A Multi-Strategy Structured Notes Solution: Hedging the 2020 U.S. Presidential Election

Abstract—**This paper studies the statistical differences between two equity portfolios and examines their performance characteristics within the context of the US presidential election. To leverage their different performance expectations, we subsequently design structured notes from the portfolios so as to explore possible trading opportunities. Two approaches are suggested in the construction process, i.e., utilizing options and swaptions.**

Index Terms—**Financial Assets and Derivatives, Statistical Test, Linear Regression, Presidential Election, Structured Notes Construction**

I. Introduction

OVER the past few decades, the market has seen a proliferation of equity-linked structured products across a broad spectrum of asset classes. To meet the ever-shifting risk appetites of investors, banks have rolled out an inexhaustible variety of structured products linked to the underlying equity market, allowing for simultaneous investment participation and risk hedging.

Our goal is to cater to investors with a desire to participate in the equity market based on their opinions on the US presidential election outcome. To that end, we propose two canonical structured notes with their respective payoff mechanisms tied to two underlying portfolios that have been empirically tested to exhibit diverging returns depending on the outcome of the US presidential election.

Before giving the fact sheet of different structured notes, we perform statistical tests on *daily return*, *cumulative return*, and relevant financial factors to determine whether there are any significant differences between democratic and republican portfolios in Section II. After carefully analyzing the relationship between presidential election results and the performance of their respective portfolio using linear regression in Section III, we present solutions to constructing structured notes from the election portfolios with different payoffs based on the previous analysis in Section IV.

II. Quantitative Analysis

We retrieve all available price data of the 30 stocks from Yahoo Finance and calculate daily returns using adjusted-closing price. The dates range from 01/02/1972 to 01/17/2020. We also retrieve Form 10-K, the annual financial reports, from Bloomberg Terminal. Assuming equally weighted portfolios, we compute their returns as the arithmetic mean of all induvial stocks wherein.

A. Analysis of financial factors

To measure whether the two portfolios are in fact different from each other, we take financial factors into consideration. Take Weighted Market Capitalization of the portfolio as an example to illustrate how to calculate weighted factors of a portfolio. Suppose that we invest X dollars in a portfolio on December 31st every year, we divide the total investment amount into N parts evenly, corresponding into N stocks [1]. Each stock will then have a weight of W_i, measured as $1/N$.

Then, $F_{portfolio}$ is

$$F_{portfolio} = \sum_{i=1}^{N} W_i * F_i$$

where F_i is the Market Capitalization of stock i.

Having tested 25 financial factors, we find that two factors exhibit statistically significant difference between the Democratic and Republic portfolios: Weighted Market Capitalization and Weighted Asset Turnover.

Market capitalization is defined as number of outstanding shares multiplied by price per share. Since 2000, the Weighted MarketCap of democratic portfolio is 43.34% higher than that of republican portfolio on average.

[1] In some situations, there are some missing values of the financial factors. For example, some companies haven't published 2019 financial reports so that we cannot get their financial factors, while the stocks exist. Therefore, we choose N as the number of this factor that exists.

Debt_Capital is defined as the ratio of debt to total capital. From 2000 to 2002, the *Weighted_Debt_Capital* of republican portfolio is 33.01% higher than that of democratic portfolio on average. After 2002, the *Weighted_Debt_Capital* of democratic portfolio is 29.65% higher than that of republican portfolio on average.

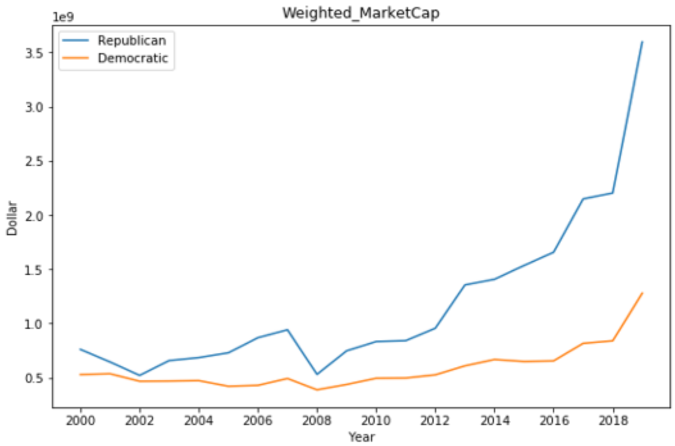

Fig. 1: Weighted Market Capitalization

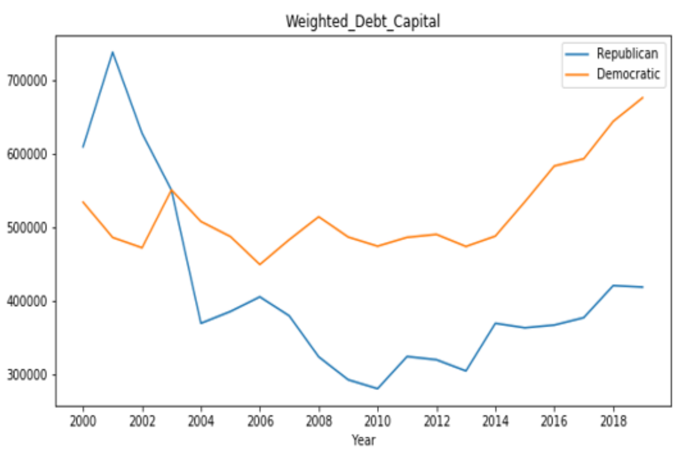

Fig. 2: Weighted Debt Capital

B. Exploratory Data Analysis and Hypothesis Construction

Before the inception of statistical analysis, we perform a data overview to ensure maximum empirical accuracy. We select three different time periods and four different metrics for examination. All time periods are backdated to 01/17/2020, the last date of our data sample.

From Table I and Table II, we observed some differences in performance between Democratic portfolio and Republican portfolio, especially over longer time spans such as four years and ten years. In order to gain a more intuitive sense of the portfolio performance for hypothesis construction, we graph the cumulative returns of the portfolios over different time spans.

TABLE I: Return Performace

	Cumulative return	Mean daily return
Democratic 1-Year	130.01%	0.107%
Republican 1-Year	125.59%	0.094%
Democratic 4-Year	182.65%	0.063%
Republican 4-Year	214.95%	0.081%
Democratic 10-Year	441.49%	0.064%
Republican 10-Year	464.78%	0.0067%

TABLE II: Risk Performace

	Annualized Volatility	Max drawdown
Democratic 1-Year	12.58%	-7.55%
Republican 1-Year	13.48%	-7.80%
Democratic 4-Year	13.61%	-16.69%
Republican 4-Year	15.33%	-21.94%
Democratic 10-Year	16.17%	-23.21%
Republican 10-Year	16.78%	-25.18%

According to Figure 3, over the past year, the democratic portfolio outperforms the republican portfolio, while the contrary is true for longer time spans. Since the cumulative return lines representing the two portfolios do not cross each other for most of the time, we build a hypothesis that the two portfolios have different characteristics. We examine our hypothesis quantitatively in the following sections.

C. Statistical Tests

We examine the differences between these two portfolios in two ways: one by daily returns, the other by cumulative returns. All tests are executed in Python for convenience and reproducibility.

1) Analysis of daily returns: Before we examine the differences in variance and mean, the data must pass the normality test. We choose Shapiro-Wilk model as a tool to test for normality. This model tests the null hypothesis that a sample $x_1, ..., x_n$ comes from a normally distributed population. The test statistic for the Shapiro-Wilk test is:

$$W = \frac{(\sum_{i=1}^{n} a_i x_{(i)})^2}{\sum_{i=1}^{n}(x_i - \bar{x})^2}$$

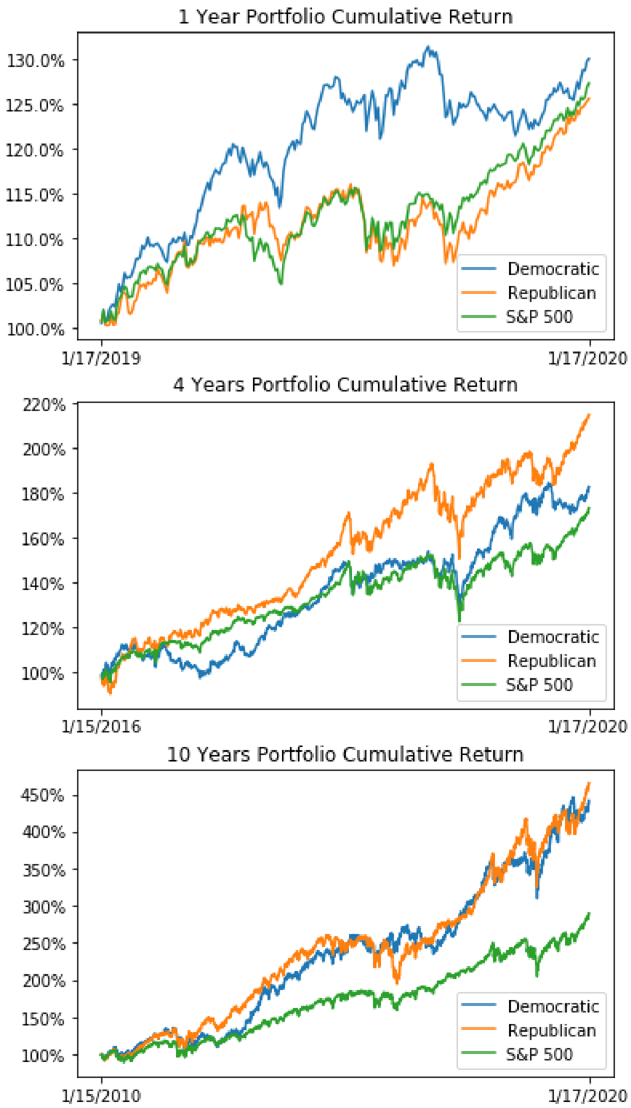

Fig. 3: cumulative portfolio returns of different time periods

where $x_{(i)}$ is the ith order statistic, and $\bar{x}$ is the sample mean.

We apply the Shapiro-Wilk model to test the daily returns of the portfolios for normality. The results are shown in the Table III.

TABLE III: Normality Test for Daily Return

Period	T-value	p-value
Democratic 1-Year	22.48	0.00
Republican 1-Year	23.76	0.00
Democratic 4-Year	72.30	0.00
Republican 4-Year	108.75	0.00
Democratic 10-Year	248.70	0.00
Republican 10-Year	184.52	0.00

From Table III, we observe p-values for all metrics are less than the significance level of 0.05, which gives us enough statistical evidence to reject the null hypothesis. All the daily returns data are not normally distributed; we cannot use the F-test for difference in variance and the standard T-test for the difference in mean, because both tests require the samples to be normally distributed.

As an alternative, we consider choosing between a paired samples T-test and a Wilcoxon signed-rank test. These tests test for the differences between two sets of paired data. In our study, the paired data is the daily returns of the two portfolios. In order to determine on an appropriate test, we test daily return difference between the two portfolios for normality. If the difference is normally distributed, a paired samples T-test can be used; otherwise, a Wilcoxon test is more appropriate.

TABLE IV: Daily Return Difference Test

Period	T-value	p-value
1-Year	1.95	0.38
4-Year	40.61	0.00
10-Year	145.78	0.00

From Table IV, the p-value for *1-year Daily Return Difference* is greater than the significance level of 0.05, therefore we cannot reject the null hypothesis. The next step is performing a paired samples T-test. In other cases, the p-values are less than 0.05, justifying the need for a Wilcoxon test with statistical evidence.

The paired T-test tests for the difference in mean with the null hypothesis that 2 related sets of data have identical expected values. The test statistic is:

$$t = \frac{\bar{X}_D - \mu_0}{\frac{S_D}{\sqrt{n}}}$$

where $\bar{X}_D$ and s_D are the mean and standard deviation of the differences between the pairs. The Wilcoxon signed-rank test is a nonparametric test that can be used to determine whether two sets of data have the same distribution. The test statistic is:

$$W = \sum_{i=1}^{N_r} [sgn(x_{(2,i)} - x_{(1,i)}) R_i]$$

TABLE V: paired samples T-test and the Wilcoxon signed-rank test

Period	Paired T-value	Paried p-value	Wilcoxon test stats	Wilcoxon test p-value
1-Year	0.32	0.75	-	-
4-Year	-	-	242427.5	0.22
10-Year	-	-	1559685.5	0.54

where sgn is the sign function, N_r is the reduced sample size after each ranking is done,R_i denotes the rank, and $x_{1,i}$ and $x_{2,i}$ denotes the measurements.

From Table V, every one of the tests returns a p-value greater than 0.05, indicating a lack of sufficient evidence to reject the null hypothesis. Whereas the two portfolios have the same mean for *1-year daily return* as stated in the null hypothesis, they have the same distribution for the *4-year* and *10-year daily return*.

No substantial conclusion can be made regarding any statistically significant difference between the two portfolios using daily return data. To more thoroughly test for quantitative differences, we then analyze cumulative return data.

2) Analysis of cumulative returns: The testing procedure of the cumulative returns is similar to that of the daily returns. For succinctness, we focus on interpreting the empirical results.

TABLE VI: Cumulative Returns Normality Test

Period	Republican p	Democratic p	Difference p
1-Year	0.015	0.000	0.000
4-Year	0.000	0.000	0.000
10-Year	0.000	0.000	0.005

Table VI shows resultant p-values of normality test across different time periods for both Republican and Democratic portfolios as well as the difference between the two. Following the rejection of null hypothesis for all three cases, we move forward with the Wilcoxon signed-rank test to test for difference in distribution.

TABLE VII: Cumulative Returns Wilcoxon signed-rank test

Period	Wilcoxon test statistic	Wilcoxon test p-value
1-Year	2.0	0.0
4-Year	6117.0	0.0
10-Year	868765.0	0.0

Table VII shows the results of Wilcoxon signed-rank test for cumulative returns. Given a p-value of zero across all three measures, we reject the null hypothesis and conclude the cumulative returns for the Democratic and Republican portfolios come from different distributions.

Combining this finding with the statistics from the exploratory data analysis (as Table VIII shows), we are able to come to a conclusion that the cumulative returns of the two portfolios exhibit significant differences in distribution. We continue to use this fact to test for the performance difference with regards to the election results in Section III.

III. Linear Regression Model

Building upon the significant differences in cumulative returns between the Democratic and Republican portfolios in Section II, we construct multivariate linear regression models to test for the statistical significance of explanatory variables in relation to portfolio performance.

To test whether the outcome of the election will significantly influence the performance of the two portfolios, we need to first introduce additional control variables to our model. According to existing academic studies , we select *max drawdown, volatility, Sharpe ratio, expected shortfall at 95% confidence interval*, and S&P 500 return as the control variables in our model. Because US presidential election is held every 4 years, the amount of historical data is limited. Consequently, our linear regression model draws on historical data from 1980 through 2016 to gauge the impact of election outcome on *portfolio return*.

The Descriptive Statistics Analysis of our control variables is shown in Table IX:

We use a dummy variable to represent the outcome of election outcome. A full representation of our regression model is shown as follows:

$$\begin{aligned} Return_x =& \beta_0 + \beta_1 Democratic_x + \beta_2 SP_x + \\ & \beta_3 MaxDD_x + \beta_4 Vol_x + \\ & \beta_5 Sharpe_x + \beta_6 ES_x + \epsilon \end{aligned}$$

To begin, we need to determine on an appropriate frequency level for portfolio return. We use x to

TABLE VIII: paired samples T-test and the Wilcoxon signed-rank test

Test Name	Daily return (1-year)	Daily return (4&10-year)	Cumulative return
Test for Normality	+ve	+ve	+ve
Test for Normality inDifference of Two Series	-ve	+ve	+ve
Test for Difference in Mean	-ve	n/a	n/a
Test for Difference in Distribution	n/a	-ve	+ve

TABLE IX: Descriptive Statistics Analysis of the variables

	Variables	Mean	Standard Deviation
	Count	10	
Dependent Variables	Daily Return_D	0.0090	0.0161
	Daily Return_R	0.0031	0.0071
	Monthly Return_D	-0.0021	0.0713
	Monthly Return_R	0.0006	0.0628
Independent Variable	Democratic	0.4000	0.5164
Control Variables	MaxDD_D	0.0437	0.0510
	Volatility_D	0.0578	0.0533
	Sharpe_D	0.3247	1.0787
	ES_D	-0.0217	0.0202
	MaxDD_R	0.0561	0.0533
	Volatility_R	0.0639	0.0527
	Sharpe_R	0.4163	0.9843
	ES_R	-0.0220	0.0176

substitute the time interval and the portfolio we choose . Upon reviewing the regression results, we find the daily return of both the Republican and Democratic portfolios are positively correlated to the dummy variable ‘Democratic’. Such finding implies a shared positive shock of Democratic victory to both portfolios; that said, if the Democratic party wins the election, it is expected to observe an price increase in both portfolios. However, when switching portfolio return frequency from daily to a monthly basis, we arrive at different empirical results. While the monthly return of the Republican portfolio goes down following a Democratic party victory, that of the Democratic counterpart goes up as expected.

Thus, we infer from the regression results that the impact of election outcome on the return of Democratic portfolio is timely and continuous, as supported by a significantly positive relationship at 5% level between the success of the Democratic party and the increase in Democratic portfolio return, both on a daily and monthly basis. However, the story develops otherwise for Republican portfolio – Republican win does not have an immediate impact on its corresponding portfolio because daily return of the portfolio is significantly increased after the Democrat wins, albeit half that of its Democratic counterpart. Moreover, the monthly return of the Republican portfolio decreases following a the Republican defeat, which shows a lag effect of the election result on the portfolio return.

TABLE X: Linear Regression Results

$Return_x$	Coefficient β_1	T statistic
Democratic daily return	0.0098	1.98
Republican daily return	0.0044	1.72
Democratic monthly return	0.0331	2.46
Republican monthly return	-0.0136	-1.62

IV. Structured notes construction

The investment thesis revolves around capturing the upside potentials on the underlying portfolio while limiting the downside risks should the US election outcome materializes otherwise. In the most conservative way, a structured note would guarantee principal protection while allowing partial participation in portfolio capital gain. This could be neatly modeled as a zero-coupon paying bond and a call option. Whereas the bond position guarantees principal payback, the call option maintains a long position that pays off in a stock rally.

A. Underlying assets

While most equity-linked structured notes are tied to an underlying market index (S&P 500, NSDAQ 100, or other broad stock indices), the ones in question are linked to an underlying portfolio. Because the portfolio was constructed specifically in such a way that its performance primarily hinges on US election outcome, its payoff structure is inherently

TABLE XI: Basic Information for Two at the Money OTC Options

	Volatility(%)	Start date	End date	Price(%)	Participation rate(%)
Democratic	12.44	01/29/2020	01/29/2021	5.78	51.07
Republican	13.61	01/29/2020	01/29/2021	6.23	48.14

risky or unpredictable at best, thereby necessitating a principal protection mechanism through bond investment. Since our structured notes are amenable to being decomposed into a combination of a zero-coupon paying bond and call options, their valuations can be broken down into an equivalent portfolio of financial instruments whereby each component is valued using the appropriate formula. By virtue of the decomposition approach, we can conveniently characterize the structured notes' payoff in terms of everyday financial products.

B. *Valuation Approach*

Consider a one-year zero-coupon paying bond as the capital preservation feature. Against the backdrop of a swiss private bank being the issuer, we set the prevailing interest rate at 3% in reference to an existing corporate bond issued by SWISS BK CORP, maturing on 07/15/2025 with a 3.4% yield [2] .

To account for the short duration of the bank's structured notes, we lower the rate by 40 bps to 3% as shorter maturity implies lower yield. Assuming no default risk, the bond position leaves approximately 3% (100% - 97%) of the principal available for call purchase. Depending on the cost of the OTC call option, we determine the participation rate accordingly, defined as the ratio of fund balance available to the call premium. Given a 40M principal value and a one-year investment horizon, we utilize Black-Scholes to compute the at-the-money call premium.

Structured Notes Payoff:

$$S + \max\{S \times P \times \frac{S_T - S}{S}, 0\}$$

Equivalent to:

$$S + \frac{S \times P}{S} \max\{S_T - S, 0\} = S + P \times \max\{S_T - S, 0\}$$

where S is the Principal Amount, S_T is the Portfolio Value, and P is the Participation Rate.

[2]"Bond Detail." Bonds Detail, http://finra-markets.morningstar.com/BondCenter/BondDetail.jsp?ticker=C27427&symbol=UBS.KG.

Note that the payoff function, $max\{S_T - S, 0\}$, translates effectively into a call option while the Principal Amount, S, represents a zero-coupon bond; that conveniently allows us to price the product separately by each component:

- Bond Value: $\frac{S}{1+r}$
- Call Option: $P[SN(d_1) - Ke^{-r}N(d_2)]$

The combined value of both components must add up to a principal amount of 40M, rendering P, Participation Rate, susceptible to manipulation.

We set risk free rate as 1.64% as this is the U.S. 10-Year Treasury yield on 01/28/2020. Assuming returns are identically independently distributed, we calculate portfolio volatility by averaging the daily return of 15 stocks in the portfolio from 01/28/2019, deriving the sample standard deviation and multiplying it by $\sqrt{252}$.

Table XI shows the basic information for two at the money OTC options.

C. *Contingent Claims*

With a zero-coupon bond and an ATM call option, the participation rate falls at 51%, which might seem somewhat unattractive to those looking for aggressive returns. To cater to investors' varied levels of risk appetites, we design a selection of participation rates through the following ways:

1) Investing in high yield corporate debt instruments
2) Capping upside gains through Bull-Spread Options

As the cost of bond investment is lowered, the remaining balance available for call option purchase becomes higher, enabling higher participation rates. However, investing in high yield corporate bonds introduces default risk and we may be no longer able to guarantee principal protection for investors. While modifying the debt component jeopardizes investor principal security, we can still achieve higher participation rates by adjusting the call position.

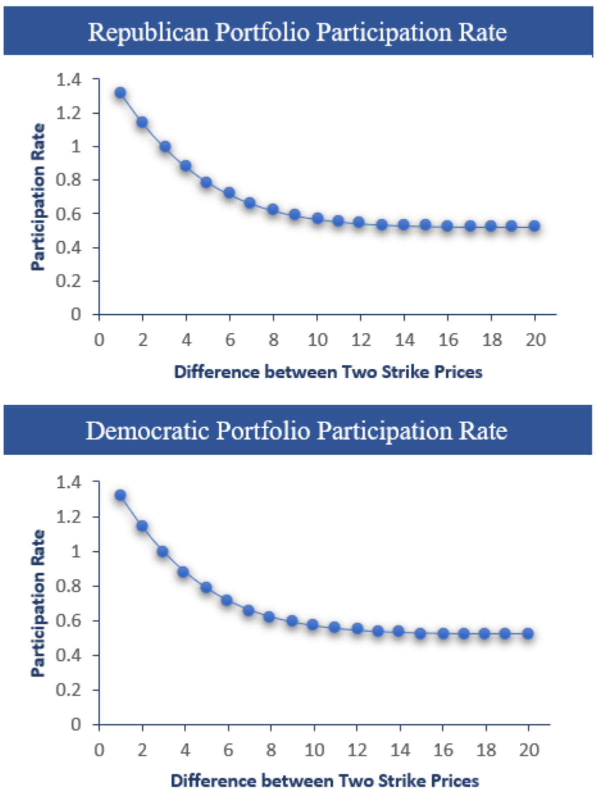

Fig. 4: Relationship of Profitable Interval and Participation Rate

One way of such realization would be to short sell an OTM (out-of-the-money) call option at a higher strike price in conjunction with the ATM (at-the-money) call option. This combination effectively constitutes a Bull-Spread strategy, profiting from underlying price rally while costing less than buying only the lower strike call. Despite having limited profit potential, this strategy performs best when the underlying portfolio rises moderately within a range between the lower and upper strike prices. The viability of the Bull-Spread strategy is further reinforced when drawing on empirical evidence – the benefiting portfolio of any particular US presidential election outcome generally will not rise above 10% in the quarter that follows.

Because of the inverse relationship between premium and strike price of call options, the higher the strike price of the short call, the lower the premium becomes; hence, translating into a lower participation rate when used to finance the ATM call option purchase.

We calculate the participation rate for the short call at different strike prices from 41M to 60M for two portfolios. The inverse relationship of profitable interval and participation rate is shown in Figure 4.

D. Swaption

To increase participation rate while keeping the possibility of gain higher returns, we can design an equity swap that the bank pay fixed rate and receive periodical return with respect to the return of underlying portfolio. Normally, the fixed rate is set to be about 6.5% annually. And then buy a swaption to have the right to enter in this swap nine month later, when the result of presidential election is almost certain. According to the result of Section III, we will not miss any impressive return but can escape from the uncertainty of election result now. The only shortage of this method is pricing the swaption is hard.

TABLE XII: Democratic Portfolio Bull-Spread Participation Rates

Targeted Realized Return	Targeted Return	Short Strike	Participation Rate
3.26%	2.50%	41M	130%
5.64%	5.00%	42M	113%
7.39%	7.50%	43M	98%
8.69%	10.00%	44M	87%
9.71%	12.50%	45M	78%
10.58%	15.00%	46M	71%
11.39%	17.50%	47M	65%
12.21%	20.00%	48M	61%
13.06%	22.50%	49M	58%
13.98%	25.00%	50M	56%

TABLE XIII: Republican Portfolio Bull-Spread Participation Rates

Targeted Realized Return	Targeted Return	Short Strike	Participation Rate
3.26%	2.50%	41M	130%
5.64%	5.00%	42M	113%
7.38%	7.50%	43M	98%
8.67%	10.00%	44M	87%
9.68%	12.50%	45M	77%
10.54%	15.00%	46M	70%
11.34%	17.50%	47M	65%
12.14%	20.00%	48M	61%
12.98%	22.50%	49M	58%
13.89%	25.00%	50M	56%

E. Equity Swaption

As an addition to our product offerings, we curate a third type of structured note specifically for investors looking for aggressive returns: a zero-coupon bond coupled with a nine-month equity swaption.

While this structured product has a higher potential upside, it no longer guarantees principal protection and puts investors at risk of capital loss, should their desired portfolio deliver poor performance following the presidential election in November. To understand the payoff mechanism of this swaption-like structured note, we analyze each component as follows:

1) The zero-coupon bond works the same as before to ensure principal delivery at expiration.
2) The equity swaption entitles us to enter into a swap transaction with a counterparty at maturity date (nine months later) with a predetermined fixed rate. The counterparty promises to pay the return on an underlying equity portfolio in exchange for a fixed rate from us. Given the timeline of US presidential election, the swaption comes into effect as of 1/27/2020 and matures on 11/03/220, a day after the US presidential election. Upon maturity, we only enter into the swap contract if the prevailing swap rate is higher than the predetermined fixed rate specified in the contract. By the same token, we take a loss of the swaption premium if the prevailing swap rate is lower than the fixed rate.

In case that we enter into the swap contract, an extra layer of risk is introduced through the uncertainty surrounding the floating return on the underlying portfolio for the 3 months after the US election outcome. So long as the portfolio return rises above the fixed rate, we are in a position to capture capital gains. However, if the portfolio delivers suboptimal returns, we suffer capital losses at the expense of investor's investment principal.

Our valuation methodology for equity swaption is cordially inspired by an academic study from Don el. 1998, who contends that pricing an equity swaption should be no different from pricing an interest rate swaption.

We define the value of portfolio at time t as $I(t)$, let $B(j,k)$ represent the value at time j of a zero-coupon bond with \$1 face value that matures at time k. Because we choose to enter into the swap nine months later, there is only one payment stream. As a fixed-rate payer, we receive

$$\frac{I(12)}{I(9)} - (1+R)$$

one year later, where R is the fixed rate we pay, determined in the ninth month after contract inception.

At any time j between 9th month and 12th month, the swap value should be:

$$V(j;9,12) = \frac{I(j)}{I(9)} - B(j,12) - RB(j,12)$$

Upon the initiation of the equity swap, the swap should have a value of zero and j = 9. Therefore, we have:

$$R = \frac{1 - B(9,12)}{B(9,12)}$$

Now that we have equated a standard equity swap with a fixed rate on a plain vanilla swap, we can start pricing the swaption at time 0. If we denote the strike of swaption as K, the payoff at expiration is:

$$\max\{R-K,0\} \times B(9,12)$$

As shown in the former equation, portfolio value is excluded. Because immediately after exercising a swaption, the payer can always enter into an offsetting swap in the market to remain market neutral. Thus, the swaption is properly valued at expiration by executing a hypothetical arbitrage-free transaction.

We then apply Black-76 formula to value a payer swaption:

$$P \cdot e^{(-it_i)}(t_i - t_{i-1})[RN(d_1) - KN(d_2)],$$

$$where \quad d_1 = \frac{\ln\frac{R}{K} + \frac{1}{2}\rho_F^2 T}{\rho_F\sqrt{T}}, \quad d_2 = d_1 - \rho_F\sqrt{T}$$

Symbol	Description	Value
T	Expiry date of swaption	$\frac{3}{4}$
ρ_F	Volatility of swap rate	$70.41 \times \sqrt{0.25}$ [3]
P	Principal	40 million
i	$f(9,12)$	1.55% [4]

A typical annual rate of 6% is applied as the fixed rate, K, as seen across a wide array of equity swaptions in existing trading landscape. Results pertaining to the valuation process are shown in Table XIV:

TABLE XIV: Result of Pricing Swaption

$B(9, 12)$	R	$N(d_1)$	$N(d_2)$	price
0.9961	0.0039	1.35×10^{-5}	7.64×10^{-7}	0.0606

The swaption is refreshingly inexpensive because of the optionality to enter into a swap that trading at an annual spot rate of 1.55%, far lower than the annualized 6% we pay on the fixed leg. Unlike any traditional interest rate swaption, the underlying asset being discussed is portfolio return; that said, investor has the ability to capture portfolio return if their preferred party wins the election in 9 months.

When it comes to the calculation of participation rate, we formulate it by the rule of cash flow replication (i.e. outflow from fixed leg + inflow from portfolio return):

$$pr = \frac{return\ from\ purchasing\ bond}{price\ of\ swaption} \times (1 - \frac{K}{R})$$

Despite yielding an abnormally high participation rate, investor is nonetheless at risk of experiencing principal losses due to the uncertainty around future portfolio performance. To the extent of principal preservation, possible features can be introduced such as adding a floor to the float leg; however, investors are likely to find this type of structure unduly sophisticated and bafflingly opaque.

F. Caveat

With the attractive balance between risk and return as well as the feature of principal protection, we find it commercial enticing to present two types of portfolio-linked structured notes: 1) principally protected with a 51% participation rate for any upside return 2) principally protected with limited upside return and varying participation rates ranging from 51% to 130%. It is at the investor's discretion to select the appropriate product type according to their own risk tolerant level. Additional attention should be directed at the forgone interests that would otherwise be generated through investing in risk-free treasury bonds.

[3]From the close price of 01/27/2020, http://www.cboe.com/SRVIX

[4]From 3 month spot rate on 01/27/2020, https://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=yieldYear&year=2020

V. Conclusion

This paper attempts to assess the implications of US presidential election outcome on equity market activities. Using historical data of two inherently different equity portfolios, we empirically test their characteristics and expected performance following US presidential election in a quantitative fashion.

Building upon empirical evidence, we construct two types of principally protected structured notes linked to the portfolios in question. By way of Black-Scholes Options Pricing Formula, we analytically compute the options premium and backward engineer the corresponding participation rate. Based on statistical analysis, we find it optimal to invest at a 87% participation given market sentiment often subdues gradually following the blistering presidential election.

In general, this paper provides strong evidence that US election has an important impact on equity market performance. Our findings in this study might shed some light on this subject area for future scholars.

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