# Conservative Investment Strategies

Silicon Valley Computerized Investing Group
January 7, 2021

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## Peter Lingane

- Financial planner and registered investment advisor.
- A penchant for bringing his considerable analytical skills to tax and investment issues.

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## It's Worth Repeating …

- "Trust, but verify!"
- Examples are not recommendations.
- Backtests provide no guarantees - other than that future results will be different.

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Today's focus is on what computerized investing offers conservative investors.

- Does not provide consistently better performance than the 20:80 benchmark for a daily SD of 0.002.
- There are tactical and active option strategies which provide better returns and drawdowns than the 60:40 benchmark, SD = 0.005.
- Passive option strategies were disappointing. However, relative performance may improve in a low interest rate environment.

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## "Curated data" at www.lingane.com/qi

- Large cap US equities – LrgCapUS
  Extension of Ibbotson's SP500 series
- 3 – 7-year Treasury bonds - IGBond
  Extension of Ibbotson's intermediate government bond series
- Large cap foreign equities – Foreign
  Extension of MSCI-EAFA index
- US real estate – USREIT
  Extension of NAREIT index

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## What Makes for a Better Strategy?

| | 20% LrgCapUS, 80% IGBond 2000 – 2020 |
|---|---|
| Similar Realized Volatility (SD) | 0.0021 per day |
| Higher Annualized Return (CAGR) | 5.13% per year |
| Consistently Higher Return<br>WINS36 80% or higher<br>Rising Relative Strength over time | Reference |
| Lower Drawdown (MaxDD) | 0.064 |
| Higher Sharpe Ratio | 1.08 |
| Higher Ulcer Performance Index | 3.21 |
| Implementation Complexity | Rebalance monthly |

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## Maurer's S121 Methodology

- Determine the allocations among SPY, QQQ and IEF which minimize the portfolio variance.

  105-day Variances and Covariances
- Dilute the minimum variance portfolio with Tbills to produce a 0.2% daily standard deviation (3.2% annually)
- Repeat at each month-end. Compute the equity curve from month-end allocations.

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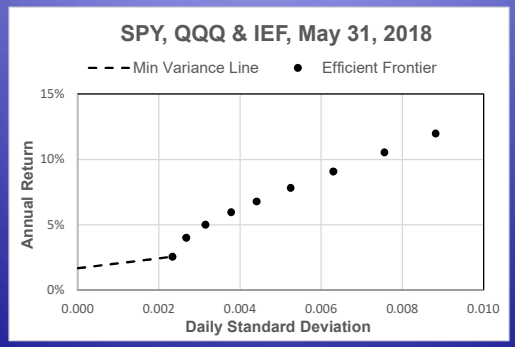
## The Efficient Frontier.

See Appendix at www.lingane.com/qi.
"Return" is the average of past 65 daily returns.

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## Extending IEF Backwards

- Price data are needed from mid-1999 to run simulations from 2000. There are adequate data for SPY and QQQ but IEF data do not begin until July 26, 2002.
- Maurer generated prior years of IEF prices by regressing IEF vs VFITX.

  VFITX is not a good surrogate for IEF because the duration of IEF is longer than that of VFITX. This is shown by a plot of relative strength.

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## Relative Strengths of Maurer IEF vs VFITX and of IEF vs 70:30 Blend of VFITX and VUSTX.


70:30 Blend is the better surrogate.

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## Comparing S121 to the 20:80 Benchmark

WINS36 drops to 21% if the comparison is with respect to 20% LrgCapUS and 80% IEF.

| 2000 – 2020 | Benchmark | S121 |
|---|---|---|
| Risky Asset | LrgCapUS | SPY, QQQ, IEF |
| Risk-Free Asset | IGBond | 3moTbills |
| Realized SD | 0.0021 | 0.0022 |
| CAGR | 5.13% | 5.41% |
| Sharpe | 1.08 | 1.13 |
| MaxDD | 0.064 | 0.044 |
| UPI | 3.21 | 3.36 |
| IEF Allocation | | 55% |
| Risk-Free Allocation | 80% | 29% |
| WINS36 | Reference | 21 - 59% |
| Implementation | Rebalance Monthly | Challenging |

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## Comparing the Simulators

"SD Below Goal" is the frequency with which the standard deviation of the optimized portfolio is less than the goal.

| 2000 – 2020 | Fixed Allocation | S121 MinVar | Case 17 MinVar |
|---|---|---|---|
| Risky Asset | LrgCapUS | SPY, QQQ, IEF | SPY, QQQ, IEF |
| Risk-Free Asset | IGBond | 3moTbills | 1moTbills |
| Realized SD | 0.0021 | 0.0022 | 0.0021 |
| CAGR | 5.02% | 5.41% | 5.20% |
| Sharpe | 1.05 | 1.13 | 1.11 |
| MaxDD | 0.064 | 0.044 | 0.043 |
| UPI | 3.09 | 3.36 | 3.16 |
| IEF Allocation | | 55% | 56% |
| R-F Allocation | 80% | 29% | 29% |
| SD Below Goal | | 0% | 9% |
| WINS36 | | 21 - 59% | 13 - 53% |
| Implementation | | Challenging | Challenging |

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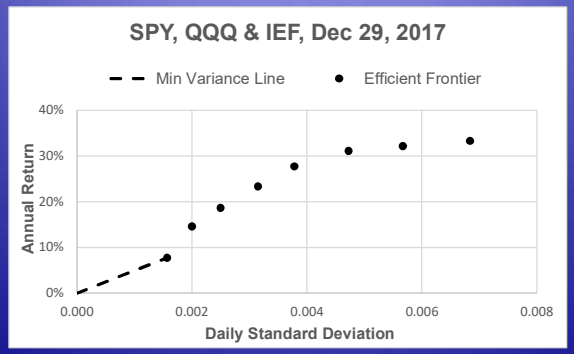
## S121 Increased Volatility and Return of the Minimum Variance Portfolio When Necessary to Achieve SD Goal.

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## Most (85%) of Portfolio is Fixed Income

- CAGR
  IEF > Blend > IGBond > Tbills
  Strategy returns follow the same trend on changes within Risky and Risk-free Assets
- Standard Deviation
  IEF > Blend > IGBond > 0.2% > Tbills
  It is more difficult to achieve SD goal the higher the volatility of the Risk-Free Asset

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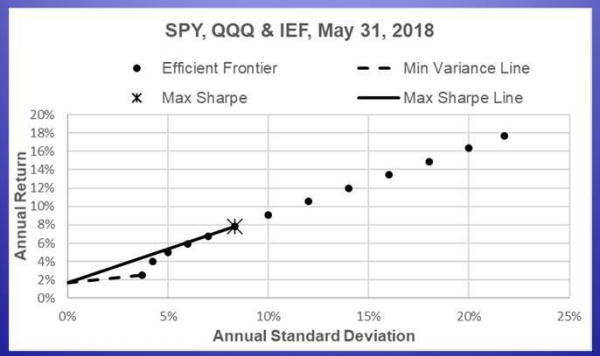
## MaxSharpe Line

See Appendix at www.lingane.com/qi for details.




The MaxSharpe line generally lies above the Minimum Variance line, suggesting a higher return for the same volatility.

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## Alternatives

- Risk-Free Asset
  - Tbills
  - 70:30 Blend (generally failed to achieve low SD goal)
  - IGBond
- Optimization
  - MinVar, followed by dilution with risk-free asset
  - MaxShape, followed by dilution
  - Dilute risky asset with risk-free asset (Macquarie strategy)
- Risky Asset
  - SPY, QQQ, Bonds
  - LrgCapUS, Foreign, Bonds
  - LrgCapUS, Foreign, USREIT
  - QQQ, Foreign, USREIT (lowest correlations)
  - LrgCapUS or QQQ (dilution only strategy)

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## Variations on S121. 2000 – October 2020

WINS36 is with respect to 20% LrgCapUS and 80% IGBond

| Case # / Optimization | Fixed Allocation | 42 MaxSharpe | 52 MaxSharpe | 58 Dilution |
|---|---|---|---|---|
| Risky Asset | LrgCapUS | LrgCapUS Foreign USREIT | QQQ Foreign USREIT | QQQ |
| Risk-Free Asset | IGBond | IGBond | IGBond | IGBond |
| Realized SD | 0.0021 | 0.0022 | 0.0020 | 0.0020 |
| CAGR | 5.13% | 5.63% | 5.73% | 5.68% |
| Sharpe | 1.08 | 1.14 | 1.19 | 1.26 |
| MaxDD | 0.064 | 0.042 | 0.042 | 0.028 |
| UPI | 3.21 | 2.74 | 3.02 | 4.47 |
| SD Above Goal | | 43% | 43% | 38% |
| WINS36 | Reference | 54% | 62% | 63% |
| Implementation | Easy | Challenging | Challenging | Doable? |

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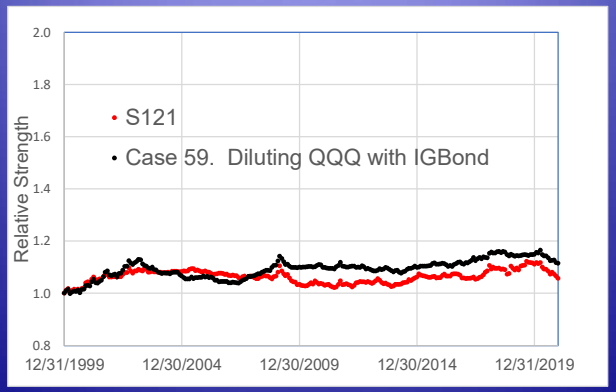
## Relative Strength provides no evidence for consistent outperformance over 20:80 portfolio

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## Original Goal

Exceed 20:80 Benchmark (SD = 0.0021)

## Conclusion

*Conservative investors should invest in the 20:80 benchmark rather than in a more complex strategy*

## New Goal

Exceed 60:40 Benchmark (SD = 0.0054)

MinVar, MaxSharpe and Dilution Simulations

Swan and other option strategies

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## 0.005 Daily SD. 2000 – 2020

Lower drawdowns, higher returns, improved WINS36

| Case # / Optimization | Fixed Allocation | 46 MaxSharpe | 54 MaxSharpe | 64 Dilution |
|---|---|---|---|---|
| Risky Asset | LrgCapUS | LrgCapUS Foreign USREIT | QQQ Foreign USREIT | QQQ |
| Risk-Free Asset | IGBond | IGBond | IGBond | IGBond |
| Realized SD | 0.0054 | 0.0052 | 0.0049 | 0.0049 |
| CAGR | 6.06% | 8.03% | 7.95% | 8.42% |
| Sharpe | 0.50 | 0.79 | 0.84 | 0.88 |
| MaxDD | 0.304 | 0.138 | 0.118 | 0.144 |
| UPI | 0.54 | 1.41 | 1.78 | 1.65 |
| RFA Allocation | 40% | 41% | 43% | 52% |
| WINS36 | Reference | 69% | 76% | 78% |
| Implementation | Easy | Challenging | Challenging | Doable? |

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## Swan Defined Risk Strategies

- Buy put options to limit the downside risk. Rate of increase on upside is limited by cost of the puts. This is an active strategy.
- Large Cap US Strategy from July 1998.
- Available as a mutual fund (SDRIX, $100,000 minimum, 1.3% expense ratio) or Separately Managed Account (SMA).

  Statistics are based on the monthly returns of the SMA, net of expenses.

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## The Mutual Fund is 1.2% per Year More Expensive than SMA


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## Swan Large Cap Defined Risk Strategy 2000 – 2020. SDRIX after 1999.

Source: Efficient Frontier Allocations_LrgCap_For_RE.xlsm

| Risky Asset | LrgCapUS | QQQ Foreign USREIT | QQQ | Swan Large Cap |
|---|---|---|---|---|
| Case # | | 54 | 64 | |
| Optimization | Fixed Allocation | MaxSharpe | Dilution | Active Option |
| Risk Free Asset | IGBonds | IGBonds | IGBonds | |
| Realized SD | 0.0054 | 0.0050 | 0.0049 | 0.0053 |
| CAGR | 6.06% | 8.16% | 8.42% | 6.89% |
| Sharpe | 0.50 | 0.88 | 0.88 | 0.66 |
| MaxDD | 0.304 | 0.118 | 0.144 | 0.136 |
| UPI | 0.54 | 1.84 | 1.65 | 1.18 |
| WINS36 | Reference | 72% | 78% | 44% |
| Implementation | Low | High | Moderate | Low, costly |

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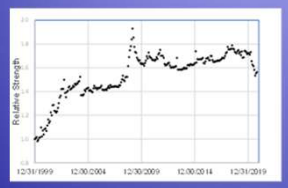
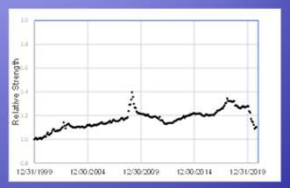
## Relative Strength vs. 60:40 Portfolio

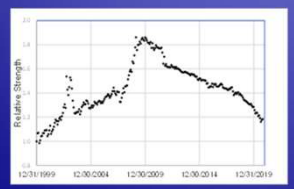
54. MaxSharpe QQQ-For-RE and IGBond



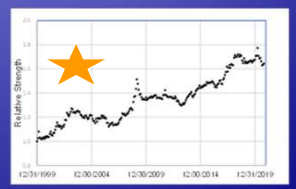
61. Dilute LrgCapUS with IGBond



2. Swan Large Cap DRS



64. Dilute QQQ with IGBond



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## Cboe Zero Cost Put Spread Index (CLLZ)

- Long SPX (synthetic position, w/o div.)
- Buy Puts, 2.5% below current price
- Sells Puts, 5.0% below current price
- Sells Calls at a strike price which offsets the cost of the Puts

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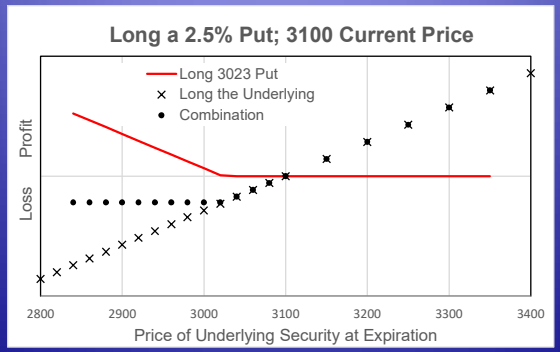
## Buying a Put Protects Against Market Declines Below Strike Price

Source: Cboe Data and Analysis.xlsx




Neglects cost of the options. The diagram is only valid at expiration.

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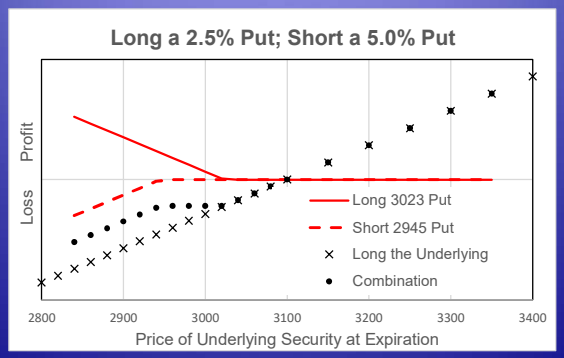
## Selling a Put at a Lower Strike Price Creates a "Put Spread," Which Protects Against Market Declines Between the Strike Prices.

Source: Cboe Data and Analysis.xlsx

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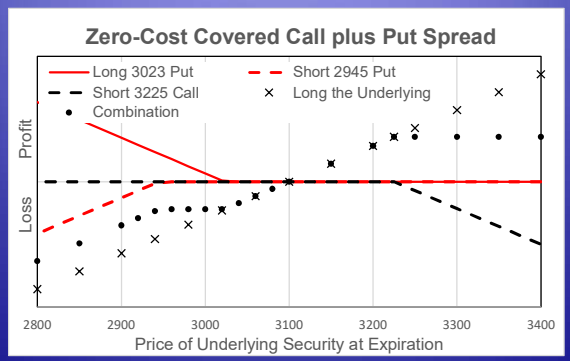
## Selling Calls Offsets the Cost of the Put Spread, But Caps the Upside

Source: Cboe Data and Analysis.xlsx

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# Cboe Zero Cost Put Spread Index (CLLZ)

- Long SPX (synthetic position, w/o div.)
- Buy Puts, 2.5% below current price
- Sells Puts, 5.0% below current price
- Sells Calls at a strike price which offsets the cost of the Puts
- Outcomes are only defined at expiration
- Resets on the 3rd Friday of each month
- History from June 20, 1986

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# Performance of the CLLZ Strategy, net of estimated expenses. 2000 – 2020.

Source: Efficient Frontier Allocations_LrgCap_For_RE.xlsm

| Risky Asset | LrgCapUS | QQQ | Swan Large Cap | Cboe CLLZ |
|---|---|---|---|---|
| Optimization | Fixed Allocation | (64) Dilution | Active Option | Passive Option |
| Risk Free Asset | IGBond | IGBond | | |
| Realized SD | 0.0054 | 0.0049 | 0.0053 | 0.0076 |
| CAGR | 6.06% | 8.42% | 6.68% | 3.20% |
| Sharpe | 0.50 | 0.88 | 0.66 | 0.18 |
| MaxDD | 0.304 | 0.144 | 0.136 | 0.436 |
| UPI | 0.54 | 1.65 | 1.18 | 0.12 |
| WINS36 | reference | 78% | 44% | 3% |

Monthly options are challenged in rapidly falling markets. It can be prohibitively expense to roll the puts forward and 2.5% per month is not much protection if the market is falling 10% per month!

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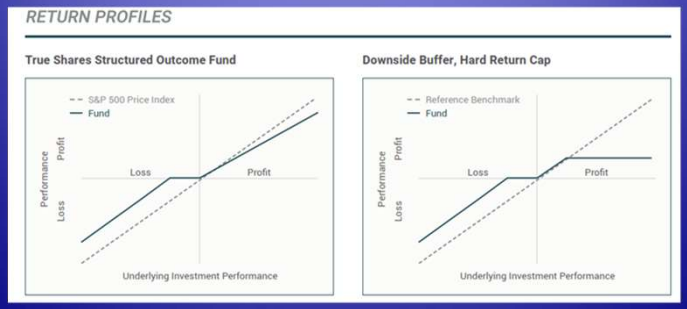
# Defined Outcome Option Strategies

Cost of downside protection is offset by lower upside participation (Swan, TrueShares) or by an upside cap (CLLZ, Innovator, First Trust.)

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# Everyone is a Bit Different!

| | SWAN | True Shares | First Trust | Innovator |
|---|---|---|---|---|
| Collateral | Sector ETFs | Buy Tbills, call; sell 90% put | Buy calls, ~ 0 strike price | Box spread, 9 options total |
| Downside Protection | ATM put | No downside before -10% | OTM put or a put spread | OTM put or a put spread |
| Upside Participation | Attenuated by cost of put; participation about 95% | Attenuated by cost of put; participation 70-85% | Capped by OTM call | Capped by OTM call |
| Strategy and Interval | Active, plus opportunistic trading of S/T options. | Passive, reconstituted annually on 1st of month. | Passive; reconstituted annually on 3rd Friday. | Passive, reconstituted annually at month-end. |
| Vehicle | MF and SMA | ETF | ETF | ETF |
| Tax Efficiency | Low? | S/B high | S/B high | S/B high |

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## Defined Outcome ETFs

- Innovator, TrueShares, First Trust, Allianz
- Expenses are about 0.8% annually
- FLEX options, reconstituted annually
- Available products (not all from one provider)
  - Monthly reconstitution dates
  - 9, 10, 15, 20 or 5-35% buffers
  - US or foreign stock index as underlying
  - 2x or 3x up, 1x down
- Cboe backtested returns for some products

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## Buffers and Caps are Gross of Fees and Net of Dividends, about 0.8 and 2% respectively

- If SPY is flat, the index plus fees is down 2.8%.
- 9% buffer protects against 9% decline in SPX at the end of one year, or 7% decline in SPY, but the investor is out the 0.8% expenses.
- 12% cap means the upside is limited to 11.2% if SPX has risen 12% or more at the end of one year, or if SPY has risen 14% or more.
- 30% buffer protects against losses in SPX over the range of 5.8 to 35.8%, or losses in SPY over the range of 3.8 to 33.8%. Better!

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## Defined Outcome Funds, net of estimated expenses. 2006 – 2020.

Source: EF Performance.xlsx

| Risky Portfolio | LrgCapUS | QQQ | Swan Large Cap | Cboe JAN Backtest | Cboe JAN Backtest |
|---|---|---|---|---|---|
| Optimization | Fixed Allocation | 64 Dilution | Active Option | Passive Option | Passive Option |
| Risk Free Asset | IGBond | IGBond | | | |
| Realized SD | 0.0055 | 0.0051 | 0.0052 | 0.0053 | 0.0041 |
| Buffer | | | | 0 – 15% | 5 – 35% |
| CAGR | 7.73% | 9.79% | 6.90% | 4.97% | 4.68% |
| Sharpe | 0.78 | 1.07 | 0.72 | 0.43 | 0.58 |
| MaxDD | 0.304 | 0.136 | 0.136 | 0.353 | 0.198 |
| UPI | 0.89 | 1.28 | 1.28 | 0.43 | 0.70 |
| WINS36 | Reference | 83% | 23% | 1% | 23% |

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## Interim Returns Lag, and Can Pierce the Downside Buffer (BJAN, 12/24/20)

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## Interim Returns Lag, and Can Pierce the Downside Buffer (BJAN, 12/24/20)

## More sedate with larger buffers (UJAN)

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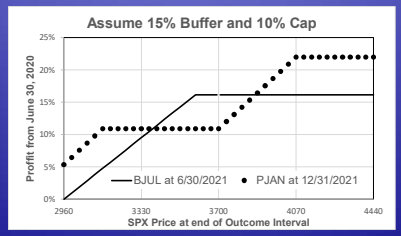
## Opportunistic Changes. Roll BJUL to New Fund on December 31, 2020?

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## Quarterly Rotation and Momentum 2006 – 2020

Source: EF Performance.xlsx

| | Cboe JAN SPFR01 (PJAN) 0 – 15% Buffer | | | Cboe JAN SPRS01 (UJAN) 5 – 35% Buffer | | |
|---|---|---|---|---|---|---|
| Optimization | | Quarterly Rotation | 1-month Momentum | | Quarterly Rotation | 1-month Momentum |
| Realized SD | 0.0053 | 0.0051 | 0.0052 | 0.0041 | 0.0038 | 0.0043 |
| CAGR | 4.97% | 5.67% | 4.38% | 4.68% | 4.45% | 4.02% |
| Sharpe | 0.49 | 0.59 | 0.43 | 0.58 | 0.58 | 0.46 |
| MaxDD | 0.353 | 0.295 | 0.323 | 0.198 | 0.217 | 0.241 |
| UPI | 0.43 | 0.65 | 0.42 | 0.70 | 0.63 | 0.43 |
| WINS36 | 1% | 0% | 0% | 23% | 14% | 16% |

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## How Might These Strategies Perform in the Future?

Vanguard 10-yr Median Return Forecasts (as of Sep 30, 2020, released Dec 2020)

| | Median Forecast | 2000 – 10/2020 |
|---|---|---|
| US Equities | 4.7 ± 16.9% | LrgCapUS: 5.8 ± 15.1% |
| Global Equities | 8.0 ± 18.6% | Foreign: 2.6 ± 16.8% |
| US REITs | 4.3 ± 19.5% | RE: 9.8 ± 20.8% |
| US Bond Aggregate | 1.2 ± 4.0% | IGBond: 4.5 ± 3.5% |
| US Inflation | 1.4 ± 2.4% | CPI-U: 000 ± 000% |

Note lower RE and bond returns, higher global equity returns.

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## Tbills as Surrogate for a Low Interest Rate Environment, 2000 –2020.

| Case # / Optimization | Fixed Allocation | 57 Dilution | Fixed Allocation | 63 Dilution |
|---|---|---|---|---|
| Risky Asset | LrgCapUS | LrgCapUS | LrgCapUS | LrgCapUS |
| Risk-Free Asset | Tbills | Tbills | Tbills | Tbills |
| Realized SD | 0.0019 | 0.0018 | 0.0057 | 0.0052 |
| CAGR | 2.69% | 2.83% | 4.78% | 5.07% |
| Sharpe | 0.39 | 0.46 | 0.39 | 0.46 |
| MaxDD | 0.114 | 0.058 | 0.336 | 0.207 |
| MaxDD w/ IGBond | 0.064 | 0.035 | 0.304 | 0.175 |
| UPI | 0.45 | 0.66 | 0.31 | 0.42 |
| Tbills Allocation | 80% | 78% | 40% | 35% |
| WINS36 | Reference | 82% | Reference | 83% |

Drawdowns increased on changing from IGBond to Tbills. Active control of volatility by Dilution provided consistently higher returns.

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## Possible Effects of Low Interest Rates – Speculation!

- Traditional fixed allocation strategies will produce lower returns with larger drawdowns.
- Dilution strategies may continue to provide better returns and drawdowns.
- Relative performance of option strategies may improve.

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## References


- "Sophisticated Portfolios for Conservative Investors," especially the appendices describing efficient frontier simulations and defined outcome ETFs.

  The EXCEL spreadsheet "Curated Data"

  Both are available at www.lingane.com/qi.
- February 2020 Webinar with Graham Day and Wes Matthews. www.innovatoretfs.com/webinars/
- "Cboe S&P500 Buffer Protect Index Series, December 2016." This article describes the methodology underlying First Trust's BUFR exchange traded fund.
- "Investing Redefined: A Proven Investment Approach" by Randy Swan, River Grove Books, 2019.


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## Conclusions I

In the Past ….

- The Conservative investor has been best served by the 20:80 portfolio.
- The Moderate investor has been best served by the Dilution strategy with a 0.005 SD goal.

  While MinVar and MaxSharpe strategies did about as well as Dilution, relative strength is disappointing and they are more complex to implement.
- The SPVOL and Macquarie allocation algorithms should be compared to these results.

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## Conclusions II

- Swan Global Investments' Large Cap active option strategy had the same volatility as the 60:40 portfolio and the Dilution strategy.

  Swan provided a lower drawdown and a larger CAGR than the 60:40 portfolio but the relative strength plot is unsatisfactory.

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## Conclusions III

- Defined Outcome ETFs, bought and held, provided lower drawdowns and lower returns than the 60:40 portfolio.

  The 30% buffer strategy has been less volatile than the 15% strategy and has provided better statistics.

  There may be trading opportunities.

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## Conclusions IV

- For the future ….

  Active strategies adjust bond allocations to control volatility.

  Active strategies are likely to be less effective when interest rates are low, but relative performance vs. a fixed bond allocation may be unchanged.

  The relative performance of option strategies may improve in a low interest rate environment.

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## Thank you for your attention.

- Slides and text are available at www.lingane.com/qi
- Questions?

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