CXW and Donald Trump's Election; Power Demonstration

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July 19, 2019

In 2016, Donald J. Trump was elected President of the United States of America. This event shocked spectators in the financial market, many of whom believed that Hillary Clinton was likely to be elected. Thus President Trump's election can be seen as a market shock, and should be analyzed as such.

Investors reevaluated several companies and industries in response to Trump's election, one of which was the private prison industry. Hillary Clinton called for ending private prisons, and private prison stocks dropped as a result [1]. Donald Trump, in comparison, supported private prisons, and private prison stocks rose in value after his election [2]. Thus we should see shock dynamics around the time of Donald Trump's election, on November 8, 2016.

CoreCivic, formerly known as the Corrections Corporation of America (CCA), is a major publicly owned private prison company, listed on the New York Stock Exchange under the ticker symbol CXW. CoreCivic was exposed to the political winds of 2016 and we would expect the behavior of the stock to change after the surprise election of Donald Trump. Specifically, we would expect the Fama-French [3] adjusted returns to change. In order to detect such a change, we need to fit the Fama-French 5-factor model to the daily returns of CXW, which involves fitting the linear model

$$\begin{aligned} R_t - R_{Ft} = \alpha &+ \beta_{Mt}(R_{Mt} - R_{Ft}) + \beta_{SMB} SMB_t \\ &+ \beta_{HML} HML_t + \beta_{RMW} RMW_t + \beta_{CMA} CMA_t + \epsilon_t \end{aligned} \tag{1}$$

In (1), R_t is the return of the security or portfolio at time t; R_{Ft} is the risk-free rate of return; R_{Mt} is the market return; SMB_t is the return on a diversified portfolio of small stocks minus the return on a diversified portfolio of big stocks; HML_t is the return of a portfolio of stocks with a high book-to-market (B/M) ratio minus the return of a portfolio of stocks with a low B/M ratio; RMW_t is the returns of a portfolio of stocks with robust profitability minus a portfolio of stocks with weak profitability; and finally CMA_t is the return of a portfolio of stocks with conservative investment minus the return of a portfolio of stocks with aggressive investment.

Kenneth French published data for estimating these coefficients on his website [4], and also comes with the package **CPAT** [5]. The data website Quandl provides free public historical daily stock price time series, including the time series for CXW prices adjusted for stock splits and dividends; Quandl was our source for CXW data. Thus, R_t in (1) is the daily log returns of CXW.

We hypothesize that the Fama-French model parameters describing the behavior of CXW changed around the time of Donald Trump's election to the U.S. Presidency, and furthermore that the Rényi-type statistic designed for regression models better detects this change than the univariate version of the Rényi-statistic introduced in [6] or the other tests considered in our power simulations. To check this, we not only performed these tests around the time of the election but considered an expanding window of data, computing the respective test statistics on each window of data as done in [6]. All data sets start on the first trading day of 2016 (January 4) but the end point varies, being each trading day from October to December 2016. All statistics except for the Hidalgo-Seo statistic use kernel methods for estimating the long-run variance, as described in the simulations. The trimming parameter for the Rényi-type statistics is $T^{\frac{1}{2}}$. We consider p-values less than 0.05 to be statistically significant.

The test statistics displayed include the Rényi-type statistic with trimming parameter $t_T = T^{1/2}$ computed with the regression model coefficients directly (———) the Rényi-type statistic with trimming parameter $t_T = T^{1/2}$ computed on the residuals (- - - -), the CUSUM statistic (— — –), and the Hidalgo-Seo statistic (-·-·-·-). The Rényi-type statistic and CUSUM statistics are the univariate statistics computed on the estimated residuals of the regression model. The Hidalgo-Seo statistic was tailored to the regression context as described in their paper.

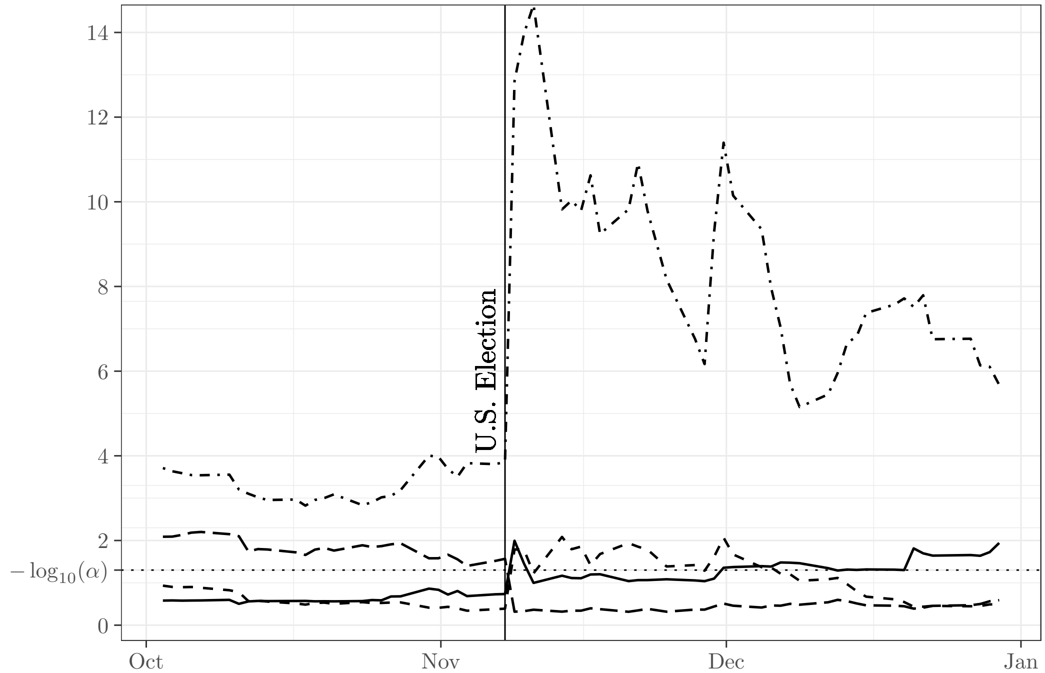

Figure 1: $-\log_{10} p$-values of test statistics checking for structural change in the regression model described in (1) computed on an expanding window of data, ranging from October 2 to December 30, 2016. The y-axis can be interpreted as tracking the number of zeros after the decimal point before the first significant digit of the p-value.

We present the results of this analysis in Figure 1. We see that the Hidalgo-Seo statistical always rejects the null hypothesis. While it is possible that there was a change point prior to the election in 2016, we do not believe that this is the reason the Hidalso-Seo statistic is rejecting the null-hypothesis; given the results of our simulations, we believe the Hidalgo-Seo statistic is showing signs of size inflation and making numerous Type I errors. That said, we do see large changes to the p-values after the election. The univariate Rényi-type statistic rejects the null hypothesis prior to the election but suddenly does not reject the null hypothesis afterwords; on the other hand, the CUSUM statistic doesn't reject the null hypothesis prior to the election, then rejects it throughout the remainder of November, then no longer rejects for most of December. The new Rényi-type statistic for regression models does not reject prior to the election, rejects the day after, hovers near the threshold of rejection throughout November, then resumes rejection of the null hypothesis in December. Of all the statistics listed here, this seems like the most reasonable behavior.

References

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