670.09	$t = -0.28$	705	$t = -0.10$	752	$t = 0.27$
	Std. Dev.	487	557.49	$z = -0.05$	537	$z = -0.76$	544	$z = -0.01$
VOLA	Mean	0.0326	0.0206	$t = -1.09$	0.0202	$t = 0.25$	0.0238	$t = 0.76$
	Std. Dev.	0.0136	0.0077	$z = -1.11$	0.0069	$z = 0.17$	0.0089	$z = 0.68$
SPR ($)	Mean	0.1135	0.1152	$t = 0.11$	0.1152	$t = -0.92$	0.1167	$t = 0.02$
	Std. Dev.	0.0262	0.0277	$z = -1.25$	0.0236	$z = -1.20$	0.0265	$z = -0.23$
ESPR ($)	Mean	0.0875	0.0881	$t = -1.13$	0.0867	$t = -1.82$	0.0893	$t = -0.31$
	Std. Dev.	0.0184	0.0178	$z = -0.20$	0.0133	$z = -1.61$	0.0162	$z = 0.09$
SPR (%)	Mean	0.39%	0.40%	$t = -0.06$	0.39%	$t = -0.07$	0.39%	$t = -0.57$
	Std. Dev.	0.27%	0.30%	$z = 0.32$	0.31%	$z = -0.03$	0.31%	$z = -0.05$
ESPR (%)	Mean	0.30%	0.31%	$t = -0.25$	0.31%	$t = -0.35$	0.30%	$t = -0.69$
	Std. Dev.	0.19%	0.22%	$z = 0.11$	0.26%	$z = 0.01$	0.23%	$z = 0.18$
Panel B. Top donor stocks (19)								
P ($)	Mean	48.03	49.04	$t = -0.73$	49.03	$t = 0.43$	50.37	$t = 0.76$
	Std. Dev.	23.12	21.40	$z = -0.37$	20.01	$z = 0.04$	19.81	$z = 0.10$

MV ($1000)	Mean	96,589,039	99,570,603	$t = -0.73$	97,181,472	$t = 0.43$	96,254,630	$t = 0.76$
	Std. Dev.	145,804,334	152,581,500	$z = -0.37$	143,987,939	$z = 0.04$	136,116,966	$z = 0.10$
V	Mean	3,314,400	3,868,724	$t = -1.92$	4,122,646	$t = 0.66$	4,092,344	$t = -0.59$
	Std. Dev.	2,382,843	2,956,226	$z = -1.73$	2,917,055	$z = 0.63$	3,095,498	$z = -0.38$
DV ($1000)	Mean	166,263,348	200,778,034	$t = -1.85$	203,991,650	$t = 0.76$	205,432,346	$t = -0.10$
	Std. Dev.	132,203,284	174,078,487	$z = -1.41$	153,791,070	$z = 0.42$	160,709,691	$z = -0.01$
T	Mean	1,090	1,190	$t = -2.45$*	1,235	$t = -2.71$*	1,282	$t = -3.73$*
	Std. Dev.	676	697	$z = -3.35$*	665	$z = -2.56$*	692	$z = -3.04$*
VOLA	Mean	0.029	0.020	$t = -0.02$	0.021	$t = 1.28$	0.021	$t = 0.02$
	Std. Dev.	0.011	0.005	$z = 0.05$	0.006	$z = 1.25$	0.009	$z = 0.14$
SPR ($)	Mean	0.1042	0.1062	$t = 2.10$*	0.1089	$t = 1.71$	0.1057	$t = -0.01$
	Std. Dev.	0.0154	0.0159	$z = 1.93$	0.0182	$z = 1.14$	0.0191	$z = -0.23$
ESPR ($)	Mean	0.0827	0.0846	$t = 1.32$	0.0873	$t = 2.95$*	0.0850	$t = 0.84$
	Std. Dev.	0.0106	0.0121	$z = 1.16$	0.0126	$z = 2.34$*	0.0119	$z = 0.48$
SPR (%)	Mean	0.26%	0.25%	$t = 1.45$	0.25%	$t = 0.13$	0.23%	$t = -0.80$
	Std. Dev.	0.12%	0.10%	$z = 0.97$	0.09%	$z = 0.00$	0.07%	$z = -0.35$
ESPR (%)	Mean	0.21%	0.20%	$t = -1.03$	0.20%	$t = 0.67$	0.19%	$t = -0.58$
	Std. Dev.	0.09%	0.07%	$z = -0.83$	0.07%	$z = 0.62$	0.06%	$z = -0.08$
Panel C. Favored stocks (32)								
P ($)	Mean	52.30	56.99	$t = 2.86$*	60.83	$t = 3.75$*	62.05	$t = 3.09$*
	Std. Dev.	15.95	18.14	$z = 3.07$*	20.35	$z = 2.57$*	20.77	$z = 2.22$*
MV ($1000)	Mean	39,966,572	42,800,724	$t = 2.86$*	47,365,763	$t = 3.75$*	48,812,850	$t = 3.09$*
	Std. Dev.	52,755,063	54,634,668	$z = 3.07$*	62,428,582	$z = 2.57$*	64,136,717	$z = 2.22$*
V	Mean	2,031,062	2,385,772	$t = -0.44$	2,404,341	$t = 0.84$	2,397,894	$t = -0.74$
	Std. Dev.	1,962,385	2,185,451	$z = -0.47$	2,279,669	$z = 0.47$	2,365,315	$z = -0.46$
DV ($1000)	Mean	99,729,871	126,024,282	$t = 0.68$	137,144,602	$t = 2.48$*	136,859,629	$t = 0.91$
	Std. Dev.	96,846,538	109,932,123	$z = 1.28$	127,759,843	$z = 1.51$	125,015,636	$z = 0.94$
T	Mean	739	891	$t = -0.53$	970	$t = 0.43$	970	$t = -1.56$
	Std. Dev.	457	518	$z = -0.24$	560	$z = -0.12$	534	$z = -1.50$
VOLA	Mean	0.032	0.020	$t = -0.98$	0.019	$t = -0.32$	0.022	$t = -0.52$
	Std. Dev.	0.013	0.004	$z = -0.72$	0.005	$z = -0.18$	0.016	$z = -0.86$
SPR ($)	Mean	0.1230	0.1263	$t = 0.99$	0.1322	$t = 2.84$*	0.1311	$t = 2.30$*
	Std. Dev.	0.0270	0.0303	$z = 1.39$	0.0344	$z = 2.32$*	0.0256	$z = 1.72$
ESPR ($)	Mean	0.0926	0.0967	$t = 2.88$*	0.0989	$t = 3.51$*	0.0993	$t = 3.26$*
	Std. Dev.	0.0159	0.0191	$z = 2.67$*	0.0212	$z = 3.03$*	0.0206	$z = 2.58$*
SPR (%)	Mean	0.25%	0.24%	$t = -2.88$*	0.23%	$t = -2.10$*	0.23%	$t = -1.88$
	Std. Dev.	0.05%	0.06%	$z = -2.41$*	0.06%	$z = -1.62$	0.07%	$z = -1.80$
ESPR (%)	Mean	0.19%	0.18%	$t = -2.50$*	0.18%	$t = -1.76$	0.17%	$t = -1.75$

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Table 2 (*continued*)

	Period I	Period II	t-Value z-score	Period III	t-Value z-score	Period IV	t-Value z-score
Std. Dev.	0.04%	0.05%	$z = -2.23$*	0.05%	$z = -1.25$	0.05%	$z = -1.58$

		Period I	Period II	Period III	Period IV
Panel D. Control stocks (223)					
P ($)	Mean	38.81	39.18	40.46	41.11
	Std. Dev.	20.80	22.14	22.38	23.16
MV ($1000)	Mean	15,421,491	15,463,375	15,632,659	15,705,457
	Std. Dev.	31,472,029	30,457,286	29,655,730	28,712,937
V	Mean	1,005,762	1,199,727	1,196,120	1,275,822
	Std. Dev.	1,030,231	1,281,488	1,369,705	1,509,490
DV ($1000)	Mean	42,567,151	52,107,581	52,911,854	53,785,298
	Std. Dev.	64,443,866	85,379,940	87,855,210	89,166,637
T	Mean	446	533	574	608
	Std. Dev.	369	419	432	434
VOLA	Mean	0.0323	0.0213	0.0203	0.0228
	Std. Dev.	0.0144	0.0078	0.0104	0.0106
SPR ($)	Mean	0.1233	0.1228	0.1250	0.1245
	Std. Dev.	0.0310	0.0308	0.0319	0.0308
ESPR ($)	Mean	0.0916	0.0922	0.0920	0.0927
	Std. Dev.	0.0186	0.0188	0.0202	0.0182
	Median	0.0880	0.0891	0.0883	0.0903
SPR (%)	Mean	0.40%	0.39%	0.39%	0.39%
	Std. Dev.	0.21%	0.20%	0.21%	0.24%
ESPR (%)	Mean	0.30%	0.30%	0.29%	0.30%
	Std. Dev.	0.18%	0.17%	0.18%	0.20%

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change of a variable over two periods, and the Wilcoxon sign test statistic (*z*-score) is on the median difference between the two samples in the log change of a variable over two periods.

Panel A of Table 2 summarizes stock characteristics and bid-ask spreads for 102 partisan industry stocks. We note that there are no significant differences in the log changes of variables between the test and control samples from the base period to the polling period, from the base period to the election & recount period, and from the base period to the post-recount period.[16]

Panel B of Table 2 reports stock characteristics and bid-ask spreads for 19 top donor stocks. From the base period to the polling period, there are no significant differences in the log changes of variables between the test and control samples, except for the number of trades and the quoted bid-ask spread in dollars. From the base period to the election & recount period, the differences between the test and control samples in the log changes of bid-ask spreads are significant. The changes in effective spreads for the top donor firms are significantly higher than those of the control firms at the 5% level while the changes in quoted spreads are significant at the 10% level. From the base period to the post-recount period, all variables are insignificantly different except for the number of trades.

Panel C of Table 2 reports stock features and bid-ask spreads for 32 favored-firm stocks. From the base period to the polling period, the log changes of favored firms are significantly different from those of control firms in stock price, market capitalization, effective bid-ask spreads in dollars and percentage, and quoted bid-ask spread in percentage, supported by both *t*-statistics and z-scores.[17] From the base period to the election & recount period, the log changes of favored firms are significantly different from those of control stocks in price, market capitalization, dollar volume, quoted spread in dollars and percentage, and effective spread in dollars. From the base period to the post-recount period, the log changes of favored firms are significantly different from those of control firms in stock price, market capitalization, and quoted and effective spreads in dollars. The results show that in general favored firms are more sensitive to the election events than the firms in the other two categories (partisan industry and top donors).

In summary, first, the price and market capitalization of favored firms go up significantly more than those of control stocks during the polling period, the election & recount period, and the post-recount period, respectively. Second, both quoted and effective bid-ask spreads of favored firms in percentage tend to decrease more than those of control stocks during the polling period. Decreases in percentage bid-ask spreads are attributable to increases in the price level. Third, both quoted and effective bid-ask spreads in dollars for top donors and favored firms increase more than those for the control stocks during the election & recount period. Therefore, the transaction costs of these firms' stocks appear to be more sensitive to the election & recount activities. Furthermore, the bid-ask spreads (in dollars) of favored firms significantly increase during the polling and post-recount periods, suggesting that these firms are most sensitive to the election events.

The results on stock features and bid-ask spreads of politically sensitive firms lead to a few questions. Is any increase in transaction costs (measured by bid-ask spreads) merely a

[16]Volume increases over these periods, though not significantly. As shown later, higher volume increases liquidity and offsets the impact of information asymmetry on the bid-ask spread. This may explain why changes in bid-ask spreads are insignificant here.

[17]The spread in percentage is the quoted (effective) bid-ask spread in dollars divided by the midquote.

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result of the changes in stock characteristics (such as price or market capitalization)? Do the news of the election & recount and the various interpretations of the public news affect the asymmetric information of politically sensitive stocks? Is the increase in transaction costs related to any change in information cost? To answer these questions, we estimate the information and liquidity cost components of bid-ask spreads. We then decompose the dollar bid-ask spread into information and liquidity cost components for each stock, and examine the cross-sectional relation between changes in bid-ask spreads and changes in stock characteristics, information cost, and liquidity cost.

4.2. Response of returns to election news

Before we formally test the effects of information asymmetry on stock trading and bid-ask spreads, we examine the response of prices for the stocks in the test samples to election news. An important question is whether the firms included in the test samples are in fact politically sensitive entities whose stock returns react positively (negatively) to favorable (unfavorable) election news. If this is the case, the next question is whether the election news announcement impacts cash flows or discount rates of these firms. In this section, we examine these two issues.

We perform the event analysis surrounding two important dates: November 7, 2000, the election day, and December 13, the day that the US Supreme Court stopped the Florida recount. To examine whether returns of politically sensitive stocks are sensitive to the election news, we first estimate the abnormal returns for each stock using the traditional event-study method which assumes constant beta risk. Specifically, we estimate the beta risk using stock returns over a 5-year estimation period from July 1, 1995 to June 30, 2000 based on the following market model:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_t. \tag{11}$$

The abnormal return (AR) for each stock in the event window is calculated as follows:

$$\mathrm{AR}_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{mt}, \tag{12}$$

where $\hat{\alpha}_i$ and $\hat{\beta}_i$ are estimates from (11) using the historical data. Because we do not allow for the change in beta risk (and discount rate) in the event window, the abnormal returns in (12) may reflect changes in both expected cash flow and discount rate of the firm. We also calculate the cumulative abnormal return using the formula in (8). These individual abnormal returns and cumulative average abnormal returns are then averaged across firms to obtain the mean abnormal return and cumulative abnormal returns. Following this, we calculate the abnormal and cumulative abnormal returns by allowing for changes in discount rate based on (6) and (7).

Table 3 reports the abnormal returns and cumulative average abnormal returns around two event dates (11/07/2000 and 12/13/2000), with constant betas in Panels A and B and changing betas in Panels C and D. We provide the results for the firms favored by the Bush platform only (B), by both the Bush and Gore platforms (B&G), and by the Gore platform only (G), as well as the results for all the test firms.

Panel A shows that the abnormal returns and cumulative average abnormal returns are insignificant on the event day of November 7 for both the Bush-favored and Gore-favored firms. This finding can be attributed to the uncertain nature of the election outcome. Results suggest that the market was clouded with considerable uncertainty at that time.

Table 3
The impact of election news on stock returns and cash flows. Panels A and B examine the impact of election news on stock returns. They report the abnormal returns for 123 politically sensitive firms and subgroups surrounding the event days of November 7, 2000 and December 13, 2000 under the assumption that beta does not change during the period. The beta is estimated using five-year daily return data before 07/01/2000. Panels C and D examine the impact of election news on cash flows. They report the abnormal returns for 123 politically sensitive firms and subgroups surrounding the event days of November 7, 2000 and December 13, 2000, by accounting for the changes in betas during the period. AR is the abnormal return. CAR is the cumulated average abnormal return. Subgroups $B(\cdot)$ and $G(\cdot)$ represent the number of firms in favor of Bush and Gore, respectively. *Indicates the 5% significance level.

Event day	*B* (103)		*B&G* (3)		*G* (17)		All Firms (123)	
	AR	CAR	AR	CAR	AR	CAR	AR	CAR
Panel A. Abnormal returns with constant betas around 11/07/2000								
−3	0.4027	0.4027	1.0896	1.0896	0.6512	0.6512	0.4538	0.4538
−2	−1.0320*	−0.6293*	−2.9770	−1.8874	−0.0970	0.5542	−0.9500*	−0.4962
−1	0.1514	−0.4779	−0.8540	−2.7414	−0.5000	0.0542	0.0369	−0.4593
0	0.3162	−0.1617	1.8597*	−0.8817	0.0956	0.1498	0.3234	−0.1359
1	0.0800	−0.0817	−2.7460*	−3.6277	0.8215	0.9713	0.1136	−0.0223
2	1.4439*	1.3622*	2.1265	−1.5012	2.4872*	3.4585	1.6047*	1.5824*
3	−0.4350*	0.9272*	3.8304	2.3292	0.4866	3.9451	−0.2030	1.3794*
Panel B. Abnormal returns with constant betas around 12/13/2000								
−3	−0.1460	−0.1460	−0.9930	−0.9930	−0.3210	−0.3210	−0.1910	−0.1910
−2	0.1204	−0.0256	0.9393	−0.0537	−2.0310*	−2.3520*	−0.1590	−0.3500
−1	0.4715*	0.4459	0.0995	0.0458	0.6433	−1.7087	0.4863*	0.1363
0	0.5833*	1.0292*	0.3143	0.3601	−1.4530*	−3.1617*	0.2930	0.4293
1	−0.7860*	0.2432	1.1485	1.5086	0.4531	−2.7086*	−0.5650*	−0.1357
2	0.5382*	0.7814	3.2606	4.7692	0.9382*	−1.7704	0.6609*	0.5252
3	1.6839*	2.4653*	3.2637	8.0329	1.2055*	−0.5649	1.6561*	2.1813*
Panel C. Abnormal returns with changing betas around 11/07/2000								
−3	0.1686	0.1686	1.0412	1.0412	0.7012	0.7012	0.2635	0.2635
−2	−0.8210*	−0.3260*	−2.9200	−0.9390	−0.1390	0.2812	−0.7780*	−0.2570
−1	0.1076	−0.1820	−0.8570	−0.9120	−0.4890	0.0244	0.0016	−0.1710
0	0.3088	−0.0590	1.8497*	−0.2220	0.0982	0.0429	0.3173	−0.0490
1	0.0788	−0.0310	−2.7550*	−0.7280	0.8171	0.1977	0.1117	−0.0170
2	1.1053*	0.1580*	0.9726	−0.4450	2.0752*	0.5106	1.2362*	0.1920*
3	−0.5720*	0.0538	3.3605	0.0988	0.3207	0.4835	−0.3520	0.1143
Panel D. Abnormal returns with changing betas around 12/13/2000								
−3	0.3396	0.3396	0.4583	0.4583	0.1922	0.1922	0.3220	0.3220
−2	0.2883	0.3139	1.5010	0.9797*	−1.8340*	−0.8210	0.0224	0.1722
−1	0.3336	0.3205*	−0.3740	0.5284	0.4731	−0.3890	0.3356	0.2267
0	0.6104*	0.3930*	0.3590	0.4861	−1.4500*	−0.6550	0.3171	0.2493*
1	−0.6280*	0.1888*	0.0859*	0.4060	0.5883	−0.4060	−0.4410*	0.1113
2	0.8286*	0.2954*	1.6291*	0.6099	1.1449*	−0.1480	0.8924*	0.2414*
3	1.7940*	0.5095*	3.8877	1.0781*	1.1992*	0.0448	1.7626*	0.4588*

Panel B shows that the abnormal returns and cumulative average abnormal returns are significantly positive for the Bush-favored firms and significantly negative for the Gore-favored firms on the event day of December 13 when Gore publicly conceded the presidency. The results show that the returns of politically sensitive firms are significantly affected by the final election outcome.

The preceding event analysis primarily looks into the overall response of stock returns to the election news. We next examine whether the abnormal returns reflect the impact of election news on firms' cash flows. In this exercise, we estimate the modified market model in (6) and calculate the abnormal return by allowing for the effect of beta changes on returns in both event periods (see (7)). Beta changes significantly in the base, polling, and election & recount periods, indicating that the discount rate changes over these periods.[18]

Panel C of Table 3 reports the abnormal returns surrounding November 7 after accounting for the changes in betas. We note that in general the uncertain outcome on the election date has no significant effect on the returns of either the Gore-favored or Bush-favored firms. Panel D of Table 3 reports the results surrounding December 13, 2000. In contrast to the results surrounding November 7, we see a clearer pattern for the stock price response to the news even after controlling for the effect of changes in discount rates. The abnormal returns and cumulative abnormal returns on event day 0 are significantly positive for Bush-favored firms. The abnormal returns on event day 0 are significantly negative for Gore-favored firms. Since the abnormal returns are calculated by accounting for the change in beta during the election period, these abnormal returns are already adjusted for the impact of election news on discount rates. The significantly positive abnormal returns for Bush-favored firms thus suggest that the election news announcement impacts the expected cash flow of politically sensitive firms.[19]

4.3. Information and liquidity costs

Table 4 reports estimates of information cost and other parameters of the MRR model for firms in the entire sample as well as in each category. Panel A reports the results for all test firms under the Bush/Gore political platforms and the control firms. Estimates of the first-order autocorrelation of order flow (ρ), the information cost parameter (θ), and the liquidity cost parameter (ϕ) are all highly significant, and the standard errors are quite small. Results indicate that the MRR model fits the transaction data of the firms in the test and control samples very well. The implied bid-ask spread ($\text{ISPR} = 2\theta + 2\phi$) and the proportion of information cost of the bid-ask spread ($\theta/(\theta + \phi)$) are calculated based on the estimated parameters.

As shown in Panel A, from the base period to the polling period, the log changes of politically sensitive stocks are insignificantly different from those of control stocks in the first-order autocorrelation of order flow, the liquidity cost parameter, and the model-implied bid-ask spread in dollars. Changes in θ and the proportion of information cost of bid-ask spread for the politically sensitive stocks are larger than those for the control stock s but only significant at the 10% level. From the base period to the election & recount period, the log changes of politically sensitive firms are significantly different from those of control stocks in the information cost parameter and the proportion of information cost of the bid-ask spread. From the base period to the post-recount period, the changes of politically sensitive firms are significantly different from those of control firms in the information and liquidity cost parameters and the proportion of information cost of the bid-ask spread.

[18]We estimated beta for each period and each subsample. In the interest of brevity, the results are not reported here.

[19]We also estimated results for each group. The results exhibit the same pattern as that of the entire sample.

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Table 4
Estimates of information cost and other parameters. This table reports estimates of information cost and other parameters for 123 politically sensitive stocks and 223 control stocks. Period I (the base period) is from 7/1/2000 to 8/31/2000, Period II (the polling period) is from 9/1/2000 to 11/6/2000, Period III (the election & recount period) is from 11/7/2000 to 12/13/2000, and Period IV (the post-recount period) is from 12/14/2000 to 12/31/2000. ρ is the first-order autocorrelation of order flow, θ is the information cost parameter, and ϕ is the liquidity cost parameter. ISPR ($) is the model-implied bid-ask spread in dollars, and it is equal to $2(\theta+\phi)$. $\theta/(\theta+\phi)$ is the proportion of information cost of the bid-ask spread. The t-statistic is for the mean difference between the test and control samples in the log change of a parameter from Period I to Period II (III or IV), and the Wilcoxon sign test statistic (z-score) is for the median difference between the two samples in the log change of a parameter from Period I to Period II (III or IV). *Indicates significance at least at the 5% level.

		All test stocks (123)							Control stocks (223)			
		Period I	Period II	t-Value z-score	Period III	t-Value z-score	Period IV	t-Value z-score	Period I	Period II	Period III	Period IV
Panel A. All Firms												
ρ	Mean	0.2451	0.2650	$t=-0.19$	0.2753	$t=-1.49$	0.2700	$t=-0.72$	0.2424	0.2635	0.2834	0.2717
	Median	0.2424	0.2651	$z=-0.49$	0.2802	$z=-1.69$	0.2688	$z=0.02$	0.0457	0.0460	0.0543	0.0589
	Std. Err.	0.0057	0.0059		0.0058		0.0066		0.0031	0.0031	0.0036	0.0039
θ	Mean	0.0114	0.0125	$t=1.84$	0.0118	$t=2.41$*	0.0127	$t=3.05$*	0.0128	0.0131	0.0122	0.0122
	Median	0.0093	0.0100	$z=1.87$	0.0101	$z=2.12$*	0.0103	$z=2.66$*	0.0096	0.0098	0.0099	0.0105
	Std. Err.	0.0008	0.0009		0.0008		0.0009		0.0006	0.0007	0.0007	0.0007
ϕ	Mean	0.0236	0.0217	$t=0.02$	0.0226	$t=-0.95$	0.0224	$t=-1.76$	0.0224	0.0210	0.0225	0.0229
	Median	0.0244	0.0222	$z=-0.01$	0.0238	$z=-1.51$	0.0241	$z=-2.08$*	0.0050	0.0056	0.0057	0.0066
	Std. Err.	0.0005	0.0006		0.0005		0.0006		0.0003	0.0004	0.0004	0.0004
$\theta/(\theta+\phi)$	Mean	31.02%	34.53%	$t=1.65$	32.86%	$t=2.46$*	31.55%	$t=2.97$*	33.96%	36.10%	32.92%	32.64%
	Median	28.03%	31.03%	$z=1.39$	29.21%	$z=1.94$	31.78%	$z=2.44$*	18.32%	19.88%	19.80%	21.79%
ISPR ($)	Mean	0.0699	0.0685	$t=0.91$	0.0689	$t=-0.01$	0.0702	$t=0.69$	0.0705	0.0682	0.0696	0.0700
	Median	0.0672	0.0659	$z=1.52$	0.0669	$z=0.03$	0.0671	$z=1.48$	0.0125	0.0119	0.0122	0.0125

		Period I	Period II	t-Value z-score	Period III	t-Value z-score	Period IV	t-Value z-score
Panel B. Partisan Industry Firms (102)								
ρ	Mean	0.2467	0.2681	$t=0.09$	0.2780	$t=-1.38$	0.2739	$t=-0.44$
	Median	0.0670	0.0711	$z=-0.26$	0.0715	$z=-1.45$	0.0787	$z=0.25$
	Std. Err.	0.0066	0.0070		0.0071		0.0078	
θ	Mean	0.0105	0.0115	$t=1.38$	0.0107	$t=1.79$	0.0114	$t=2.25$*
	Median	0.0080	0.0092	$z=1.51$	0.0077	$z=1.79$	0.0085	$z=2.19$*
	Std. Err.	0.0008	0.0009		0.0008		0.0008	
ϕ	Mean	0.0238	0.0221	$t=-0.00$	0.0232	$t=-0.89$	0.0228	$t=-1.57$

Table 4 (*continued*)

		Period I	Period II	*t*-Value *z*-score	Period III	*t*-Value *z*-score	Period IV	*t*-Value *z*-score
	Median	0.0054	0.0058	$z = 0.27$	0.0053	$z = -1.33$	0.0070	$z = -1.79$
	Std. Err.	0.0005	0.0006		0.0005		0.0007	
$\theta/(\theta+\phi)$	Mean	29.38%	32.36%	$t = 1.30$	30.41%	$t = 2.07$*	28.83%	$t = 2.41$*
	Median	17.02%	18.91%	$z = 1.12$	16.98%	$z = 1.71$	33.34%	$z = 2.08$*
ISPR ($)	Mean	0.0687	0.0671	$t = 0.43$	0.0677	$t = -0.42$	0.0685	$t = 0.25$
	Median	0.0104	0.0129	$z = 0.97$	0.0117	$z = -0.16$	0.0152	$z = 1.21$
Panel C. Top Donor Firms (19)								
ρ	Mean	0.1928	0.2159	$t = 0.20$	0.2268	$t = -0.06$	0.2061	$t = -1.16$
	Median	0.0522	0.0627	$z = -0.25$	0.0705	$z = 0.06$	0.0805	$z = -0.80$
	Std. Err.	0.0120	0.0144		0.0162		0.0185	
θ	Mean	0.0082	0.0094	$t = 1.73$	0.0097	$t = 2.34$*	0.0093	$t = 1.45$
	Median	0.0062	0.0074	$z = 1.40$	0.0065	$z = 2.12$*	0.0075	$z = 1.39$
	Std. Err.	0.0014	0.0017		0.0015		0.0017	
ϕ	Mean	0.0266	0.0250	$t = 0.24$	0.0249	$t = -2.20$*	0.0252	$t = -1.88$
	Median	0.0037	0.0047	$z = -0.41$	0.0050	$z = -2.38$*	0.0045	$z = -2.24$*
	Std. Err.	0.0008	0.0011		0.0011		0.0010	
$\theta/(\theta+\phi)$	Mean	22.59%	25.98%	$t = 1.58$	27.16%	$t = 2.37$*	25.12%	$t = 1.47$
	Median	14.06%	16.43%	$z = 1.34$	16.03%	$z = 2.30$*	18.13%	$z = 1.58$
ISPR ($)	Mean	0.0696	0.0687	$t = 1.40$	0.0691	$t = 0.29$	0.0689	$t = -0.32$
	Median	0.0068	0.0073	$z = 0.93$	0.0067	$z = -0.42$	0.0088	$z = -0.41$
Panel D. Favored Firms (32)								
ρ	Mean	0.2262	0.2440	$t = -0.57$	0.2641	$t = -0.16$	0.2542	$t = -0.43$
	Median	0.2382	0.2573	$z = -0.85$	0.2695	$z = -0.17$	0.2703	$z = 0.47$
	Std. Err.	0.0098	0.0112		0.0121		0.0135	
θ	Mean	0.0121	0.0134	$t = 1.85$	0.0152	$t = 3.65$*	0.0160	$t = 3.43$*
	Median	0.0098	0.0103	$z = 1.80$	0.0122	$z = 3.15$*	0.0139	$z = 3.37$*
	Std. Err.	0.0016	0.0018		0.0022		0.0024	
ϕ	Mean	0.0233	0.0224	$t = 0.96$	0.0228	$t = -0.15$	0.0232	$t = -0.47$
	Median	0.0237	0.0224	$z = 0.56$	0.0234	$z = -0.96$	0.0247	$z = -1.26$
	Std. Err.	0.0011	0.0012		0.0010		0.0010	
$\theta/(\theta+\phi)$	Mean	32.80%	35.31%	$t = 1.28$	36.99%	$t = 2.87$*	37.44%	$t = 2.66$*
	Median	29.85%	30.24%	$z = 0.95$	33.86%	$z = 2.39$*	37.63%	$z = 2.64$*
ISPR ($)	Mean	0.0707	0.0715	$t = 2.95$*	0.0761	$t = 3.35$*	0.0783	$t = 3.61$*
	Median	0.0689	0.0693	$z = 2.67$*	0.0719	$z = 2.85$*	0.0739	$z = 3.58$*

Panels B–D report the results for each subsample. Panel B shows that the difference between the partisan industry firms and control firms is significant only at the 10% level for the information cost change from the base period to the election & recount period. The difference in the proportions of information cost of the bid-ask spread between the two groups is significant at the 5% level. In addition, the differences in both the information cost and the proportion of information cost of the bid-ask spread are significant at the 5% level from the base period to the post-recount period.

Panel C reports the results for the top donor firms. Like the results for the entire sample in Panel A, changes in the information cost and the proportion of information cost of the bid-ask spread for the top-donor firms are significantly higher than those of the control firms at the 5% level from the base period to the election & recount period. By contrast, the change in the liquidity cost parameter for the top-donor group is significantly lower than that of the control firms.

Panel D reports the results for the favored-firm sample. The changes in the information cost and its proportion of the bid-ask spread for this group relative to the control firms are more significant than those for the entire sample in panel A. In addition, the implied spread estimates (ISPR) are significantly higher for the favored firm group for all three periods.

In summary, it appears that the events in the 2000 election affected the information cost and the proportion of information cost of the bid-ask spread for politically sensitive firms. These effects are stronger during the election & recount period and the post-recount period. On the other hand, the liquidity cost decreases in the election & recount and post-recount periods as trading volume increases, though the impact of election events on liquidity cost is not as significant as that on information cost. In general, the effects of the election events are more clearly manifested by the favored-firm sample, followed by top donors and partisan industry firms. Overall, the unusual delay in the election outcome causes higher information cost and a higher proportion of information cost of the bid-ask spread for most politically sensitive firms. With the estimates of information and liquidity costs, we are ready to examine the cross-sectional changes in bid-ask spreads against the changes in information cost, liquidity cost, and stock features for firms in the test and control samples.

4.4. Tests of changes in bid-ask spreads

We estimate the cross-sectional regression model in (5) for each period, i.e., from the base period to the polling period, the election & recount period, and the post-recount period, respectively.[20] Table 5 reports the results of cross-sectional regression of log changes in bid-ask spreads against log changes in stock characteristics, and information and liquidity costs. Panel A shows results on quoted bid-ask spreads, while Panel B provides results on effective bid-ask spreads. We first note that in general the cross-sectional variation of changes in bid-ask spreads is positively and significantly related to

[20]We tested the correlation of changes in variables for a combination of 123 politically sensitive firms and 223 control firms. The correlations among the log changes in price, volatility, dollar volume, information cost parameter, and liquidity cost parameter are low. We do not include market capitalization, share volume, and number of trades because they are highly correlated with other variables. In the interest of brevity, the results are not reported here.

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Table 5
Tests o f cross-sectional variations in changes of bid-ask spreads. This table reports the cross-sectional regression tests of the changes in bid-ask spreads for 123 politically sensitive firms and 223 control firms. Period I (the base period) is from 7/1/2000 to 8/31/2000, Period II (the polling period) is from 9/1/2000 to 11/6/2000, Period III (the election & recount period) is from 11/7/2000 to 12/13/2000, and Period IV (the post-recount period) is from 12/14/2000 to 12/31/2000. The testing model is

$$\Delta Y = n_0 + n_1\Delta P + n_2\Delta \text{VOLA} + n_3\Delta \text{DV} + n_4\Delta\theta + n_5\Delta\phi \\ + D^{*}(s_0 + s_1\Delta P + s_2\Delta \text{VOLA} + s_3\Delta \text{DV} + s_4\Delta\theta + s_5\Delta\phi),$$

where Y is SPR ($) in Panel A and ESPR ($) in Panel B, P is the average close price, VOLA is the absolute daily change in the log of close price, DV is the daily dollar volume, θ is the information cost parameter, ϕ is the liquidity cost parameter, SPR ($) is the average quoted bid-ask spread in dollars, and ESPR is the average effective bid-ask spread in dollars. Δ represents the log change in a variable. For example, from the base period to the polling period, ΔP is equal to the log price of the polling period minus the log price of the base period. D is a dummy variable, where $D = 1$ for the 123 politically sensitive firms and 0 for the 223 control firms. Parameter s_0 represents the difference in the change of bid-ask spread between the favored firms and control firms, with the control of changes in P, VOLA, DV, θ, and ϕ. *Indicates significance at least at the 5% level.

		From the base period to the polling period (II)		From the base period to the election & recount period (III)		From the base period to the post-recount period (IV)	
Variable	Parameter	Parameter	t-Value	Parameter	t-Value	Parameter	t-Value
Panel A. Test of changes in SPR ($)							
Intercept	n_0	−0.0056	−1.12	0.0156*	3.27	0.0053	0.67
ΔP	n_1	0.2647*	7.88	0.2179*	5.68	0.1884*	6.63
ΔVOLA	n_2	0.0614*	3.29	0.0511*	2.86	0.0641*	3.60
ΔDV	n_3	−0.0416*	−2.59	−0.0409*	−2.60	−0.0364*	−2.25
$\Delta\theta$	n_4	0.0982*	6.38	0.0899*	6.54	0.0545*	4.41
$\Delta\phi$	n_5	0.1005*	2.58	0.0716*	3.47	0.0248	1.30
D	s_0	−0.0013	−0.16	−0.0040	−0.39	0.0031	0.24
$D*\Delta P$	s_1	−0.0802	−1.12	−0.0283	−0.33	−0.0924	−1.42
$D*$ΔVOLA	s_2	−0.0346	−1.10	0.0158	0.50	−0.0339	−1.13
$D*$ΔDV	s_3	0.0460	1.59	−0.0034	−0.09	0.0158	0.49
$D*\Delta\theta$	s_4	−0.0415	−1.87	−0.0201	−0.88	0.0082	0.41
$D*\Delta\phi$	s_5	0.0090	0.18	0.0119	0.31	0.0438	1.16
Adj. R^2 (%)		43.43		40.18		33.39	
Panel B. Test of Changes in ESPR ($)							
Intercept	n_0	0.0010	0.23	0.0037	0.76	−0.0005	−0.07
ΔP	n_1	0.2067*	6.59	0.1640*	5.07	0.1660*	6.67
ΔVOLA	n_2	0.0471*	2.49	0.0695*	3.58	0.0567*	3.01
ΔDV	n_3	−0.0055	−0.38	−0.0067	−0.47	0.0006	0.05
$\Delta\theta$	n_4	0.0804*	5.69	0.0769*	5.99	0.0476*	4.68
$\Delta\phi$	n_5	0.0875*	2.93	0.0433	1.42	0.0137	0.76
D	s_0	0.0060	0.86	0.0078	0.74	0.0027	0.29
$D*\Delta P$	s_1	−0.0512	−0.88	−0.0270	−0.35	−0.0313	−0.52
$D*$ΔVOLA	s_2	0.0078	0.25	−0.0100	−0.31	−0.0114	−0.38
$D*$ΔDV	s_3	0.0192	0.71	−0.0213	−0.68	0.0028	0.11
$D*\Delta\theta$	s_4	−0.0343	−1.7	−0.0369	−1.78	0.0111	0.7
$D*\Delta\phi$	s_5	0.0030	0.06	−0.0630	−1.13	0.0221	0.81
Adj. R^2 (%)		44.12		34.27		43.32	

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changes in price, volatility, and liquidity cost (in periods II and III) and negatively related to dollar volume. More importantly, the change in bid-ask spreads is significantly related to the change in information cost, even with the control of stock characteristics. Second, parameter s_0 is insignificant at the 5% level, indicating that, controlling for changes in stock characteristics, information cost, and liquidity cost, there is no longer any difference in the change of bid-ask spreads between the test and control firms. Third, there is no significant difference between the test and control firms in the sensitivity of spreads to changes in the information cost, liquidity cost, and stock characteristic variables. Overall, results show that controlling for the effects of stock characteristics and the liquidity cost, changes in bid-ask spreads are explained by changes in information cost. Thus, the increase in bid-ask spreads is not merely a result of the increase in stock price or changes in other stock characteristics. These findings are consistent with the contention that the uncertainty in the 2000 presidential race and the unusual delay in the election outcome cause higher information cost, which exerts a pressure on the bid-ask spreads for politically sensitive firms.

4.5. *Robustness check*

4.5.1. *The instrumental variable approach*

The cross-sectional regression above relies upon the parameters θ and ϕ estimated from the time-series MRR model to determine whether bid-ask spread changes are significantly related to information and liquidity costs. Since this two-step procedure involves the generated regressors, it may cause an error-in-variable problem in parameter estimation, leading to inconsistency and inefficiency in regression tests. This two-step estimation problem is quite common in asset pricing tests which employ systematic risk estimates (betas) as explanatory variables. The standard approach to overcoming this problem is to form portfolios and perform rolling regression tests (e.g., Fama and MacBeth (1973); Litzenberger and Ramaswamy (1979)). However, in the present case, our choice is limited by the length of the sample period and the number of firms in our sample due to the unique nature of the election event. Therefore, we adopt the instrumental variable approach suggested by Easley, Hvidkjaer, and O'Hara (2002) instead. In this approach, the solution to the error-in-variable problem is to create an instrumental variable. The implementation procedure is as follows. We first rank all firms in the test and control samples by θ and divide them into 10 portfolios in each sample.[21] We calculate the average θ for each portfolio, Ptheta, and this variable is then assigned to each individual stock in the portfolio as an instrumental variable for θ. This instrumental variable (Ptheta) mitigates the error-in-variable problem caused by the two-step estimation, and yet it is closely related to θ. Finally, we run the cross-sectional regression of spread changes using both $\Delta\theta$ and ΔPtheta. If there is a serious error-in-variable problem and the instrumental variable Ptheta resolves it, then the coefficient of ΔPtheta will be significant while the coefficient of $\Delta\theta$ will be close to zero. Conversely, if there is no error-in-variable problem, the coefficient of ΔPtheta will be close to zero and the coefficient of $\Delta\theta$ will not be significantly affected by

[21]There are 12 or 13 stocks in each portfolio for the test sample, and 22 or 23 stocks in each portfolio for the control sample. In the test sample, there are three portfolios with 13 stocks. In the control sample, there are three portfolios with 23 stocks.

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Table 6
Tests of the effects of error-in-variable on spread regressions. This table provides the GMM tests for the effects of error-in-variable caused by the two-step regression. The following is the model:

$$\Delta Y = n_0 + n_1\Delta P + n_2\Delta\text{VOLA} + n_3\Delta\text{DV} + n_4\Delta\theta + n_5\Delta\phi + n_5\Delta\phi + n_6\Delta\text{Ptheta} \\ + D^{*}(s_0 + s_1\Delta P + s_2\Delta\text{VOLA} + s_3\Delta\text{DV} + s_4\Delta\theta + s_5\Delta\phi + s_6\Delta\text{Ptheta}),$$

where Ptheta is the portfolio θ, that is, the average of θ values for all stocks in each portfolio. We rank the firms in both the test (123 firms) and control (223 firms) samples by θ and divide them into 10 portfolios in each sample. The remaining variables are as defined in Table 5. We conduct two tests. In Test 1, Ptheta replaces θ of the individual stocks. In Test 2, both Ptheta and θ are included. *Indicates significance at least at the five-percent level.

		From the base period to the polling period		From the base period to the election & recount period		From the base period to the post-recount period	
Variable	Parameter	Test 1	Test 2	Test 1	Test 2	Test 1	Test 2
Panel A. Test of changes in SPR ($)							
Intercept	n_0	−0.0005	−0.0057	0.0124*	0.0161*	0.0017	0.0063
		(−0.07)	(−1.16)	(2.32)	(3.26)	(0.21)	(0.80)
ΔP	n_1	0.1660*	0.2560*	0.2690*	0.2171*	0.2031*	0.1794*
		(6.67)	(7.73)	(7.48)	(5.60)	(7.28)	(6.23)
ΔVOLA	n_2	0.0567*	0.0584*	0.0689*	0.0512*	0.0680*	0.0611*
		(3.01)	(3.13)	(3.59)	(2.88)	(3.68)	(3.34)
ΔDV	n_3	0.0006	−0.0401*	−0.0495*	−0.0405*	−0.0269	−0.0299
		(0.05)	(−2.44)	(−2.98)	(−2.55)	(−1.58)	(−1.87)
$\Delta\theta$	n_4		0.0789*		0.0782*		0.0420*
			(5.23)		(4.16)		(2.84)
$\Delta\phi$	n_5	0.0137	0.1013*	0.0363	0.0718*	0.0140	0.0293
		(0.76)	(2.56)	(1.59)	(3.51)	(0.73)	(1.55)
ΔPtheta	n_6	0.0476*	0.0351	0.0679*	0.0196	0.0547*	0.0275
		(4.68)	(1.94)	(4.92)	(1.04)	(4.78)	(1.76)
D	s_0	0.0027	−0.0011	0.0001	−0.0044	0.0121	0.0044
		(0.29)	(−0.13)	(0.01)	(−0.42)	(0.94)	(0.35)
$D*\Delta$P	s_1	−0.0313	−0.0748	−0.0515	−0.0283	−0.0927	−0.0855
		(−0.52)	(−1.03)	(−0.60)	(−0.33)	(−1.46)	(−1.32)
$D*\Delta$VOLA	s_2	−0.0114	−0.0327	0.0118	0.0156	−0.0307	−0.0303
		(−0.38)	(−1.03)	(0.37)	(0.50)	(−1.01)	(−1.01)
$D*\Delta$DV	s_3	0.0028	0.0453	0.0080	−0.0035	−0.0014	0.0071
		(0.11)	(1.55)	(0.22)	(−0.09)	(−0.05)	(0.22)
$D*\Delta\theta$	s_4		−0.0264		−0.0091		0.0078
			(−1.30)		(−0.30)		(0.30)
$D*\Delta\phi$	s_5	0.0221	0.0093	0.0163	0.0115	0.0482	0.0430
		(0.81)	(0.18)	(0.39)	(0.30)	(1.48)	(1.17)
$D*\Delta$Ptheta	s_6	0.0111	−0.0274	−0.0213	−0.0178	0.0019	−0.0041
		(0.70)	(−0.97)	(−0.91)	(−0.56)	(0.11)	(−0.16)
Adj. R^2 (%)		39.51	43.73	34.13	40.05	30.76	33.88
Panel B. Test of changes in ESPR ($)							
Intercept	n_0	−0.0021	0.0071	0.0008	0.0044	−0.0053	−0.0003
		(−0.49)	(1.21)	(0.16)	(0.89)	(−0.80)	(−0.05)
ΔP	n_1	0.2462*	0.1532*	0.1943*	0.1446*	0.1901*	0.1645*
		(7.22)	(3.08)	(6.38)	(4.68)	(7.71)	(6.52)
ΔVOLA	n_2	0.0508*	0.0542*	0.0764*	0.0594*	0.0637*	0.0562*

Table 6 (*continued*)

Variable	Parameter	From the base period to the polling period		From the base period to the election & recount period		From the base period to the post-recount period	
		Test 1	Test 2	Test 1	Test 2	Test 1	Test 2
		(2.58)	(2.18)	(4.06)	(3.29)	(3.40)	(2.96)
ΔDV	n_3	−0.0085	0.0142	−0.0129	−0.0043	0.0049	0.0017
		(−0.54)	(0.63)	(−0.88)	(−0.30)	(0.34)	(0.13)
$\Delta\theta$	n_4		0.0432*		0.0748*		0.0455*
			(2.93)		(4.75)		(3.57)
$\Delta\phi$	n_5	0.0504	0.0912*	0.0416	0.0755*	−0.0021	0.0144
		(1.71)	(2.18)	(1.79)	(3.91)	(−0.12)	(0.80)
ΔPtheta	n_6	0.0654*	0.0054	0.0622*	0.0159	0.0341*	0.0046
		(3.75)	(0.28)	(4.80)	(1.00)	(3.41)	(0.37)
D	s_0	0.0103	−0.0061	0.0063	0.0023	0.0123	0.0044
		(1.48)	(−0.88)	(0.66)	(0.24)	(1.35)	(0.48)
$D*\Delta$P	s_1	−0.0797	0.0481	−0.0059	0.0266	−0.0412	−0.0315
		(−1.30)	(0.79)	(−0.09)	(0.38)	(−0.68)	(−0.52)
$D*\Delta$VOLA	s_2	0.0116	−0.0089	0.0018	0.0104	−0.0116	−0.0103
		(0.35)	(−0.28)	(0.06)	(0.36)	(−0.38)	(−0.35)
$D*\Delta$DV	s_3	0.0195	−0.0188	−0.0118	−0.0219	−0.0087	−0.0002
		(0.69)	(−0.69)	(−0.39)	(−0.71)	(−0.31)	(−0.01)
$D*\Delta\theta$	s_4		0.0252		−0.0336		0.0025
			(1.29)		(−1.42)		(0.13)
$D*\Delta\phi$	s_5	0.0289	−0.0032	−0.0394	−0.0550	0.0313	0.0245
		(0.58)	(−0.06)	(−0.96)	(−1.43)	(1.10)	(0.88)
$D*\Delta$Ptheta	s_6	−0.0295	0.0165	−0.0326	−0.0131	0.0174	0.0149
		(−1.19)	(0.65)	(−1.41)	(−0.47)	(1.11)	(0.76)
Adj. R^2 (%)		40.08	44.10	32.34	37.39	39.09	43.21

the inclusion of ΔPtheta in the regression. In this way, we can detect whether the cross-sectional relationship between the spread and θ changes in Table 5 is spurious due to the two-step estimation procedure.

Table 6 provides the results of two different tests, using the instrumental variable Ptheta. In Test 1, we replace $\Delta\theta$ with ΔPtheta as the information cost variable in the cross-sectional regression. The results show that ΔPtheta is significant at the 5% level in both quoted and effective spread regressions. In addition, the coefficient of ΔPtheta is very close to the coefficient of $\Delta\theta$ in Table 5. This finding suggests that ΔPtheta is an effective instrumental variable for $\Delta\theta$. However, the t-values and R^2 decrease, indicating that while it may correct the error-in-variable problem, some information is lost in using ΔPtheta as a proxy variable. In Test 2, we conduct cross-sectional regressions using both $\Delta\theta$ and ΔPtheta as the explanatory variables for the change in the information cost. Results show that the coefficient of $\Delta\theta$ remains highly significant while the coefficient of ΔPtheta becomes insignificant. Moreover, the coefficient of ΔPtheta is close to zero whereas the coefficient of $\Delta\theta$ remains close to the results of the regression excluding ΔPtheta. These findings strongly suggest that the error-in-variable problem associated with the information cost parameter is not a serious concern in the cross-sectional spread change regression.

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4.5.2. The portfolio approach

The portfolio approach provides another tool which is robust to the error-in-variable problem. This approach is used extensively in the finance literature (see for example, Daniel and Titman, 1997; Pastor and Stambaugh, 2003; Gebhardt, Hvidkjaer, and Swaminathan 2005). The portfolio approach allows us to analyze the cross-sectional variation in bid-ask spread changes associated with the information cost change while isolating the influence of the change in the liquidity or non-information cost. Using this portfolio approach, we form portfolios to assess the effect of the information cost on bid-ask spreads over the four periods in the 2000 presidential election.

Table 7 reports the results of the bivariate portfolio analysis on spread changes. Stocks in both test and control samples are first sorted independently into three $\Delta\theta$ portfolios (high, median, and low) and two $\Delta\phi$ portfolios (high and low) based on the fact that information cost has a stronger role in bid-ask spreads than liquidity cost. This creates six portfolios in the intersection of $\Delta\theta$ and $\Delta\phi$. We then calculate the average spread change for each portfolio between the base period and any of the later three periods (polling, election & recount, and post recount).

Panel A reports the results of spread changes for the bivariate portfolios formed from the 123 politically sensitive firms. All variables (ΔSPR, ΔESPR, $\Delta\theta$, and $\Delta\phi$) are expressed in log changes. The figures in each column are the spread changes corresponding to low, middle, and high $\Delta\theta$ groups given a level of the liquidity cost change ($\Delta\phi$). The figures in each row are the spread changes corresponding to low and high $\Delta\phi$ groups given the information cost change ($\Delta\theta$). Results show that controlling for the effect of the liquidity cost change ($\Delta\phi$), spread changes increase monotonically as the information cost change ($\Delta\theta$) increases. Similarly, controlling for the effect of $\Delta\theta$, the spread change increases as $\Delta\phi$ increases. Thus, there is clear evidence of a positive relationship between spread changes and the information and liquidity cost changes for the politically sensitive firms.

Panel B reports the results of spread changes for the bivariate portfolios constructed from the 223 control firms. Results again show that after controlling for the effect of the liquidity cost change ($\Delta\phi$), spread changes increase monotonically as $\Delta\theta$ increases. Likewise, controlling for the effect of the information cost change ($\Delta\theta$), we find that spread changes increase with $\Delta\phi$. Once more, these findings are consistent with the prediction of microstructure theory.

We next analyze the difference in the spreads between test and control firms. If the uncertainty in the 2000 election causes greater information asymmetry for politically sensitive stocks, the change in the information cost will be greater for test firms than for control firms. This in turn will cause the change in bid-ask spread over the period of the election to be greater for politically sensitive firms, other things being equal. To test this hypothesis, we first sort the control firms into 6 control portfolios similar to Panel B by $\Delta\theta$ and $\Delta\phi$, and calculate the mean values of $\Delta\theta$ and $\Delta\phi$ for each portfolio. These mean changes in the information and liquidity costs for the control firms serve as the benchmark values. We then sort the 123 firms in the test sample into 6 test portfolios similar to the procedure in Panel A. For each firm in each of the 6 portfolios, we calculate the difference between the test firm's $\Delta\theta$ (or $\Delta\phi$) and the mean value of $\Delta\theta$ (or $\Delta\phi$) of the corresponding benchmark portfolio. For example, if a test firm is classified in portfolio 1 with low $\Delta\theta$ and $\Delta\phi$, we subtract the firm's $\Delta\theta$ from the mean value of $\Delta\theta$ associated with the control (benchmark) portfolio 1. Similarly, we calculate the differences in log spread changes and $\Delta\phi$ between the test firm and the benchmark portfolio. This procedure is repeated for all

Table 7
Bivariate portfolio analysis. Panel A reports log spread changes of bivariate portfolios of the 123 politically sensitive firms sorted independently by $\Delta\theta$ and $\Delta\phi$ where θ is the information cost parameter and ϕ is the liquidity cost parameter. SPR ($) is the quoted bid-ask spread in dollars, and ESPR is the effective bid-ask spread in dollars. We sort the politically sensitive firms independently into three $\Delta\theta$ portfolios and two $\Delta\phi$ portfolios where Δ represents the log change in a variable between two subperiods in the 2000 election. Panel B reports log spread changes of bivariate portfolios of the 223 control firms sorted independently by $\Delta\theta$ and $\Delta\phi$. Panel C reports the difference between log spread changes of test and control firms. These spread change differences are sorted independently by $(\Delta\theta^{T}-\Delta\theta^{C})$ and $(\Delta\phi^{T}-\Delta\phi^{C})$ where the superscripts T and C represent the test and control firms, respectively. *Indicates significance at least at the 5% level and † represents significance at the 10% level.

ΔSPR($)				ΔESPR($)	
$\Delta\theta/\Delta\phi$	Low	High	$\Delta\theta/\Delta\phi$	Low	High
Panel A. All test firms (123)					
			From period I to II		
Low	−0.0565	−0.0229	Low	−0.0348	0.0019
Middle	−0.0067	−0.0006	Middle	0.0063	0.0152
High	0.0144	0.0403	High	0.0388	0.0527
			From period I to III		
Low	−0.0582	−0.0345	Low	−0.0367	−0.0271
Middle	0.0221	0.0619	Middle	0.0038	0.0538
High	0.0470	0.0370	High	0.0487	0.0297
			From period I to IV		
Low	−0.0756	−0.0123	Low	−0.0823	−0.0212
Middle	0.0280	0.0434	Middle	0.0318	0.0580
High	0.0556	0.0302	High	0.0709	0.0463
Panel B. Control firms (223)					
			From period I to II		
Low	−0.0896	−0.0462	Low	−0.0714	−0.0261
Middle	−0.0245	−0.0040	Middle	−0.0100	0.0085
High	0.0498	0.0704	High	0.0505	0.0624
			From period I to III		
Low	−0.0821	−0.0411	Low	−0.0927	−0.0387
Middle	0.0201	0.0397	Middle	0.0235	0.0427
High	0.0556	0.0855	High	0.0387	0.0473

Table 7 (*continued*)

ΔSPR($)			ΔESPR($)		
$\Delta\theta/\Delta\phi$	Low	High	$\Delta\theta/\Delta\phi$	Low	High
		From period I to IV			
Low	−0.0434	−0.0583	Low	−0.0511	−0.0410
Middle	0.0091	0.0371	Middle	0.0146	0.0339
High	0.0592	0.1286	High	0.0593	0.0961

ΔSPR($)				ΔESPR($)			
$(\Delta\theta^T-\Delta\theta^C)/(\Delta\phi^T-\Delta\phi^C)$	Low	High	High-low difference	$(\Delta\theta^T-\Delta\theta^C)/(\Delta\phi^T-\Delta\phi^C)$	Low	High	High-low difference
Panel C. Difference between test and control firms							
			From period I to II				
Low	−0.0379	−0.0080	0.0300	Low	−0.0161	−0.0090	0.0072
Middle	−0.0081	0.0261	0.0343*	Middle	0.0041	0.0264	0.0224[†]
High	0.0142	0.0283	0.0141	High	0.0195	0.0157	−0.0040
High−low diff.	0.0521*	0.0363*		High−low diff.	0.0356*	0.0247*	
			From period I to III				
Low	−0.0531	−0.0008	0.0523*	Low	−0.0475	0.0006	0.0482*
Middle	−0.0048	0.0237	0.0285	Middle	−0.0005	0.0224	0.0230
High	0.0001	0.0335	0.0334[†]	High	0.0254	0.0355	0.0101
High-low diff.	0.0532*	0.0343*		High-low diff.	0.0729*	0.0349*	
			From period I to IV				
Low	−0.0258	0.0044	0.0302[†]	Low	−0.0091	0.0117	0.0208
Middle	0.0064	0.0075	0.0012	Middle	0.0083	0.0093	0.0010
High	−0.0138	0.0328	0.0467*	High	−0.0048	0.0175	0.0222
High-low diff.	0.0120	0.0284[†]		Dif	0.0043	0.0058	

firms in the test sample. Finally, we sort the 123 firms in the test sample into 3×2 portfolios by the differences in $\Delta\theta$ and $\Delta\phi$ between the test firm and the benchmark portfolio (of the control firms), that is, by $(\Delta\theta^{T} - \Delta\theta^{C})$ and $(\Delta\phi^{T} - \Delta\phi^{C})$ where the superscripts T and C represent the test firm and the control (benchmark) portfolio, respectively. We report the average difference in log spread changes between the test firm and the benchmark portfolio in Panel C of Table 7 for each portfolio.

The first two columns in each period in Panel C show the differences in spread changes between the test and control firms for the low, middle, and high $(\Delta\theta^{T} - \Delta\theta^{C})$ groups given a level of $(\Delta\phi^{T} - \Delta\phi^{C})$. The differences in spread changes between high and low $(\Delta\theta^{T} - \Delta\theta^{C})$ groups are reported in the bottom row for each period. The first three rows of each spread category (quoted or effective) in each period show the differences in spread changes for low and high $(\Delta\phi^{T} - \Delta\phi^{C})$ groups given a level of $(\Delta\theta^{T} - \Delta\theta^{C})$. The differences in spread changes between high and low $(\Delta\phi^{T} - \Delta\phi^{C})$ groups are reported in the third column of each spread category (SPR and ESPR) for each period.

Consistent with the prediction, we find that the difference in spread changes generally increases as the difference in the information cost $(\Delta\theta^{T} - \Delta\theta^{C})$ increases, holding the difference in the liquidity cost $(\Delta\phi^{T} - \Delta\phi^{C})$ constant. Similarly, the difference in spread changes increases as the difference in liquidity cost $(\Delta\phi^{T} - \Delta\phi^{C})$ increases, holding the difference in the information cost $(\Delta\theta^{T} - \Delta\theta^{C})$ constant. Conditional on the value of $(\Delta\phi^{T} - \Delta\phi^{C})$, the differences in the bid-ask spreads between the high and low $(\Delta\theta^{T} - \Delta\theta^{C})$ groups are significantly positive at the 5% level from the base period (I) to the polling period (II), and to the election & recount period (III). The differences between the high and low $(\Delta\theta^{T} - \Delta\theta^{C})$ groups are also positive from the base period to the post-recount period (IV) but are only significant at the 10% level for the case associated with quoted spread. Similar results for the spread changes due to liquidity cost changes are found. The differences in spreads between high and low $(\Delta\phi^{T} - \Delta\phi^{C})$ groups are positive, though somewhat less significant. Overall, the results are consistent with the findings in the regression analyses, suggesting that the information cost increases during the election periods and that these increases have positive impacts on spread changes of the politically sensitive stocks.

5. Conclusions

This paper investigates the information and non-information cost components of stock trading at the intraday level during the 2000 presidential election. Our results show that the information cost of the politically sensitive firms under the Bush/Gore platforms is affected by the delay in the election outcome.

In a typical presidential election, the uncertainty about the election outcome, if there is any, is usually resolved by the end of the election day or by the next day. During the 2000 presidential election, however, the uncertainty about the election outcome lasted for about 36 days. The unusual delay in the election outcome may lead to various interpretations of public information and induce an information disparity. The politically sensitive stocks under the Bush/Gore platforms tend to be affected by this information disparity during the election & recount period. Consistent with this view, we find that information asymmetry increases over the election period. The politically sensitive stocks are explicitly exposed to the attention of investors and traders, and their future financial performances are directly linked to the election outcome. The unusual delay in the election outcome leads to

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differential interpretations regarding the performances of these stocks, and speculators trade based on their own private information or superior forecast. As a consequence, market makers would incur higher information cost in executing buy and sell orders of these stocks.

We find that the information cost increases, particularly during the election & recount period (11/7/2000–12/13/2000), for most politically sensitive stocks. At the same time, the liquidity cost for the politically sensitive stocks declines relative to the stocks in the control sample. The decrease in liquidity partially offsets the increase in the information cost for the politically sensitive stocks. The net increase in bid-ask spread depends on the relative strength of these two components in different periods and test samples. More importantly, we find that cross-sectional variations in the spread changes are significantly related to changes in stock price, volatility, dollar volume, and the information and liquidity costs. Our finding supports the contention that the uncertainty in the 2000 presidential election causes informational asymmetry for politically sensitive stocks, and increases their information cost of trading as well as their price volatility. These changes in turn exert a pressure on bid-ask spreads during this period.

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