AN UPDATE TO CLIFF ASNESS'S STUDY ON THE BENEFITS OF A LEVERED 60/40

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Upon launching the WisdomTree U.S. Efficient Core Fund (NTSX), previously referred to as the WisdomTree 90/60 U.S. Balanced Fund, we updated some of the seminal research from Cliff Asness on the diversification benefits that come from applying leverage to a traditional 60/40 portfolio approach. Today, we are excited to launch international and emerging markets versions of these strategies with the WisdomTree International Efficient Core Fund (NTSI) and the WisdomTree Emerging Markets Efficient Core Fund (NTSE). While this piece focuses on U.S. markets, our research has shown similar results outside of the U.S.

Additionally, while there is a new mantra that academic studies fail to replicate after researchers publish their findings, what was interesting was that in the 25 years after Asness published his paper, the results actually improved!

We now have another three years since the launch of the WisdomTree U.S. Efficient Core Fund to test out how this strategy works in real time—in addition to the research and historical hypotheticals.

Primer on the Research

In Asness's 1996 piece, titled *"Why Not 100% Equities: A diversified portfolio provides more expected return per unit of risk,"* one of his core arguments was that an "investor willing to bear the risk of 100% equities can do even better with a diversified portfolio."

Asness showed how the use of leverage, which we discuss below, when applied to a traditional 60/40 strategy, could achieve a similar volatility as the 100% equity exposure but could help improve the return.

Asness's paper, based on data from 1926 through 1993, applied a 155% leverage rate to a 60/40 portfolio (applied monthly), where the borrowing rate used for leveraging his 60/40 portfolio was done at a cost of financing by the one-month t-bill rate. This is a table from his paper:

Figure 1: Return and Volatility Table from Asness's "Why *Not* 100% Equities" Paper

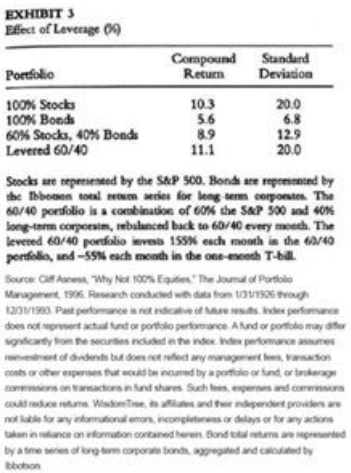

EXHIBIT 3
Effect of Leverage (%)

Portfolio	Compound Return	Standard Deviation
100% Stocks	10.3	20.0
100% Bonds	5.6	6.8
60% Stocks, 40% Bonds	8.9	12.9
Levered 60/40	11.1	20.0

Stocks are represented by the S&P 500. Bonds are represented by the Ibbotson total return series for long-term corporates. The 60/40 portfolio is a combination of 60% the S&P 500 and 40% long-term corporates, rebalanced back to 60/40 every month. The levered 60/40 portfolio invests 155% each month in the 60/40 portfolio, and −55% each month in the one-month T-bill.

Source: Cliff Asness, "Why Not 100% Equities," The Journal of Portfolio Management, 1996. Research conducted with data from 1/31/1926 through 12/31/1993. Past performance is not indicative of future results. Index performance does not represent actual fund or portfolio performance. A fund or portfolio may differ significantly from the securities included in the index. Index performance assumes reinvestment of dividends but does not reflect any management fees, transaction costs or other expenses that would be incurred by a portfolio or fund, or brokerage commissions on transactions in fund shares. Such fees, expenses and commissions could reduce returns. WisdomTree, its affiliates and their independent providers are not liable for any informational errors, incompleteness or delays or for any actions taken in reliance on information contained herein. Bond total returns are represented by a time series of long-term corporate bonds, aggregated and calculated by Ibbotson

The Asness Research vs. the WisdomTree Efficient Core Approach

While aspects of the two are similar, there are, of course, some very important differences between the approach of the WisdomTree U.S. Efficient Core Fund, and its targeted exposures, and the research that Asness published.

The similarities between the two strategies come from the equity exposures. The large-cap "equity beta" exposure in

NTSX targets S&P 500-like returns and, as such, overlaps what we see in Asness's piece. However, there are more distinct differences on the bond exposure side of the equation.

Asness showed returns for bonds using the long-term corporate series from Ibbotson, funding these bond returns by borrowing at the one-month t-bill rate so an investor could earn both credit and duration premiums over the t-bill rate.

Bond Futures vs. Corporates

WisdomTree is implementing bond exposure in the WisdomTree U.S. Efficient Core Fund through laddered Treasury bond futures. No one earns "credit risk" premiums through this Treasury bond futures exposure, so there is less additional income to be earned from that perspective.

Although there are very important differences between our strategy implementation and the Asness study, we think that study is very useful in understanding the market dynamics at work in a levered 60/40 approach.

In a previous blog post, we showed an update of the Asness research in the 24 years after his first publication.

Now we update that to extend through 2020 and show how NTSX has compared to his simulations.

Our calculations use the same Ibbotson data series and methodology: borrowing -55% at the one-month t-bill rate that finances the 155% exposure every month in the 60/40 mix of S&P 500 and the Ibbotson corporate bond series. Our independent calculation of Asness's test showed the same compound return figures.

Figure 2: WisdomTree's Replication of Asness's Results (1/31/1926–12/31/1993)

Asness Replication, 1/31/1926-12/31/1993

Portfolio	Annualized Total Return	Annualized Volatility
100% Stocks	10.3%	20.0%
100% Bonds	5.6%	6.8%
100% Cash	3.7%	0.9%
60% Stocks, 40% Bonds	8.9%	12.9%
Levered 60/40	11.1%	20.0%

Extended, 1/31/1926-4/30/2021

Portfolio	Annualized Total Return	Annualized Volatility
100% Stocks	10.4%	18.7%
100% Bonds	6.1%	7.6%
100% Cash	3.3%	0.9%
60% Stocks, 40% Bonds	9.1%	12.1%
Levered 60/40	11.7%	18.8%

Extension, 1/1/1994-4/30/2021

Portfolio	Annualized Total Return	Annualized Volatility
100% Stocks	10.4%	14.9%
100% Bonds	7.2%	9.3%
100% Cash	2.3%	0.6%
60% Stocks, 40% Bonds	9.5%	10.0%
Levered 60/40	13.1%	15.5%

Source: WisdomTree. Past performance is not indicative of future results. You cannot invest directly in an index. Index performance does not represent actual fund or portfolio performance.

For definitions of terms in the chart, please visit our glossary.

When we updated the figures for the next 27-plus years, we saw that stocks returned generally in line, but we also saw lowering equity volatility. While the compounded S&P 500 returns ticked up 10 basis points (bps) from 10.3% to 10.4% when updated through 2021, the bonds' compounded returns ticked 160 bps higher, from 5.6% to 7.2%, so a 60/40 portfolio increased by 20 basis points from 8.9% to 9.1%.

Because cash rates generally also ticked down over the 27-year period after Asness published the paper, the levered 60/40 returns using Asness's assumptions/calculations ticked up 200 basis points from 11.1% to 13.1% when updated to 2021, and the spread between 100% equities and the levered 60/40 widened out from 80 bps at the time of his original study to 130 bps over the full 1926–2021 period. When people publish research, often the research itself gets a reputation of "failing to replicate out of sample."

Asness's study, and the levered 60/40 portfolio utilizing the same approach he outlined in the paper, actually saw portfolio returns outperform in the following 27-year period compared to its historical back test. The levered 60/40 portfolio returned 13.1% for the 1994–2021 period, 270 bps ahead of the 100% equity line, compared with only 80 bps during his original test.

WisdomTree's Live Fund out of Sample Results

While replicating Asness's research has been instructive as to the potential for this strategy, how did NTSX fare in real time?

In short, NTSX outperformed 100% stocks by 1.61% per year with lower volatility and drawdowns. While it lagged the hypothetical levered 60/40 by nearly 3% per year, this was primarily a function of much longer duration for their fixed income position and credit over-weights versus NTSX.

During periods of rising rates, we would expect NTSX to add value compared to the levered 60/40 hypothetical approach quoted in the Asness study. Additionally, we believe that Treasuries may be a better diversifier than corporate credit in helping to dampen equity volatility.

	Average Annual Total Returns as of 4/30/21			Full Period Statistics	
Strategy	YTD	1 year	Since WT Fund Inception*	Volatilty	Maximum Drawdown
WisdomTree U.S. Efficient Core Fund (NAV)	7.52%	37.90%	18.45%	16.70%	-14.46%
WisdomTree U.S. Efficient Core Fund (Market Price)	7.28%	37.59%	18.47%	16.70%	-14.46%
100% Stocks	11.84%	45.98%	16.84%	21.30%	-19.60%
100% Bonds	-8.27%	-1.95%	9.31%	11.20%	-11.64%
100% Cash	0.01%	0.08%	1.23%	0.50%	N/A
60% Stocks, 40% Bonds	3.46%	25.00%	14.36%	14.00%	-12.30%
Levered 60/40	5.32%	40.36%	21.37%	21.60%	-18.89%

Source: WisdomTree, as of 4/30/21

Performance is historical and does not guarantee future results. Current performance may be lower or higher than quoted. Investment returns and principal value of an investment will fluctuate so that an investor's shares, when redeemed, may be worth more or less than their original cost. Performance data for the most recent month-end is available at wisdomtree.com.

WisdomTree shares are bought and sold at market price (not NAV) and are not individually redeemed from the Fund. Total returns are calculated using the daily 4:00 p.m. EST net asset value (NAV). Market price returns reflect the midpoint of the bid/ask spread as of the close of trading on the exchange where Fund shares are listed. Market price returns do not represent the returns you would receive if you traded shares at other times.

For standardized performance of NTSX, please click here.

Current Equity vs. Bond Debates

Right now, one of the core asset allocation conundrums remains: Interest rates generally are still near their lowest levels, and, as such, one doesn't earn as much from bonds as in the past. Similarly, equity valuations are extended from historical levels, so forward-looking equity returns are also lower than normal.

The conundrum for traditional asset allocators, however, is that equity premiums (how much compensation stocks are offering over relatively "safe" assets like bonds) are likely still favoring stocks in asset allocation models.

Professor Jeremy Siegel, under whom I have studied extensively, believes the current equity premium over bonds is more than 5%, whereas his work over the last 200 years shows the real equity premium was closer to 3% historically.

Shifting bond exposures to equities, which have higher volatilities, when they are at high valuations is not easy to do. Substituting some of the traditional equities with a package of equities that also increases bond exposure could perhaps help solve one of these key asset allocation debates facing investors: stocks or bonds? Why not both for the same dollar invested?

Important Risks Related to this Article

There are risks associated with investing, including possible loss of principal.

Risks related to NTSX, NTSE and NTSI: While the Funds are actively managed, their investment processes are expected to be heavily dependent on quantitative models, and the models may not perform as intended. Equity securities, such as common stocks, are subject to market, economic and business risks that may cause their prices to fluctuate. The Funds invest in derivatives to gain exposure to U.S. Treasuries. The return on a derivative instrument may not correlate with the return of its underlying reference asset. The Funds' use of derivatives will give rise to leverage, and derivatives can be volatile and may be less liquid than other securities. As a result, the value of an investment in the Funds may change quickly and without warning, and you may lose money. Interest rate risk is the risk that fixed income securities, and financial instruments related to fixed income securities, will decline in value because of an increase in interest rates and changes to other factors, such as perception of an issuer's creditworthiness.

Additional risks specific to NTSI: Investments in non-U.S. securities involve political, regulatory and economic risks that may not be present in U.S. securities. For example, foreign securities may be subject to risk of loss due to foreign

currency fluctuations, political or economic instability, or geographic events that adversely impact issuers of foreign securities.

Additional risks specific to NTSE:
Investments in non-U.S. securities involve political, regulatory and economic risks that may not be present in U.S. securities. For example, foreign securities may be subject to risk of loss due to foreign currency fluctuations, political or economic instability, or geographic events that adversely impact issuers of foreign securities. Investments in securities and instruments traded in developing or emerging markets, or that provide exposure to such securities or markets, can involve additional risks relating to political, economic or regulatory conditions not associated with investments in U.S. securities and instruments or investments in more developed international markets.

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For more investing insights, check out our Economic & Market Outlook

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You cannot invest directly in an index.

DEFINITIONS

Diversification : A risk management strategy that mixes a wide variety of investments within a portfolio.

60/40 Portfolio : A portfolio of 60% equities and 40% fixed income.

Leverage : Total assets divided by equity. Higher numbers indicate greater borrowing to finance asset purchases; leverage can tend to make positive performance more positive and negative performance more negative.

Volatility : A measure of the dispersion of actual returns around a particular average level. .

Treasury Bill : A treasury bill (T-Bill) is a short-term debt obligation backed by the U.S. government with a maturity of one month (four weeks), three months (13 weeks) or six months (26 weeks).

Large-Capitalization (Large-Cap) : A term used by the investment community to refer to companies with a market capitalization value of more than $10 billion. Large cap is an abbreviation of the term "large market capitalization". Market capitalization is calculated by multiplying the number of a company's shares outstanding by its stock price per share.

Beta : A measure of the volatility of a security or a portfolio in comparison to a benchmark. In general, a beta less than 1 indicates that the investment is less volatile than the benchmark, while a beta more than 1 indicates that the investment is more volatile than the benchmark.

S&P 500 Index : Market capitalization-weighted benchmark of 500 stocks selected by the Standard and Poor's Index Committee designed to represent the performance of the leading industries in the United States economy.

Duration : A measure of a bond's sensitivity to changes in interest rates. The weighted average accounts for the various durations of the bonds purchased as well as the proportion of the total government bond portfolio that they make up.

Futures/Futures Contract : Reflects the expected future value of a commodity, currency or Treasury security.

Corporate treasury : The funds of a corporation.

Ladder : A fixed income strategy that seeks equal allocations across the yield curve in order to limit reinvestment risk.

Credit risk : The risk that a borrower will not meet their contractual obligations in conjunction with an investment.

Basis point : 1/100th of 1 percent.

Drawdowns : Periods of sustained negative trends of return.

Valuation : Refers to metrics that relate financial statistics for equities to their price levels to determine if certain attributes, such as earnings or dividends, are cheap or expensive.