Mapping the Presidential Election Cycle in US Stock Markets

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Revised: January 2007

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Abstract

This paper shows that in the almost four decades from January 1965 through to December 2003, US stock prices closely followed the four-year Presidential Election Cycle: in general, stock prices fell during the first half of a Presidency, reached a trough in the second year, rose during the second half of a Presidency, and reached a peak in the third or fourth year. This cyclical trend is found to hold for the greater part of the last ten administrations, starting from President Lyndon Johnson to the present administration under President George W. Bush, particularly when the incumbent is a Republican. The empirical results suggest that the Republican Party may have greater cause to engage in active policy manipulation to win re-election than their Democratic counterparts. There is irony in that bullish runs in the stock market have tended to coincide with sub-periods under Democratic administrations. The existence of the Presidential Election Cycle shown in the paper may constitute an anomaly in the US stock market, which could be useful for investors.

KEYWORDS: Presidential election cycle, spectral analysis, EGARCH intervention model, S&P stock prices, S&P returns.

1. Introduction

Prices are the outcomes of volatile human expectations, shifting the supply and demand lines, and causing prices to oscillate. Fluctuations in prices are a natural process of changing expectations, thereby leading to cyclical patterns. There are many kinds of cycles, with the combined effect of driving movements in stock prices.

Six interesting cyclical patterns are worthy of note: 28-day Trading Cycle, 10.5-month Futures Cycle, January Effect, 4-year Cycle, 9.2-year Cycle, and 54-year Cycle. The 28-day cycle, which is also known as the lunar cycle, was found as early as the 1930s in the wheat market. Regardless of the actual causes, many markets, including stocks, appear to follow the 28-day cycle. Although individual commodities exhibit their own unique cycles, another cycle ranging between 9 and 12 months has been found in the Commodity Research Bureau Index, which is a good reflection of the overall behavior of commodity prices. In addition, the stock market has shown an uncanny tendency to end the year higher (lower) if prices increase (decline) during the month of January, leading to the saying: “so goes January, so goes the rest of the year.” Between 1950 and 1993, the January Effect was correct on 38 of 44 occasions, with an accuracy rate of 86%.

In 1860, Clemant Juglar found that a cycle lasting approximately 9 years existed in many areas of economic activity, including the stock market. Subsequent research found that this cycle had a significant presence during the period 1840 to 1940. Named after a Russian economist, the Kondratieff Wave is a long-term, 54-year cycle that has been identified in prices and economic activity. However, since this cycle is extremely long, to date it has only repeated itself three times in the stock market.

The most popular cycle is the 4-year cycle, which is also known as the Kitchin Wave and the Presidential Election Cycle. Kitchin (1923) found that a 40-month cycle existed in a variety of financial variables in both Great Britain and the USA between 1890 and 1922. The four-year Presidential cycle was later found to have an extremely strong presence in the stock market between 1868 and 1945. Stovall (1992) found a pattern of low returns in the first two years of a President’s term and high returns in

the last two years in the stock market. Although it is called a "four-year cycle", the length of the cycle has been found to vary between 40 and 53 months.

This paper explores the existence of the Presidential Election Cycle in the USA based on Presidential Elections that occur every four years. One possible underlying reason is that stock prices may decline following a Presidential Election as the newly elected president takes unpopular steps to make adjustments to the economy. In mid-term, stock prices may begin to rise in anticipation of a stronger Election Day economy.

Historically the stock market has held a role as one of the most sensitive indicators of the business cycle, and one of the most influential variables in the government's index of leading economic indicators.[1] Schwert (1990) and Fama (1965) have confirmed that stock prices are correlated with future economic activity in statistical regressions. Confidence in the President may implicitly reflect the underlying economic conditions, which are important in determining stock prices.

The pattern in stock market prices related to the 4-year Presidential term has been the focus of Wall Street pundits for some time. Allivine and O'Neill (1980), Gartner and Wellershoff (1995), Hensel and Ziemba (1995), Huang (1985), and Booth and Booth (2003) found that the difference between the returns in the first half and those in the second half of the Presidential term are economically and statistically significant. In addition, Huang (1985) reported that such a Presidential cycle has persisted in both Democratic and Republican administrations, but is more pronounced in Democratic administrations. Examining each year's returns in the Presidential term, Foerster and Schmitz (1997) found that both US and international stock returns were lower in the second year of the US Presidential term relative to those in years 1, 3, and 4. Finance academic researchers have tended to focus their attention on how monetary policies and business conditions might explain stock market movements as the reason for a Presidential Election Cycle in the stock market.

[1] See, for example, Mitchell and Burns (1938), Moore (1975), Keilis-Borok, et al (2000), Simpson et al. (2001), Duarte and Holden (2003), Koskinen and Öller (2004), and Sensier et al. (2004).

In order to explain the causes of a Presidential Cycle, Nordhaus (1975) commented that political business cycles are often manipulated by political parties in trying to win elections. He argued that Presidential administrations have an incentive to stimulate the economy prior to elections and to pursue deflationary policies after the elections, regardless of the political orientation of the incumbent. Alesina and Sachs (1988) and Willet (1989) suggested that the Presidential cycle in stock return coincided with the business cycle because inflationary and deflationary measures were often pursued through fiscal and monetary policies. Hence, political factors are conjectured to influence the economy through these economic policies, which affect the timing and severity of the inherent business conditions.

Examining the role that monetary policy has played in explaining stock returns, Jensen et al. (1996) and Thorbeche (1997) discovered that monetary policy can help explain future stock returns. Rogoff (1990) argued that political budget cycles developed as government tended to increase spending, especially on projects with high immediate visibility, cut taxes, and raise transfers prior to and during election years. Megna and Xu (2003) used indicators to forecast the economy and cycles for the USA. Booth and Booth (2003) confirmed the previous findings and found that the Presidential Cycle had explanatory power beyond the business condition proxies that have been shown to be important in explaining stock returns. However, Santa-Clara and Valkanov (2003) found that the difference in returns could not be explained by business cycle variables that were related to expected returns, and were not concentrated around election dates. There was no difference in the riskiness of the stock market across Presidencies that could justify a risk premium. The differences in returns through the Presidential Cycle remain a puzzle.

Several studies have shown the interactions between macroeconomic outcomes and Presidential administrations. Chappell and Keech (1986) and Alesina and Sachs (1988) found that macroeconomic outcomes during Democratic administrations differed from those during Republican administrations, with higher (lower) average rates of growth in GNP in the first half than in the second half of Democratic (Republican) administrations. In addition, numerous studies have examined the relationship between Presidential administrations and the stock market. In a comprehensive examination of historical stock returns over the period 1988 to 1992,

Siegel (1994) revealed that the stock market, as measured by the Dow Jones Industrial Average (DJIA), rose by an average of 0.81% on the day following Republican victories, and fell by 0.75% on the day following Democratic victories. An earlier study by Riley and Luksetich (1980) also documented a favourable (unfavourable) market reaction following a Republican (Democratic) victory. However, Kansas (1996) reported that the stock market generated an average of 11.1% in the fourth year of a presidential term, while the market provided a 15% return in the fourth year of Democratic Presidencies. These studies suggest that stock returns are closely related to Presidential administrations.

Every four years, American voters elect a President. Due to the President's overwhelming influence on both domestic and world affairs, the ripple effects of Presidential elections are staggering. Hence, it should not come as a surprise that stock prices, often called the leading indicator of the macro economy, are affected by Presidential elections. The theory that seeks to explain the relationship between stock prices and Presidential elections is called the Theory of the Presidential Election Cycle.It is well known that business prospers in an environment of low taxes and stable government policies, which is precisely what policy-makers serve up in an election year when no public official wants to be seen as a big tax-and-spend proponent. Therefore, the stock market prospers in an election year.

However, politics and financial markets share a common truth that nothing lasts forever. In the year following an election, voters can be euphoric as they look forward with anticipation to the achievement that the President hopes to accomplish. Around this time, policy makers may begin to feel less restrained about introducing new programs that will put their agenda in place. This somewhat cynical view holds that the early days of a new administration are the best time to make big changes as the myopic electorate will forget about them over the next three years. These new programs and economic policies usually involve more taxes, more spending, and more regulations, which begin to eat into business profits. As a consequence, stock prices that follow corporate earnings will likely fall. This negative environment reaches a nadir during the second year of a Presidential term, following which policy makers begin to change their ways to be more "voter friendly" before the next election. Once again, they become more conservative and less prone to new tax-and-spend policies,

such that markets begin to recover before the next election.

In the literature, a Presidential Cycle is hypothesized and a t-test or simple regression analysis is used to test the hypothesis. In this paper, we contribute to the literature by applying spectral analysis to estimate the periods of the cycles, which verifies a formal existence of the four-year Presidential Election Cycle in the US stock market. The limitations of applying a t-test or simple regression analysis are that they do not take into consideration the time dependence and conditional heteroskedasticity (or the GARCH effect) in stock returns. In order to circumvent these problems, we adopt the exponential GARCH Intervention model to examine the Presidential Cycle.

It is found that, in general, stock prices fall during the first half of a Presidency, reaching the trough in the second year, and rise during the second half of a Presidency, reaching the peak in the third or fourth year. Furthermore, on average the cyclical pattern during a Republican administration is much more significant than that of a Democratic administration, which suggests that the Republican Party may engage in policy manipulation to win elections more frequently than may their Democratic counterparts.

The structure of the remainder of the paper is as follows. Section 2 discusses the data and methodology. Section 3 reports and explains the empirical findings from the estimation results. Section 4 provides some concluding comments.

2. Data and Methodology

Standard & Poor's 500 Composite Price Index (hereafter, S&P) on a weekly basis from 1 January 1965 to 31 December 2003 from DataStream are used in the empirical analysis. Weekly data rather than daily data are used to avoid representation bias from some thinly traded stocks, specifically the problem of non- synchronous trading. Wednesday indices are used to avoid the weekday effect of stock returns (Lo and MacKinlay (1988)).

We first check the stationarity property of the S&P stock index, its logarithm and

its log-difference (or returns). If a structural variable is non-stationary, shocks may have permanent effects on the variable, which may consequently lead to misleading results of the time series analysis. In particular, if the index contains a trend in mean, it will lead to serious leakage problems in spectral analysis. This effect occurs when variation at one frequency leaks into periodogram terms at frequencies different from the true frequency of the variation. In other words, it will cause the phenomenon of over-concentration at the low frequency, which means that every trend may give the zero frequency band a large value and raise the values of the neighbouring frequency bands. Therefore, if the data are non-stationary, it is necessary to transform the time series, such as the use of logarithms, square root or differencing, which could remove the problem of leakage in spectral analysis by reducing the importance of variation at a strong frequency.

If a series, say y_t, has a stationary, invertible and stochastic ARMA representation after differencing d times, it is said to be integrated of order d, and is denoted as $y_t = I(d)$. To test the null hypothesis H_0, $y_t = I(1)$ versus the alternative hypothesis H_1 , $y_t = I(0)$, we apply the augmented Dickey-Fuller (ADF) unit root test procedure based on the following auxiliary regression:

$$\nabla y_t = b_0 + a_0 t + a_1 y_{t-1} + \sum_{i=1}^{p} b_i \nabla y_{t-i} + \varepsilon_t \qquad (1)$$

where $\nabla y_t = y_t - y_{t-1}$, ε_t is the error term, and p is chosen to achieve white noise residuals. Testing the null hypothesis of the presence of a unit root in y_t is equivalent to testing the hypothesis that $a_1 = 0$ in (1). If the least squares estimate of a_1 is significantly less than zero, the null hypothesis of a unit root is rejected[2].

As shown in the next section, it is found that both the stock index and its logarithm are non-stationary, while the stock return is stationary. Henceforth, we only analyze the cyclical behaviour based on the return series. We then apply spectral analysis, including both periodogram and spectral density analyses, to analyse the

[2] See Granger (1981, 1987) and Hamilton (1994) for a detailed description of the test procedure.

periodicity of the US stock market. Using the stationary process, $\{Y_t\}_{t=-\infty}^{\infty}$, periodogram analysis assumes that the time series can be expressed as a linear combination of sinusoidal waves, such that:

$$Y_t = A\cos\omega t + B\sin\omega t + \varepsilon_t \tag{2}$$

where ω is the angular frequency (in radians per unit time), ϕ is the phase such that $A = R\cos\phi$ and $B = -R\sin\phi$, R is the amplitude, and ε_t is the error term. The method of least squares is used to minimize the following:

$$T(A,B) = \sum_{t=0}^{n-1} (Y_t - A\cos\ \omega t - B\sin\ \omega t)^2 \tag{3}$$

to obtain the following estimates:

$$A = \frac{1}{\Delta}\{\sum Y_t \cos\omega t \sum (\sin\omega t)^2 - \sum Y_t \sin\omega t \sum \cos\omega t \sin\omega t\}, \tag{4}$$

$$B = \frac{1}{\Delta}\{\sum Y_t \sin\omega t \sum (\cos\omega t)^2 - \sum Y_t \cos\omega t \sum \cos\omega t \sin\omega t\},$$

$$R = (A^2 + B^2)^{1/2}$$

where $\Delta = \sum (\cos\omega t)^2 \sum (\sin\omega t)^2 - \{\sum \cos\omega t \sin\omega t\}^2$.

The sum of squares associated with ω_k, which is called the power spectrum, is given approximately by:

$$f(\omega_k) = 2/n\{(\sum Y_t \cos\omega_k t)^2 + (\sum Y_t \sin\omega_k t)^2\}.$$

The power spectrum is a finite estimate of the spectral density function. A sharp peak in the power spectrum will indicate significant frequencies. If time series changes

contain any periodicity, their spectral density estimate will display a dominant peak at the corresponding frequency and a concentration in the neighbourhood of the peak. In practice, the Tukey and Tukey-Hamming windows, or the triangular weighting sequence, tend to be used to smooth the periodogram using spectral window weights.[3]

As shown in the next section, by applying the spectral analysis technique, we confirm the existence of the Presidential Election Cycle in the US stock market. We then define the Presidential dummy variables, I_1 to I_4, representing the first to fourth years of each Presidential cycle by taking on the value of 1 in the corresponding year and 0 otherwise. We also define the time variable, t_1, for the uptrend from 1965 to 2000, and the time variable, t_2, for the downtrend from 2001 onwards. Finally, we define P as the dummy variable for the prevailing administration's political party, with the dummy taking on the value of 1 (0) when a Democrat (Republican) occupies the White House.

Although a wide range of univariate and multivariate conditional volatility models is available (see, for example, McAleer (2005)), we use the following intervention model with the Exponential Generalized Autoregressive Conditional Heteroscedasticity (EGARCH) (1,1) (see Nelson (1991))[4]:

$$R_t = \alpha_0 + \alpha_1 I_{1t} + \alpha_2 I_{2t} + \alpha_3 I_{3t} + \alpha_4 I_{4t} + \beta_1 t_1 + \beta_2 t_1^2 + \beta_3 t_2 + \beta_4 t_2^2 + \lambda P + \sqrt{h_t}\varepsilon_t$$

$$\log h_t = \omega + \alpha_1 g(z_{t-1}) + r_1 \ln(h_{t-1}) + \sum_{t=1}^{I} \omega_t I_t + \sum_{t=1}^{J} \lambda_t K_t \qquad (5)$$

$$g(z_t) = \theta z_t + r\left[|z_t| - E|z_t|\right]$$

$$z_t = \mu_t / \sqrt{h_t}$$

[3] See, for example, Granger (1964), Jenkins (1968), Priestley (1981), Shumway and Stoffer (2000), and McCoy and Stephens (2004) for further details about spectral analysis.

[4] The GARCH(1,1) model (see Bollerslev (1986)) was also estimated. However, as the empirical results relating the Presidential Cycle to the US stock market were very similar to those obtained from the EGARCH(1,1) model, the GARCH results are not reported here.

to the stock returns, where $z_t = \frac{\varepsilon_t}{\sigma_t}$ is the normalized residuals series and the value of $g(z_t)$ is dependent on several elements. This model will be applied to the full sample periods as well as to the Democrat and Republican sub-periods. The dummy variable P is not included in the sub-periods analysis.

3. Empirical Findings and Interpretation

Table 1 gives the mean, standard deviation, skewness, kurtosis, Jarque- Bera Lagrange multiplier test of normality, and ADF unit root test for the S&P index, its logarithm and the logarithmic rate of return. The results of the ADF test in Table 1 lead to non-rejection of the null hypothesis of a unit root for both the index and its logarithm, but to rejection of the null hypothesis for the log-returns at the 1% significance level. This confirms that both the index and its logarithm are I(1) variables[5], and the log-return is I(0). In addition, the Jarque-Bera statistic rejects the null hypothesis of normality for the index, its logarithm and the log-returns at the 1% level of significance.

Table 1 here

The plots of the index and its logarithm from 1 January 1965 to 31 December 2003 are shown in Figures 1 and 2, respectively. From these figures, we find that the stock index follows a strong positive trend until 2000, with a strong downward trend dominating thereafter. Besides the major trend, the stock index follows a pattern of a four-year cycle, with the stock index falling during the first half of a Presidency, reaching its trough in the second year, and rising during the second half to reach its peak in the third or fourth year, thereby completing a cycle over a four-year period.

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[5] We further test the null hypothesis I(2) versus the I(1) alternative. The empirical results confirm that both the index and its logarithmic rate are I(1).

Figures 1 and 2 here

The plot of the logarithmic rate of return in Figure 3 from 1 January 1965 to 31 December 2003 shows that the return is highly volatile, and displays both volatility clustering and leverage effects. These are precisely the characteristics of time series data that are accommodated by the EGARCH model. However, no obvious cyclical patterns can be observed from the figure.

Figure 3 here

In order to determine the cycles, we apply the Fuller transformation to the S&P stock returns and display its plot in Figure 4. By examining the plots of the periodogram and spectral density function, it may be possible to obtain a clearer view of the hidden cyclical patterns in the S&P returns. The periodogram[6] of the S&P returns in Figure 4 removes some of the jaggedness, and reveals the dominant peaks at different periods with several spikes. This confirms that the US stock market consists of several cycles. However, it is clear that the four-year Presidential Election Cycle is the most prominent cycle as the strongest spikes occur at about 200 weeks (or every 4 years).

Figure 4 here

We then apply the EGARCH Intervention model defined in (5) to analyze the effect of the Presidential Election Cycle for the entire sample period, as well as for various sub-periods under Republican and Democratic administrations. As shown in Table 2,[7] statistically significant EGARCH and Presidential Election Cycle effects

[6] The plot of the spectral density estimate, which are not reported here, shows similar patterns.

[7] We also applied the GARCH Intervention model to analyze the data. As the results are very similar to those of the EGARCH model, we only report the results of the EGARCH Intervention model. In Table 2, we deleted the exogenous variables in the model if they were not significant in all the periods considered.

were observed in the stock market throughout the entire period, as well as during individual sub-periods for Democratic and Republican administrations. Although all the intervention parameters during the second year (I_2) [third year (I_3)] are negative (positive), as expected; only some of them are statistically significant. In particular, the second-year and third-year intervention estimates are significant only during Republican administrations, but not during Democratic administrations. This implies the possibility of relatively more intensive policy manipulation by Republicans to win an election as compared with the Democrats.

On the other hand, the trend component t_1 for the bull run from 1965 to 2000 is strongly significant during Democratic administrations, but is insignificant during Republican administrations. This suggests the irony that the stock market seems to prosper more under Democratic than under Republican administrations. This also raises interesting and important questions about the welfare effects of relatively more activist policy manipulation by Republicans.

Table 2 here

We also analyze the Presidential Election Cycle effect by examining the effect from one President to another. From the results reported in Table 3, we find that of twenty Presidential Election Cycle parameters, sixteen are of the expected signs (with thirteen being statistically significant), while four would appear to be of "incorrect" signs (with three being statistically significant). Of the three significant estimates with "incorrect" signs, two are actually "corrected" due to the successful re-election of the incumbent presidents, namely Ronald Reagan and Bill Clinton, respectively.

We postulate an explanation for this observation. The relatively more favourable economic conditions during the second terms in office by Ronald Reagan and Bill Clinton might have minimized the imperative for policy manipulation. Alternatively, and cynically, the exigency to manipulate policy to win re-election does not apply to a President serving a second term in office as one is prohibited by the US Constitution

from seeking a third term in office. Therefore, eighteen of twenty sub-periods have the expected signs, and among them, fifteen are statistically significant, thereby strengthening the presence of a Presidential Election Cycle effect in the US stock market.

Table 3 here

We also analyze the effect of the President's party. For Democratic Presidencies, only one of eight Presidential Election Cycle dummy variables is of an incorrect sign (though it is not significant), while the remainder are of the correct sign and are significant. On the other hand, for Republican Presidencies, only one of twelve Presidential Election Cycle dummy variables has a significant and incorrect sign (namely, Richard Nixon in 1971). The remaining eleven dummies are all of the correct sign, of which nine are significant. This shows that the Presidential Election Cycle effect prevails, regardless of the President's party.

The relatively milder policy manipulation by Democrats has tended to give a seemingly freer rein to the Presidential Election Cycle effect during Democratic administrations, as all but one of the dummies are significant and of the correct sign (with the sole exception of an incorrect sign being insignificant). The empirical findings also show that the incumbent Republican Presidents who succeeded in being re-elected managed to reverse the expected negative effect during the second year into positive territory. This suggests that Republican Presidents may have succeeded in manipulating government policies in an effort to win re-election. These empirical results should be useful for the re-election strategy of incumbent Presidents, especially if they are Republicans.

4. Conclusion

The political behaviour of governments may have an important effect not only on the macroeconomic performance of the whole economy, but also an important influence

on the microeconomic behaviour of all individuals. More often than not, the incumbent government can try to manipulate economic policies in both the macro and micro spheres in order to achieve specific political goals, including re-election.

This paper analyzed the impact of Presidential elections on stock prices with reference to the USA, which has not only a well-developed political electoral system but also a mature and sophisticated stock market. The empirical results using spectral analysis and the EGARCH Intervention model found that, since 1965, the US stock market has experienced several robust and quantitatively important Presidential Election Cycles.

We first performed unit root tests to determine whether the stock index series was stationary, using the augmented Dickey-Fuller (ADF) test. Then we used spectral analysis to show the types and strength of the existing cyclical patterns in the US stock market, especially the Presidential Election Cycle. This was followed by using the EGARCH Intervention model to determine whether any Presidential administration might have tried to manipulate economic policies to win re-election. Finally, we stratified the data by political affiliation, specifically Republicans and Democrats, in order to differentiate their respective attitudes toward policy manipulation with a mind to winning elections.

The result of the spectral analysis indicated that stock prices in the USA exhibited several cycles, with the four-year Presidential Election Cycle being the most prominent cycle, with the strongest spikes being spaced at about 200 weeks (or around 4 years) apart.

The results of the EGARCH Intervention analysis showed that there were statistically significant Presidential Election Cycles in the US stock market during the greater part of the past four decades, at both the overall as well as individual levels. In other words, during some of the ten four-year Presidential Election Cycles, stock prices decreased with a statistically significant amount in the second year, and then increased by a statistically significant amount in the third year of the Presidential Election Cycle. Furthermore, on average the cyclical pattern during a Republican administration was much more significant than that during a Democratic

administration, which suggests that the Republican Party may have dabbled in policy manipulation more actively to win re-election than did the Democratic Party. However, the efficacy of activist policy manipulation was thrown into some doubt by the irony that bull runs in the US stock market tended to coincide with sub-periods under Democratic rather than Republican administrations.

The empirical results reported here provide some justification for investors to incorporate the Presidential Election Cycle in their investment decisions in order to obtain greater returns. For even better returns, investors could incorporate investments that are timed to the Presidential Election Cycle with other approaches, such as technical analysis and fundamental analysis or strategies based on the economic situation and financial anomalies.[8] They could also enhance their investment decisions by applying other advanced forecasting and statistical techniques.[9]

[8] See, for example, Thompson and Wong (1991), Wong et al. (2001), Fong, et al. (2005), and Rapach, et al. (2005).
[9] See, for example, Matsumura et al. (1990), Wong and Miller (1990), Tiku et al. (2000), Muradoglu (2002), Niemira and Saaty (2004), Clements et al. (2004), Falk and Roy (2005), Ghiassi et al. (2005), and Ghysels et al. (2006).

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Figure 1. Plot of S&P Composite Index from 1965 to 2003

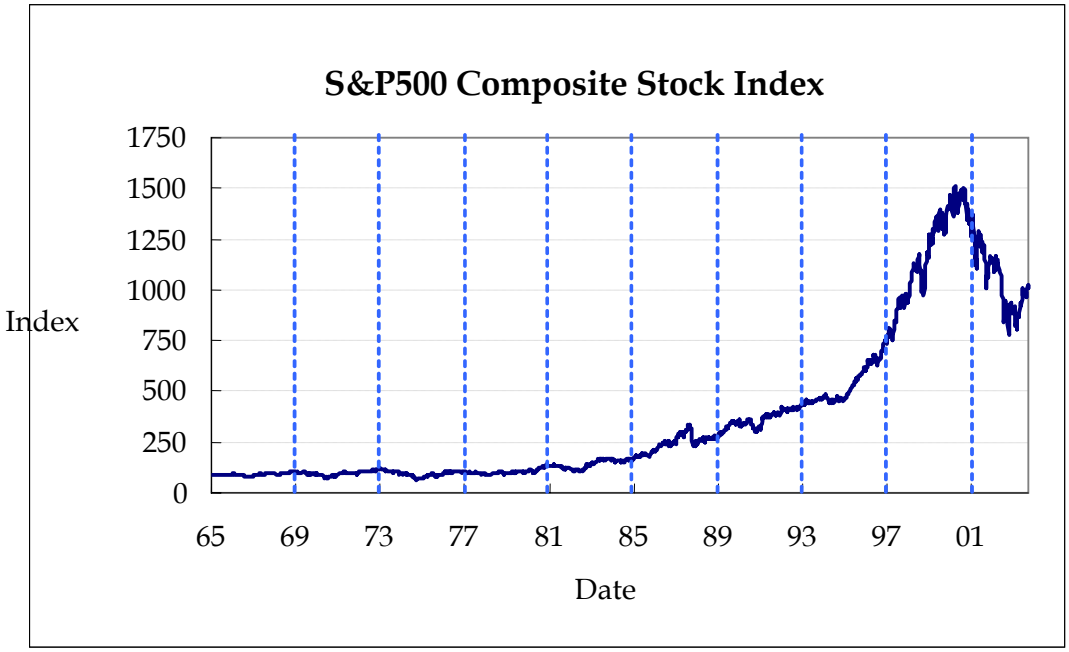

Figure 2. Plot of Logarithm of S&P Stock Index from 1965 to 2003

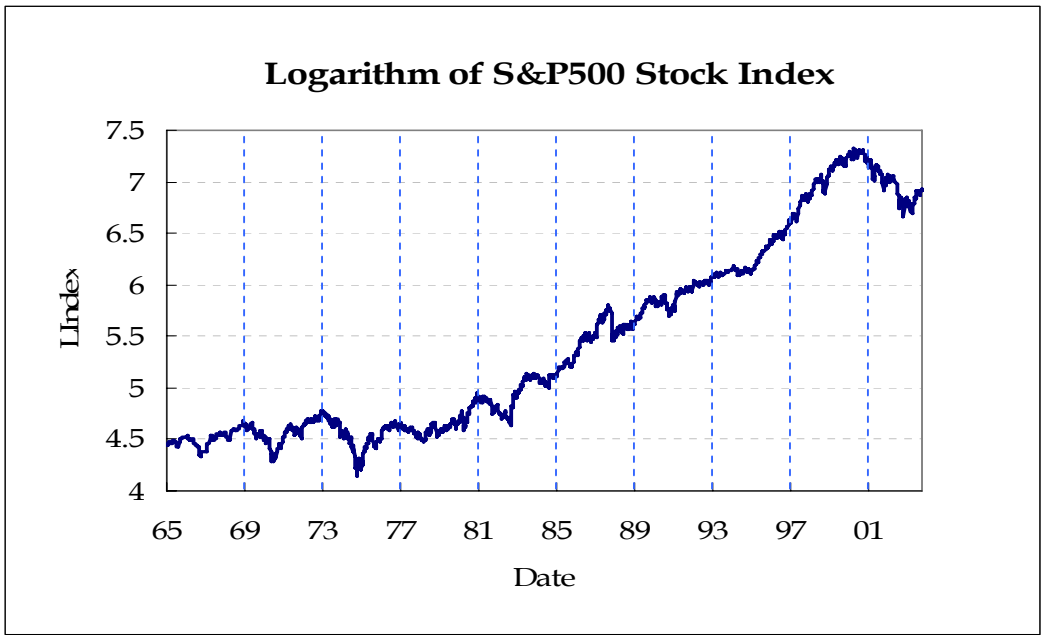

Figure 3. Time Series Plot of Logarithm of S&P Returns from 1965 to 2003

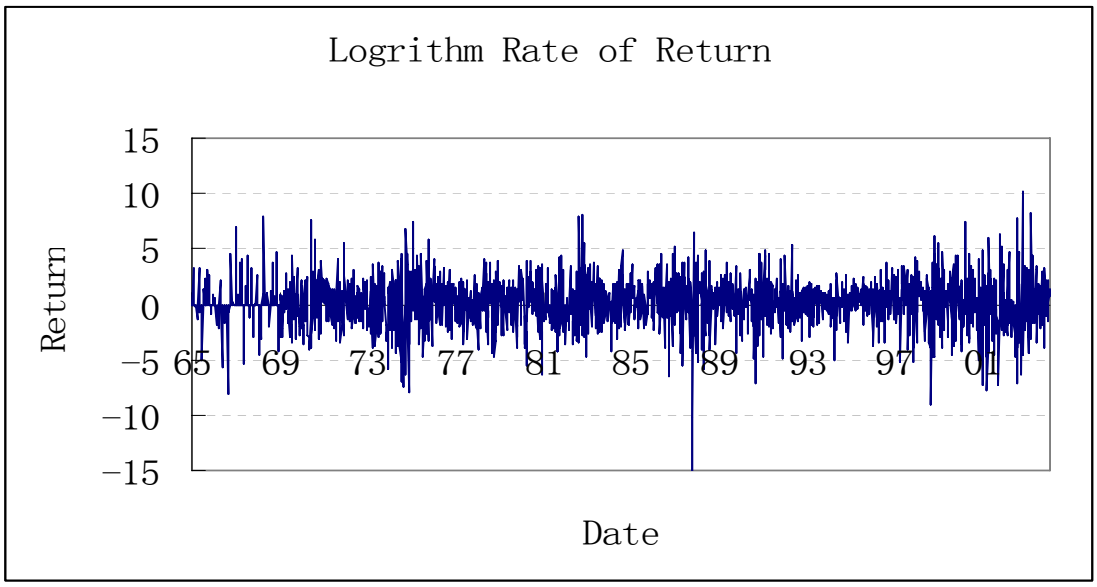

Figure 4. Plot of Periodogram for S&P Returns from 1965 to 2003

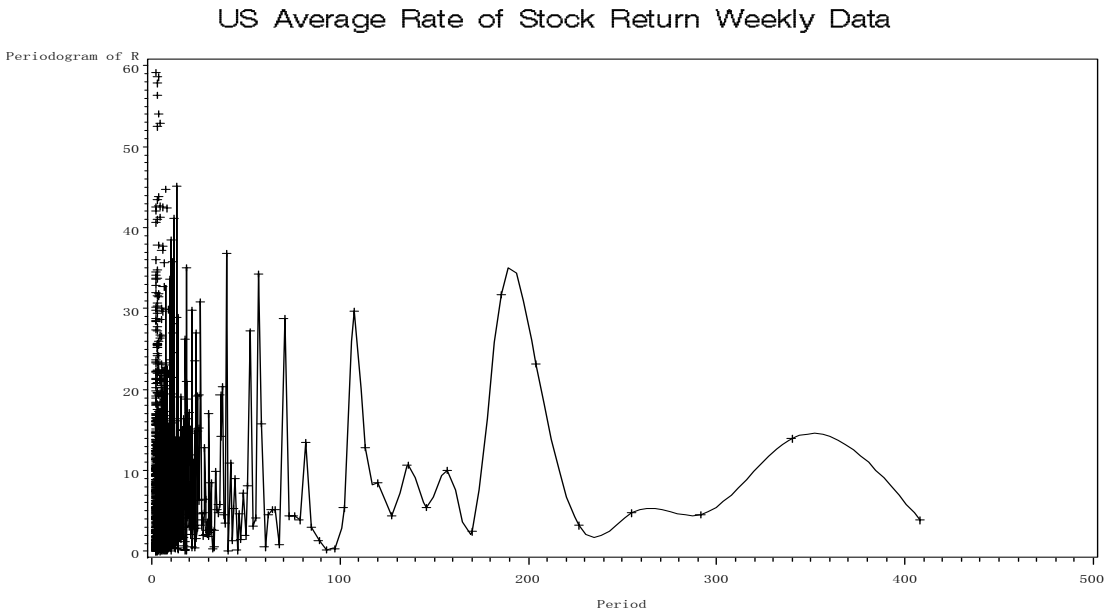

Table 1. Descriptive Statistics for levels, logarithms and log-returns of S&P

Statistics	S&P	Log (S&P)	Log (S&P returns)
Mean (μ)	374.262	5.4494	0.0001266
Std. Dev (σ)	389.395	0.9466	0.02154
Skewness	1.4085	0.5544	-0.3490
Kurtosis	0.7316	-1.1211	3.2754
Jarque-Bera	112.48***	1548.85***	47.87***
ADF	-1.46	-2.10	-12.23***

Notes: * p < 10%, ** p < 5%, *** p < 1%

Table 2. Overall EGARCH Intervention Model

	Entire Period		Democrat		Republican	
Variable	Estimate	t-value	Estimate	t-value	Estimate	t-value
t_1	0.000103*	1.94	0.000131**	2	0.000137	1.6
I_2	-0.1287	-1.22	-0.0273	-0.18	-0.284**	-2.05
I_3	0.2471**	2.53	0.1656	1.13	0.2344*	1.82
EARCH0	1.4937***	41.48	1.2617***	25.31	1.6117***	34.01
EARCH1	0.2859***	6.77	0.0363***	0.54	0.371***	6.61
THETA	-0.4901***	-3.5	-4.1745***	-0.52	-0.3582***	-2.64

Notes: * p < 10%, ** p < 5%, *** p < 1%

Table 3 , EGARCH Intervention Model-Individual in the Entire Period

Variable	Democrat/ Republican	Estimates	Standard Error	Pr > |t|
t1		6.04E-05	0.0000503	0.2296
Lyndon Johnson	D	-0.3306***	0.0286	<.0001
1967	D	0.3845***	0.0304	<.0001
R. Nixon	R	0.1852--	0.0834	0.0265
1971	R	0.2112***	0.0218	<.0001
R. Nixon/Gerald Ford	R	-0.9956***	0.0876	<.0001
1975	R	0.6539***	0.0553	<.0001
Jimmy Carter	D	0.062=	0.0379	0.1017
1979	D	0.216**	0.0947	0.0226
Ronald Reagan	R	-0.00975#	0.0394	0.8045
1983	R	0.1585**	0.0676	0.0191
Second Term@	R	0.3506---	0.0741	<.0001
1987	R	0.4892**	0.1946	0.0119
George Bush	R	-0.2281***	0.054	<.0001
1991	R	0.1004#	0.0724	0.1654
Bill Clinton	D	-0.2002*	0.1135	0.0777
1995	D	0.3357***	0.1157	0.0037
Second Term@	D	0.7195---	0.1499	<.0001
1999	D	0.1452*	0.0798	0.0687
George W. Bush	R	-0.7559***	0.1148	<.0001
2003	R	0.1697#	0.1562	0.2774
EARCH0		1.4833***	0.0356	<.0001
EARCH1		0.3433***	0.0451	<.0001
THETA		-0.3997***	0.1177	0.0007

Notes:

* p < 10%, ** p < 5%, *** p < 1% (correct sign)

- p < 10%, -- p < 5%, --- p < 1% (incorrect sign)

p > 10% (correct sign) and = p > 10% (incorrect sign)

@ The sign looks incorrect but is correct due to the second term.

D denotes Democrat and R denotes Republican.