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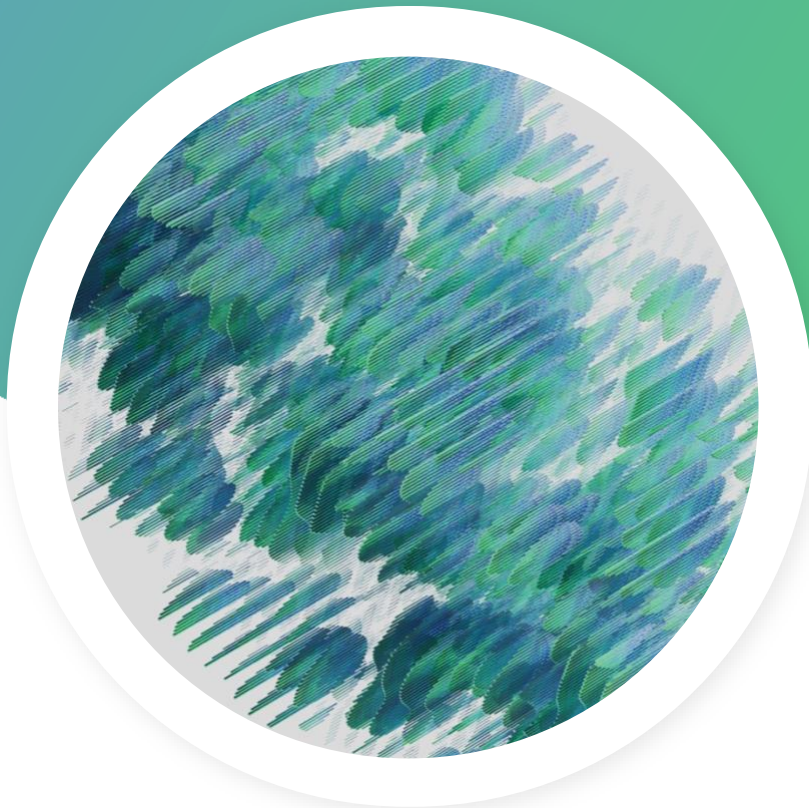## CASE STUDY:
AI for Tax Loss Harvesting on Steroids

September 2024

Tax Loss Harvesting on Steroids...

Taxable investors can enhance their after-tax returns by using AI to systematically harvest tax losses to offset capital gains while maintaining their portfolio's factor and ESG exposures, if any, maximize their tax alpha, minimize risk, and maintain net exposure. But as we will see, **Long-Only** investing offers limited tax alpha that typically declines rapidly after three years, while **Long-Short** investing is much more conducive to harvesting more tax losses, and potentially into perpetuity. We employ three systematic phases to portfolio, risk, and tax management, as follows:

Initial Trade

Lumenai executes an initial trades of buys and sells that are aligned with the client's goals. Portfolios can start with:
All cash
Existing securities

Optimize

Each day, accounts are reviewed and assigned for rebalance based on multiple criteria:
Available losses
Expiring ST losses
Last trade date

Rebalance

LUMENAI replaces securities with losses and replaces similar stocks to control tracking error.
Harvest losses
Reinvest excess cash
*Risk control*
Tilts control

- **Clear Tax Loss Harvesting Theory:** Understanding the fundamental principles is essential.

- **Rigorous Control Beyond Basics:** We implement a thorough approach that exceeds standard practices.

- **Strategy Adaptation:** Customization of approaches based on specific strategy requirements.

- **Clustering Techniques:** Individual or block substitution of securities using advanced clustering methods.

- **Tax Payment Condition Adaptation:** Tailoring strategies to the tax conditions of each country or state.

- **Continuous Optimization:** Demonstrating that optimization is an ongoing process, not just an end-of-year activity.

- **Real experience:** Already working for all of our clients that requested it.

Tax Loss Harvesting – Not an Exact Science

What can we expect? TLH may be substantially greater when the underlying investments in a portfolio have higher volatility, and when the investments have higher cross-sectional dispersion of returns. This is not an exact science, and there will be certain years where outcomes heavily depend on market conditions.
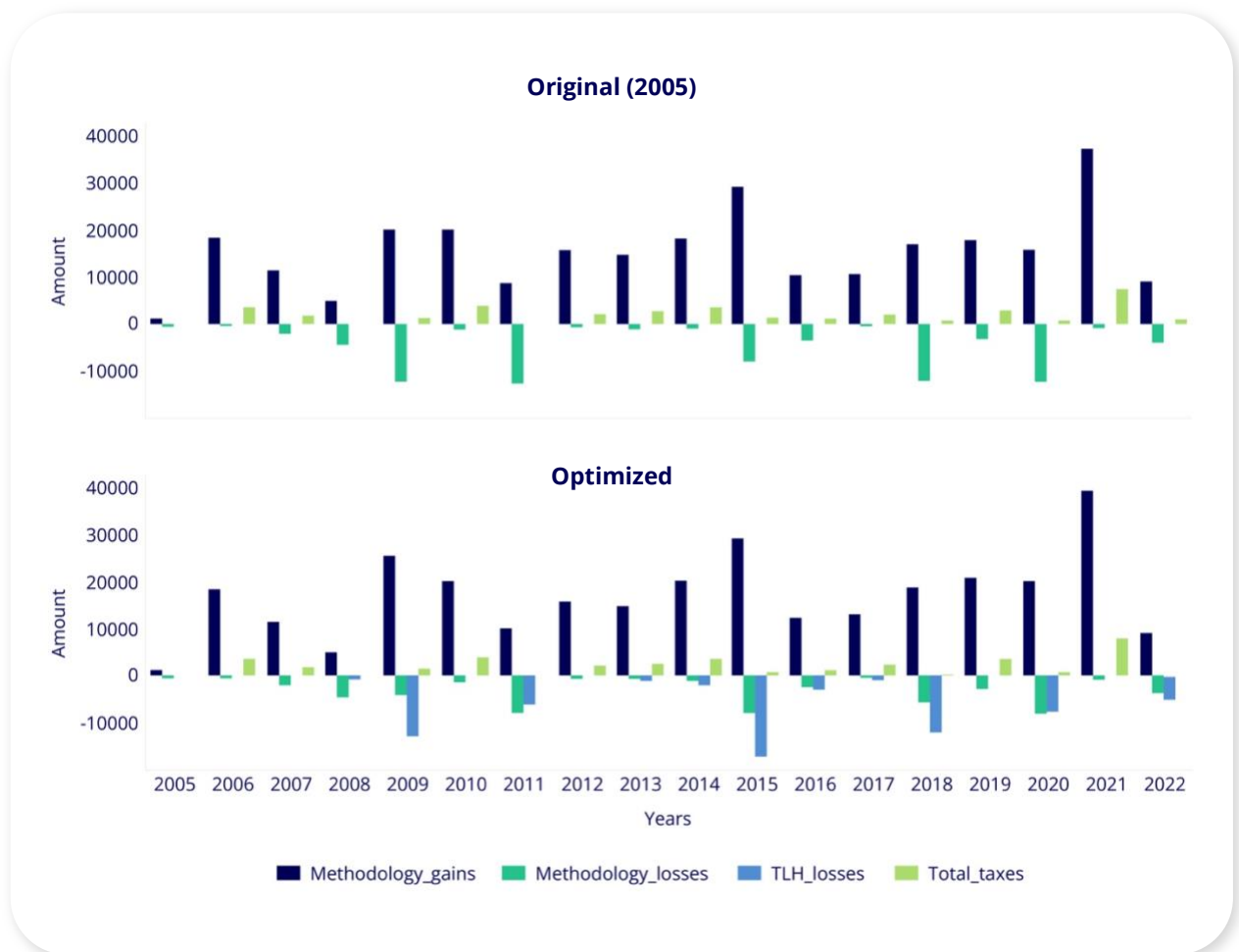
Source: Lumenai and ETS estimates. The performance above is from 1/1/16 to 8/5/24. Its numbers are estimated, unaudited, net of management fees, and subject to change. Assumes 0% risk free rate. Please note there is no guarantee that Lumenai will be successful in achieving the historical returns shown above. Your returns may be lower and maximum drawdown may be larger. Read about the risks of simulated performance in the section "Important Disclaimers."

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Portfolio Comprising	Volatility	Dispersion	TLH Opportunities
Stocks	High	High	High
Bonds	Low	Low	Lower
Equity ETFs	Medium	Low	Lower
Equity Mutual Funds	Medium	Low	Lower
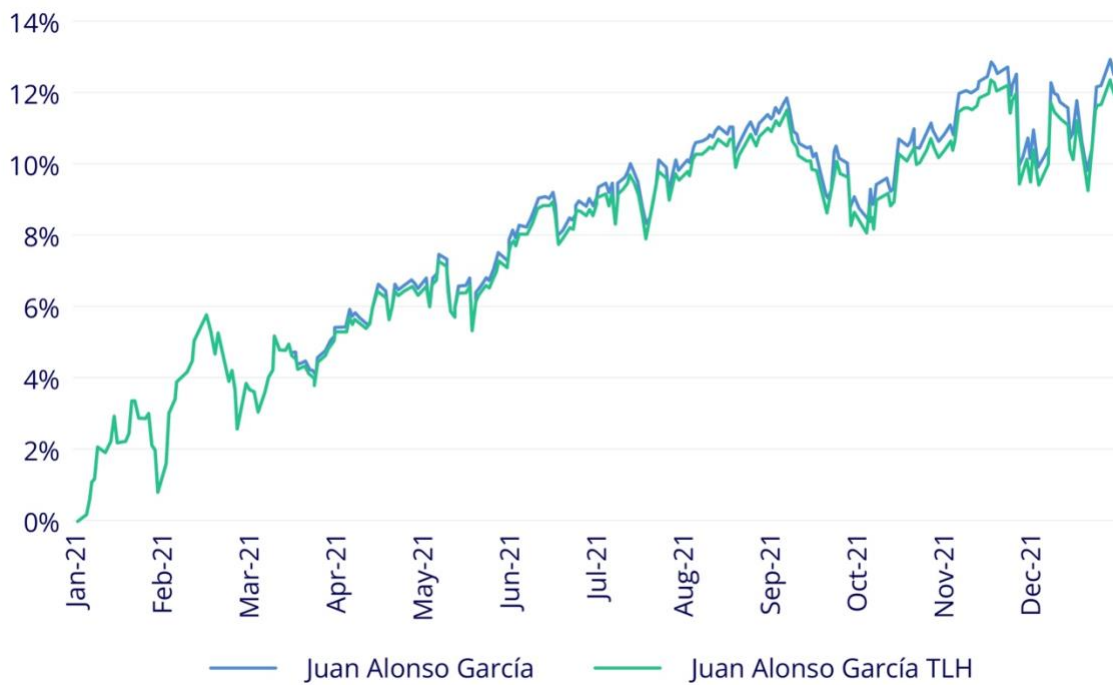
Legend: Juan Alonso García — Juan Alonso García TLH

Source: Lumenai and ETS estimates. The performance above is from 1/1/16 to 8/5/24. Its numbers are estimated, unaudited, net of management fees, and subject to change. Assumes 0% risk free rate. Please note there is no guarantee that Lumenai will be successful in achieving the historical returns shown above. Your returns may be lower and maximum drawdown may be larger. Read about the risks of simulated performance in the section "Important Disclaimers."

Tax Loss Harvesting – Long Oxidation

Something many people don't mention is that in long-only portfolios, there's a clear process of 'deterioration' where tax-loss harvesting becomes almost ineffective.
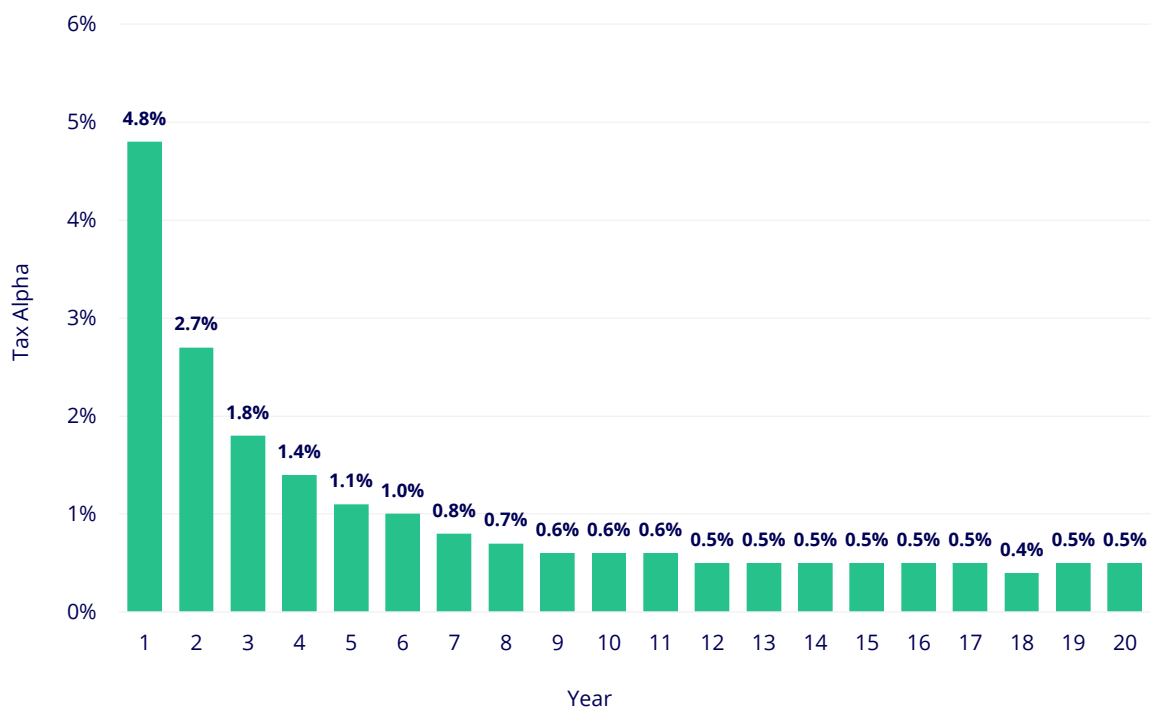
However, in long-short strategies, these projections of tax credits are highly improvable. Our strategy at Lumenai is optimized so that the long side has low turnover, aiming for positions to be taxed at long-term capital gains rates, while the short side is very active in consistently harvesting losses.

Tax Loss Harvesting – Long-Short Stable Oxidation

"Tax-aware long-short" offers far more tax loss harvesting (TLH) opportunities, over far longer periods of time than "long-only with TLH" or "tax-agnostic long-short". Over a three-year period, AQR estimates below that tax-aware long-short investing can harvest up to -136% net of initially invested capital in net realized capital losses, whereas the tax-agnostic long-short harvests only -12% net.

Tax-Aware Long Short Realizes 11X More Net Losses

Exhibit 1
Three-Year Cumulative Gains and Losses Realized by the strategies, as Percentage of Initially Invested Capital
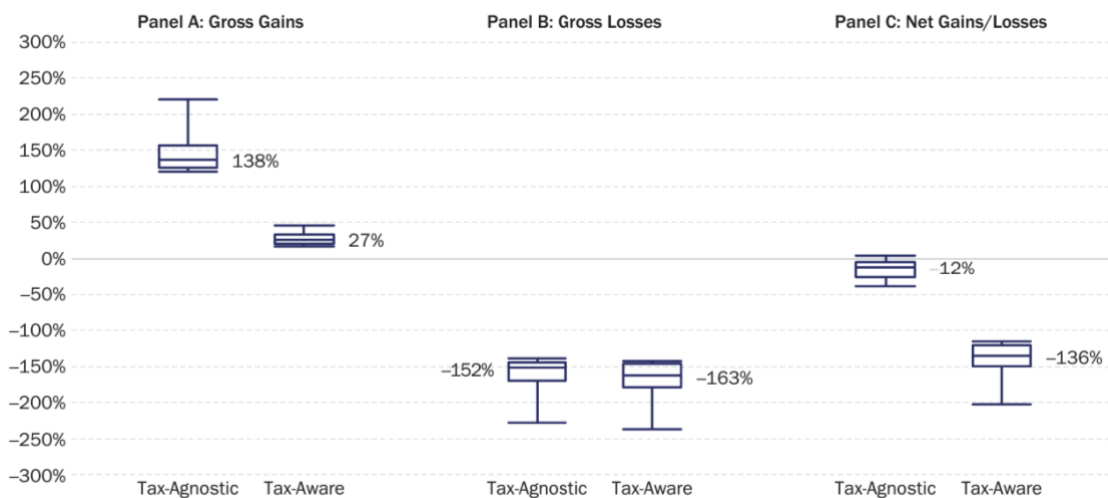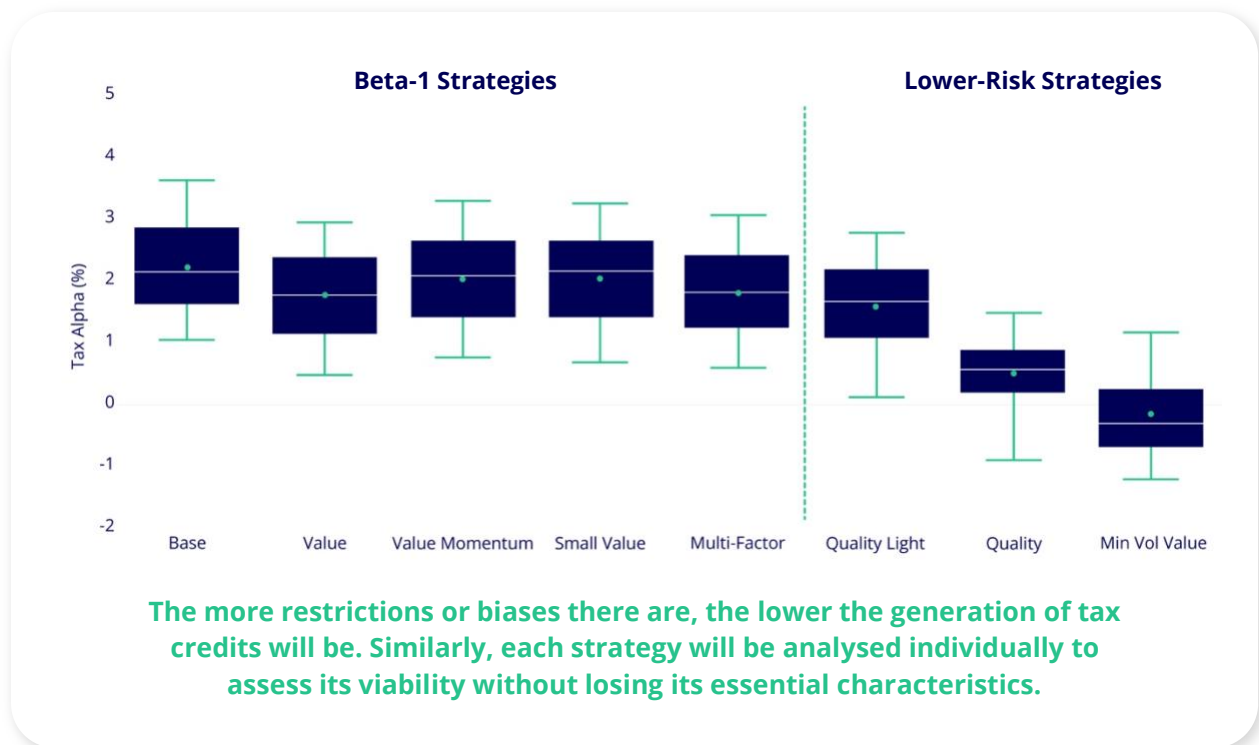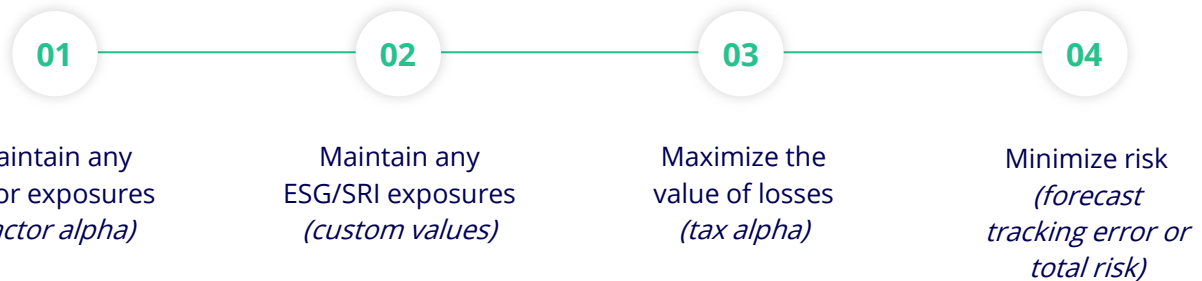

Notes: This exhibit show total aggregate gains and losses realized during the first three years since inception as a percentage of initially invested capital. The boxes show the 25th, 50th, and 75th percentiles of aggregate gains and losses across 34 three-year-long vintages and the whiskers show their 10th and 90th percentiles.

Source: Stanley Krasner and Nathan Sosner of AQR, "Loss Harvesting or Gain Deferral? A Surprising Source of Tax Benefits of Tax-Aware Long-Short Strategies", The Journal of Wealth Management. Please note there is no guarantee that Lumenai will be successful in achieving the historical returns or tax realizations referenced above. Your returns may be lower, net tax liabilities may be higher, maximum drawdown may be larger. Read about the risks of simulated performance in the section " Important Disclaimers."

Tax Loss Harvesting and Maintaining Portfolio Exposures...

Tax-managed Factor Tilts and/or ESG/SRI balance these objectives:

01
Maintain any
factor exposures
(factor alpha)

02
Maintain any
ESG/SRI exposures
(custom values)

03
Maximize the
value of losses
(tax alpha)

04
Minimize risk
*(forecast
tracking error or
total risk)*

The more restrictions or biases there are, the lower the generation of tax credits will be. Similarly, each strategy will be analysed individually to assess its viability without losing its essential characteristics.

Source: Lumenai and ETS estimates. The performance above is from 1/1/16 to 8/5/24. Its numbers are estimated, unaudited, net of management fees, and subject to change. Assumes 0% risk free rate. Please note there is no guarantee that Lumenai will be successful in achieving the historical returns shown above. Your returns may be lower and maximum drawdown may be larger. Read about the risks of simulated performance in the section "Important Disclaimers."

Summary

- A tax-loss harvesting strategy generates losses that can be used to lower a client's tax bill.

- Our long/short strategy, due to its inherent structure, can have a significant advantage in optimization thanks to its market independence. Additionally, our long-short strategy should be able to generate more tax losses over much longer periods of time than long-only portfolios and generate much more tax efficiency than similar tax-agnostic long-short strategies.

	Quintile				
	1	2	3	4	5
Average Index Return (%)	3.0	8.2	12.5	15.1	17.1
Average Tax Alpha (%)	2.5	1.8	1.2	1.0	0.9

- Oxidation is the term we use to describe older portfolios for which the amount of TLH has declined.

- As tax benefit extraction becomes increasingly complex, measures such as reinvesting cash from dividends, regular flows, or corporate action payments can be employed to enhance tax efficiency.

- TLH is greater when done throughout the year (versus just at year end) due to increased opportunities.

- The more restrictions there are, the more complex it becomes to achieve effective optimization.

Appendix:

Tax loss harvesting (TLH) is a strategy used by investors to minimize their tax liability by selling securities at a loss to offset capital gains. While it is not driven by AI, we can use our system to aggressively harvest losses to increase after-tax returns.

By realizing losses (i.e. purposely selling stocks with losses), investors can reduce their taxable income, potentially lowering their tax bill. TLH can be applied to offset ordinary income, short-term capital gains, and long-term capital gains.

Here's how it works, including examples for each type of income:

For the highest earners in 2024, the federal tax rates are as follows:

Ordinary Income: The highest federal tax rate for ordinary income is 37%. This applies to taxable income over certain thresholds, depending on filing status. For example, for single filers, the 37% rate applies to income over $578,125.

Short-Term Capital Gains: Short-term capital gains are taxed as ordinary income, so the highest rate is also 37%.

Long-Term Capital Gains: The highest rate for long-term capital gains is 20%. Additionally, high-income individuals may be subject to the Net Investment Income Tax (NIIT) of 3.8%, making the effective rate 23.8% for some taxpayers.

These rates apply only to the federal level and do not account for state taxes, which vary by state and can affect the total tax liability.

Example:
- Investment portfolio generates 10% net returns
- And 3% in short term capital (ST) gains
- Ordinarily their after-tax (AT) return would be 10% - 3% = 7% net
- But we harvested another 5% in realized short-term capital losses (CL)

Resulting in an estimated after-tax return of 10% - 3% + 5% = **12% after tax net return**

The additional 2% TLH credits (5% tax loss credits minus the 3% in ST gains = 2% additional credits) can be used to offset gains elsewhere.

1. Offsetting Ordinary Income with Capital Losses

While capital losses are primarily used to offset capital gains, if the losses exceed the gains, up to $3,000 ($1,500 if married filing separately) of the excess losses can be deducted against ordinary income in a given tax year. Any remaining losses can be carried forward to future years.

Example:
- An investor realizes $10,000 in capital losses in a year but has no capital gains.
- They can use $3,000 of these losses to offset their ordinary income for that year, potentially reducing their taxable income and thus their tax liability.
- The remaining $7,000 in losses can be carried forward to offset gains or income in future years.

2. Short-Term Capital Losses to Offset Short-Term Capital Gains

Short-term capital gains are taxed at higher ordinary income rates. Short-term losses can be used to offset these gains directly, reducing the overall taxable gain and potentially the tax rate applied.

Example:
- An investor realizes $5,000 in short-term capital gains and $7,000 in short-term capital losses in the same year.
- The $7,000 loss can fully offset the $5,000 gain, leaving $2,000 in net losses.
- These $2,000 can then be used to offset other gains or up to $3,000 of ordinary income.

3. Long-Term Capital Losses to Offset Long-Term Capital Gains

Long-term capital gains are taxed at lower rates than short-term gains. Long-term losses can offset long-term gains, reducing the amount of gain subject to these rates.

Example:
- An investor realizes $15,000 in long-term capital gains and $10,000 in long-term capital losses in a year.
- The $10,000 in losses offsets part of the $15,000 in gains, leaving a net long-term gain of $5,000.
- This remaining gain will be taxed at the lower long-term capital gains rate.

Wash Sale Rule

It's important to note the wash sale rule, which disallows a tax deduction for a security sold at a loss if a substantially identical security is purchased within 30 days before or after the sale. Investors should be mindful of this rule to ensure that their tax loss harvesting strategies are valid.

Benefits of TLH

Tax Efficiency:
By reducing taxable gains, investors can lower their tax liability.

Portfolio Rebalancing:
TLH can provide an opportunity to rebalance a portfolio without incurring tax penalties.

Carryover Losses:
Unused losses can be carried forward to future years, providing tax benefits over time.

Considerations

Transaction Costs: The costs of buying and selling securities can reduce the benefits of TLH.
Investment Strategy: TLH should align with the investor's overall investment strategy and goals.

In summary, tax loss harvesting is a valuable tool for managing tax liabilities and improving after-tax returns. However, it should be executed carefully, considering rules like the wash sale rule and the investor's long-term strategy.

Mechanics of Tax Loss Harvesting in a Market-Neutral Strategy

1. Identify Losses:

- Long Positions: A loss occurs when a stock is sold for less than its purchase price. In a market-neutral strategy, losses in long positions can be realized for tax purposes.
- Short Positions: A loss occurs when the cost to close a short position (buying back the stock) is higher than the proceeds from selling it short. Realizing losses from short positions can also provide tax benefits.

2. Realizing Losses:

- Selling Long Positions at a Loss: The fund manager may sell a losing long position to realize a capital loss. This loss can offset gains elsewhere in the portfolio or other taxable income, reducing the overall tax liability.
- Closing Short Positions at a Loss: Closing a short position at a loss (when the stock price rises above the short sale price) also generates a capital loss, which can similarly offset gains.

3. Offsetting Gains and Losses:

- Short-Term and Long-Term Losses: Losses are categorized as short-term (assets held for one year or less) or long-term (assets held for more than one year). Short-term losses offset short-term gains, and long-term losses offset long-term gains. If losses exceed gains in either category, they can be used to offset gains in the other category.
- Carrying Over Losses: If losses exceed gains, up to $3,000 of excess losses can offset ordinary income each year. Remaining losses can be carried forward indefinitely to offset future gains.

4. Maintaining Market Neutrality:

- Replacement Securities: To maintain the market-neutral stance, the fund manager may replace sold securities with other securities that provide similar market exposure but are not substantially identical (to comply with the wash sale rule).
- Wash Sale Rule: This rule disallows the deduction of a loss on a security if a substantially identical security is purchased within 30 days before or after the sale. In a market-neutral fund, this requires careful planning to avoid disallowed losses while maintaining portfolio objectives.

5. Daily Trading and Tax Implications:

- Frequent Trading: In a fund that trades daily, frequent realization of gains and losses can complicate tax loss harvesting. The manager must carefully track the holding periods and potential losses to optimize the tax benefits.
- Tax Efficiency: The fund's overall tax efficiency depends on effectively managing gains and losses, considering transaction costs, and maintaining a market-neutral posture.

> *Example:*
> Suppose a market-neutral fund holds a long position in Stock A and a short position in Stock B:
>
> **Stock A:** Initially purchased at $100, now worth $80. Selling this position realizes a $20 loss.
>
> **Stock B:** Shorted at $100, now trading at $110. Closing this position realizes a $10 loss.

The manager sells Stock A to realize the $20 long-term capital loss and covers the short position in Stock B, realizing a $10 short-term capital loss. These losses can offset any gains within the fund or be carried over to future years.

Why Is Long-Short Better For Tax Loss Harvesting?

We believe long-short investing is a much better environment to harvest maximum tax losses to offset taxable gains due to the nature of shorts. Short positions can be more effective for harvesting capital losses than long positions due to several factors:

1. Unlimited Loss Potential on Shorts

- **Short Selling Mechanics:** When an investor shorts a stock, they borrow shares and sell them with the intention of buying them back at a lower price. However, if the stock price rises instead, the potential losses are theoretically unlimited because the price of a stock can rise indefinitely.
- **Frequent Realization of Losses:** In a rising market, short positions are more likely to incur losses as the stock prices increase. This makes it more frequent to realize losses from shorts, which can be used to offset gains from other investments or carried forward.

2. Higher Volatility in Short Positions

- **Volatility:** Stocks that are shorted often exhibit higher volatility, partly because they may be perceived as overvalued or subject to negative news. This volatility can lead to significant price movements, increasing the likelihood of substantial losses that can be harvested for tax purposes.
- **Opportunistic Loss Realization: The** volatility in shorted stocks allows for opportunistic harvesting of losses, as price spikes can be used to realize losses when the stock price moves against the short position.

3. Limited Upside in Long Positions

- **Long Position Dynamics:** When holding a long position, the maximum loss is limited to the initial investment (the stock price falling to zero), and any capital gains are realized only when the stock is sold. While losses can be realized if the stock price drops, they are capped by the initial investment amount.
- **Less Frequent Loss Realization:** In a generally rising market, long positions are more likely to appreciate in value, resulting in fewer opportunities to realize losses compared to short positions.

4. Use of Leverage in Short Selling

- **Leverage:** Short selling often involves leverage, as investors borrow shares to sell them. Leverage can amplify both gains and losses. Larger, amplified losses due to leverage can result in more significant tax loss harvesting opportunities compared to unleveraged long positions.
- **Strategic Use:** Investors in market-neutral or hedge fund strategies may actively use short selling as part of their investment strategy, providing more frequent opportunities to realize losses from short positions as part of regular portfolio management.

Conclusion

While both long and short positions can provide opportunities for tax loss harvesting, the nature of short selling—with its potentially unlimited loss, higher volatility, leverage, and strategic use in certain investment strategies—can lead to more frequent and potentially larger losses. These factors make short positions particularly effective for realizing losses that can offset gains and reduce overall tax liabilities.

Key Considerations

Transaction Costs: Frequent trading and tax loss harvesting can incur transaction costs that may offset some of the tax benefits.

Investment Strategy Alignment: The primary goal of the fund's strategy must align with tax loss harvesting activities, ensuring that tax considerations do not detract from the investment objectives.

Compliance: The fund must comply with tax regulations, such as the wash sale rule, to ensure that harvested losses are deductible.

Overall, tax loss harvesting in a market-neutral fund involves a sophisticated approach to managing both long and short positions, aiming to reduce tax liabilities while maintaining a balanced exposure to the market.

The above is for example purposes only and is not tax advice. Investors and advisors should seek qualified tax counsel before investing in this or any investment strategy.

For more information on Lumenai and its AI-powered investment solutions, visit **Lumenai.net.**

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The NASDAQ Composite Total Return is a stock market index that includes almost all stocks listed on the Nasdaq stock Exchange. The 60% MSCI World / 40% Barclays Aggregate Blend, or 60/40, assumes a 60% percent investment in the MSCI World Index and a 40% investment in Bloomberg Barclays US Aggregate Index. The 70% MSCI All Country World Index / 30% Bloomberg Barclays Aggregate Index, or 70/30, assumes a 70% investments in the MSCI All Country World Index and a 40% investment in the Bloomberg Barclays US Aggregate Index. The 50% DJ Dividend / 50% Barclays Aggregate, or 50/50, assumes a 50% percent investment in the DJ Dividend Index and a 50% investment in Bloomberg Barclays US Aggregate Index. The S&P 500 is a market-capitalization-weighted index of 500 leading publicly traded companies in the U.S. The MSCI All Country World Price Index is a stock index that tracks nearly 3,000 stocks in 47 developed and emerging market countries. The Eurostoxx 50 is a blue-chip index designed to represent the 50 largest companies in the eurozone. The Ibex 35 is a benchmark for the BME Spanish Exchange of the 35 most liquid stocks traded on the Spanish stock market.

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Alpha - Alpha is a measure of the active return on an investment, the performance of that investment compared with a suitable market index. An alpha of 1% means the investment's return on investment over a selected period of time was 1% better than the market during that same period; a negative alpha means the investment underperformed the market. Alpha, along with beta, is one of two key coefficients in the capital asset pricing model (CAPM) used in Modern Portfolio Theory (MPT) and is closely related to other important quantities such as standard deviation, R-squared, and

the Sharpe Ratio. Alpha is a measure of investing skill or the "uniqueness" of ones returns – and is therefore very valuable to investors.

Annualized Return - An annualized rate of return is calculated as the equivalent annual return an investor receives over a given period.

Artificial Intelligence (AI) - Artificial intelligence (AI) refers to the simulation of human intelligence by software-coded heuristics. Nowadays this code is prevalent in everything from cloud-based, enterprise applications to consumer apps and even embedded firmware. The year 2022 brought AI into the mainstream through widespread familiarity with applications of Generative Pre-Training Transformer. The most popular application is OpenAI's ChatGPT. The widespread fascination with ChatGPT made it synonymous with AI in the minds of most consumers. However, it represents only a small portion of the ways that AI technology is being used today. The ideal characteristic of artificial intelligence is its ability to rationalize and take actions that have the best chance of achieving a specific goal. A subset of artificial intelligence is machine learning (ML), which refers to the concept that computer programs can automatically learn from and adapt to new data without being assisted by humans. Deep learning techniques enable this automatic learning through the absorption of huge amounts of unstructured data such as text, images, or video.
Beta – In finance, the beta (β or beta coefficient) of an investment is a measure of the risk arising from exposure to general market movements as opposed to idiosyncratic factors. The market portfolio of all investable assets has a beta of exactly 1. A beta below 1 can indicate either an investment with lower volatility than the market, or a volatile investment whose price movements are not highly correlated with the market. An example of the first is a treasury bill: the price does not fluctuate significantly, so it has a low beta. An example of the second is gold. The price of gold fluctuates significantly, but not in the same direction or at the same time as the market. A beta greater than 1 generally means that the asset both is volatile and tends to move up and down with the market. An example is a stock in a big technology company.

Barclays Aggregate or Bloomberg Barclays US Aggregate - The Bloomberg Barclays US Aggregate Bond Index is a broad-based flagship benchmark that measures the investment grade, US dollar-denominated, fixed-rate, taxable bond market. The index includes Treasuries, government-related and corporate securities, fixed-rate agency MBS, ABS, and CMBS (agency and non-agency). The US Aggregate Index was created in 1986, with history backfilled to January 1, 1976.

Correlation – In statistics, correlation or dependence is any statistical relationship, whether causal or not, between two random variables. In the broadest sense correlation is any statistical association, though it commonly refers to the degree to which a pair of variables are linearly related. Familiar examples of dependent phenomena include the correlation between the physical statures of parents and their offspring, and the correlation between the price of a good and the quantity the consumers are willing to purchase, as it is depicted in the so-called demand curve. Correlations are useful because they can indicate a predictive relationship that can be exploited in practice. For example, an electrical utility may produce less power on a mild day based on the correlation between electricity demand and weather.

Drawdown or Maximum Drawdown - A drawdown is the measure of the decline from a historical peak in some variable (typically the total equity of a portfolio, fund, or a security), from its peak to its trough. The Maximum Drawdown is the largest drawdown a portfolio or fund experiences, from its high to low.

Excess Return – Excess returns are returns achieved above and beyond the return of a benchmark or proxy. Some of the most basic return comparisons include a riskless rate and benchmarks with similar levels of risk to the investment being analyzed.

iShares TBonds 1-3yrs – The iShares 1-3 Year Treasury Bond ETF (ticker "SHY") seeks to track the investment results of an index composed of U.S. Treasury bonds with remaining maturities between one and three years.

Maximum Drawdown – See Drawdown, above.

Machine Learning (ML) - Machine learning is the concept that a computer program can learn and adapt to new data without human intervention. Machine learning is a field of artificial intelligence (AI) that keeps a computer's built-in algorithms current regardless of changes in the worldwide economy.

MSCI ACWI Index is a commonly-used free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of developed and emerging markets. The MSCI ACWI consists of 46 country indexes comprising 23 developed and 23 emerging market country indexes. The developed market country indexes include: Australia, Belgium, Canada, Denmark, Finland, France, Germany, Hong Kong, Ireland, Israel, Italy, Japan, Netherlands, New Zealand, Norway, Singapore, Spain, Sweden, Switzerland, the United Kingdom and the United States. The emerging market country indexes include: Brazil, China, India, Indonesia, Korea, Malaysia, Mexico, Poland, Russia, South Africa, Taiwan, Thailand, Turkey and UAE.

Nasdaq Composite – The NASDAQ Composite is a stock market index that includes almost all stocks listed on the Nasdaq stock exchange. Along with the Dow Jones Industrial Average and S&P 500, it is one of the three most-followed stock market indices in the United States. The composition of the NASDAQ Composite is heavily weighted towards companies in the information technology sector.

Nasdaq-100 Index - The Nasdaq-100 Index is a "modified capitalization-weighted" index designed to track the performance of the 100 largest and most actively traded non- financial domestic and international securities listed on The Nasdaq Stock Market. To be included in the Index, a stock must have a minimum average daily trading volume of 100,000 shares. Generally, companies on the Index also must have traded on Nasdaq, or been listed on another major exchange, for at least two years.

Quantitative Finance - Quantitative finance, also known as mathematical finance or simply "quant", is a field of mathematics, concerned with mathematical modelling of financial markets.

R-Squared - R2 is the proportion of the variance in the dependent variable that is predictable from the independent variable(s). It provides a measure of how well observed outcomes are replicated by the model, based on the proportion of total variation of outcomes explained by the model. So, if the R2 of a model is 0.50, then approximately half of the observed variation can be explained by the model's inputs.

S&P 500 Index - The Standard & Poor's 500 Index is a capitalization-weighted index of 500 stocks intended to be a representative sample of leading companies in leading industries within the U.S. economy. The S&P 500 Index features 500 leading U.S. publicly traded companies, with a primary emphasis on market capitalization. The S&P 500 Index was launched in 1957 by the credit rating agency Standard and Poor's. The S&P is a float-weighted index, meaning the market capitalizations of the companies in the index are adjusted by the number of shares available for public trading. Because of its depth and diversity, the S&P 500 is widely considered one of the best gauges of large U.S. stocks, and even the entire equities market. You can't directly invest in the S&P 500 because it's an index, but you can invest in one of the many funds that use it as a benchmark, tracking its composition and performance.

Sharpe Ratio – In finance, the Sharpe ratio measures the performance of an investment (e.g., a security or portfolio) compared to a risk-free asset, after adjusting for its risk. It measures the risk-adjusted returns of an investment. It is defined as the difference between the returns of the investment and the risk-free return, divided by the standard deviation of the investment (i.e., its volatility). It represents the additional amount of return that an investor receives per unit of increase in risk. It was named after William F. Sharpe, who developed it in 1966.

Sortino Ratio - The Sortino ratio is a variation of the Sharpe ratio that differentiates harmful volatility from total overall volatility by using the asset's standard deviation of negative portfolio returns—downside deviation—instead of the total standard deviation of portfolio returns. Because the Sortino ratio focuses only on the negative deviation of a portfolio's returns from the mean, it is thought to give a better view of a portfolio's risk-adjusted performance since positive volatility is a benefit. The Sortino ratio is a useful way for investors, analysts, and portfolio managers to evaluate an investment's return for a given level of bad risk.

Standard Deviation – In finance, standard deviation is often used as a measure of the risk associated with price-fluctuations of a given asset (stocks, bonds, property, etc.), or the risk of a portfolio of assets (actively managed mutual funds, index mutual funds, or ETFs). Risk is an important factor in determining how to efficiently manage a portfolio of investments because it determines the variation in returns on the asset and/or portfolio and gives investors a mathematical basis for investment decisions. The fundamental concept of risk is that as it increases, the expected return on an investment should increase as well, an increase known as the risk premium. In other words, investors should expect a higher return on an investment when that investment carries a higher level of risk or uncertainty. When evaluating investments, investors should estimate both the expected return and the uncertainty of future returns. Standard deviation provides a quantified estimate of the uncertainty of future returns.

Total Net Return - Total net return or cumulative net return, when measuring performance, is the actual rate of return of an investment or a pool of investments after fees since the inception of the investment. Total return accounts for two categories of return: income including interest paid by fixed-income investments, distributions, or dividends and capital appreciation, representing the change in the market price of an asset.

VaR 95% - Value at risk (VaR) is a statistic that tries to quantify the extent of 95% of the possible financial losses within a firm, portfolio, or position over a specific time frame. Its a way to estimate the risk of potential losses for an investment in most conditions.

Volatility – Volatility is a statistical measure of the dispersion of returns for a given security or market index. In most cases, the higher the volatility, the riskier the security. Volatility is often measured by the standard deviation of returns of a security or market index.