

Leverage

WHITEPAPER

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In an environment of exceedingly low rates and historically low expected returns, investors are trying to find new ways to meet return expectations. One approach they may consider is actually quite old: the use of borrowed funds, or leverage. By using leverage, an investor can move beyond the constraints of the traditional efficient frontier in order to amplify their gains. However, leverage can also magnify losses and may introduce new risks to the portfolio.

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What is leverage?

At its core, leverage is the use of borrowed funds to make an investment. In other words, it is the debt-financed purchase of an asset (or a derivative of an asset). While our focus is on the use of leverage in investment portfolios, leverage is itself ubiquitous. Most companies use borrowed funds to finance projects, cover operating expenses, and accelerate growth. Using a mortgage to buy a home is an explicit form of personal leverage. In financial markets, participants can take advantage of a number of instruments and tools to create levered asset exposure. Doing so magnifies investment gains as well as losses. For leverage to be profitable, the asset in which the borrowed funds are invested must produce a rate of return that exceeds the cost of borrowing. Leverage can be achieved through explicit borrowing or investment in securities that facilitate leverage (e.g., derivatives).

Why leverage and why now?

With bond yields near record lows and equity valuations at historical highs, many investors are wary about forward-looking returns. For institutions with return targets, structuring a portfolio to achieve that target given current investment conditions means “moving up the risk curve.” This might include tilting the asset allocation toward riskier assets such as equities, investing more in illiquid or unproven “opportunistic” assets, etc. In many cases, this is driven by a reaction to the limited return potential on offer from most lower and medium risk assets instead of optimistic expectations for these assets. Such an approach generally means adding exposure to the parts of a portfolio that already represent the largest risk in those portfolios. However, leverage potentially offers an attractive alternative solution. The reasoning is two-fold.

First, leverage allows investors to allocate more to parts of their portfolio that provide diversification from a risk standpoint. For example, a common form of leverage is the “carry trade” whereby investors borrow funds at low, short-term interest rates and invest at higher, longer-term rates. While this adds risk to the overall portfolio, specifically in the form of interest rate risk, this is a different kind of risk than currently dominates the portfolios of many institutional investors.

Second, with rates at historically low levels, leverage can be implemented at historically cheap costs. Leverage is profitable so long as the return on levered assets exceeds the borrowing cost, and at the current level of rates, this hurdle is low. Further, with an upward sloping yield curve, the carry trade and similar forms of leverage are potentially quite attractive (putting aside concerns over increased interest rate risk for the moment). If the Federal Reserve (“Fed”) is going to manage the yield curve such that they keep short-term rates low for a prolonged period, leverage warrants consideration.

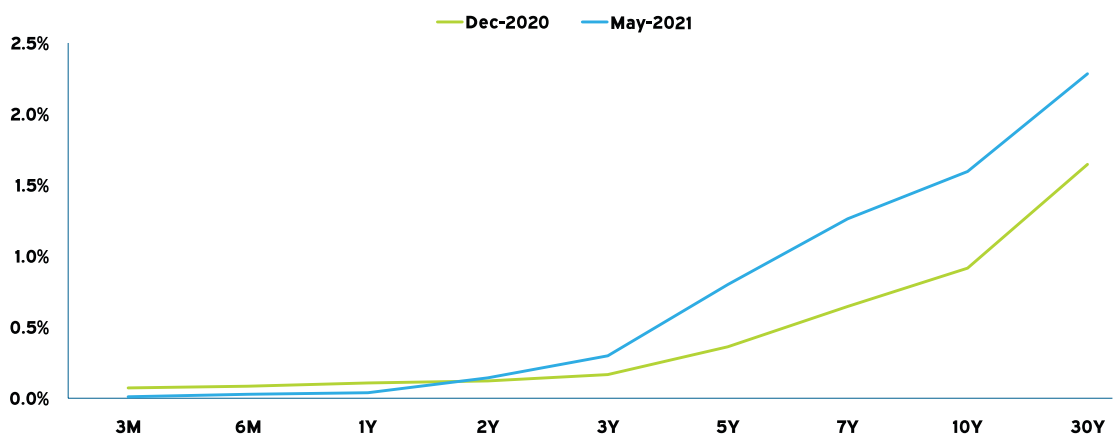


FIGURE 1
Yield Curve

Source: Bloomberg Data as of May 31, 2021.

Who uses leverage?

Many public companies utilize debt to help fund their operations. Private equity, real estate, and hedge fund strategies implement leverage to help aid in funding their investments or for buying property. Any portfolio that has exposure to equities, real estate, infrastructure, private equity, or hedge funds, has leverage embedded in it. Risk parity funds and portable alpha strategies likewise use leverage. Manager overlay strategies (e.g., equitizing cash to bring beta up to one) may act like leverage.

Explicit portfolio leverage is not as common, but it is implemented by some public funds and endowments.¹ In these cases, the fund-level leverage is typically between 10% and 20%.

¹ For example, Wisconsin (SWIB), Texas Teachers (TRS), Indiana (PRS), Pennsylvania (PSERS), Harvard (HMC), and Yale all use explicit leverage to some degree.

System Level (Explicit)	Manager/Fund Level (Implicit)	Security Level (Embedded)
Buy investments using borrowed funds	Common practice in hedge funds, private equity, and real estate investments. Hence, leverage is embossed in many of these vehicles by the GPs	Most corporations finance their operations with debt as well as shareholder equity
Buy investments using derivatives, putting down only a portion of the value as collateral ("margin")	Buy investments using borrowed funds, including from short sales	Most investments in shares of public equities thus have embedded leverage
Exposures exceed asset pool's capital	Buy investments using derivatives	Managers can choose to invest in more or less leveraged companies
Can incur losses that exceed total investment capital	Investors cannot lose more than amount they invested	

TABLE 1
Types of Leverage

Source: Meketa Investment Group.

Fund level leverage

Private markets managers have been using leverage in their strategies for decades. These asset classes have the benefit of not having to be marked-to-market or dealing with margin calls. Likewise, they generally have (or can have) long-term holding periods. The longer the time frame, the higher the likelihood of a successful execution of leverage usage.

Private Equity

Private equity funds often use leverage, particularly for buyout transactions. Buyout managers employ borrowed funds to acquire controlling interests in a company. Leverage levels used by buyout funds was previously much higher than it is currently, peaking at a little over 70% in the late 1990s. These proportions began to shift in the wake of the Global Financial Crisis ("GFC") of 2008, where leverage levels dipped to around 50%. During the recovery, buyouts had reached average leverage levels of 60-65% annually, though leverage has most recently retreated to an annual average of around 55%.

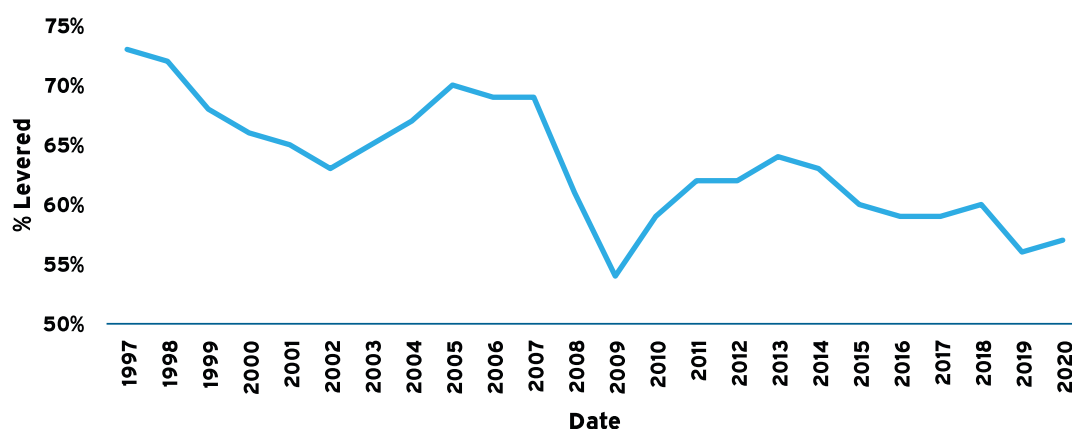


FIGURE 2
Average Leverage Levels
(All Buyouts)

Source: S&P Global Market Intelligence.

Real Estate

Real estate managers also borrow, in their case, to purchase property for investment. The amount of leverage utilized depends on the kind of strategy in which the real estate manager is engaged. The tiers of real estate strategies and general leverage used are as follows:

Strategy	Typical Leverage Range
Core	20 - 25%
Core+	25 - 35%
Value add and opportunistic	50-65%

TABLE 2
Types of Leverage

Source: Meketa Investment Group.

In a similar fashion to private equity, the GFC was a major turning point for leverage usage in real estate. In the early 2000s, leverage for core strategies hovered at about 15-20% before peaking to almost 35% during the GFC. After the recession, leverage leveled off to about 20-25%.

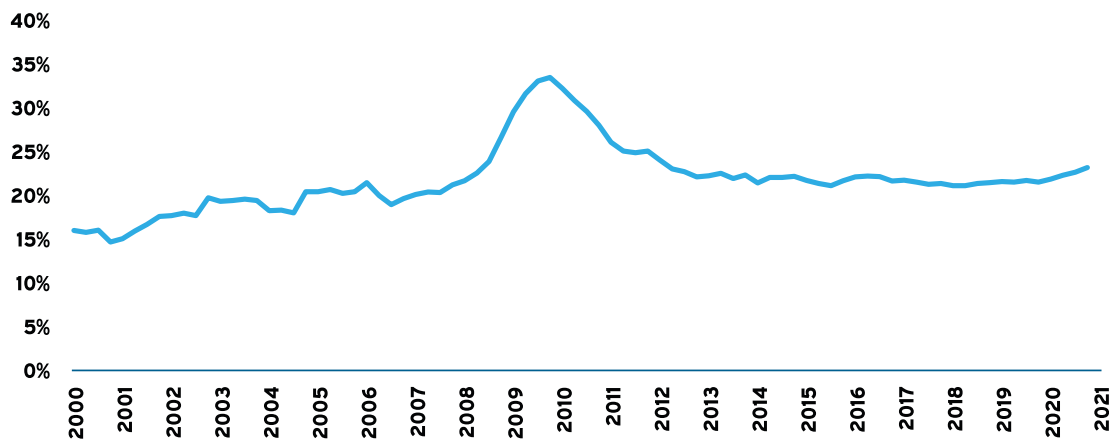


FIGURE 3
Level of Leverage for Core Real Estate

Source: NFI-ODCE Value-Weighted Real Estate Index.

Infrastructure and natural resources

Similar to real estate, infrastructure and natural resources funds implement leverage at a level that depends on the strategy. Core infrastructure funds, which tend to have fairly stable cash flows, will be 40-50% levered, with individual asset leverage reaching up to 80-90%. On the other hand, some opportunistic infrastructure strategies will have little to no explicit borrowing due to the uncertainty of future cash flows. For natural resources generally, leverage levels can be anywhere between 0-50%. Timberland and farmland leverage can behave similar to a mortgage, whereby steady income is used to service the debt.

Hedge funds

Like other strategies, hedge fund leverage tends to vary depending on the strategy. Fund managers make use of explicit borrowing or derivatives to amplify their returns or to reduce certain risks. Long-short equity and event-driven strategies tend to be the most conservatively levered, with multiples of 2x to 3x, while global macro leverage can reach up to 15x. On a fund-by-fund basis, the level of leverage depends on the liquidity of the underlying securities, the hedge fund's creditworthiness, and the comfort a bank has lending to the hedge fund. The tactical application of leverage may also depend on the off-setting of risks across a hedge fund's book of positions to manage the total level of risk.

Benefits of leverage

Modern Portfolio Theory ("MPT") provides a convenient framework for jointly assessing risk and return. MPT produces "efficient" portfolios in the form of asset class or security combinations that maximize expected return at a given level of risk. Introducing leverage into the MPT framework effectively expands the so-called "efficient frontier" and allows an investor to achieve the same expected return at a lower level of risk or a higher expected return with the same amount of risk.

Figure 4, below provides a standard rendering of the efficient frontier. Without leverage, an allocator can achieve any combination of expected risk and return along the curved line. For MPT, risk is typically measured as the standard deviation, or volatility, of returns. The capital market line represents the portfolios that optimally combines risk and return. Therefore, in the unlevered world, the best risk-return allocation is portfolio D, the point of tangency. Introducing leverage allows an investor to achieve portfolios that lie above the efficient frontier and otherwise would not be accessible. That is, an investor can construct portfolios that now have improved risk-return properties (or Sharpe ratios) over portfolio D – such as portfolios B and C.

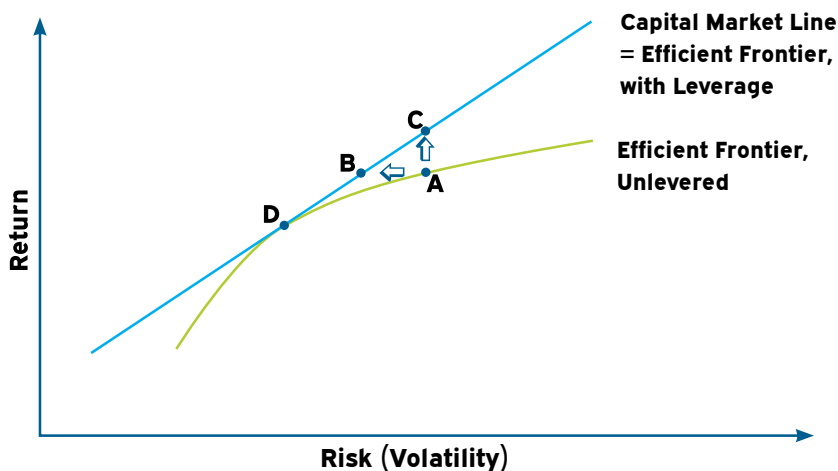


FIGURE 4
Efficient Frontier, with and without Leverage

Source: Meketa Investment Group.

For additional information on portfolios A, B and C, please see Table 3 on page 11 of the Appendix.

The main qualitative lesson from MPT is that diversification improves expected returns. Leverage can enable an investor to reap greater diversification benefits. Consider a 60-40 stock-bond allocation. Historically, this portfolio derives over 90% of its volatility from stocks, suggesting that despite a 40% allocation to bonds, their contribution to risk is minimal. An investor could make use of leverage to increase the effective bond exposure, creating, say, a 60-60 allocation (using 1.5x leverage on the bonds). Doing so increases the role bonds play in the overall portfolio, amplifying the expected diversification benefits without reducing the exposure to equities. This is how leverage allows an investor to achieve otherwise unattainable portfolios in the unlevered MPT setting. However, if stocks and bonds move down together, the realized loss of the levered 60-60 allocation will exceed that of the 60-40.

The balancing of risk accomplished through leverage can serve a number of purposes from an institutional perspective. It reduces the need to rely heavily on equities and other growth-oriented asset classes, which is especially tempting in an era of high multiples and low rates.² It, likewise, reduces the reliance on alpha as a necessity for achieving a fund's target return. Lastly, if implemented prudently, it diminishes the need to invest more in high fee strategies like hedge funds and private equity.

² Not a few market observers have opined that the low level of interest rates accounts, at least in part, for the high multiples being applied to US equities. The theory (consistent with the Dividend Discount Model) is that when the future cash flows of US companies are discounted back to the present, the low level of interest rates justifies a higher present value (and hence P-E multiple). However, should rates rise, this dynamic could reverse itself.

Risks of leverage

While leverage does have attractive qualities, especially when it comes to return magnification, it is important to consider the risks associated with implementing leverage as well. Taking both the pros and cons into account will allow investors to make responsible and prudent decisions with their portfolios.

Market downturns

In times of market shocks, the effects on a leveraged investment can be magnified. While this is notably true over shorter time periods, it can also be true for extended periods of time.³ Leverage always poses a risk because the economic exposure exceeds the capital assets to cover the exposure. It becomes a problem when either periodic financing payments cannot be met or the amount of equity relative to the debt declines to a level unacceptable to the financier.

³ See, for example, the quotation often attributed to John Maynard Keynes that "The market can remain irrational longer than you can remain solvent."

In the event of a downturn, borrowing costs may exceed the return generated by the investment. A broker may require additional margin if a derivatives contract declines. If that margin is not provided, the broker will sell the contract and force the investor to realize losses. A loan's covenant may require a maximum debt-to-equity ratio. If exceeded, the loan may be called early or may not be renewed by the lender or loan provider.

Convexity

Convexity refers to the concept that a shift in interest rates can have an amplified effect on borrowing costs, depending on the starting level of rates. For example, if an investor borrows some amount of money at 0.5% interest, and the borrowing rate fluctuates such that the cost to borrow money rises to 1%, the borrowing cost has now doubled. On the other hand, if the interest rate has gone from 3% to 3.5%, the borrowing cost will have barely been multiplied by 1.17. It is paramount to take this risk into account, especially in low rate environments, where small shifts in interest rates can cause borrowing costs to grow at faster rates than expected. Managing this potential mismatch is essential in safely managing a levered portfolio.

Additional risks

Leverage introduces risks that are not easily measured via traditional metrics. These include illiquidity, mark-to-market, counter-party, cash flow, headline, model risks, and Unrelated Business Taxable Income (“UBTI”).

Illiquidity - During periods of market stress, many ordinarily liquid assets can behave more like illiquid assets (i.e., a chasm opens between the normally tight bid and ask prices). During a liquidity shock, debt providers tend to pull back and require more margin on investments.

Mark-to-market - Through the process of pledging high quality, low risk assets as collateral, a portfolio’s total risk is increased. For example, pledging Treasuries as collateral for equity futures exposes those Treasuries to daily mark-to-market equity volatility.

Counter-party - Some of the instruments used to achieve leverage introduce counter-party risk. An example of this would be the liquidity crisis of September 2019. The combination of Treasury auctions and corporate tax date timing caused the standard collateral to shift from Treasuries to riskier corporate debt, causing repo rates to rise sharply and liquidity to dry up quickly.

Cash flow management – An investment portfolio may have cash flow distribution requirements that could be disrupted by margin calls and collateral management operations. For example, pledged collateral would not be accessible for normal cash flow management.

Headline - Headline risk is the risk involved with the news having an effect on an investment. Because leverage magnifies volatility, a high degree of pain tolerance may be required to avoid unwinding the program at an inopportune time.

Model risk - Refers to the models that are used to measure the amount of risk exposure in a portfolio. If these models (or more likely, their assumptions) are incorrect, it could lead to an investor facing margin calls or even more extreme outcomes.

UBTI - Even if a plan is tax-exempt, leverage can still expose investors to UBTI taxation in certain cases. Investors should consult with tax counsel on this topic.

Implementation

While borrowing is the most straightforward method to access leverage, there are numerous instruments that are designed to help funds implement explicit leverage. The most commonly used instruments are total return swaps, futures, and repurchase agreements (i.e., repos). We refer the reader to the Appendix for a more detailed description of each instrument as well as an analysis of the pros and cons of each.⁴

Internal versus external management

Managing a portfolio with explicit leverage is complex and requires dedicated resources and/or additional monitoring costs. The investment management team must be qualified and have sufficiently allocated resources to monitor their leverage exposure properly and to transact in the underlying instruments used to achieve leverage. In addition, leverage has to be disclosed in financial reports, making for an extra accounting consideration.

There are several crucial operational aspects that investors must manage. First, they must identify the correct beta source to mitigate basis risk or undesired market risk. This includes a consideration of cost as the cost is more expensive if there is not a highly liquid futures/swaps market.⁵ Second, they must manage margins to avoid margin calls at inopportune times. Third, they must ensure adequate liquidity is available (for settling swaps, etc.).

Best practices for managing leverage include the following: 1) leave a margin buffer – do not fully lever to the maximum; 2) determine tail risk exposure and maintain adequate liquidity to cover (some multiple of) this exposure; Value at Risk (“VaR”), Conditional Value at Risk (“CVaR”), and left tail event simulations are a good way to determine this exposure; 3) collateralize more frequently if leveraged exposure is in a volatile asset class (e.g., equities).

To avoid incurring extra staffing costs, an investor can use a turnkey solution, though these turnkey strategies tend to ask for high fees. Examples of a turnkey approach include overlay managers, risk parity strategies, and “portable alpha” strategies. Before implementing leverage, an investor should assess their staffing capabilities and consider their appetite for fees when it comes to a turnkey approach. Finally, no matter the approach taken, an investor should give appropriate consideration to benchmarking.

⁴ Investors can also use STRIPs to mimic leverage exposure, without taking on many of the risks inherent to leverage. Investors often use STRIPs to extend duration and hedge interest rate exposure. The use of STRIPs is an important part of the leverage discussion because unlike the other stated tools, which are focused on return magnification, STRIPs can also be a useful part of risk mitigation and interest rate hedging.

⁵ As of June 2021, the cost of obtaining Treasury exposure via a swap was approximately 40 basis points, while the cost of obtaining BBG Aggregate exposure was roughly 80 basis points higher.

Conclusion

Leverage can allow for the construction of more efficient portfolios. Leverage allows investors to create portfolios with higher risk-adjusted returns and to reduce their reliance on the biggest sources of risk in their portfolio. Leverage works so long as the return on the portfolio exceeds the borrowing cost. Those costs are at historically low levels.

While there are potential return benefits to be gleaned by using leverage, an investor needs to consider the many risks inherent to leverage exposure. Leverage introduces new risks to the portfolio, such as illiquidity, mark-to-market, and counterparty risks. Implementing and managing leverage requires appropriate resources and processes. Any consideration of leverage should include a thorough vetting of the potential risks and challenges.

Leverage is not for everyone, but taking a prudent, responsible approach with ample resources could lead to it serving a beneficial role in a portfolio. Any investor who decides to use leverage should proceed cautiously.

Appendix

A cautionary tale – LTCM

Long-Term Capital Management (“LTCM”) was a relative-value hedge fund founded in 1994 by a group of extremely well regarded trading practitioners and finance academics, including eventual Nobel Prize winners. The fund’s strategies sought to profit on deviations from fair value between liquid securities.

For instance, one of their principal strategies in US Treasury arbitrage attempted to exploit differences in liquidity between government bonds with slightly different maturities. In the US Treasury market, the most recently issued bond, called the benchmark or on-the-run issue, will be more liquid than similar bonds with slightly shorter maturity. As such, there is a premium for the relative illiquidity of the non-benchmark bond. As time passes, the Treasury will issue new bonds, the current benchmark will become off-the-run, and trading activity (liquidity) will be concentrated in the new benchmark. LTCM sought to exploit this phenomenon by buying the older bond, short-selling the benchmark bond, and betting on the eventual convergence in value between the two.

Because the discrepancies in valuation for this type of trade are only a few basis points, in order to earn sizable returns for investors, LTCM employed substantial leverage. According to Eric Rosenfeld, a trader and principal at LTCM, in 1998 the firm

had equity of \$4.7 billion and had borrowed over \$124.5 billion, representing a debt-to-equity ratio over 25 to 1. Not only did this represent enormous risk in terms of outright leverage, but it also made LTCM highly reliant on the willingness of counterparties in the short-term lending market to continually finance their portfolio.

These risks all came to a head in 1998. A year prior, the Asian financial crisis sparked concerns about systemic risk, concerns which continued to shape investor risk appetites into 1998. Increased risk-aversion expressed itself in a flight-to-quality as money flowed into liquid, low-risk assets such as the on-the-run Treasuries that LTCM was shorting. This caused divergence in the spreads where LTCM had bet convergence. The spread widening was exacerbated by the Russian financial crisis in August and September of 1998 when the Russian government defaulted on its own debt. A second and stronger flight-to-quality again bid up the liquid US Treasuries that LTCM was shorting and depressed prices on less liquid Treasuries where LTCM was in a long position.

Because LTCM implemented their Treasury convergence strategy with massive leverage, the losses due to spread widening were magnified. To make matters worse, the magnified losses forced LTCM to liquidate other positions at highly unfavorable prices, further depleting its capital base and driving overall losses deeper.

LTCM is an illuminating example of the explicit and tacit risks of excessive leverage. While the loss magnification risks were clear, LTCM underestimated the additional second-order dangers of building such a levered investment structure. Quick losses due to leverage forced them to then sell off other parts of their portfolio at the most inopportune time. Additionally, in the absence of cheap financing, the reliance on counter-party funding to supply this leverage meant LTCM had no way to profitably run its strategies.

We don't expect anyone to embrace leverage the way LTCM did (or be able to for that matter). However, what one should embrace is the full slate of risks that comes with leverage and how these risks, if neglected, can wipe out even a fund with the brain trust of LTCM.

	Portfolio A (%)	Portfolio B (%)	Portfolio C (%)
Growth/Equity	45	54	50
Global Equity	35	44	39
Private Equity	10	10	11
Credit	10	10	11
High Yield Bonds	5	5	5.5
Private Debt	5	5	5.5
Rate Sensitive	25	16	27.5
Investment Grade Bonds	20	11	22
TIPS	5	5	5.5
Real Assets	15	15	16.5
Real Estate	10	10	11
Infrastructure (Core Private)	5	5	5.5
Other	5	5	5.5
Hedge Funds	5	5	5.5
<i>Expected Return (20 years)</i>	<i>6.1</i>	<i>6.6</i>	<i>6.6</i>
<i>Standard Deviation</i>	<i>11.1</i>	<i>12.7</i>	<i>12.3</i>
<i>Probability of Achieving 7% over 20 Years</i>	<i>35.3</i>	<i>43.7</i>	<i>39</i>

To increase expected return, portfolio B opted to allocate out of the less risky investment grade bonds and into global equity, allowing for a higher expected return but higher expected volatility.

Portfolio C, instead, opted to add 10.5% leverage, applied pro-rata. Through the use of leverage, portfolio C can enjoy comparable returns to portfolio B but a lower expected volatility.

TABLE 3
Sample Portfolio
(Shows an example of three different possible portfolio scenarios.)

Source: Expected returns derived from Meketa's 2021 Capital Markets Assumptions.

Modeling leveraged instruments

When managing leverage levels and ascertaining the optimal levels of leverage (if any) is right for the investor, modeling can be an important way of gaining more information to make better decisions. In regards to leverage, an investor will likely want to get an understanding of the risks involved with leverage. Namely, they will want to get an understanding of the pain tolerance required to successfully execute leverage in the portfolio. Some potential options include VaR modeling and CVaR modeling.

VaR modeling explicitly tries to answer the question of, "How much could I lose in a given period?" One takes the historical returns of a given index or asset class and uses it to ascertain what the worst case loss scenario would be for the given asset class, assuming that history repeats itself. To arrive at that worst case scenario, one could simply take the bottom percentage of a given historical simulation. These simulations can be created a number of ways, including taking historical returns or making a Monte Carlo simulation.

CVaR modeling takes the VaR model and applies another layer on conservatism onto it. It is not often used for asset classes such as large cap equity, but for more volatile asset classes (or, in this case, the use of leverage), it can be a great tool to model leverage scenarios in advance. While VaR models tend to outline a worst case scenario, CVaR takes things a step further by trying to figure out the expected losses in the worst case scenario beyond what the VaR model provides.

Pros and cons of leverage instruments

Total return swaps

Total return swaps are financial contracts set up by two parties who agree to exchange financial instruments or cash flows for a fixed amount of time. The payer owns the underlying asset. This asset could be virtually anything, including a bond, commodity, or loan. Once the terms of the contract (e.g., duration, interest rate) are determined, the payer gives the receiver any income generated by the asset such as capital appreciation and coupon payments. In other words, for a period of time, the receiver enjoys the benefits of having an asset (although the receiver does not technically own it). In return, the receiver pays interest for the right of newly-gained exposure as well as any depreciation on the asset. That is, if the asset's value declines during the life of the swap, the payer (lender) receives interest payments and insulation from the mark-to-market losses. This agreement involves leverage because, in most cases, actual ownership is not transferred. The receiver is able to gain full, though temporary, investment exposure (capital gains and rights to any fixed payments of the asset) by expending an amount of capital that is less than the market price of the asset.

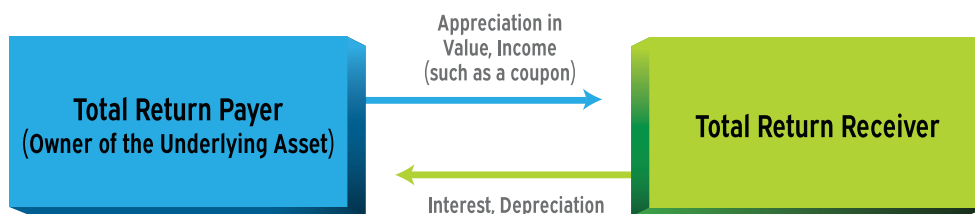


FIGURE 5
Mechanics of a Total Return Swap

Source: Meketa Investment Group.

Pros:

- The investor in the asset enjoys the return benefits without having to deal with the operational and administrative costs of actually owning the asset.
- Total return contracts are highly customizable since they are individually made between the two parties. Because of this, there is an amount of flexibility in creating the terms of the agreement.
- Because the payments to the receiver are determined by the behavior of the asset, no tracking error is incurred.

Cons:

- The contract's terms often depend on the current lending rate environment, so a fluctuation in interest rates can serve as a risk to either party. For instance, if interest rates go up, the receiver must pay more to the asset owner.
- If the asset sharply declines in price, then the receiver must pay for the depreciation of that asset, magnifying the default rate. The risk is exacerbated if the receiver is in multiple total return swap contracts at the same time. In extreme cases, the receiver can default. Because the payments to the receiver are determined by the behavior of the asset, no tracking error is incurred.
- While total return swap contracts are highly customizable, they are inflexible once they have been established. The contracts are terminated upon their expiration dates (which may be the maturity date of the asset) or upon the receiver's default.

Futures

A futures contract is an agreement to buy or sell an asset on a specific date in the future at a pre-determined price. To protect against counter-party risk, both the buyer and the seller post upfront margin typically between 5 and 15 percent of the contract's value. The margin is much smaller than the actual value of the asset, creating a levered position. Once the expiration date arrives, the contract is settled through either a physical delivery of the asset in question or a cash settlement of the difference between the two positions. If the price of the asset is above the sale price, the contract buyer realizes a profit as they essentially purchased the asset at a discount. If the asset price settles below the pre-determined sale price, the seller realizes a profit because they are selling the asset at a premium to the spot price. While industrial businesses tend to use futures contracts to mitigate volatility risk (as in being able to know exactly how much it will cost to buy 1000 bushels of wheat in three months' time), investors use it to make levered bets on the movement on the price of the asset. Futures also allow investors to gain exposure to commodities without explicitly buying and selling the physical assets.

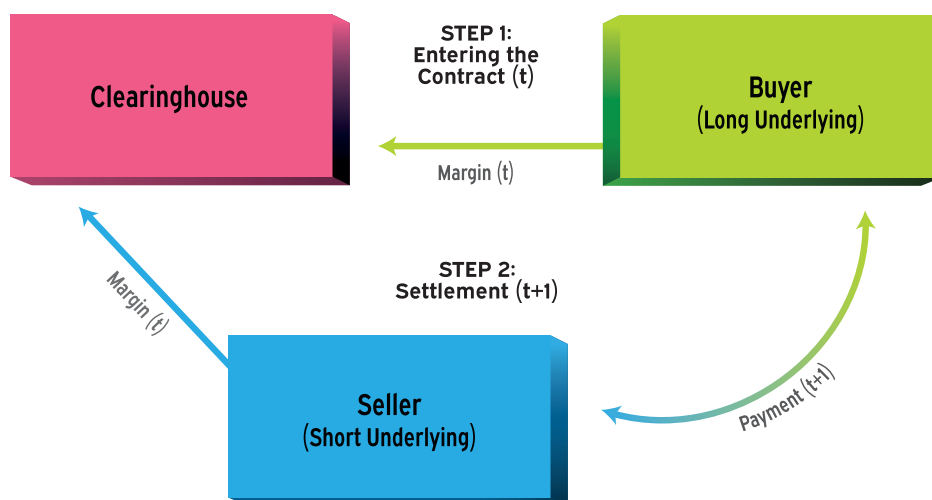


FIGURE 6
Mechanics of a Futures Contract

Source: Meketa Investment Group.

Pros:

- Futures are useful hedging tools and can provide protection against price fluctuations.
- Futures are highly liquid, providing stable margin rates.
- There is very low counter-party risk; payment and delivery of the asset or cash is nearly guaranteed.
- Investors do not have to worry about time decay risk. While the market may move towards or away one's favorable position, the futures contract will not necessarily decline in value as the expiration date draws closer.
- Investors can be exposed to sections of the market, including commodities, which they may not have access to otherwise.

Cons:

- Futures contracts are marked-to-market daily, so investors realize gains and losses daily even if the contract has not yet expired.
- The prices of the futures contracts may not align with the prices of the assets that the contracts are based on due to trading halts and delays in the market. This can create tracking error and other volatility risks.

Repos

A repurchase agreement is a form of short-term borrowing where the borrower sells the underlying security with the intention of buying it back shortly afterward. The repurchase price is slightly higher than the sale price, subjecting the borrower to what is in effect an interest rate paid in exchange for the right to borrow. The amount of leverage in the position is determined by a haircut, which is the difference between the market value of the collateral and the amount of cash lent out. The borrower has exposure to the security (since they have agreed to repurchase) as well as the borrowed money that can be used for further investment. Thus, the investor has created a levered long position by using an asset as collateral to borrow additional funds. If the market price of the collateral asset rises above the pre-set repurchase price, the investor is able to repurchase the asset at a discount. Of course, the reverse is true as well, and the investor could buy back the asset at a premium in the event the market price falls.

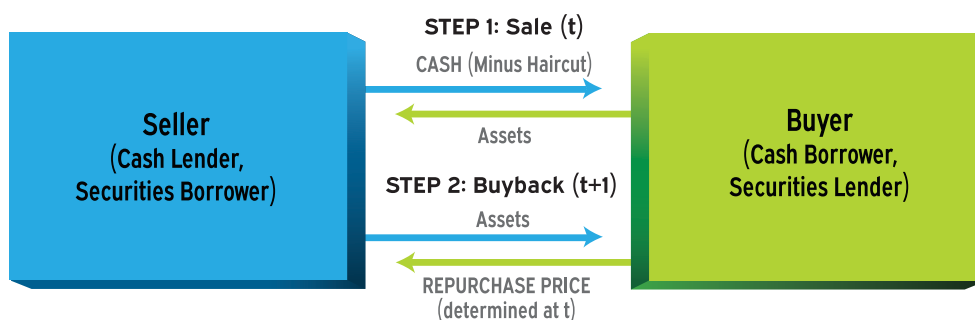


FIGURE 7
Mechanics of a Repo

Source: Meketa Investment Group.

Pros:

- Repos have a very low cost, making it one of the cheapest ways to gain leverage exposure. They are also quite liquid, especially for Treasuries.
- Repo agreements are flexible. They can be used to borrow cash or a set of securities, and term lengths can be flexible.
- Cash borrowers can pledge a general collateral in the form of a basket of securities if approved by the counter-party.

Cons:

- Repos are primarily backed by Treasuries. Other repo markets are not as populated or nonexistent.
- Either party may choose not to re-engage in the contract if the market becomes stressed.
- Either party may opt to simply default if the agreement has become over or under-collateralized.
- Margins are marked-to-market daily, so parties will need to maintain margin on a frequent basis.

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