An Opportunity to Speculate on Election: Structured Notes of Differentiated Returns on Election Results

Abstract:
Election effects on stock market are researched in this passage, and a structured note is designed to exploit on stocks' distinctive performance among different electoral scenarios. Historical data are tested on CAPM and Fama-French factors in different times, and βs are tested statistically stable. Then a optimized portfolio under mean-variance model has been established to form the basis of the structured note, with a fixed income security served as an insurance. Backtesting results show reliable differentiated returns under election scenarios.
Keywords: Optimization, Structured Notes

Contents

I. Introduction

US Stock market has been substantially affected by political events, especially presidential election each four years, due to the fact that election policy and its subsequential economic effect have drastic influence on macroeconomics and further, financial market. Therefore widespread concerns are concentrated on the 2020 election, which may be alleviated if possible financial instruments are available to protect investors from this systematic risk.

This article empirically tests on the historical performance of the given Democratic portfolio and Republican portfolio to see whether there are differences between these two portfolios under different party. Main contribution of this paper is the implementation of optimization method on selecting stocks to construct a portfolio and furthermore, to build structured notes which generate differentiated payoffs depending on the election outcomes. In this way, we can bet on the party-in-power for 2020 presidential election to realize different payoffs from the structured notes.

II. Data

We collect election, financial market and the Fama-French Three factors data from January 1980 to January 2020 to carry out empirical study on returns.

A. Election Data

For election data, we collect historical party-in-power data with the time range in which includes each president in the White House. These election data will be treated as a indicator variable in our later analysis.

B. Fama-French Data

For the Fama-French data, we obtain adjusted close stock prices, S&P 500 index and risk free rate and the Fama-French Three factors data from Kenneth French Data Libaray. All data is collected on a daily basis. All these data will be needed for regression model fitted.

C. Financial Market Data

For the market data part, we collect all 30 given stocks' time series price data to carry out the historical statistically analysis and prediction on performance. These data are grabbed from Bloomberg terminal and the time span is January 1980 to January 2020.

In the paper, we examine two equally weighted portfolio representing Democratic and Republican party respectively. The Democratic portfolio consists of following stocks: Exelon Corp., Ford Motor Co., Aptiv PLC, Constellation Brands Inc., Estee Lauder Cos., SunPower Corp., Coca-Cola Co., Walmart Inc., Home Depot Inc., NextEra Energy Inc., NextEra Energy Inc.,CSX Corp.,McDonald's Corp.,Simon

Property Group Inc.,First Solar Inc. and Norfolk Southern Corp. The Republican Portfolio includes the following stocks: Honeywell International Inc., Alphabet Inc., ConocoPhillips, Marathon Oil Corp., Citigroup Inc., Saleforce.com Inc., QUALCOMM Inc., Gilead Sciences Inc., Amazon.com Inc.,Chevron Corp.,Facebook Inc., Merck&Co., PayPal Holdings Inc.,American Express Co. and Visa Inc.

We initially look into the stocks' distribution among sectors devided by SPDR sector ETFs. An overview of the distribution is in the following graph, which illustrates that most democratic portfolio stocks are condensed in Consumer Discretionary, Consumer Staples, Utilities and sub sector semiconductor. And republican portfolio stocks are concentrated in Consumer services, Energy, Financials, Health Care and Technolody.

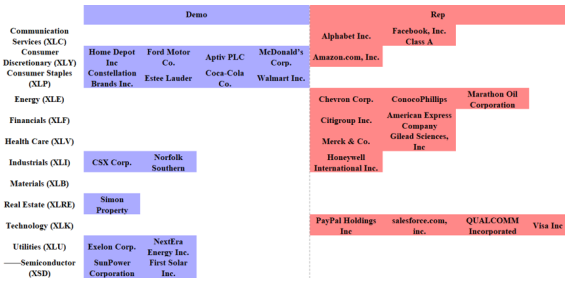

Fig. 1: Stock Sectors Overview

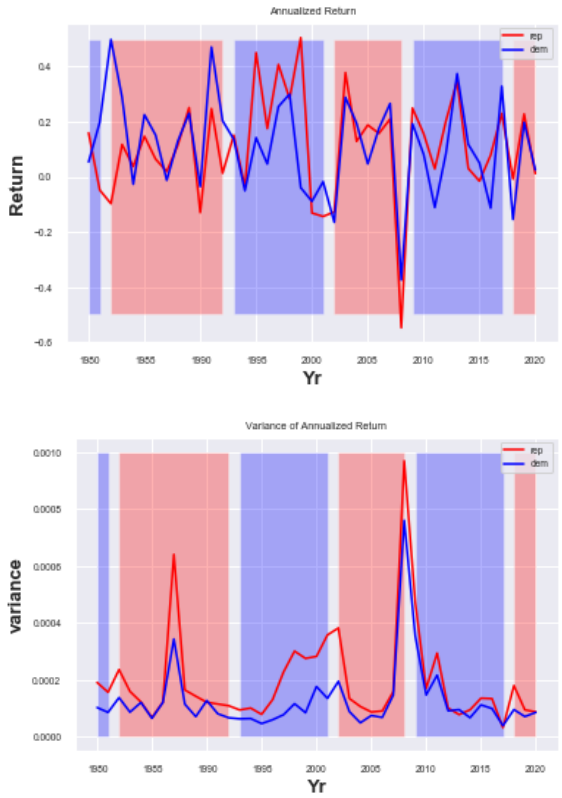

Fig. 2: Annualized Return and Variance of Two Portfolios

III. Statistical Analysis

The goal of our paper is to construct structured notes associated with these two portfolios which have differentiated payoffs according to the election result. The first thing is to differentiate these two portfolios in a quantitative way.

A. Differentiate Two Portfolios by Quantitative Methods

1) Portfolio Analysis

We utilize historical data obtained to calculate annualized returns and volatility of the two portfolios.

From the annualized returns plotted in Figure 2, we notice that one portfolio outperforms the other in their corresponding governing periods, which implies that these two portfolios do represent two parties in some extent respectively.

As for the variance of annualized return, it is obvious that the variance of the democratic portfolio is smaller than that of republican portfolio in almost the whole history period.

The annualized return of republican portfolio is slightly higher than the democratic over the 40 years horizon. While the variance demonstrate periodic pattern, the volatility of portfolio is lifted up if its corresponding party empowers the White House.

Figure 3 shows that cumulative return of the democratic portfolio are greater than that of republican portfolio for the whole history period. At the same time, it depicts different growth trends in two portfolios: democratic one gains larger returns in the early time and the republican portfolio has rapid increase over the last two decades.

To check if the two portfolios have different variance, a F-test is implemented here with degree of freedom $n = m = 10311$.

The F statistic is derived from variance of two portfolios:

$$S_X^2 = \frac{1}{n-1}\sum_{i=1}^{n}\left(X_i - \overline{X}\right)^2 = 0.013828^2$$

$$S_Y^2 = \frac{1}{m-1}\sum_{i=1}^{m}\left(Y_i - \overline{Y}\right)^2 = 0.011154^2$$

$$F = \frac{S_X^2}{S_Y^2} = 1.5369$$

The F statistic has F distribution of degree of freedom n-1 and m-1 under null hypothesis, in which The 95% distribution of F is (0.96,1.04). So we can tell that there exists significant difference in variances of the two portfolios.

To evaluate these two portfolios, we can also look at the sharpe ratio and information ratio. It is not surprising to find that, the republican portfolio do possess higher sharpe ratio and information ratio than the democratic portfolio in most of the time. This is demonstrated in figure 4.

In addition, we can analyze these two portfolios' distribution. We plot the density of two portfolios and their $'qqplots'$ using annualized data.

From the density in Figure 6, we can determine that the annualized return of both portfolios are asymptotically normal distributed. The extreme values of skewness and kurtosis appeared in 1980s, which is exactly the time period the U.S.

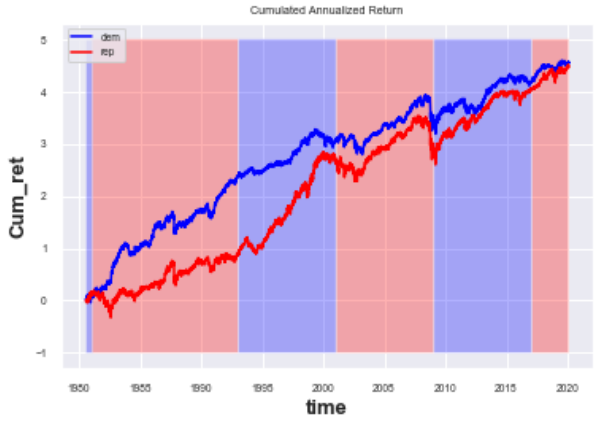

Fig. 3: Cumulative Return of Two Portfolios

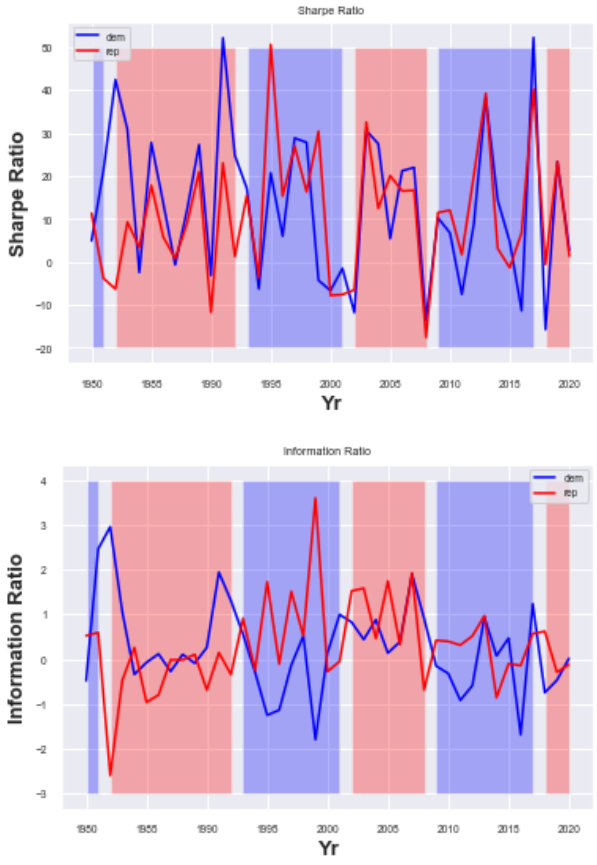

Fig. 4: Sharp Ratio and Information Ratio of Two Portfolios

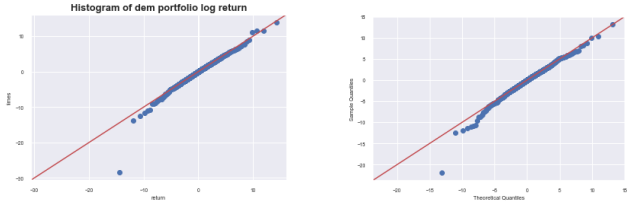

Fig. 5: Histogram of Annualized Portfolios Return

Fig. 6: Skewness and Kurtosis of Annualized Portfolios

Fig. 7: Density Plot of Annualized Return

financial market was experiencing the nominal oil crisis. Under this strong disturbance, the whole stock market suffered a huge downside effect and led to the appearance of bizarre statistics.

Figure 4 is the result of $'qqplot'$ of these two portfolios. The distribution of republican portfolio has fatter tail and larger variance and the mean returns are closed to each other. It is reasonable and it follows the variance analysis we did above.

2) Correlation Analysis

Next, we adapt detailed analysis upon the correlation of stocks in two portfolios respectively. We visualize the correlation matrix using heat maps and find that the correlation of republican portfolio is much stronger. This implies that there may exist more related companies which are under the same industry. From this result, we can take a guess that the betas, which represents the sensitivity of portfolio to market, should be different from each other.

3) Sensitivity Analysis Under Financial Market

These two portfolios may have different levels of sensitivity to the performance of the whole market. In order to determine these characteristics, we first calculate the Sharpe ratio and information ratio based on risk free rate and market return respectively. Figure 8 demonstrates the change of Sharpe ratio and information ratio of the two portfolios return from 1980 to 2020.

We continue our evaluation of market analysis upon the relation with financial market. By applying Capital Asset Pricing Model (CAPM) and Fama–French three-factor model to describe portfolio return.

We test the significance of CAPM coefficients: α and β using bootstrapping method, where our null hypothesis is

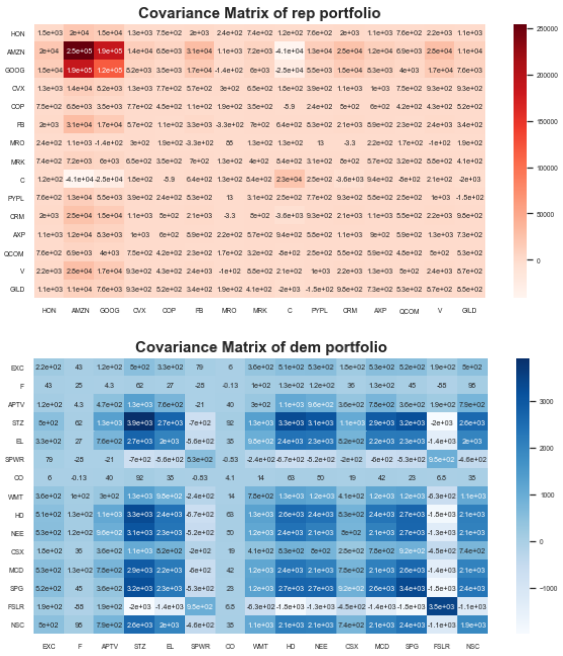

Fig. 8: Covariance Matrix of Two Portfolios

TABLE I: CAPM Coefficients of two portfolios

Coefficients	α	β
Republican	0.0012	1.0592
Democratic	-0.0011	0.9331

that the coefficients for the two regression are equal, namely $\beta_{dem} = \beta_{rep}$. Portfolio returns are randomly selected from our data set and αs and βs are calculated. Then, we compute the difference between the two coefficients for the two portfolios and the standard deviation of these differences. The bootstrapping method does not have many strict assumptions and enables us to capture the correlation between each coefficients if there is any. We divide the difference of the coefficients in the two models by its standard error and get the p-value result for both parameters.

TABLE II: Bootstrap Significance Test for Coefficients

Coefficients	DEM - REP	std. error	p-value
β	0.0001177794	0.0002516952	0.482785
α	-6.386094e-06	9.874519e-05	0.06467246

The p-value indicates that there is no significant difference of β between two portfolios. However, α has fairly significant difference on the regression of market excess returns. This implies the Republican is likely to beat the market performance while the Democratic may not.

The bootstrapping result for Fama-French three factor model does not indicate significant difference for all coefficients: MKT-RF, SMB and HML. However, there is evident difference in terms of the intercept, which yields the same outcome as the CAPM significant test.

Both regression results show higher sensitivity from market

TABLE III: Fama French Coefficients of two portfolios

Coefficients	Mkt-RF	SMB	HML	intercept
Republican	-0.000335	0.002174	0.000662	0.0005
Democratic	-0.000037	0.00170	0.000732	0.00045

TABLE IV: Bootstrapping Significance Test for Coefficients

Coefficients	DEM - REP	std. error	p-value
MKT-RF	0.0002989607	9.557233e-05	3.128109
SMB	0.0004785483	0.0001757919	2.722243
HML	6.969441e-05	0.0001825584	0.381765
intercept	4.05432e-06	0.0001019589	0.03976426

performance of democratic portfolio. In regards of the CAPM model, Democratic portfolio has higher alpha value, which implies a higher excess while it has lower beta value. It means that it is less sensitive to the market.

B. Portfolios Under Different Party

1) T-test for Returns under Different Party

After doing basic statistical analysis for the Democratic and Republican portfolio, we perform further analysis on the daily log return of the two portfolios under different regimes, namely time period when a Democratic president is in the White House and that when a Republican president is in the White House.

The intuitive methodology comes in with the student t-test under unequal sample sizes and unequal variance, which testifies whether there is a statistical difference for portfolios' performance under different time regime.

To check the stability of variance among two different portfolios $n, m = 6009, 4302$,

$$F_1 = \frac{0.011557^2}{0.010565^2} = 1.196606$$

$$F_2 = \frac{0.014167^2}{0.013335^2} = 1.128677$$

The 95% confidence interval under null hypothesis for F statistics are (0.95,1.06), so it can be concluded that portfolios have different volatility regimes under different party-in-power times.

$$t = \frac{\bar{X}_1 - \bar{X}_2}{s_{\bar{\Delta}}}$$

in which:

$$s_{\bar{\Delta}} = \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$$

As a benchmark we examine the all-time difference for the two portfolios, which scrutinizes whether there is a fundamental difference among two portfolios. Then we test the t-test for two portfolios under the different time regimes.

$$t_{demo} = \frac{\bar{X}_{demo-portfolio1} - \bar{X}_{demo-portfolio2}}{s_{\bar{\Delta}}}$$

$$t_{rep} = \frac{\bar{X}_{rep-portfolio1} - \bar{X}_{rep-portfolio2}}{s_{\bar{\Delta}}}$$

And we have the following result: comparing the t-statistic under all time, the t-statistics of different time is much larger indicating the fact that the portfolios have significant different performance under different party-in-power times.

TABLE V: T-test under different times

Test	t statistics	p-value
Benchmark	-0.04326123	0.96549373
Democrat Time	-1.16415997	0.24438323
Republican Time	1.40865812	0.15897431

2) Determine Differentiated returns

Further in the initial t-tests, the CAPM one factor model is a good way to quantify how these two portfolios perform comparing to the market benchmark. We uses the log return of S&P500 index as the representation of the market return. Also, since we want to emphasize the influence of party-in-power, we also add a dummy variable ($party$) into the CAPM model, where a value of 1 indicates that a Democratic president is in the House and vice versa. Thus, our model for the two portfolios become

$$r_p - r_f = \alpha + \beta_{market} \cdot (r_m - r_f) + \beta_{party} \cdot party.$$

In this model, r_p and r_m are daily log return of the portfolio and the S&P 500 Index and r_f is the risk free rate.

The regression results are in the following table:

TABLE VI: Regression Results

Portfolio	β_{market}	β_{party}	p-value for β_{party}
Democrat	0.8615	-0.0004	0.000
Republican	1.1240	0.0001	0.370

The results are far from satisfying, the pre-selected equal-weighted portfolios fails to generate a significant difference in returns. The β_{party} may be robust but it has too tiny a value that may be wiped out by the volatility of stocks, therefore no investor should expect these two portfolios to generate a differentiated returns and further optimization methods need to be exploited to modify these portfolios to have differentiated returns.

IV. Structured Notes

For the construction of structured notes, we first compute βs for the 30 stocks under different party using the CAPM model. Since the stock return in the given period is always proportional to β under the CAPM model, βs for the 30 stocks will serve as the estimation of stocks return. Then, we use a Multivariate GARCH (generalized autoregressive conditional heteroskedasticity) model to forecast the covariance matrix of the thirty stocks. Consequently, we use mean-variance analysis to maximize the difference in total return under the two regimes. The calculated portfolio weights will be used to construct an at-the-money option on the basket of stocks, given investor's opinion on the upcoming election result.

A. Computation of βs

In order for our methodology to have an accurate and robust result, we need the following assumptions.

- Under the CAPM model, the true β for each stock will change only when the party in the White House changes.
- Variation in the estimate of β are pure noise if the party-in-power remains the same.
- The market excess return will be the same under either party.

If the above assumptions hold true, we are able to find two vectors of β_0 and β_1 such that for each stock i, β_{0_i} is the β under a Republican president and β_{1_i} is the β for the same stock under a Democratic president. All βs are estimated using the horizon of data available to us from 1980 to 2020. Table 7 shows the β for each stock under two regimes.

TABLE VII: βs for Stocks

Stocks	β_0	β_1
HON	1.096400	1.092213
AMZN	1.393088	1.434814
GOOG	1.003912	0.930824
CVX	0.920174	0.793759
COP	0.968508	0.819025
FB	1.282338	1.038358
MRO	1.133624	1.0416357
MRK	0.802783	0.783883
C	1.454651	1.763064
PYPL	1.383199	1.160870
CRM	1.318465	1.275001
AXP	1.397835	1.349551
QCOM	1.317994	1.296629
V	1.001132	0.948716
GILD	1.020100	0.995596
EXC	0.621669	0.446908
F	1.183358	1.090179
APTV	1.260605	1.319927
STZ	0.564559	0.700193
EL	0.657788	0.821496
SPWR	1.906496	1.705730
CO	0.066162	0.262401
WMT	0.880665	0.761713
HD	1.094164	1.061931
NEE	0.5741	0.435638
CSX	1.027078	1.015707
MCD	0.772930	0.617242
SPG	1.027344	0.844915
FSLR	1.499209	1.391855
NSC	0.979061	0.961210

B. Estimation of Covariance Matrix: Multivariate GARCH

In this part, we use the DDC model of Engel(2002) to estimate the covariance matrix, which can be defined as:

$$R_t = diag(q_{11,t}^{-1/2} ... q_{NN,t}^{-1/2}) Q_t diag(q_{11,t}^{-1/2} ... q_{NN,t}^{-1/2})$$

where the N x N symmetric positive definite matrix $Q_t = (q_{ij,t})$ is given by:

$$Q_t = (1 - \alpha - \beta)\bar{Q} + \alpha u_{t-1} u_{t-1}^{'} + \beta Q_{t-1}$$

$\bar{Q}$ is thhe N x N unconditional variance matrix of u_t, and α and β are non-negative scalar parameters satisfying $\alpha+\beta < 1$. The Q matrix is the covariance matrix that can be used in the optimization problem in next section.

C. Construction of Structured Notes

Once we have obtained the two vectors of βs and the covariance matrix, we can set up an optimization problem to construct a portfolio that will maximize the certainty equivalent of s given investor . Explicitly, the model we use is

$$\begin{aligned} \max \ & (\vec{\beta_0} - \vec{\beta_1})^{'} \vec{w} - \frac{1}{2} A \vec{w}^{'} \Sigma \vec{w} \\ \text{subject to } & \vec{w}^{'} I = \vec{1} \\ & \vec{w}^{'} X = 0.65, \end{aligned}$$

where X is a 30×1 column vector such that the first 15 entries of the vector are 1s and the rest are 0s. This constraint is to ensure that an investor will invest 65% of her asset in the Republican portfolio if she thinks a Republican president will win the election, and vice versa. Then, we can solve for w by:

$$w = \frac{1}{2A} \Sigma^{'} (R - G^T \lambda),$$

where Σ is a 30×30 covariance matrix, R is the difference between the βs under different president lead, G is a 2×30 matrix consisting of 0s and 1s representing the two constraints and λ is the Lagrange multiplier.

Since we assume that the benchmark market excess return will not be affected by the president in the White House, we deliberately neglect the forecast of the market excess return. Then, this optimization problem maximize the difference of expected return when different party gets elected to the White House, while penalizing the return if the variance of the portfolio is too large. Moreover, the parameter A can be chosen for different investors with different reative risk aversion. In this case, we choose $A = 2$ to represent a typical risk averse investor.

Once we have the weight vector for the 30 stocks, we use this portfolio to construct an at-the money-option, where the strike price is just the weighted sum of the 30 stock price at the purchase date, January 29, 2020. Then, if an investor believes that a Republican president will win the election, he or she should buy a call of the structured notes. On the other hand, if an investor believes that a Democratic president will win the 2020 election, he or she should buy a put of the structured notes. Table 8 and 9 give the weight of each stock when $A = 2$ when betting on different election result. Positive weights represent a long position of the stock and negative weights represent a short position.

Furthermore, we also add a risk free bond to further minimize the risk exposed to investing and add principal protection to our structured product. This asset allocation is based on the Merton Optimal Allocation formula,

$$w_{r_f} = \frac{\mu + \frac{1}{2}\sigma^2 - r_f}{\gamma \sigma^2}.$$

The portfolio mean return and standard deviation from our previous optimization problem is calculated and represented in the formula as μ and σ. Also, γ is the relative risk aversion of an investor and r_f is the risk free rate. Hence, the weights for the 30 stocks can be represented as $w_i(1 - w_{r_f})$, for all $i \leq 30$ and $i \in N$.

Table 10 and 11 show the respective weights for each stock and the risk free bond. With the optimized portfolio and principal protection of risk free asset, we constructed a bet-on-Republican structured note and a bet-on-Democrat structured note. Then we can use these weights and the stock price at the beginning of structure notes to calculate the strike price for the option. The strike price for bet-on-Republican portfolio is 212.65 and the price for bet-on-Democratic portfolio is 199.84.

TABLE VIII: Optimized Weights with Only Risky Assets (Bet on Republican)

HON	AMZN	GOOG	CVX	COP
0.0988	-0.0081	0.0601	0.1006	0.0844
FB	MRO	MRK	C	PYPL
0.0387	-0.1027	0.0800	-0.0647	-0.0130
CRM	AXP	QCOM	V	GILD
-0.0168	0.1543	0.0503	0.0084	0.0531
EXC	F	APTV	STZ	EL
0.1266	0.0608	-0.0633	0.0320	-0.0523
SPWR	CO	WMT	HD	NEE
-0.0655	0.0969	0.0820	0.0004	0.1611
CSX	MCD	SPG	FSLR	NSC
-0.0388	0.1205	0.0610	-0.0281	-0.0167

TABLE IX: Optimized Weights with Only Risky Assets (Bet on Democratic)

HON	AMZN	GOOG	CVX	COP
0.0713	0.0228	-0.0069	0.0555	0.0620
FB	MRO	MRK	C	PYPL
0.0095	-0.0842	0.0751	0.0324	-0.0441
CRM	AXP	QCOM	V	GILD
-0.0166	0.1048	0.0447	-0.0240	0.0476
EXC	F	APTV	STZ	EL
0.0251	0.0470	-0.0441	0.0804	0.0236
SPWR	CO	WMT	HD	NEE
-0.0589	0.1187	0.0816	0.0279	0.2218
CSX	MCD	SPG	FSLR	NSC
-0.0185	0.1153	0.0538	-0.0283	0.0048

V. Discussion

A. Backtesting Asset Allocation

In order to see whether our allocation methodology is valid and has the expected performance, we use previous stock data

TABLE X: Optimized Weights with Risky and Risk Free Asset (Bet on Republican)

HON	AMZN	GOOG	CVX	COP
0.0594	-0.0049	0.0361	0.0605	0.0508
FB	MRO	MRK	C	PYPL
0.0232	-0.0617	0.0481	-0.0389	-0.0078
CRM	AXP	QCOM	V	GILD
-0.0101	0.0927	0.0302	0.0050	0.0319
EXC	F	APTV	STZ	EL
0.0760	0.0365	-0.0380	0.0193	-0.0315
SPWR	CO	WMT	HD	NEE
-0.0394	0.0582	0.0493	0.0002	0.0968
CSX	MCD	SPG	FSLR	NSC
-0.0233	0.0725	0.0367	-0.0169	-0.0100
RF				
0.3988				

TABLE XI: Optimized Weights with Risky and Risk Free Asset (Bet on Democratic)

HON	AMZN	GOOG	CVX	COP
0.0389	0.0124	-0.0038	0.0303	0.0338
FB	MRO	MRK	C	PYPL
0.0052	-0.0459	0.0410	0.0177	-0.0241
CRM	AXP	QCOM	V	GILD
-0.0090	0.0571	0.0243	-0.0130	0.0259
EXC	F	APTV	STZ	EL
0.0137	0.0256	-0.0241	0.0439	0.0128
SPWR	CO	WMT	HD	NEE
-0.0321	0.0647	0.0445	0.0152	0.1209
CSX	MCD	SPG	FSLR	NSC
-0.0101	0.0629	0.0293	-0.0155	0.0026
RF				
0.4547				

to back-test our portfolio selection. The backtest period is from the 2000 election to the 2016 election. For each election year, a portfolio that bet on a Republican President would be elected and a portfolio that bet on a Democratic President would be elected are constructed and set to be last one year which corresponds to the maturity of the 1-year structured notes. Then, the two portfolios' excess returns are compared to each other and of course, the market excess return.

For example, the detailed back test method is listed below for the 2012 election year.

- Use all daily stock return data prior to 2012 to compute two vectors of β, one under a Republican president and one under a Democratic president.
- Estimate future volatility and the covariance matrix by applying MGARCH model on the daily stock return data mentioned above.
- Maximize certainty equivalent using the objective function stated in the previous section and solve for the weight vector.
- Compute the two portfolios' cumulative return from January 2012 to January 2013 and compare with that of the market.

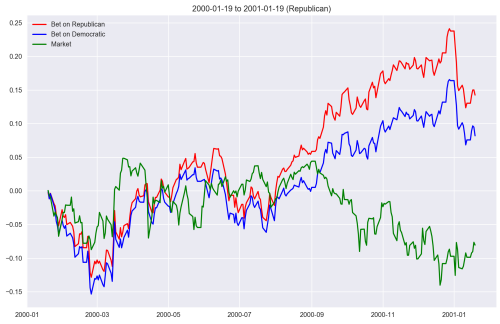

Fig. 9: Cumulative returns for the bet-on-Republican and bet-on-Democratic portfolio in 2000 elections

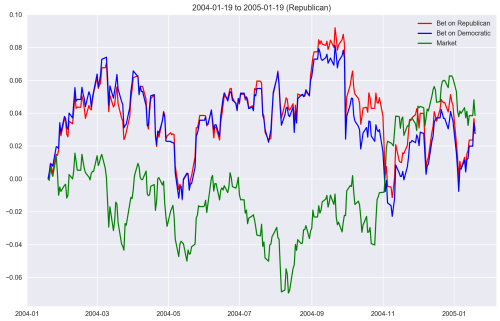

Fig. 10: Cumulative returns for the bet-on-Republican and bet-on-Democratic portfolio in 2004 elections

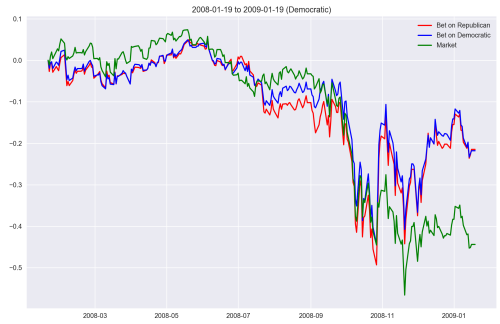

Fig. 11: Cumulative returns for the bet-on-Republican and bet-on-Democratic portfolio in 2008 elections

Figure 9-13 show our portfolio return VS. the market return for each selected election year.

As we can see, except for the short period 2004-2005, both of our portfolios, no matter of what party we bet on, perform better than the market return,which implies the profitability of our portfolios in most of the time. In particular, it is not hard to find that, if the party we bet was the same as the elected party, the corresponding portfolio's cumulative is

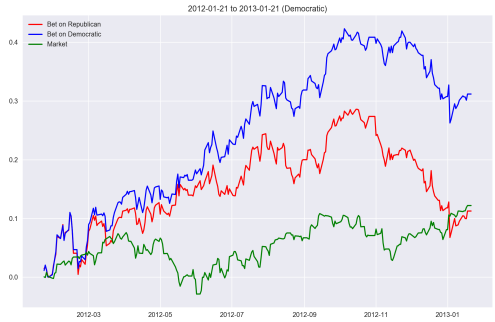

Fig. 12: Cumulative returns for the bet-on-Republican and bet-on-Democratic portfolio in 2012 elections

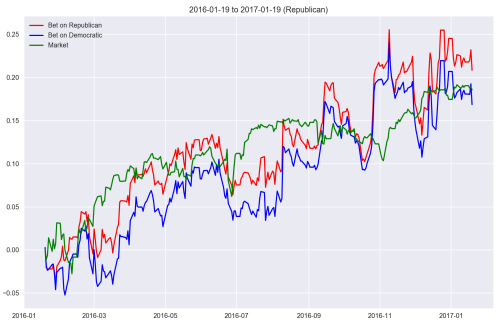

Fig. 13: Cumulative returns for the bet-on-Republican and bet-on-Democratic portfolio in 2016 elections

distinguished from the one lost the bet. To be specifical, the bet-on-Republican portfolio has higher cumulative return than the bet-on-Democratic portfolio's cumulative return from 2000 to 2001,2004 to 2005 and 2006 to 2007 which is exactly the time the Republican party was in power. Correspondingly, in 2008 and 2012, the bet-on-Democratic portfolio outperformed the bet-on-Republican one when the Democratic party was in power. This is what we want to differentiated the payoffs depending on the outcome of the election.

B. Disadvantages and Improvements

Although we constructed a structured notes that we expect will have differentiated payoff given different election results, we have made some assumptions that might not be true for financial time series data.

First of all, under the CAPM model, βs might change over time. However, since the 30 stocks given have uneven start date for which data is available, it is challenging for us to find a time period such that all stocks have underwent the leadership of both parties, or have been through a period such that there is a change from a Republican led House to a Democratic led House. Therefore, we made a compromise by using the entire 40 year period for all stocks and believe that the precision of estimation offered by high frequency daily data would compensate the time effect we might observe for βs.

Secondly, it is challenging for us to test the robustness and the predictability of the MGARCH model that we used to estimate the covariance matrix. Since the MGARCH model performs better under a short period of time, the accuracy of prediction for a one year span is still in question. However, we believe that past covariance matrix cannot be a representation of the future. Therefore, MGARCH or a stochastic volatility model seems more reasonable to predict volatility. If time permitted, we could also use a stochastic volatility model and back-test the performance of our selected stocks.

Even more, the structured product that we constructed serve as an at-the-money option of a selected portfolio. However, at-the-money option are always expensive to purchase and our paper does not discuss the pricing of our structured product. Also, if we are certain that a stock's return will go into one specific direction if a Democratic or Republican president were elected, the portfolio could then contain more out-of-the-money option, which will decrease the cost of purchasing the structured products but also increase the payoff if investor's bet is realized.

VI. Conclusions

To sum up, we have found some significant differences between the Democratic Portfolio and the Republican Portfolio. However, we do not find any significant difference between the return of the two portfolios. That is, we can not find strong evidence indicating that the Democratic portfolio will perform better than the Republican portfolio if a Democratic president is elected in 2020.

Further, we construct a corresponding structured note that has differentiated payoffs depending on which party empowers the White House. However, in the process of generating such a derivative, we have adopted some assumptions which are not very robust in real financial time-series data.

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