INTERNATIONAL JOURNAL OF BUSINESS, 25(2), 2020 ISSN: 1083-4346

The Congressional Calendar, Market Performance, and Market Volatility

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ABSTRACT

We examine the period of the options used for construction of the Chicago Board Options Exchange Market Volatility Index (the VIX) for signs of the "Congressional Effect" of higher uncertainty, when Congress is in session. We find evidence that S&P 500 returns are lower when Congress is in session than when Congress is out of session. We also find evidence that the VIX is higher when Congress is in session. Specifically, in the case of the Senate, the proportion of Senate days in session in the upcoming 30 days is associated with a higher VIX. This indicates the anticipation of near-term Senate action is associated with "investor fear."

JEL Classifications: G18, H20, H60

Keywords: congressional effect; volatility; VIX

I. INTRODUCTION

Politics and wealth are two subjects of interest, particularly when they intersect. We study the "Congressional effect" correlating with stock market returns. We question whether the presence of Congress, in session, has an association with lower stock returns. Unlike other previous works, we use the commonly followed S&P 500 index as a measure of returns. The ex-ante expectation of market volatility can be captured by the Chicago Board Options Exchange Market Volatility Index (the VIX) or "investor fear index," and for the first time, we link Congressional activity with the VIX. .

The Congressional effect, first identified by Eric Singer in 1992, is the trend of the stock market performing much better when Congress is out of session. Lamb, Ma, Pace, and Kennedy (1997) subjected the Congressional effect to academic scrutiny and confirmed the association. Their belief was that a probable explanation of the effect is that uncertainty due to potential legislation, or other activity, when Congress is in session, may depress demand for stock ownership.

We ask two questions. Is the Congressional effect detected in recent S&P 500 returns? And is the proportion of session days in the forthcoming 30-day period, whose options are used to construct the VIX index, correlated with a higher VIX? Simply put, can we detect an association of potential Congressional action (or fear of Congressional action) in security returns and the volatility measured by VIX?

II. LITERATURE REVIEW

Singer (1992) first discussed his Congressional effect in the popular press (Barron's), noting that stocks appear to do about six times better when Congress was out of session than when it was in session. Singer (2012) recently authored a trade book based on the same concepts. Lamb et al. (1997) find that from 1897 to 1993 most advances in the market occurred when Congress was out of session. Their results hold for the most recent period of their study (1984 to 1993), and when controlling for the "January Effect."[1]

Work linking legislative activity to market performance continues. Recently, Cohen, Diether, and Malloy (2013), find voting records of "interested" legislators, those directly affecting their constituents, provide information not captured by the market. Effectively, they find legislators designate winners and losers and the voting records are predictive of future returns. Belo, Gala, and Li (2013) document that during Democratic presidencies, firms with high exposure to the government have higher cash flows and stock returns, and these firms have lower cash flows and stock returns during Republican presidencies.

The VIX, first described by Brenner and Galai (1989), was implemented by Whaley (1993) who emphasizes that the VIX is "*implied* by the current prices of the S&P 500 Index and represents expected *future* stock market volatility over the next 30 calendar days" and is often called the "investor fear gauge" (Whaley, 2009). If the Congressional effect is connected to an uncertainty or fear of Congressional actions, it should be detected in the VIX.

The prices of put and call options on the level of the S&P 500 determine the actual level of the VIX. When option prices are greater, all else equal, there is greater uncertainty regarding future price changes for an underlying asset (such as a weighted portfolio of stocks comprising the S&P 500). This effect exists because option holders

face a dichotomy in which they are increasingly rewarded for "in the money" options. Calls (puts) with reference or "strike" prices below (above) the actual or "spot" prices have ever-increasing value as stock prices continue to rise (fall) "in the money." Conversely, when stock prices fall (rise), call (put) owners do not suffer increasing losses once their options are "out of the money." Option buyer maximum losses are fixed. Thus, general volatility of underlying stock prices is advantageous for option holders, and option prices rise with stock volatility.

The VIX calculation is based on this relationship of volatility and option prices. Higher call and put prices for the S&P 500 level imply that future volatility of stocks is expected to be relatively higher. The VIX uses a mix of call and put options with 30 days until expiration to create a measure of implied volatility, which is then standardized into an annualized standard deviation for ease of interpretation. For example, when option prices for the S&P 500 might imply a VIX of 25, S&P 500 option prices are at a level implying that the standard deviation of S&P 500 ex ante returns for the upcoming year is 25%. If option prices were higher (lower), the annualized standard deviation for the upcoming year might be 30% (20%).

III. DATA AND METHODS

All data are from publicly available sources. S&P 500 data are from Yahoo! Finance. Congressional calendar data are from The Library of Congress.[2] We consider our analyses separately for meetings of the United States House of Representatives ("House") and the United States Senate ("Senate"). VIX data are from the CBOE website.[3] Our sample period is from 1990-2011 as our study is partly focused on the link between Congressional sessions and the VIX volatility (or "fear") index, and calculations of the VIX were first made in 1990.[4] For portions of the analysis, we consider the proportion of the next 30 calendar days that the House or Senate will meet as the VIX calculation is based on characteristics of options on the S&P 500 index which will expire in the next 30 days.

We first present summary statistics regarding Congressional meetings by session (year) and market performance relative to Congress' status as either in session (open) or in recess (closed). Results are shown separately for the House and the Senate. We provide a variety of basic statistics for S&P 500 performance, as a proxy for the market, based on Congress' status. We provide results for the entirety of observation days in our sample (5,547 days) as well as after we remove the top and bottom 1% of the S&P 500 returns days from the sample.[5]

We next conduct regression analyses to determine whether evidence exists for the proposition that market returns are driven by the performance of the market when Congress is in session or in recess. Results are again presented separately for the House and the Senate. In order to consider these possibilities, we estimate the regression:

$$AnnRet_m = \alpha + \beta\ OutRet + e \quad (1)$$

where $AnnRet_m$ is the market's compounded annual return in a calendar year, proxied for by the S&P 500, and OutRet is the market's return compounded over the same calendar year, only for days when Congress is in recess. Similarly, we estimate the regression:

$$AnnRet_m = \alpha + \beta\ InRet + e \quad (2)$$

where InRet is the market's return compounded over the same calendar year as $AnnRet_m$, though only for days when Congress is in session. Truncated and raw results are both presented.

We also acknowledge that Congress is often in recess for a large portion of the month of January, especially the opening trading days of the month which are commonly believed to drive the oft-mentioned "January Effect." In order to ensure that our results regarding market returns are not actually a manifestation of the confounding variable problem, we estimate the regression:

$$DayRet = \alpha + \beta_1 D + \beta_2 J + e \quad (3)$$

where DayRet is the S&P 500 return on a given day, D is a dummy variable which takes the value 0 when Congress is in recess (closed) and 1 when Congress is in session (open). J is a dummy variable which takes the value 1 for days in January and 0 otherwise. Again, results are presented separately for the House and Senate, and results before and after truncation are presented.

We next shift to the consideration of market volatility relative to Congress' status. We present comparisons of the average VIX level when the House and Senate are in session and out of session. We do so both before and after truncating our sample to remove the most extreme 1% of VIX observations from the sample.[6]

Finally, we seek to determine whether the VIX index, which measures the anticipated volatility of the S&P 500 over the next 30 calendar days, is influenced by the proportion of those calendar days that Congress will be in session.[7] We thus estimate the regressions:

$$VIX = \alpha + \beta HouseProp + e \quad (4)$$

$$VIX = \alpha + \beta SenateProp + e \quad (5)$$

where VIX is the closing value of VIX on a particular trading day, and HouseProp, and SenateProp are the proportions of the next 30 calendar days in which the House and Senate, respectively, are in session. Results with and without truncation of the highest and lowest 1% of VIX daily observations are provided.[8] Because we use daily observations of VIX and HouseProp (SenateProp), an overlapping data problem exists which necessitates adjustments of the potentially autocorrelated errors. The t-stats of the regression results we provide are calculated based on Newey-West standard errors in order to address this concern.

IV. RESULTS

We begin our analysis by presenting descriptive statistics regarding the sessions of the US House of Representatives ("House") from the 1990-2011 period. In Panel A of Table 1, we note that the House is in session (open) in slightly more than half of trading days in an average year (133.3 open days, on average, vs. 118.9 trading days in recess (closed) on average). The updated sample shows more year-to-year stability in recent times, with standard deviations of the number of days in recess and in session each less than 20 days per year. This differs significantly from the sample of Lamb et al. (1997) which reports standard deviations of 58.9 days in recess each year and 61.7 days in session each year.

Table 1
House descriptive statistics

	In Recess Closed)	In Session (Open)	
Panel A: Session Statistics			
# of Sessions	22	22	
# of Days	2615	2932	
Average # of Days	118.9	133.3	
Minimum # of Days	81	101	
Maximum # of Days	150	171	
Standard Deviation	19.6	19.5	
Panel B: Session Returns			Difference
Average Daily Return (Arithmetic)	0.0477%	0.0140%	0.0337%**
Average Daily Return (Geometric)	0.0401%	0.0074%	0.0327%**
Number of Days with Gains	1410/2615 (53.9%)	1517/2932 (51.7%)	
Average Daily Return (Arithmetic, Truncated)	0.0610%	0.0012%	0.0598%***
Average Daily Return (Geometric, Truncated)	0.0573%	0.0005%	0.0568%***
Average Annual Return	5.43%	1.88%	3.55%**
Average Annual Return (Truncated)	7.26%	0.34%	6.92%***

This table presents descriptive statistics of US House of Representatives sessions (in Panel A) and stock market performance (in Panel B) around these sessions, which are from 1990-2011. Market returns are those of the S&P 500. Only days with open US trading markets are considered. Average returns results are presented both before and after observations of the high and low 1% of S&P 500 returns are truncated from the sample. Average annual return is the arithmetic mean of the annual rolling returns of trading days where the House is in recess or in session. ** and ***denote statistical significance at the 5% and 1% levels, respectively.

In Panel B of Table 1 we demonstrate the superiority of S&P 500 performance when the House is out of session. The arithmetic (geometric) average daily return of the S&P 500 is 4.77bp (4.01bp) when the House is in recess, yet only 1.40bp (0.74bp) when the House is in session. The difference in returns, based on the House's status, is statistically significant for both the arithmetic and geometric average. The difference between performances is even more pronounced when we truncate the data to eliminate highest 1% and lowest 1% of S&P 500 returns days from our sample. This result is provided because the most extreme market movements are likely to be the result of outside information beyond the House's meeting status. We believe any direct causative effect of the House's meeting status would more likely be gradual; thus, we provide the truncated results as an additional viewpoint. While the tests for significant differences of returns were significant at the 5% level for both the arithmetic and geometric averages of the full sample, the statistical strength rises to the 1% level when testing the differences of the truncated sample.[9] We provide annual results based on our 22 years of data as well and, again, note the statistically superior performance of the S&P 500 when the house is in recess.[10]

In Table 2, we perform analyses similar to those of Table 1 but shift our focus to the link that the status of the U.S. Senate ("Senate") has to the returns of the S&P 500. While the results are similar in direction, namely, that the market performs better when the Congress is in recess, these findings are weaker, statistically, for the Senate than for the House. The Senate is in session approximately 20 additional trading days, on average, relative to the House. There is no statistical difference, in the full sample, between the average daily market performances, based on whether or not the Senate is in session.

Table 2
Senate descriptive statistics

	In Recess (Closed)	In Session (Open)	
Panel A: Session Statistics			
# of Sessions	22	22	
# of Days	2184	3363	
Average # of Days	99.3	152.9	
Minimum # of Days	52	127	
Maximum # of Days	127	200	
Standard Deviation	20.5	20.2	
Panel B: Session Returns			Difference
Average Daily Return (Arithmetic)	0.0319%	0.0285%	0.0034%
Average Daily Return (Geometric)	0.0251%	0.0213%	0.0038%
Number of Days with Gains	1185/2184 (54.3%)	1763/3363 (52.4%)	
Average Daily Return (Arithmetic, Truncated)	0.0441%	0.0232%	0.0209%*
Average Daily Return (Geometric, Truncated)	0.0386%	0.0144%	0.0242%*
Average Annual Return			
Average Annual Return (Truncated)	4.14%	3.29%	0.8500%

This table presents descriptive statistics of US Senate sessions (in Panel A) and stock market performance (in Panel B) around these sessions, which are from 1990-2011. Market returns are those of the S&P 500. Only days with open US trading markets are considered. Average returns results are presented both before and after observations of the high and low 1% of S&P 500 returns are truncated from the sample. Average annual return is the arithmetic mean of the annual rolling returns of trading days where the Senate is in recess or in session, respectively. * denotes statistical significance at the 10% level.

There is, however, evidence suggesting that the market performs better, in terms of average daily truncated returns, when the Senate is in recess. The arithmetic (geometric) average daily return when the Senate is closed is 4.41bp (3.86bp). The arithmetic (geometric) average daily return when the Senate is open is 2.32bp (1.44bp). The difference between average returns when the Senate is closed, rather than open, is 2.09bp (2.42bp) for the arithmetic (geometric) average. These results are both significant at the 10% statistical level.

Similar to Lamb et al. (1997) we next demonstrate, via separate regression frameworks, whether the House's status as in or out of session is predictive of the market returns (measured by the S&P 500 herein). In Panel A of Table 3 we note that the annual returns of the market in a year are significantly (at the 5% level) linked to the returns of that year for the sub-period where the House is in recess. In Panel B of Table 3 we find that annual returns are not statistically linked to the market performance in the sub-period where the House is in session. Additionally, the intercept in Panel A is statistically insignificant while the intercept in Panel B, of 3.2%, is significant at the 10% level. This indicates that the market returns in a given year are attributable to the returns in the days when the House is in recess, even though this period represents less than half the trading days in an average year.

We reconsider the dual-regression framework for annual returns, this time relative to Senate status, in Table 4. Similar to the dynamic seen between Tables 1 and 2, we find a weaker link between the Senate's status and market returns than that of the House. Annual S&P 500 returns are statistically linked to the returns in the sub-period where the

Senate is in recess (at the 5% level). However, unlike the House results of Table 3, the intercept of Panel B is insignificant.

Table 3
Market return regression results for US House sessions

Panel A: Relationship Between Annual Market Return and Returns in Recess

$AnnRet_m = \alpha + \beta$ OutRet + *e,* where OutRet is the market return when House is in recess

$AnnRet_m = 0.002 + 1.049$ OutRet
(0.24) (2.31)
F-value = 5.33 p-value = 0.0318

Panel B: Relationship Between Annual Market Return and Returns in Session

$AnnRet_m = \alpha + \beta$ InRet + *e,* where InRet is the market return when House is in recess

$AnnRet_m = 0.032 + 1.019$ InRet
(1.77) (0.83)
F-value = 0.69 p-value = 0.416

This table presents regression results linking truncated market returns (removing high and low 1% S&P 500 return days, each year) and periods where the US House is in and out of session. In Panel A we regress each year's annual return, AnnRet, on the year's return only on days where the House is in recess, OutRet. In Panel B we regress each year's annual return, AnnRet, on the year's return only on days where the House is in session, InRet. t-statistics are presented in parentheses. Market returns are those of the S&P 500. Only days with open US trading markets are considered.

Table 4
Market return regression results for US Senate sessions

Panel A: Relationship Between Annual Market Return and Returns in Recess

$AnnRet_m = \alpha + \beta$ OutRet + *e,* where OutRet is the market return when House is in recess

$AnnRet_m = 0.007 + 1.052$ OutRet
(0.24) (2.31)
F-value = 4.43 p-value = 0.048

Panel B: Relationship Between Annual Market Return and Returns in Session

$AnnRet_m = \alpha + \beta$ InRet + *e,* where InRet is the market return when House is in recess

$AnnRet_m = 0.028 + 1.016$ InRet
(0.68) (0.65)
F-value = 0.42 p-value = 0.225

This table presents regression results linking truncated market returns (removing high and low 1% S&P 500 return days, each year) and periods where the US Senate is in and out of session. In Panel A we regress each year's annual return, AnnRet, on the year's return only on days where the Senate is in recess, OutRet. In Panel B we regress each year's annual return, AnnRet, on the year's return only on days where the Senate is in session, InRet. t-statistics are presented in parentheses. Market returns are those of the S&P 500. Only days with open US trading markets are considered. Observations are from 1990-2011.

In Table 5 we consider if the findings linking Congressional status and market returns hold after acknowledging the potential, oft-documented "January Effect". In fact, our results show that returns were not particularly strong in January for the 1990-2011 period. The coefficient on the January dummy variable is negative in both Panel A, when we estimate regressions based on House status, and in Panel B, when we estimate

regressions based on Senate status. Market returns are significantly negatively linked (at the 5% level) to the dummy variable representing that the House is in session. There is no significant link between market returns and the Senate's status.

Table 5
Regressions controlling for January effect

Panel A: "Congress" Defined as US House

$$DayRet_m = \alpha + \beta_1 D + \beta_2 J + e$$

	Coefficient	t-value	p-value
Intercept	0.065	2.95	0.003
D	-0.062	-2.11	0.035
J	-0.035	-0.65	0.516

Panel B: "Congress" Defined as US Senate

$$DayRet_m = \alpha + \beta_1 D + \beta_2 J + e$$

	Coefficient	t-value	p-value
Intercept	0.041	1.74	0.083
D	-0.016	-0.55	0.585
J	-0.026	-0.49	0.626

This table presents regression results linking daily market returns to periods where Congress is in and out of session controlling for the potential January effect. Each day's return is denoted DayRet. When D = 0, Congress is in recess. When D = 1, Congress is in session. J = 1 if an observation day is in January, and J = 0 otherwise. Panel A considers the US House of Representatives, and Panel B considers the US Senate. The sample period is from 1990-2011. Market returns are those of the S&P 500. Only days with open US trading markets are considered. Returns are expressed in percentage format.

Table 6
VIX with Congress in and out of session

	In Recess (Closed)	In Session (Open)	Difference
Panel A: House Results			
Mean Daily VIX	20.60	20.54	- 0.06
Mean Daily VIX (Truncated)	19.98	20.50	0.52***
Panel B: Senate Results			
Mean Daily VIX	20.17	20.82	0.64***
Mean Daily VIX (Truncated)	19.81	20.54	0.73***

This table presents VIX levels comparisons based on whether Congress is in or out of session. US House results are shown in Panel A while US Senate results are shown in Panel B. Observations are from the 1990-2011 period. Results are presented for the full sample, as well as after the highest and lowest 1% of VIX observations are truncated (removed) from the sample. ***denotes statistical significance at the 1% level.

We next turn to the link between the market volatility (or "fear index"), VIX, and the status of the House and Senate. In Table 6 above, we present the average VIX levels for days when the House (Senate) is in recess vs. in session in Panel A (Panel B). We present our results for the full sample of observations, as well as for the truncated sample where we omit those days with the highest and lowest 1% of VIX levels.[11] We find, in Panel B, that market volatility is considerably lower, on average, when the Senate is in recess than when it is in session. The VIX on the average day when the Senate is in session is 0.64% (0.73%) higher than the VIX on the average day when the Senate is in recess for the full (truncated) sample. The full and truncated differences are both statistically significant at the 1% level. In Panel A, we find that the VIX is also

significantly lower (also at the 1% level) when the House is in recess, but this finding is unique to the truncated sample where extreme VIX observations are removed.

Finally, in Table 7, for a slightly different perspective, we consider the link between VIX and the proportion of days in the upcoming 30-day period where the House (in Panel A, denoted by HouseProp) or Senate (in Panel B, denoted by SenateProp) is in session.[12] The results in Table 7 are based only on the truncated VIX sample. We find no link between the upcoming proportion of days with House meetings and VIX, but we find the proportion of upcoming days where the Senate is in session to be significantly positively linked, at the 5% significance level, with VIX. The evidence suggests that there is greater market uncertainty not just when the Senate is in session, but when it will be meeting more in the near future. This is, we believe, the most interesting results. That is, that the greater the proportion of Senate session days in the next 30 days, the greater the "fear" level, as measured by VIX.

Table 7
Explaining VIX with upcoming Congressional status

Panel A: Relationship between next 30-day House sessions and VIX

VIX = 19.98 + 0.71 HouseProp
(52.70) (0.76)

Panel B: Relationship between next 30-day Senate sessions and VIX

VIX = 19.48 + 1.87 SenateProp
(49.31) (2.07)

This table presents regression results linking the volatility index VIX's level on a given day (VIX) to the proportion of the next 30 days in which the House of Representatives (HouseProp) or Senate (SenProp) are in session. This proportion is utilized as VIX is constructed based on ratios of S&P 500 futures contracts prices over the next 30 days. Results are truncated to exclude VIX observations in the highest and lowest 1% of observations. Newey-West standard errors are utilized to control for the overlapping data problem inherent to using daily observations. The sample period is from 1990-2011. The t-statistics are presented in parentheses. Only days with open US trading markets are considered as observations because VIX will change only when markets are open. VIX, however, is based on futures contracts covering the next 30 calendar days, not trading days, thus the appropriate independent variable is a proportion based on calendar days.

V. CONCLUSION

We find that the "Congressional Effect" as reported by Lamb et al. (1997) continues to be detected in the S&P Index. We also find that the Congressional calendar is associated with higher VIX levels. Most interestingly, we find that for the Senate, the greater the proportion of the upcoming 30 days that are in session the greater the VIX, or "fear" indicator.

ENDNOTES

1. Rozeff and Kinney (1979) find higher stock returns in January, and subsequent research generally finds that these higher returns happen in the first few days of January and are particularly pronounced for smaller firms.
2. http://thomas.loc.gov/home/schedules.html
3. http://www.cboe.com/micro/vix/historical.aspx

4. The original VIX was measured based on S&P 100 option price characteristics, rather than S&P 500 options. S&P 500 options were first used for VIX calculations in 1993.We, however, use retroactively calculated VIX levels based on S&P 500 options, available from the CBOE website, starting in 1990.
5. The truncated results herein omit the high and low 1% of S&P 500 returns days, ex post, for the entire sample period of 1990-2011. Results are materially very similar when truncations are made by year alternatively.
6. We do our truncations both annually and for the overall sample. Results are qualitatively very similar though overall truncation results are shown herein.
7. In reality, it is not always known, 30 days in advance, exactly which upcoming dates the House and Senate will be in session or in recess, though generally the schedule can be anticipated with great accuracy.
8. We do our truncations both annually and for the overall sample. Results are qualitatively very similar though overall truncation results are shown herein.
9. All statistical significance levels reported in this paper are two-sided.
10. As an additional item for study we consider whether the partisan make-up of the House (and, later, of the Senate) was linked to our results. We find no evidence that partisan make-up is linked to any of the results contained herein.
11. We make these truncations to the overall sample and present the results here. Additionally, for robustness, we truncate the highest and lowest 1% of VIX observations by calendar year. Results are very similar qualitatively.
12. While not every meeting day of the House and Senate is known weeks in advance, the vast majority of the Congressional calendar is prearranged.

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