The Effect of the Government Shutdown on the S&P 500 Futures Market from 1982-2014

Alexa Abraham
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Dr. Michele Naples

Abstract

This study explores the relationship between a government sequester and futures market prices through examining historical government shutdowns' effects, controlling for consumer confidence and other measures of the economy. Results indicate that the presence of a government sequester, as well as consumer confidence, are the two most important variables to be considered in evaluating the effect of a sequester on the futures market. The paper also provides various explanations for the surprisingly positive relationship between a government sequester and futures market prices.

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I. Introduction

This study aims to measure the effect of the October 2013 government shutdown on the futures market. Shutting down the government, also known as a government sequester in which the government induces automatic spending cuts, causes short-term and long-term effects on the United States' economy. The economy and financial markets closely relate to one another, and anticipated economic conditions will affect the projected status of financial assets. Thus, comparing the performance of a financial market during the time of the sequester with normal periods, such as the stock, bond, foreign exchange, commodities, and derivatives markets, serves to measure the sequester's anticipated impact on the economy.

Measuring the effects of the shutdown on a section of the futures market in particular was an intriguing idea because people invest in this market to buy and sell future contracts for delivery on a specified future date, so the volume of investors in this market and its stock prices could reflect financiers' assessment of the future of the economy, and may correlate with consumer confidence as well. John Maynard Keynes once said that "animal spirits" in consumer and business confidence are crucial to understanding economic fluctuations. Ultimately, answering the question "How does the government shutdown of 2013 effect the futures market?" brings to light the current disposition of the country's people, which would illustrate implications of the future of our economy as a result of the sequester.

This paper tests the hypothesis that the government shutdown will cause a decline in the futures market in the present because the notion of government instability will force financiers to lose confidence in the economy and deter them from investing in the market. The paper demonstrates the determinants of confidence, and the impact that previous government shutdown's have had on confidence. Explaining futures prices over time, trends can be compared

with and without either threatened or actual government shutdowns, results can be interpreted in terms of the impact of the shutdown on uncertainty and business confidence.

The rest of the paper provides a literature review of other studies addressing government shutdowns as they relate to confidence and the financial markets, the theoretical model used in the study with interpretations of the signs of each variable's beta coefficient, the actual results with interpretations of the results, and a conclusion with suggestions for future studies on this topic.

I. Literature Review

Literature specifically addressing a government shutdown's effect on the futures market does not exist thus far. However, there are various studies and reports that isolate some of the variables related to government instability, confidence, and the financial markets. Knowledge from these works of literature may be compiled and pieced together to gain insight regarding the specific research topic.

First, the concept of a government shutdown must be explained in order to understand how a sequester may affect the economy and financial markets. According to Kevin R. Kosar (2004), government shutdowns occur when federal agencies lack appropriate funding and must cease operations. They may also coincide with the failure of the President and Congress to reach agreement on funding measures. The longest government shutdown occurred between December 16, 1995 and January 6, 1996. However, government shutdowns often occur around the end of September, or beginning of October, because October 1st is the deadline for passing regular appropriations bills. One crucial effect of a government shutdown is placing federal employees in a temporary, non-duty, non-pay status. Only "essential" employees who perform duties

relating to national defense, public health and safety, or other important operations may be required to work during a sequester. A less immediate effect of the government shutdown regards public health. For example, new patients may not be accepted into clinical research at the National Institutes of Health Clinical Center, and the Centers for Disease Control and prevention halt disease surveillance. Delays occur in other societal areas including law enforcement and public safety, visas and passport applications, and federal contracting.

The futures market must also be thoroughly explained to grasp how changes in the economy and government procedures may affect the financial markets. Bradford Cornella and Marc R. Reinganum (1981) help explain the concept of futures prices, as people confuse futures contracts with forward contracts, since they both imply the buying or selling of securities at a future date. The authors of this study nicely highlight the difference between these two tools of foreign exchange. Banks at the retail level handle the forward market in foreign exchange. An agent who wants to take a forward position contacts a bank to request a quote, and establishes a forward contract upon acceptance of this quote. The contract entails the amount of foreign exchange to be delivered, the date of delivery, and the price. The agent may close out his position before the delivery date, but must arrange a covering transaction with the bank. On the other hand, the futures market deals in standardized contracts, meaning the contract size and delivery date are specified in advance by the exchange and trading is conducted by open auction on the exchange floor. The clearing house takes opposite sides of each position, being the buyer for every seller and seller for every buyer. For example, an agent who places an order to buy Swiss Francs in the futures market has a contract to buy from the clearing house. If the agent covers his or her position, he places an order to sell the Swiss Francs for the same delivery date. The clearing house nets out the agent’s position on its books when the order is executed. All

profits and losses must be marked to market, meaning they must be settled on a daily basis so that funds change hands each day. Furthermore, traders must post a margin, a performance bond when a position is opened.

David H. Goldenberg (1988) finds that in a perfectly efficient market, futures and security prices should be serially uncorrelated. This study finds that the price changes of the S&P 500 futures contracts during 1983 and 1984 have negative serial correlations. This negative serial correlation arises from certain frictions in the trading process, such as the presence of the bid-ask spread.

Zhongquan Zhou (2002) explains that commodity spot and futures prices are determined by producers, consumers, speculators, and governments. Producers take short futures position to hedge against price declines, consumers take long futures positions to hedge against price increases, speculators try to make profit. Governments provide producers with various support programs and may affect commodity prices and inventory levels by directly intervening in the markets. This paper shows that liquidity constraints cause the futures price to exhibit mean reversion, examines the impact of speculation on risk premium and volatility, studies the optimal speculative and hedging strategies, analyzes equilibrium effects of government price support programs and explains observed volatility skewness. When supply is low and future prices is high, the expected return is negative because consumers demand for hedging is high due to high risk aversion, but lack of full participation by producers, speculators must sell futures to consumers. Thus, negative return on futures is a form of reward for the insurance service provided by the speculators. Speculation serves to increase future volatility when the futures price is high, and acts to decrease volatility when the price is low. The effect of a government price subsidy on the equilibrium commodity prices depends on the extent to which producers can

participate in futures trading. In complete hedging, the price subsidy causes futures risk premium to be smaller and reduces price volatility, especially when futures price is below government price support level. The paper finds that speculation makes futures prices more volatile, when futures prices are high and expected output is low. A price subsidy is basically a put option that pays to the producer the amount equal to the max for each unity of commodity production. The presence of price support can reduce price volatility. Price subsidy causes expected return on future prices to be negative and reduces price volatility.

After understanding government sequesters and the futures market, other literature may be aggregated to comprehend how these markets intertwine to affect consumer confidence and other economic indicators. Rudiger Bachmann and Eric R. Sims (2012) are the first to bridge the relationship between confidence and the transmission of policy shocks. Their paper uses structural vector autoregression (VARs) to identify government spending shocks and their effects on the macroeconomy. They estimate VARs with a measure of government spending, an empirical measure of consumer confidence from the Michigan Survey of Consumers, and aggregate output. The response is broken down into a direct effect, which captures the pure fiscal output multiplier, and an indirect effect, where fiscal policy influences confidence, which then influences output. In the standard structural VAR, confidence does not significantly react to spending shocks, while confidence increases after an increase in spending during periods of economic recessions. This paper demonstrates that government shocks truly affect the economic status, and factors that go into public sentiment, such as expenditure, may be used to measure this effect.

In addition to the crowing-in or crowding-out impact of government spending on consumer spending, Yasemin Ozerkek and Sadullah Celik (2010) investigate the relationship

between government spending, consumer spending, and consumer confidence for emerging market countries. The authors find that consumer confidence is an important aspect of government spending and private consumption expenditures. Using quarterly data for variables of private consumption, consumer confidence, and government spending for Brazil, Czech Republic, Hungary, Poland, South Africa and Turkey, the study finds that a one percent increase in private consumption leads to a 0.31 percent increase in government spending, and a one percent increase in consumer confidence decreases government spending by about 0.11 percent. In sum, the government tightens its budget when the private sector leads the economic cycle. Consumer confidence plays in important role in the relationship between government actions and the market.

Saruta Benjanuvatra (2009) studies the relationship between consumer confidence and consumer expenditure, researching the causes of movements in consumer confidence in particular. In measuring the determinants of consumer confidence, the variable with the highest posterior inclusion probability is the average unemployment duration in weeks of those individuals who are unemployed. Posterior probability is the revised probability of an event occurring after taking into consideration new information. The second determinant is one-month lagged value of the present component of the Conference Board Leading Economic Index, an index that is a composite average of ten leading indicators in the United States. This determinant means that after a large negative change in consumer confidence, consumers are more likely to regain confidence in the next month. Other relevant variables are short-term interest rates and the purchasing managers' index.

Mark D. Griffiths, Vlatemir Kotomin, and Drew B. Winters (2012) explain that "the structure of the money markets stems from the unique role they play in the trading of liquidity.

These are the primary markets where lenders with temporary cash surpluses make short-term loans to borrowers with temporary cash shortages". This paper reviews the roles of the money markets during the recent credit crisis, and illustrates that lenders must be confident in the credit quality of the borrowers, the value of the underlying collateral, and their own financial condition in order to fix the crisis. Thus, confidence plays an important part in the future of the economy.

Panagiotis Konstantinou and Athanasios Tagkalakis (2011) found that expansionary fiscal policy, such as cuts in direct taxes and higher non-wage government consumption, increases consumer confidence. On the other hand, government wage bills and investment reduce confidence, especially when the general debt to GDP ratio is high. The control variables used to measure the impact on consumer and business confidence were the change in the unemployment rate, the growth rate of real GDP per capita, inflation based on the GDP deflator, the quarterly change in real aggregate asset process, and the real long-term interest rate.

David P. Myatt and Torun Dewan (2012) measured the determinants of government's performance and longevity. They found that high expectations of government survival catalyzes a positive performance that maintains government popularity, while when "ministers coordinate around a pessimistic outlook on government fortunes, ministerial career values fall, and corresponding low effort ensures a drop in popularity and a finitely lived government" (Myatt, Dewan, 2012). This model shows that institutions with longevity have a positive impact on performance, and also helps understand crises of confidence that destroy government performance when negative shocks decrease popularity. The paper explains how government shocks like sequesters affect institutional performance, which is useful for this study when examining the role of government performance in other institutions like the financial markets.

Ali F. Darrat (1988) examines the relationship between aggregate quarterly stock returns and a number of important macro variables, including monetary and fiscal policy actions in Canada. Inflation is found to depress stock returns; short-term interest rates positively affect stock returns since this variable is designed to capture the effect of anticipated required return to capital in the mode. Past monetary policy actions have an insignificant effect on current stock returns. The Canadian stock market appears to have been inefficient with respect to available information on fiscal policy.

II. Theoretical Model Development and Specification

A. Model

The theoretical model formed in this study appears below (see Table 1):

(1) Percent Change in Futures Market Prices = ∫(Unemployment Rate, Expected Real Gross Domestic Product, Percent Change in Real Investment, Inflation Rate, Three-Month Treasury Bill Rate, Prime Interest Rate, Percent Change in Consumer Confidence, Government Shutdown)

[Insert Table 1]

B. Futures Market Prices

In order to measure the effect of a government shutdown on the futures market, seven additional explanatory variables are used in the statistical analysis: the unemployment rate, expected real gross domestic product, percent change in real investment, inflation rate, three-month Treasury bill rate, and prime interest rate. The sole dependent variable is the monthly performance of the futures market measured as a percent change.

C. Government Shutdown

To use historical evidence for research, this data has been recorded since 1982, and controls for each period of time when a sequester took place, or when a sequester was threatened. A dummy variable is used to indicate when a sequester took place (sequester = 1, no sequester = 0). The month and year of each sequester is indicated by an interpolation and a counter variable that numbers each month and year. The data is recorded for the first of every month. The expected sign of the sequester's beta coefficient is positive; although the sequester should depress current futures price, it should induce an increase in futures prices in the future, since a higher volume of consumers would invest in the futures market to lock in the current price for the future.

D. Unemployment Rate

The monthly unemployment rate is used because previous literature indicates that the nation's state of employment effects confidence of people looking for jobs and gives people a notion of the success of the country's economy at the time. The expected sign of unemployment's beta coefficient is negative, because a lower unemployment rate should relate to a decrease in the futures market prices.

E. Real Gross Domestic Product

The percent change in real gross domestic product (GDP) is used because a higher positive change in GDP indicates economic growth. When consumers, investors, and financiers expect the economy to grow, they have more confidence in the market so futures prices should

increase. Thus, a positive sign for GDP's beta coefficient is expected. Data for this variable exists as quarterly real GDP rather than monthly GDP, so the data is interpolated to match the monthly values of the other variables.

F. Real Investment

The percent change in real investment is used because people choose to save their money based on the amount of money they have and their confidence that they will receive returns in the future. When financiers and investors see their neighbors are unemployed, they begin to lose confidence in the future of the economy. Furthermore, when they notice that their neighbors choose to not to invest, they lose confidence in the market because others are losing confidence in the market, and the reality that the demand for securities has gone down causes the prices of these securities to plummet as well. The quarterly data is interpolated into monthly data in the same manner as the data for GDP. The expected sign of investment's beta coefficient is positive because as people invest in the market, the futures prices should increase.

G. Inflation Rate

The inflation rate is in the same manner as the interest rates. Inflation tends to be inversely correlated with unemployment, a factor used above. Excess inflation is a negative sign in assessing the economy of a nation, so the Federal Reserve tries to target the perfect level of inflation, sending a signal to the public about the health of the economy whenever the entity acts. Inflation also erodes the purchasing power of the public, affecting its investing decisions. The expected sign for inflation's beta coefficient is negative, as higher inflation indicates an unhealthy economy or market, and relate to a decrease in futures prices.

H. Treasury Bill and Prime Interest Rate

The three-month Treasury bill rate and monthly prime interest rate are the cost of funds to businesses and will also be used as an indication of the general state of the financial markets and economy. Higher interest rates cause lower profits net of any interest payments owed, so stock prices fall. Thus, a negative coefficient for these beta's are expected.

I. Consumer Confidence

Lastly, change in consumer confidence was measured through Bloomberg and used in this model. As described above, consumer confidence positively impacts consumer sentiment encourages their investment in the markets, which would increase futures prices. Thus, a positive coefficient for the confidence beta is expected.

The econometric model with appropriate signs for this study appears below:

$$(2)\ \text{futurespriceschange} = B_0 + B_1(\text{sequester}) + B_2(\text{unemploymentrate}) + B_3(\text{interpolatedgdpcahnge}) + B_4(\text{interpolatedrealinvestment}) + B_5(\text{expectedinflation}) + B_6(\text{monthtbill}) + B_7(\text{bankprimeloanrate}) + B_8(\text{consumerconfidencechange})$$

III. Econometric Results

A. Initial Regression

Running the initial regression with nine variables and 373 observations yields an R-squared of 0.0719, meaning that the data explains 7.19 percent of the model (see Table 2). The F-statistic is 3.53, which is larger than the critical value of 2.02, showing that the equation is significant at the 95 percent level. The unemployment rate, expected inflation rate, and percent change in consumer confidence are all significant at the 94 percent level. The only significant variable with a negative sign is the expected inflation rate. A negative sign for the coefficient of the inflation rate variable makes sense because higher inflation relates to an unhealthy economy and thus, an expected decrease in futures prices. Surprisingly, the model yields a positive sign for the coefficient of the unemployment rate variable, meaning that an increase in the unemployment rate leads to an increase in the futures market prices. Although a significant variable, this aspect of the model does not make sense because a relatively higher unemployment rate should indicate an unhealthy economy, and therefore a decrease in futures prices. The consumer confidence variable was expected to have a positive coefficient, as illustrated in the model's results.

[Insert Table 2]

From the pairwise correlation test, results show that significant pairwise correlation (over 80 percent) exists between expected inflation and the treasury bill rate, expected inflation and the prime loan rate, and the treasury bill rate and prime loan rate (see Table 3). These variables are expected to be correlated because inflation increases the cost of funds. The two cost of funds

could be related because the banks depend on the Treasury bill rate to set their rate including a spread for their risk.

[Insert Table 3]

Testing for autocorrelation gives a Durbin-Watson statistic of 2.035899 which means the model is free of autocorrelation. Running a test for heteroskedasticity, the model yields a chi-squared of 3.80 with a probability of 0.0512, meaning that the probability of zero heteroskedasticity is very low. This problem is corrected, producing a new significant F-statistic of 2.97 and an R-squared of 0.0719 (see Table 4).

[Insert Table 4]

Lastly, a stepwise regression is conducted, adding in variables significant at least at the 20 percent level. The two variables added are consumer confidence, and then sequester. The new R-squared reduced to 0.0482, which is normal for a model with less variables. Consumer confidence and sequester prove to be the most significant variables of the model, illustrating the expected results. The coefficient for consumer confidence is positive, as hypothesized. However, the sequester variable has a surprisingly positive coefficient (see Table 5).

[Insert Table 5]

The hypothesis suggests that a government shutdown would have a negative effect on the futures prices in the present, having an inverse relationship. The reasoning behind this hypothesis stems from the notion that a government sequester deters confidence in the market, so people do not invest in futures prices, contributing to price decreases. The statistics show a positive beta for the sequester variable and ultimately contribute to the argument, demonstrating that the government shutdown has a direct relationship with futures prices in the future. There are two reasons for this direct relationship. Firstly, consumers expect that a government shutdown would decrease futures prices while the sequester is in place. Therefore, consumers invest in the futures market during a sequester when the market is down because they expect prices to increase in the future as the sequester resolves and the market redeems itself. Secondly, a sequester causes uncertainty; consumers would rather invest in the futures market to secure a certain price and hedge against future risk. Ultimately, the financial market players recognize that the economic conditions associated with a sequester are only temporary, so they are not phased.

B. Regression With Change-In Variables

In a second round of regression, the data is slightly altered to test whether the model works better when certain variables already expressed as rates are changed to be expressed as *changes* in the rates. The motivation behind this new regression comes from the attempt to explain expected futures prices' tendency to rise or fall more or less, as opposed to the initial regression that explains the level of expected futures prices in relation to these specific variables. Regarding the new regression, a change in the variables expressed as rates reflects the amount of change in futures prices. This alteration affects the unemployment, inflation, Treasury bill interest, and bank prime loan rates. Running the regression with the changed variables yields an

R-squared of 0.061 (see Table 6). This R-squared is lower than the initial R-squared, so the variables for the first model yield a better representation for the model than the variables for the regression with changed variables.

[Insert Table 6]

Pairwise correlation results are not as significant with the changed variables. The highest pairwise correlation occurs between interpolated real investment and the change in unemployment rate at -46.83 percent (see Table 7).

[Insert Table 7]

Testing for autocorrelation yields a Durbin-Watson statistic of 1.936031, which is lower than that of the initial regression. Thus, the revised model does not have autocorrelation. The test for heteroskedasticity yields a chi-squared of 17.33 and a probability of 0.00, meaning that heteroskedasticity is present. The model was corrected for this problem (see Table 8).

[Insert Table 8]

A stepwise regression is conducted adding both consumer confidence and sequester as in the initial regression. This causes an increase in the R-squared to 0.0482. Consumer confidence and sequester prove yet again to be the most significant variables in the model with positive coefficients. The results (see Table 9) are the exact same as in Table 5.

[Insert Table 9]

IV. Conclusion and Suggestions for Future Study

Those who choose to study this topic in further detail should delve deeper into the reasoning behind the positive relationship between a government sequester and futures market prices. Furthermore, future researchers should attempt to rationalize the reason other economic indicator variables other than the sequester and consumer confidence variable clouted the model. Other suggestions include testing the effect of a sequester on the regular S&P 500 stock prices, and testing whether the longevity of the sequester has any effect on financial market prices.

Table 1: Summary of Variables

Variable Definitions, Summary Statistics and Data Sources				
Variable	**Definition**	**Mean**	**Standard Deviation**	**Source**
futurespriceschange	Monthly percent change in futures prices.	0.81	4.43	Bloomberg
sequester	Dummy variable identifying the month and year in which a government shutdown took place.	0.03	0.18	U.S. Politics, About.com
unemploymentrate	Monthly unemployment rate.	6.34	1.65	Bloomberg
interpolatedgdpchange	Quarterly percent change in real GDP interpolated monthly.	38.49	328.65	Bloomberg
interpolatedrealinvestment	Quarterly percent change in the real investment rate interpolated monthly.	0.01	0.03	St. Louis Fed
expectedinflation	Monthly inflation rate.	0.03	0.01	St. Louis Fed
monthtbill	Monthly Treasury bill interest rate.	4.20	2.73	St. Louis Fed
bankprimeloanrate	Monthly bank prime loan rate.	7.25	2.59	St. Louis Fed
consumerconfidencechange	Monthly percent change in consumer confidence.	0.16	4.85	Bloomberg
Notes: The data include annual state level observations from 1982-2013.				

***Note: The figures below will be changed to tables from Stata.**

Table 2: Initial Regression Results

Number of obs	=	373
F(8, 364)	=	3.53
Prob > F	=	0.0006
R-squared	=	0.0719
Adj R-squared	=	0.0515

futurespriceschange	Coef.	t	P>t
sequester	1.993859	1.44	0.152
unemploymentrate	0.3172729	1.9	0.059
interpolatedgdpchange	-0.000738	-1	0.319
interpolatedrealinvestment	11.73353	1.42	0.156
expectedinflation	-134.5748	-2.36	0.019
monthtbill	0.2074702	0.35	0.727
bankprimeloanrate	0.421652	0.72	0.475
consumerconfidencechange	0.168745	3.61	0
_cons	-1.265763	-0.47	0.638

Table 3: Initial Test for Pairwise Correlation

	futures prices change	sequester	unemployment rate	interpolated gdp change	interpolated real investment	expected iflation	month tbill	bankprime loanrate	consumer confidence change
futurespriceschange	1								
sequester	0.0976	1							
unemploymentrate	0.0791	0.1274	1						
interpolatedgdpchange	-0.0006	-0.0797	0.0661	1					
interpolatedrealinvestment	0.0685	-0.0874	0.1817	0.2739	1				
expectedinflation	0.0348	0.2351	-0.0395	-0.1648	0.1383	1			
monthtbill	0.0653	0.1983	-0.2139	-0.1	0.0807	0.915	1		
bankprimeloanrate	0.0651	0.2302	-0.2748	-0.1123	0.0207	0.888	0.99	1	
consumerconfidencechange	0.1979	0.0134	0.1163	0.085	0.1006	-0.005	-0.01	-0.0208	1

Table 4: Initial Test for Heteroskedasticity

Number of obs	=	373
F(8, 364)	=	2.97
Prob > F	=	0.003
R-squared	=	0.072

futurespriceschange	Coef.	t	P>t
sequester	1.99386	1.98	0.048
unemploymentrate	0.31727	1.84	0.067
interpolatedgdpchange	-0.00074	-1.46	0.145
interpolatedrealinvestment	11.7335	1.03	0.302
expectedinflation	-134.575	-2.07	0.039
monthtbill	0.20747	0.31	0.754
bankprimeloanrate	0.42165	0.66	0.507
consumerconfidencechange	0.16875	3.16	0.002
_cons	-1.26576	-0.47	0.642

Table 5: Initial Stepwise Regression Results

Number of obs	=	373
F(2, 370)	=	9.37
Prob > F	=	0.0001
R-squared	=	0.048
Adj R-squared	=	0.043

futurespriceschange	Coef.	t	P>t
consumerconfidencechange	0.17987	3.88	0
sequester	2.38614	1.87	0.062
_cons	0.70566	3.09	0.002

Table 6: Regression with Change-In Variables

Prob > F	=	0.004
F(8, 364)	=	2.93
R-squared	=	0.061
Adj R-squared	=	0.04
Number of obs	=	373

futurespriceschange	Coef.	t	P>t
sequester	2.29067	1.76	0.079
changeinunemploymentrate	0.13388	0.09	0.932
interpolatedgdpchange	-0.00053	-0.73	0.467
interpolatedrealinvestment	12.1583	1.33	0.183
changeinexpectedinflation	6.87925	0.09	0.928
changein3monthtbill	1.85924	1.44	0.151
changeinbankprimeloanrate	-2.2814	-1.65	0.1
consumerconfidencechange	0.16762	3.54	0
_cons	0.58823	2.36	0.019

Table 7: Test for Pairwise Correlation with Change-In Variables

	futures prices change	sequester	unemployment rate	interpolated gdp change	interpolated real investment	expected iflation	month tbill	bankprime loanrate	consumer confidence change
futurespriceschange	1								
sequester	0.0976	1							
changeinunemploymentrate	-0.0132	0.0263	1						
interpolatedgdpchange	-0.0006	-0.0797	-0.1208	1					
interpolatedrealinvestment	0.0685	-0.0874	-0.4683	0.2739	1				
changeinexpectedinflation	-0.007	-0.0284	-0.1136	0.0821	0.1415	1			
changein3monthtbill	0.0604	-0.1253	-0.1701	0.1745	0.3228	0.16	1		
changeinbankprimeloanrate	-0.0347	-0.1763	-0.2482	0.0816	0.3891	0.287	0.6	1	
consumerconfidencechange	0.1979	0.0134	0.0137	0.085	0.1006	5E-04	0.14	0.0455	1

Table 8: Test for Heteroskedasticity with Change-In Variables

Number of obs	=	373
F(8, 364)	=	2.51
Prob > F	=	0.011
R-squared	=	0.061

futurespriceschange	Coef.	t	P>t
sequester	2.29067	2.41	0.017
changeinunemploymentrate	0.13388	0.08	0.936
interpolatedgdpchange	-0.00053	-1.12	0.264
interpolatedrealinvestment	12.1583	1.07	0.284
changeinexpectedinflation	6.87925	0.08	0.94
changein3monthtbill	1.85924	1.23	0.22
changeinbankprimeloanrate	-2.2814	-1.44	0.151
consumerconfidencechange	0.16762	3.1	0.002
_cons	0.58823	2.29	0.022

Table 9: Stepwise Regression Results with Change-In Variables

Number of obs	=	373
F(2, 370)	=	9.37
Prob > F	=	1E-04
R-squared	=	0.048
Adj R-squared	=	0.043

futurespriceschange	Coef.	t	P>t
consumerconfidencechange	0.17987	3.88	0
sequester	2.38614	1.87	0.062
_cons	0.70566	3.09	0.002

Table 10: Summary of Results

	futures prices change	sequester	U	interpolated gdpchange	I_{REAL}	expected inflation	month tbill	bankprime loanrate	consumer confidence change	_cons	F	R^2	Adj R^2	n
1	Coef.	1.99	0.32	0.00	11.73	-134.57	0.21	0.42	0.17	-1.27	(3.53)*	0.07	0.05	373
	t	(1.44)	(1.9)^	(-1)	(1.42)	(-2.36)+	(0.35)	(0.72)	(3.61)*	(-0.47)				
2	Coef.	1.99	0.32	0.00	11.73	-134.57	0.21	0.42	0.17	-1.27	(2.97)*	0.07		373
	t	(1.98)+	(1.84)^	(-1.46)	(1.03)	(-2.07)+	(0.31)	(0.66)	(3.16)*	(-0.47)				
3	Coef.	2.39							0.18	0.71	(9.37)*	0.05	0.04	373
	t	(1.87)^							(3.88)*	(3.09)+				

	futures prices change	sequester	ΔU	interpolated gdpchange	I_{REAL}	Δexpected inflation	Δ3month tbill	Δbankprime loanrate	consumer confidence change	_cons	F	R^2	Adj R^2	n
4	Coef.	2.29	0.13	0.00	12.16	6.88	1.86	-2.28	0.17	0.59	(2.93)*	0.06	0.04	373
	t	(1.76)^	(0.09)	(-0.73)	(1.33)	(0.09)	(1.44)	(-1.65)^	(3.54)*	(2.36)+				
5	Coef.	2.29	0.13	0.00	12.16	6.88	1.86	-2.28	0.17	0.59	(2.51)+	0.06		373
	t	(2.41)+	(0.08)	(-1.12)	(1.07)	(0.08)	(1.23)	(-1.44)	(3.1)+	(2.29)*				
6	Coef.	2.39							0.18	0.71	(9.37)*	0.05	0.04	373
	t	(1.87)^							(3.88)*	(3.09)+				

^ Significant at 10% level
+ Significant at 5% level
* Significant at 1% level

1 = initial Regression
2 = Heteroskedasticity Test
3 = Stepwise Regression
4 = Regression with Change-In Variables
5 = New Heteroskedasticity Test
6 = New Stepwise Regression

Table 11: List of Government Shutdowns

	Year	President	Date	# Days
1	2013	Barack Obama	Oct. 1-17	16
2	1995-1996	Bill Clinton	Dec. 5-Jan. 6	21
3	1995	Bill Clinton	Nov. 13-19	5
4	1990	George W. Bush	Oct. 5-9	3
5	1987	Ronald Reagan	Dec. 18-20	1
6	1986	Ronald Reagan	Oct. 16-18	1
7	1984	Ronald Reagan	Oct. 3-5	1
8	1984	Ronald Reagan	Sept. 30-Oct. 3	2
9	1983	Ronald Reagan	Nov. 10-14	3
10	1982	Ronald Reagan	Dec. 17-21	3
11	1982	Ronald Reagan	Sept. 20- Oct. 1	1
12	1981	Ronald Reagan	Nov. 20-23	2
13	1979	Jimmy Carter	Sept. 30-Oct. 12	11
14	1978	Jimmy Carter	Sept. 30-Oct. 18	18
15	1977	Jimmy Carter	Nov. 30-Dec. 9	8
16	1977	Jimmy Carter	Oct. 31-Nov. 9	8
17	1977	Jimmy Carter	Sept 30-Oct. 13	12
18	1976	Gerald Ford	Sept. 30- Oct. 11	10

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