The Persistent Presidential Dummy

Differences turn out to be insignificant.

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Documentation by Santa-Clara and Valkanov [2003] that stock market returns have been significantly higher under Democratic than Republican administrations is certainly thought-provoking. The research reports that the excess return of the CRSP value-weighted market index over the one-month Treasury bill rate is on average 9 percentage points higher under Democratic than Republican administrations from January 1927 through December 1998—16 percentage points higher for the excess return of the CRSP equal-weighted market index.

Confronted by such a puzzle, Santa-Clara and Valkanov (SV hereafter) apply an extensive battery of robustness tests to check their results. They examine the effects of outliers, study the consistency of the results within subsamples, and use a bootstrap procedure to correct for small-sample inference problems. Without fail, the differential effect persists. They conclude the difference is indeed significant.

Obviously such a conclusion, if correct, has great importance. Consequently, the experimental design deserves close scrutiny. In their empirical work, SV regress the monthly stock index returns on a dichotomous explanatory variable (i.e., a dummy variable) that switches on and off according to whether a Republican or a Democrat is in office during the month. If Republican months are coded as one and Democratic months are coded as zero, the coefficient on the dummy is interpreted as the incremental stock market performance of Republicans over Democrats. If the coefficient on the dummy is significantly positive (negative), the null hypothesis that stock market performance is the same under either administration is rejected in favor of the alternative: that performance under

Republican (Democratic) administrations is better. SV find that the coefficient is significantly negative.

The use of dummy variables is commonplace in the economics literature. Typically they are used in a regression model to test a significant difference in the intercept or slope for data observed in different environments (e.g., a time series regression model that includes war-time and peace-time observations). What is sometimes overlooked, however, is that a dichotomous explanatory variable is like any other stochastic regressor and may be extremely persistent over time.

Ferson, Sarkissian, and Simin [2003] demonstrate the spurious regression problem that can arise when stock returns are regressed on continuous explanatory variables that are persistent (i.e., highly autocorrelated) through time (see Yule [1926] and Granger and Newbold [1974]). The problem is exacerbated by data mining for explanatory variables, as highly persistent variables are more likely to seem significant. If there is high autocorrelation in a regressor, the error term inherits the autocorrelation, making the standard error of the estimate downward-biased and indicating a significant relation when none actually exists.

In retrospect, persistence in the presidential administration dummy should not be a surprise if monthly returns are used. The run of zeros or ones must be at least 48 months long with each successive administration.

To take account of the potential influence of persistence, we conduct simulations following Ferson, Sarkissian, and Simin [2003] to assess how much the spurious regression problem interacts with data mining to affect dummy variable regression results. We model the presidential regime dummy variable as switching randomly between zero and one according to a transition matrix that represents the probability of remaining in or changing a particular political regime due to a presidential election. Simulated stock market returns are then regressed against an independently simulated political dummy variable to obtain a benchmark for the influence of spurious regression on the regression results; the benchmark takes into account the number of series that are searched for potentially significant regression relations. The simulation results indicate that the regression adjusted R^2 values and the estimated coefficients obtained in political regime return difference studies are lower than would be expected by chance.

We also look at the issue of sample selection. Like so many empirical studies in finance, the start of the sample period is dictated by the start date of the CRSP monthly database. Unfortunately, this means that nearly 70 years of valuable information is discarded, and distinct differences in the ideologies of the Republican and Democratic parties date back to 1856. And historians have argued that the distinctions between parties were even greater during the late 1800s than they are today.

We use market data back to 1856, nearly doubling the SV sample size. Under these conditions, stock market performance in different political regimes is even less distinguishable. The longer sample period also allows us to dispel data mining concerns.

PRESIDENTIAL REGIME STOCK MARKET RETURN DIFFERENCES

People have been interested in stock market performance under Democratic and Republican administrations for decades.[1] Herbst and Slinkman [1984] document a 48-month stock market cycle that is closely associated with U.S. presidential elections. Huang [1985] reports that the mean annual stock market return is 9.2 percentage points higher under Democratic than Republican administrations from 1929 through 1980, and that the difference is significant at the 10% probability level. Hensel and Ziemba [1995] show that much of the average return differential arises from small stocks, which apparently perform better under Democratic administrations.

Santa-Clara and Valkanov [2003] conduct a careful empirical analysis of stock market performance under different presidential regimes. They use several tests to determine whether a significant difference exists. Center stage in the analysis is a dummy variable regression model designed to test for return differences between Republican and Democratic presidential administrations. The presidential regime dummy variable (π_t) is equal to one if a particular party is in power at the beginning of a particular month and zero otherwise.[2]

The annualized stock market index return differential over the month, r_{t+1}, is regressed on the dummy using the model:

$$r_{t+1} = \alpha + \beta\pi_t + u_{t+1} \tag{1}$$

The presidential party political dummy variable designations in SV are $RD_t = 1$ if a Republican president is in power during month t and $RD_t = 0$ otherwise, and $DD_t = 1$ if a Democratic president is in power during month t and $DD_t = 0$ otherwise. Since the dummy variables are complementary, we ignore the DD_t variable and focus exclusively on RD_t. Thus, $\pi_t \equiv RD_t$. The null

hypothesis that presidential regimes have no effect on stock market return differentials implies $\beta = 0$.

SV estimate Equation (1) using annualized monthly market index return differentials from January 1927 through December 1998. The return differentials are based on four different monthly series. *VWR* and *EWR* are the Center for Research in Security Prices value- and equal-weighted log market returns; *TBL* is the log return on a 30-day T-bill; and *INF* is the log monthly inflation in the Consumer Price Index. These series are used to calculate value- and equal-weighted excess and real return series.

The four differential return series are denoted, *VWR–TBL*, *VWR–INF*, *EWR–TBL*, and *EWR–INF*. SV report that the presidential regime dummy variable RD_t has statistically significant explanatory power in three of the four regressions.

As a first step in our analysis, we gather the same data as SV from the CRSP monthly data files from January 1927 through December 1998. With the raw rates of return in hand, we create the logged variables, *VWR*, *EWR*, *TBL*, and *INF*. Slight differences in the *TBL* and *INF* variables are possible since SV use 30-day T-bill and inflation rates from Ibbotson Associates data rather than CRSP. The differences are trivial, however.

Exhibit 1 provides summary statistics for our monthly return differentials, which we can compare to the Table I values in the SV study. The results are virtually identical. For the series *VWR–TBL*, for example, we estimate a mean and standard deviation of 6.44% and 19.18%, compared to 6.46% and 19.20% for SV. For *EWR–TBL*, we have 8.74% and 25.28%, while SV have 8.76% and 25.32%. The difference between the average levels of *VWR–TBL* and *EWR–TBL* indicates that small stocks had higher returns (and greater risks) than large stocks during the sample period.

Aside from documenting the fact that we are working from essentially the same data as SV, Exhibit 1 also reveals extreme persistence in the presidential dummy variable that is the independent variable in Equation (1). The first-order autocorrelation in *RD* is very high, at 0.983. All four of the return differential series also show positive first-order autocorrelation, although at lower levels. These are the symptoms of a potential spurious regression problem.

Ferson, Sarkissian, and Simin [2003] point out that a high level of persistence in the independent variable and at least partial persistence in the dependent variable may give rise to spurious regression results, especially when data sets are mined for potentially significant regression relations.

SIMULATED CUTOFF SIGNIFICANCE VALUES FOR PRESIDENTIAL REGIME STOCK MARKET RETURN DIFFERENCES

When there is documented persistence in a regressor, the potential for spurious regression results looms large. The error term inherits the autocorrelation in the regressor, making the standard error of the estimate downward-biased and implying a significant relation when none actually exists.

One way to work around this potential problem is to simulate critical cutoff values for the coefficient estimates, the *t*-statistics, and the adjusted R^2 to test whether the coefficients and significance levels estimated using regression model (1) are lower than would be expected by chance. We assume that the dependent and independent variables are uncorrelated, but that the autocorrelation properties of the variables match those present in the actual data.

Dependent Variable

From Exhibit 1, we know that the monthly excess and real return series are

EXHIBIT 1
Summary Statistics of Market Index Return Differentials 1927–1998

	VWR-TBL	*VWR-INF*	*EWR-TBL*	*EWR-INF*	*RD*
Annualized mean (%)	6.44	7.05	8.74	9.35	0.47
Annualized standard deviation (%)	19.18	19.22	25.28	25.26	0.50
Autocorrelation					
1	0.102	0.103	0.182	0.181	0.983
2	-0.007	-0.015	0.024	0.017	0.965
3	-0.108	-0.111	-0.095	-0.098	0.948
4	0.014	0.008	-0.048	-0.052	0.930
5	0.086	0.088	0.022	0.021	0.913

VWR: CRSP value-weighted index log return.
EWR: CRSP equal-weighted index log return.
TBL: one-month T-bill log return.
INF: log monthly inflation.
RD is 1 if a Republican is in office at time t, and 0 otherwise.

positively autocorrelated. Consequently, the dependent variable stock index return series is generated as

$$r_t = \alpha_r + \rho_r r_{t-1} + e_t \qquad \text{for } t = 2,\ 3,\ldots,\ n \qquad (2)$$

where α_r is the intercept, ρ_r is the first-order autocorrelation coefficient, and n is the sample length in months.

The unconditional mean and variance of the dependent variable are

$$\mu_r = \frac{\alpha_r}{1-\rho_r}$$

and

$$\sigma_r^2 = \frac{\sigma_e^2}{1-\rho_r^2}$$

where the parameters μ_r, σ_r^2, and ρ_r are estimated using the actual stock index data. The dependent variable simulation is started at the unconditional mean μ_r, and the error term for Equation (2) is generated from a normal distribution with a mean of zero and a variance of $\sigma_r^2(1-\rho_r^2)$.

Independent Variable

The presidential regime dummy variable is generated using a transition matrix that represents the conditional probability of remaining in or changing a particular political regime on a presidential election date. The transition matrix conditional probabilities are estimated from the actual election data.[3]

Appendix A provides the history of U.S. presidential election results, and Appendix B summarizes the information from which we compute the transition probabilities for the period 1927 through 1998. The presidential regime independent variable series $\pi_i (i = 1,\ldots,\ I)$ is generated as a first-order Markov chain so that the transition probabilities for potential presidential regime changes at 48-month intervals are:

$$\Pr(\pi_i = 0 \mid \pi_{i-1} = 0) = q$$
$$\Pr(\pi_i = 1 \mid \pi_{i-1} = 0) = 1-q$$
$$\Pr(\pi_i = 1 \mid \pi_{i-1} = 1) = p$$
$$\Pr(\pi_i = 0 \mid \pi_{i-1} = 1) = 1-p$$

where the subscript i represents presidential inauguration dates, and I is the total number of elections in the sample.

Once a presidential inauguration has occurred, the presidential regime dummy variable remains the same for the next 47 months. The regime dummy variable series is generated independently of the stock index return series. The presidential regime series starting value $\pi_{i=0}$ is generated according to the unconditional probability of a Republican presidency occurring during the sample period.[4]

Cutoffs for Spurious Regression Bias

A dependent variable series and an uncorrelated independent variable series are simulated for a time period equal to 864 months (January 1927 through December 1998), and a regression is then run on the simulated series using the presidential return difference regression model in Equation (1). The process is repeated 10,000 times.

The coefficient estimates and t-statistics as well as the adjusted R^2 are recorded for each simulated regression and then ranked from lowest to highest. The 95th percentile adjusted R^2 as well as the 2.5th and 97.5th percentile coefficient estimates and t-statistics are recorded as the 5% critical cutoff values.

The cutoff adjusted R^2 value is compared to the actual adjusted R^2 that is estimated using the original data to assess the overall significance of the estimated regression relation (see Foster, Smith, and Whaley [1997]). The critical cutoff coefficient estimates and t-statistics are similarly used to evaluate whether the regression estimates obtained using the actual data are lower than would be expected by chance.

Cutoffs for Spurious Regression Bias with Data Mining

A second set of modified cutoff statistics are also reported that use Bonferonni correction intervals to take account of the number of series examined in the search for potentially significant relations (see Lo and MacKinlay [1990]). Santa-Clara and Valkanov [2003] examine five dependent variable series (the four CRSP return differential series reported in Exhibit 1 as well as a real Treasury bill return series), and studies they cite also examine nominal and real return series for the S&P 500, small stocks, long-term corporate bonds, and long- and intermediate-term government bonds, thus implying that a total of 15 return series have been tested for presidential regime return differences (see Huang [1985]; Hensel and Ziemba [1995]; and Johnson, Chittenden, and Jensen [1999]).

There are many ways to measure the political dummy variable, including presidential party, congressional party, and the first or last two years of the presidential term. In other words, a total of 60 (i.e., 15 times 4) potential combinations are examined in political return difference studies. A conservative adjustment factor of five is used to determine the modified cutoff statistics (e.g., it is assumed that at least five dependent or independent series are examined in the search for statistical relations).

This modification is equivalent in an operational sense to requiring a 1% level of significance rather than a 5% level.

Simulated Cutoff Significance Values for the SV Sample

Results for presidential regime return difference regression model (1) are reported in Exhibit 2. The coefficient estimates are within a few basis points of those reported in SV's Table II, providing more assurance that the values of the monthly variables are essentially the same. Below the coefficient estimates in Exhibit 2 are the lower and upper confidence bounds for the coefficient estimates; *t*-statistics are given in the second and third lines of each set of results, and modified lower and upper bounds adjusted for the five regression variable series examined by SV in the fourth and fifth lines.

Interestingly, the dummy variable estimates are within the corresponding coefficient estimate confidence bounds for three of four series and within the corresponding modified confidence bounds for all four series. The *t*-statistic confidence interval bounds and the modified cutoff adjusted R^2 values reported in Exhibit 2 also support this conclusion.

This evidence strongly suggests that the difference in returns under different political regimes is spurious, in that it is less of a difference than would be expected by chance. The results in Exhibit 2 therefore indicate that spurious regression, combined with data mining, can be an important problem for dummy variable regressions, just as it can be in time series regressions that use continuous explanatory variables that are persistent.

EXHIBIT 2
Political Regime Return Differential Regression Results Using Monthly Returns

Variable	*n*	α	$t(\alpha)$	β	$t(\beta)$	$\overline{R}^2$
VWR-TBL	864	10.58	3.72	-8.77	-1.85	0.32%
	Cutoffs for spurious regression bias					
	Lower	-0.65	-0.18	-10.36	-2.03	0.42%
	Upper	13.46	4.04	10.13	2.01	
	Cutoffs for spurious regression bias with five variables examined					
	Lower	-3.09	-0.82	-13.33	-2.62	0.75%
	Upper	15.96	4.66	12.98	2.54	
VWR-INF	864	9.42	3.19	-5.02	-1.06	0.03%
	Cutoffs for spurious regression bias					
	Lower	0.02	0.01	-10.37	-2.04	0.42%
	Upper	14.21	4.27	10.19	2.00	
	Cutoffs for spurious regression bias with five variables examined					
	Lower	-2.03	-0.56	-13.51	-2.65	0.81%
	Upper	16.77	4.99	13.25	2.64	
EWR-TBL	864	16.47	3.79	-16.39	-2.53	0.76%
	Cutoffs for spurious regression bias					
	Lower	-1.36	-0.26	-14.52	-2.05	0.53%
	Upper	18.90	3.97	14.69	2.07	
	Cutoffs for spurious regression bias with five variables examined					
	Lower	-4.86	-0.91	-19.79	-2.76	1.02%
	Upper	22.33	4.69	19.99	2.78	
EWR-INF	864	15.32	3.48	-12.63	-1.95	0.40%
	Cutoffs for spurious regression bias					
	Lower	-0.67	-0.13	-14.93	-2.10	0.54%
	Upper	19.53	4.17	14.62	2.05	
	Cutoffs for spurious regression bias with five variables examined					
	Lower	-4.13	-0.74	-19.68	-2.78	1.02%
	Upper	22.99	4.82	19.73	2.80	

$\overline{R}^2$ denotes adjusted R^2. Regressions are estimated by OLS, and t-statistics are adjusted for autocorrelation and heteroscedasticity using Newey-West [1987]. Lower and Upper are 95 % confidence bounds obtained by simulation.

OUT-OF-SAMPLE TESTS

Out-of-sample tests are often performed to address the problem of data mining. One option is to wait for more data to arrive. Another is to look back in time. SV offer two reasons for restricting the analysis to the post-1927 period. The first is that the ideologies of the Democratic and Republican parties before World War I were not clearly delineated. The second is that data for most of the control variables were not available before 1927.

The decision to overlook nearly 70 years of potentially valuable information should not be taken lightly. Since monthly

stock market return and 30-day interest rate data are available dating back to January 1802 and January 1831 (see Schwert [1989, 1990]), the critical issue should be at what time there was a clear distinction between the ideologies of the two political parties.

Two features of American political party history are important in answering this question. The first is the periodic realignment of political parties in the United States through time (Sundquist [1983]; Schofield, Miller, and Martin [2003]). The establishment of the Republican party in the early 1850s by anti-slavery activists and proponents of free Western land grants represented a crucial realignment following abandonment of the Whig party.

The Republican party was established when Colonel John C. Fremont, a popular hero of the time known as the "Pathfinder of the Pacific," galvanized anti-slavery and free land supporters in the 1856 presidential election. The victory of Abraham Lincoln in the polarizing 1860 presidential election and the ensuing Civil War over southern secession and the abolition of slavery solidified the Republican party's reputation and its political power base in the North.

The Democratic party has also gone through important realignments. The most successful of these, from a presidential election point of view, was the New Deal political realignment in the 1930s prompted by the Great Depression (Sundquist [1983]; Burnham [1965]). Interestingly, a depression in the 1890s during the Democratic administration of Grover Cleveland also led to the most disastrous of Democratic party realignments (again, from an election point of view) when agrarian elements and proponents of monetary expansion gained control of the party. The Democrats were led by the firebrand orator, William Jennings Bryan, who deliberately heightened the polarization of the country along regional lines and rural versus industrial interests in the 1896 presidential election. Failure in the 1896 election temporarily pushed the Democrats back to the southern power base they had maintained since the Civil War, a setback that was reversed when President Franklin Delano Roosevelt once again seized the economic initiative with New Deal reforms.

The polarizing 1896 election provides perhaps the sharpest distinction between Democratic and Republican economic and socioeconomic ideology. Key issues were the hardship of farmers as well as inequality in the distribution of wealth and income between regions and classes (Sundquist [1983]). The Democratic candidate, William Jennings Bryan, "appealed for a coalition of the 'toiling masses'—farmers and urban working men, organized as an avowed class party against the interests that had exploited them" (Sundquist [1983, p. 155]).

Bryan's Cross of Gold speech at the Democratic convention, considered the most important in American political history, staked out the Democrats' 20th century position and is still paraphrased today in support of policy:

> The sympathies of the Democratic Party, as described by the platform, are on the side of the struggling masses, who have ever been the foundation of the Democratic Party.
>
> There are two ideas of government. There are those who believe that if you just legislate to make the well-to-do prosperous, that their prosperity will leak through on those below. The Democratic idea has been that if you legislate to make the masses prosperous their prosperity will find its way up and through every class that rests upon it (Bryan [1896, p. 5]).

The Republican position in the 1896 election was pro-business and in opposition to Bryan's "toiling masses." Eastern business interests, under threat, rallied behind Republican presidential candidate William McKinley. Sundquist [1983, p. 156] notes that, as a consequence of this support, McKinley's campaign manager was able to raise massive campaign funds for the Republicans by the remarkable method of "assessing major corporations at the rate of one-fourth of one percent of capital." Theodore Roosevelt, upon becoming president with the assassination of McKinley in 1901, felt the most pressing issue of the time was ensuring the Republican principle of competition in a free market.

Bryan's appeal to industrial workers fell upon deaf ears in the East because they were not convinced that monetary expansion was the primary solution to their economic problems; they also felt excluded by Bryan's regional, agrarian-based coalition. It was not until Franklin Roosevelt's reforms were aimed directly at workers that the Democrats gained ascendancy with the "toiling masses." Sundquist ([1983, p. 207]) states "the Democrats had at last staked out a position as the party of the masses against the classes," although this position can clearly be traced back to Bryan's 1896 Cross of Gold speech.

Bryan in turn looked to the founding fathers of the Democratic party in support of his party's policy positions: "What we need is Andrew Jackson to stand as

Jackson stood, against the encroachments of aggregated wealth." And:

> Mr. Jefferson, who was once regarded as good Democratic authority, seems to have a different opinion from the gentleman who has addressed us on the part of the minority. Those who are opposed to this proposition tell us that the issue of paper money is a function of the bank and that the government ought to go out of the banking business. I stand with Jefferson rather than with them, and tell them, as he did, that the issue of money is a function of the government and that the banks should go out of the governing business (Bryan [1896, p. 3]).

The economic ideology that sharply distinguished Republicans during the polarizing 1896 presidential election had antecedents in the party's formative years of liberal capitalism and its "unmistakable appeal to the economic interest of the business element" (Sundquist [1983, pp. 86–88]). Sundquist ([1983, p. 81]) also states:

> the panic of 1857 closed banks and factories throughout the north and south and sent railroads into bankruptcy. Republicans blamed Democratic low tariff policies and gained a potent new issue.

The Republican power base in the north during Civil War reconstruction helped to increasingly affiliate the party with eastern industrial interests, thus foreshadowing by many decades Calvin Coolidge's sentiments in 1925 that "the chief business of the American people is business."

A second important feature of American political history is a pervasive decline in party affiliation, as defined by split-voting (voting for one party in the presidential election and another party in other offices) and "roll-off" (failure to vote a complete ticket), both used to identify party association (Burnham [1965]). These measures indicate that party affiliation was intense in the latter half of the 19th century. In the words of Burnham [1965, p. 22]: "The late 19th-century voting universe was marked by a more complete and intensely party-oriented voting participation among the American electorate than ever before or since."

Strong party affiliation and generally high voter turnout during the latter half of the 19th century meant that presidential landslides were possible only when turnout of one party's voters fell for some reason, and results were not a result of swing voters. Split-ticket voting and roll-off increased sharply, and voter turnout fell precipitously following the 1896 Democratic party realignment, a pattern attributed to the collapse of two-party systems in some states following 1896 and the rise of direct primaries (Burnham [1965]). The trend was only partially reversed by the New Deal realignment elections in 1932 to 1944 and is an important but dynamic feature of the current political landscape.

The sharply distinct ideologies of the Republican and Democratic parties during the polarizing 1896 presidential election suggest we could learn something if we were to include the post-1896 period in a test of presidential regime return differences. In fact, it is probably difficult to exclude any part of the history of Democratic versus Republican presidential elections, because very different ideological positions and their justifications date back to the early years of each party. Very strong party affiliation during the latter half of the 19th century also supports this view. Notwithstanding these observations, the sharp falloff in party affiliation following the 1896 realignment suggests that the post-1896 time period could be an interesting subsample to examine in comparison to the full sample.

Monthly Return Results

To test the hypothesis that there is no difference between Democratic and Republican administrations over a longer sample period, we use monthly data dating to 1856, when John C. Fremont became the first Republican nominee for President under the banner: "Free soil, free labor, free speech, free men, Fremont." For the period January 1926 through December 2004, we use the monthly value-weighted index returns and 30-day T-bill rates provided by CRSP.[5]

For the period January 1857 through December 1925, our data come from two sources. First, monthly stock market returns were downloaded from a website described in Schwert [1990]; this is a historical single, continuous, stock market price index return series compiled from five historical sources. While the monthly series dates back to February 1802, we use only the data after the November 1856 presidential election.

Second, Schwert provided us monthly short-term interest rates based on four- to six-month commercial paper yields reported in Macaulay [1938] and adjusted so that the level of the series is comparable to the CRSP short-term series. The transformation used to make the adjustment is described in Schwert [1989, p. 1148].

EXHIBIT 3
Political Regime Return Differential Regression Results Using Monthly Returns from 1857

Variable	n	α	$t(\alpha)$	β	$t(\beta)$	$\overline{R}^2$
Panel A: January 1857 - December 2004						
VWR-TBL	1,776	6.27	2.65	-2.61	-0.85	-0.01%
	Cutoffs for spurious regression bias					
	Lower	-0.20	-0.08	-6.46	-2.05	0.21%
	Upper	9.76	4.04	6.46	2.04	
	Cutoffs for spurious regression bias with five variables examined					
	Lower	-1.93	-0.75	-8.56	-2.68	0.39%
	Upper	11.35	4.73	8.29	2.62	
Panel B: January 1897 through December 2004						
VWR-TBL	1,296	8.32	3.32	-4.52	-1.26	0.05%
	Cutoffs for spurious regression bias					
	Lower	0.44	0.15	-7.68	-2.00	0.28%
	Upper	11.15	4.31	7.59	2.01	
	Cutoffs for spurious regression bias with five variables examined					
	Lower	-1.76	-0.58	-9.76	-2.57	0.53%
	Upper	13.27	4.88	10.31	2.67	

EXHIBIT 4
Political Regime Return Differential Regression Results Using Four-Year Returns from 1857

Variable	n	α	$t(\alpha)$	β	$t(\beta)$	$\overline{R}^2$
Panel A: January 1857 - December 2004						
VWR-TBL	37	6.27	2.90	-2.61	-0.95	-1.31%
	Cutoffs for spurious regression bias					
	Lower	0.13	0.06	-6.82	-2.21	7.14%
	Upper	9.36	5.08	6.66	2.20	
	Cutoffs for spurious regression bias with five variables examined					
	Lower	-1.63	-0.68	-9.11	-2.90	13.75%
	Upper	11.20	6.28	9.08	3.10	
Panel B: January 1897 through December 2004						
VWR-TBL	27	8.32	4.98	-4.52	-1.76	0.44%
	Cutoffs for spurious regression bias					
	Lower	0.95	0.35	-7.97	-2.32	9.30%
	Upper	10.78	5.92	7.91	2.19	
	Cutoffs for spurious regression bias with five variables examined					
	Lower	-1.24	-0.46	-10.31	-3.17	17.70%
	Upper	12.57	7.54	10.65	3.25	

The methodology used to test the hypothesis that there is no difference between monthly market returns under Democratic and Republican administrations is the dummy variable regression model in Equation (1). To develop the appropriate cutoff values for coefficient estimates, *t*-ratios, and adjusted R^2, we use estimates of unconditional and conditional probabilities obtained from the frequency distributions reported in Appendix B. Each sample period has a different distribution.

Finally, each simulation requires estimates of the mean and standard deviation of the monthly return differential series, *VWR-TBL*, as well as its first-order autocorrelation. These values are reported in Appendix C.

The extreme persistence of the presidential dummy variable is apparent. The first-order autocorrelation in *VWR–TBL* is positive and statistically significant. For the period beginning January 1857 and ending December 2004, its standard error is $1/\sqrt{1,776} = 0.023$.

Exhibit 3 reports the regression results and critical cutoff levels for the extended sample period. Over the entire history of the Republican party, the null hypothesis that there is no difference in stock market performance during different presidential regimes cannot be rejected at the 5% level. Both the estimated coefficients and their *t*-ratios are well within their bands, and the adjusted R^2 are below the critical levels.

In other words, increasing the sample size by using the entire history of elections of Republicans against Democrats makes it increasingly difficult to differentiate market return performance under two political parties, reinforcing the message that data mining combined with explanatory variable persistence has played an important role in presidential regime return difference results.

Four-Year Return Results

The regression results reported for the full sample in Exhibit 3 offer strong statistical support for the hypothesis that there is no significant difference in monthly stock market performance under the different political regimes. The use of monthly data makes the statistical inference more tedious than necessary, however. After all, only one value of the presidential dummy variable is observed each four years.

Consequently, only the total return over the entire four-year presidential term is relevant.

A simpler, more intuitive, testing procedure is to estimate Equation (1) using one observation every four years. The dependent variable is simply the annualized four-year return differential, *VWR–TBL*.

Appendix D provides summary statistics for annualized four-year returns. These, together with the transition information in Appendix B, are used to simulate critical cutoff levels. Exhibit 4 reports the results.

We draw the same conclusion in Exhibit 4—there is no significant difference in excess market returns during Republican and Democratic administrations. All coefficient estimates and *t*-ratios remain within their confidence bands, and the adjusted R^2 is well below its critical level.

The coefficient estimates of α and β are the same in Exhibits 3 and 4 because we are using annualized logarithmic returns. The confidence intervals are wider, as there are fewer return observations.

CONCLUSION

Dichotomous explanatory variables can be highly persistent in time series regressions. If they are, regression results may be spurious. This is especially the case when data sets are mined for significant explanatory variables, as highly persistent variables are more likely to display apparent significance.

We use a simulation procedure to correct potentially misleading inference in such regressions. The simulation is based on a procedure outlined by Ferson, Sarkissian, and Simin [2003] for highly persistent continuous explanatory variables. We regress simulated stock market returns against an independently generated presidential regime dummy variable series. This lets us tell how much dummy variable persistence combined with data mining can affect the significance of presidential regime return difference regression model results.

We find lower adjusted R^2 and coefficient estimates in presidential regime return difference studies than would be expected by chance. The conclusion that presidential regime differences are insignificant is reinforced when we extend the data sample back to the mid-1800s when Republican and Democratic ideologies became distinguishable from one another.

APPENDIX A

History of U.S. Presidential Election and Inauguration Dates Since 1856

President	Republican/ Democrat	Election date	Inauguration date
James Buchanan	D	18561104	18570304
Abraham Lincoln	R	18601106	18610304
Abraham Lincoln/Andrew Johnson	R	18641108	18650304
Ulysses S. Grant	R	18681103	18690304
Ulysses S. Grant	R	18721105	18730304
Rutherford B. Hayes	R	18761107	18770305
James A. Garfield/Chester A. Arthur	R	18801102	18810304
Grover Cleveland	D	18841104	18850304
Benjamin Harrison	R	18881106	18890304
Grover Cleveland	D	18921108	18930304
William McKinley	R	18961103	18970304
William McKinley/Theodore Roosevelt	R	19001106	19010304
Theodore Roosevelt	R	19041108	19050304
William H. Taft	R	19081103	19090304
Woodrow Wilson	D	19121105	19130304
Woodrow Wilson	D	19161107	19170304
Warren G. Harding/Calvin Coolidge	R	19201102	19210304
Calvin Coolidge	R	19241104	19250304
Herbert Hoover	R	19281106	19290304
Franklin D. Roosevelt	D	19321108	19330304
Franklin D. Roosevelt	D	19361103	19370120
Franklin D. Roosevelt	D	19401105	19410120
Franklin D. Roosevelt/Harry S Truman	D	19441107	19450110
Harry S Truman	D	19481102	19490120
Dwight D. Eisenhower	R	19521104	19530120
Dwight D. Eisenhower	R	19561106	19570120
John F. Kennedy/Lyndon B. Johnson	D	19601108	19610120
Lyndon B. Johnson	D	19641103	19650120
Richard M. Nixon	R	19681105	19690129
Richard M. Nixon/Gerald R. Ford	R	19721107	19730120
Jimmy Carter	D	19761102	19770120
Ronald Reagan	R	19801104	19810120
Ronald Reagan	R	19841106	19850120
George H. Bush	R	19881108	19890120
William J. Clinton	D	19921103	19930120
William J. Clinton	D	19961105	19970120
George W. Bush	R	20001107	20010120
George W. Bush	R	20041102	20050120

ENDNOTES

The authors are grateful to Michael Munger for providing insights regarding the historical development of the ideologies of the Republican and Democratic parties; to William Schwert for providing monthly short-term

APPENDIX B
Frequency of Presidential Transitions During Different Sample Periods

	1927-1998	1857-2004	1869-2004	1897-2004
No. of presidential elections	19	37	35	27
No. of Republican administrations	9	22	21	15
No. of Democratic administrations	10	15	14	12
Republican to Republican	5	14	13	9
Republican to Democrat	4	7	7	5
Democrat to Democrat	6	7	7	7
Democrat to Republican	3	8	7	5

APPENDIX C
Summary Statistics for Annualized Monthly Return Data

Period	Variable	*n*	Mean (%)	Standard deviation (%)	Autocorrelation 1	2	3	4	5
January 1857 through December 2004	*VWR-TBL*	1,776	4.72	17.50	0.084	-0.006	-0.053	0.012	0.076
	RD	1,776	0.59	0.49	0.982	0.964	0.946	0.928	0.909
January 1865 through December 2004	*VWR-TBL*	1,680	4.63	17.00	0.084	0.007	-0.078	0.009	0.087
	RD	1,680	0.60	0.49	0.982	0.964	0.947	0.929	0.911
January 1897 through December 2004	*VWR-TBL*	1,296	5.81	17.89	0.086	0.007	-0.082	0.018	0.089
	RD	1,296	0.56	0.50	0.984	0.968	0.951	0.935	0.919

Market return, VWR, is based on the monthly returns compiled by Schwert [1990] for January 1857 through December 1925 and the CRSP value-weighted index for January 1926 through December 2004. Excess return equals the difference between the monthly market return and the 30-day T-bill rate, where the 30-day T-bill rate, TBL, is based on the monthly rates compiled by Schwert [1989] for January 1857 through December 1925 and the 30-day T-bill rate provided by CRSP for January 1926 through December 2004. The presidential dummy variable, RD, is coded 1 for Republican and 0 for Democratic administrations.

APPENDIX D
Summary Statistics for Annualized Four-Year Return Data

Period	Variable	*n*	Mean (%)	Standard deviation (%)	Autocorrelation 1	2	3	4	5
January 1857 through December 2004	*VWR-TBL*	37	4.72	10.57	-0.474	0.228	-0.008	-0.029	-0.067
	RD	37	0.59	0.50	0.130	-0.179	-0.152	0.054	0.035
January 1865 through December 2004	*VWR-TBL*	35	4.63	10.44	-0.459	0.242	0.034	-0.100	-0.007
	RD	35	0.60	0.50	0.148	-0.181	-0.152	0.067	0.048
January 1897 through December 2004	*VWR-TBL*	27	5.81	11.07	-0.460	0.221	0.005	-0.102	-0.088
	RD	27	0.56	0.51	0.220	-0.343	-0.156	0.115	0.002

Market return, VWR, is based on the monthly returns compiled by Schwert [1990] for January 1857 through December 1925 and the CRSP value-weighted index for January 1926 through December 2004. Excess return equals the difference between the monthly market return and the 30-day T-bill rate, where the 30-day T-bill rate, TBL, is based on the monthly rates compiled by Schwert [1989] for January 1857 through December 1925 and the 30-day T-bill rate provided by CRSP for January 1926 through December 2004. The presidential dummy variable, RD, is coded 1 for Republican and 0 for Democratic administrations.

interest rate data prior to January 1926; and to Nicolas Bollen for comments and suggestions.

[1]Hirsch and Hirsch [2005] are responsible for the 38th edition of *The Stock Trader's Almanac.* It documents a wide array of stock market anomalies including market performance (i.e., movement in the DJIA 30) under Republican and Democratic administrations since the late 1960s.

[2]Technically speaking, the SV dummy variable definition implies that a new administration does not take effect until February of the year following the election. We assume the new administration takes effect in January because a lame duck administration is unlikely to have any

meaningful impact on the marketplace. Given the similarity in our results and those of SV, it appears that our variable definitions are consistent.

[3]The diagonal elements of the transition matrix therefore ensure that the persistence of the simulated series matches the persistence of the actual series; the higher the diagonal element values, the more persistent is the generated series.

[4]The unconditional and conditional probability estimates are obtained using the actual presidential history during the sample period 1927–1998. The sample includes 19 presidential elections. Nine were won by Republicans, so the unconditional probability of a Republican presidential victory is 9/19. The conditional transition probabilities are dependent on the previous presidential administration. Nine elections occurred with a Republican in power, and nine with a Democrat in power. The transition from a) Republican to Republican occurs five times (i.e., the one-to-one conditional transition probability is 5/9); b) Republican to Democrat occurs four times (i.e., the one-to-zero conditional transition probability is 4/9); c) Democrat to Republican occurs three times (i.e., the zero-to-one conditional transition probability is 3/9); and d) Democrat to Democrat occurs six times (i.e., the zero-to-zero conditional transition probability is 6/9).

[5]While monthly equal-weighted market returns and inflation rates are unavailable during the earlier period, the cost is not huge. Stock market performance is defined as the market capitalization-weighted average returns of all stocks, and the 30-day T-bill rate subsumes the short-term inflation rate.

REFERENCES

Bryan, William Jennings. "Cross of Gold" Speech." *Official Proceedings of the Democratic National Convention*. Chicago: 1896. Reprinted in *The Annals of America*, Vol. 12, *1895-1904: Populism, Imperialism, and Reform*. Chicago: Encyclopedia Britannica, Inc., 1968.

Burnham, Walter D. "The Changing Shape of the American Political Universe." *American Political Science Review*, Vol. 59, No. 1 (1965), pp. 7-28.

Ferson, Wayne E., Sergei, Sarkissian, and Timothy T. Simin. "Spurious Regressions in Financial Economics?" *Journal of Finance*, Vol. 58, No. 4 (2003), pp. 1393-1413.

Foster, Douglas F., Tom Smith, and Robert E. Whaley. "Assessing the Goodness-of-Fit of Asset Pricing Models: The Distribution of the Maximal R-Squared." *Journal of Finance*, Vol. 52, No. 2 (1997), pp. 591-607.

Granger, Clive W.J., and Paul Newbold. "Spurious Regressions in Economics." *Journal of Econometrics*, Vol. 4, No. 2 (1974), pp. 111-120.

Hensel, Chris R., and William T. Ziemba. "United States Investment Returns During Democratic and Republican Administrations, 1928-1993." *Financial Analysts Journal*, Vol. 51, No. 2 (1995), pp. 61-69.

Hirsch, Yale, and Jeffrey A. Hirsch. *Stock Trader's Almanac 2005*. Hoboken: John Wiley & Sons, Inc., 2005.

Huang, Roger D. "Common Stock Returns and Presidential Elections." *Financial Analysts Journal*, Vol. 41, No. 2 (1985), pp. 58-61.

Johnson, Robert R., William Chittenden, and Gerald Jensen. "Presidential Politics, Stocks, Bonds, Bills, and Inflation." *The Journal of Portfolio Management*, Vol. 26, No. 1 (1999), pp. 27-31.

Lo, Andrew W., and Craig A. MacKinlay. "Data Snooping in Tests of Financial Asset Pricing Models." *Review of Financial Studies*, Vol. 3, No. 3 (1990), pp. 41-66.

Macaulay, Frederick R. *The Movements of Interest Rates, Bond Yields and Stock Prices in the United States Since 1856*. New York: National Bureau of Economic Research, 1938.

Santa-Clara, Pedro, and Rossen Valkanov. "The Presidential Puzzle: Political Cycles and the Stock Market." *Journal of Finance*, Vol. 58, No. 5 (2003), pp. 1841-1872.

Schofield, Norman, Gary Miller, and Andrew Martin. "Critical Elections and Political Realignments in the U.S.A.: 1860-2000." *Political Studies*, Vol. 51, No. 2 (2003), pp. 217-240.

Schwert, G. William. "Indexes of U.S. Stock Prices from 1802 to 1987." *Journal of Business*, Vol. 63, No. 3 (1990), pp. 399-426.

——. "Why Does Stock Market Volatility Change over Time?" *Journal of Finance*, Vol. 44, No. 5 (1989), pp. 1115-1153.

Sundquist, James L. *Dynamics of the Party System: Alignment and Realignment of Political Parties in the United States*. Washington, DC: The Brookings Institution, 1983.

Yule, George U. "Why Do We Sometimes Get Nonsense Correlations Between Time Series? A Study in Sampling and the Nature of Time Series." *Journal of the Royal Statistical Society*, Vol. 89, No. 1 (1926), pp. 1-64.