

AUTHORS



Mohsen Fahmi
Managing Director
Portfolio Manager



Josh Davis
Managing Director
Global Head of Client Analytics



Ashish Tiwari
Executive Vice President
Head of Client Solutions,
Americas



Brad Guynn
Senior Vice President
Asset Allocation Strategist

Capital-Efficient Strategies: Tackling the Challenges of Low Prospective Returns

A pragmatic implementation of investment leverage seeks to enhance alpha and diversification.

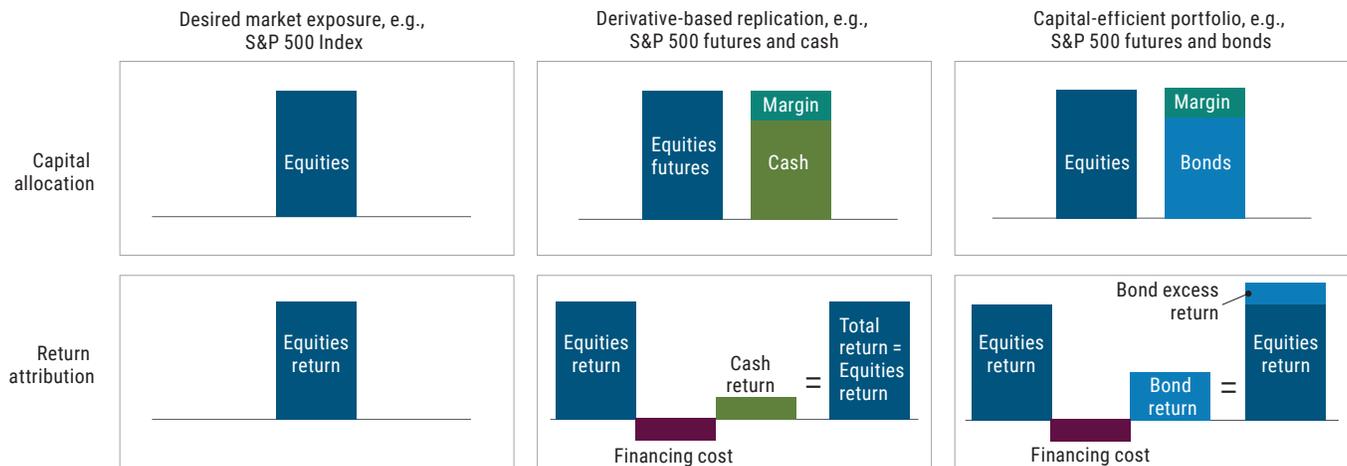
EXECUTIVE SUMMARY

- Many investors seek ambitious annual return targets – often as high as 7%. Yet with valuations stretched for both equities and bonds, standard portfolio allocations seem unlikely to deliver what’s needed.
- This has led some investors to reach for more returns by reducing exposure to less risky but lower-returning assets and leaning instead into riskier, higher-returning assets.
- Yet shunning diversification and increasing exposure to procyclical assets with embedded leverage is a risky way to tackle the prospect of lower returns. Thus, growing numbers of institutional investors are pursuing an alternative approach that uses capital-efficient strategies.
- These entail direct and more efficient uses of leverage to gain exposure to assets that may improve portfolio returns without a material increase in portfolio risk.

Investors face a dilemma. Many seek ambitious annual return targets – often as high as 7%. Yet with valuations stretched for both equities and bonds, standard portfolio allocations seem unlikely to deliver what’s needed.

This has led some investors to reach for more returns by reducing exposure to less risky but lower-returning assets and leaning instead into riskier, higher-returning assets. Yet shunning diversification and increasing exposure to procyclical assets with embedded leverage is a risky way to tackle the prospect of lower returns.

Thus, growing numbers of institutional investors are pursuing an alternative approach that uses capital-efficient strategies. These entail direct and more efficient uses of leverage to gain exposure to assets that may improve portfolio returns without a material increase in portfolio risk. Indeed, many asset owners, such as large U.S. public pension plans, have obtained authorization from their boards to employ plan-level leverage to implement this approach. Although capital-efficient strategies have numerous applications, which we explore below, they remain underutilized due to legacy practices, organizational silos, and governance concerns over the direct use of leverage.

Figure 1: Anatomy of a capital-efficient portfolio

Source: PIMCO. **For illustrative purposes only.** Figure is for illustrative purposes and is not indicative of the past or future performance of any PIMCO product.

PIMCO sees great potential in capital-efficient strategies. In our view, capital-efficient solutions can be a highly effective tool in the endeavor to achieve the lofty – and challenging – return targets many institutional investors require. (PIMCO’s five-year capital market assumptions imply the average institutional portfolio will return about 5%).¹

Capital-efficient approaches can free up cash, increasing overall portfolio liquidity and flexibility. They can give investors access to a broader range of alpha strategies without affecting beta allocations. And they can be used to fund increased allocations to diversifying strategies without having to take capital away from other assets.

WHAT IT MEANS TO BE CAPITAL EFFICIENT

At their core, capital-efficient strategies seek to benefit from the depth and liquidity of the capital markets. Synthetic instruments, such as futures, forwards, or total return swaps can be used to provide exposure to all major asset classes. These liquid instruments offer high replication quality and, in many cases, are centrally cleared – and therefore entail limited counterparty risk (non-centrally cleared synthetic instruments can carry significant counterparty risk). Most important, they require minimal upfront cash to obtain desired notional exposures and maintain the ongoing financing costs. The remaining “freed-up” capital can serve as collateral for synthetic exposures or be used to pursue other policy objectives (see Figure 1).

Consider a capital-efficient approach to large-capitalization U.S. equities, a staple in nearly all portfolios. Index funds and exchange-traded funds (ETFs) are a popular choice. Although they replicate benchmark indices and have much lower fees than actively managed funds, fully funding passive equity exposures may not be the best use of capital for all investors.

A capital-efficient implementation can obtain exposure to the S&P 500 through futures, which require only a minimal cash outlay. An investor can choose to hold the freed-up cash as dry powder, deploy it in an alpha strategy to increase return potential, or even invest it in uncorrelated beta exposures to boost portfolio diversification and return potential.

Gaining strategic beta allocations through synthetic exposures can also give large investors the ability to reallocate capital rapidly – such as when markets cratered last spring, only to quickly recover.

CASES IN CAPITAL-EFFICIENT INVESTING

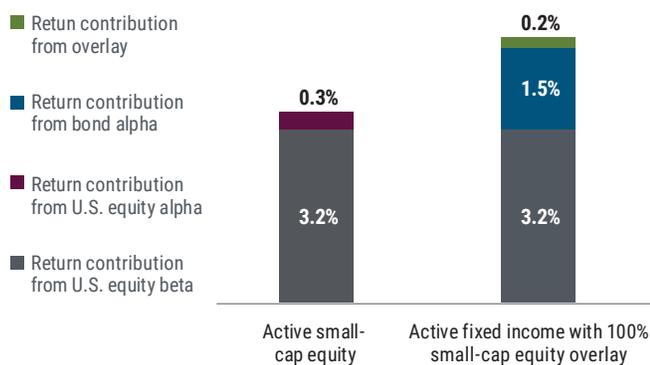
We see investors employing the concept to achieve a range of policy objectives, including diversification of alpha sources, risk mitigation, foreign exchange (FX) hedging, tactical asset allocation, and transitions management, to name a few. Below we highlight a few recent examples of how we are seeing investors employ capital-efficient techniques to seek to achieve various investment objectives.

1 The Sample Institutional Portfolio reflects the average asset allocation of all institutions in the NACUBO-Common Fund Study of Endowments (NSCE), which represents 774 U.S.-based endowments.

Figure 2: More diversified sources of alpha

	Small-cap equity comparison		Total portfolio impact	
	Active small-cap equity	Active fixed income with 100% small-cap equity overlay	U.S. public plan portfolio with active equity	U.S. public plan portfolio with capital-efficient solution
Estimated return ¹	3.5%	4.9%	3.4%	3.8%
Estimated volatility ²	24.2%	21.9%	11.7%	11.0%
Estimated equity beta (S&P)	1.59	1.43	0.77	0.72
Estimated CVaR 95% ²	52.9%	46.2%	25.4%	23.6%
Return contribution from U.S. equity beta	3.2%	3.2%	0.9%	0.9%
Return contribution from U.S. equity alpha	0.3%	-	0.1%	-
Return contribution from bond alpha	-	1.5%	-	0.4%
Return contribution from overlay	-	0.2%	-	0.0%

Small-cap equity return contribution



- 1 Return estimates are based upon the product of risk factor exposures and projected risk factor premia which rely on historical data, valuation metrics and qualitative inputs from senior PIMCO investment professionals.
- 2 See disclaimer at the end of this paper for additional information regarding estimated volatility and CVaR

As of 30 September 2020. Source: PIMCO. **Hypothetical example for illustrative purposes only.** Active Small Cap Equity: Russell 2000 Index with 0.3% alpha assumption; Active Fixed Income + Small Cap Equity Overlay: 100% Russell 2000 Index net of 3M LIBOR financing costs plus 100% absolute return fixed income collateral. US Public Plan: 25% S&P 500 Index, 15% MSCI EAFE Index, 7.5% MSCI EM Index, 2% 3M USD LIBOR Index, 8% private equity model, 7% HFRI Composite Index, 3% BBG BC US TIPS Index, 7% Private Core Real Estate Model, 20% BBG BC US Universal Index, 2% BBG BC Global Agg Index (USD-H), 1% BBG Commodity Index. Weightings may not add to 100% due to rounding. Capital-efficient solution takes public equity exposure synthetically and invests collateral in absolute return fixed income. The estimated returns do not include investment management fees and expenses. If these fees and expenses were reflected, performance would be lower. Figure provided for illustrative purposes and is not indicative of the past or future performance of any PIMCO product.

1. Seek higher and more consistent alpha with fixed income

A U.S. public pension plan was seeking reliable sources of alpha within their allocation to small-cap equities, which was benchmarked to the Russell 2000 Index. Their existing small-cap equity managers sought to generate alpha through stock selection, but most had failed to deliver. The plan considered capital efficiency with the goal of improving both the level and the consistency of alpha. They explored obtaining exposure to the Russell 2000 Index using total return swaps and investing the unencumbered cash in a highly liquid, absolute-return-oriented fixed income portfolio to seek alpha.

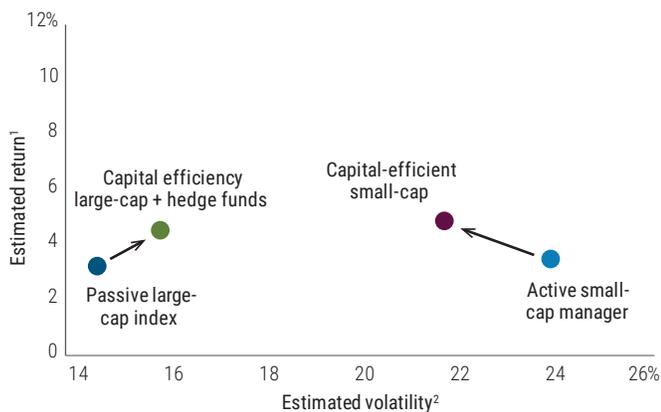
A benefit of obtaining exposure to the Russell 2000 Index via derivatives is that the implied financing cost is typically well below Libor – which, given recent low levels, means financing costs have been outright negative. For example, between 2014 and 2020 the median implied financing cost for Russell 2000 swaps was Libor -30 basis points (bps), and ranged between Libor -80 bps and Libor +10 bps. This structural bias arises from a persistent supply/demand imbalance, as there is much higher demand for obtaining short exposure to the Russell 2000 Index.

Figure 2 shows that if the U.S. public pension plan switched to the capital-efficient portfolio, they could have had a portfolio with nearly the same risk exposure as their original active equity managers (estimated volatility actually declined 2 percentage points – about 10% risk reduction – from 24.2% to 21.9%), and estimated returns would have improved because of additional returns from both the fixed income alpha strategy and the tailwind of attractive financing levels for the Russell 2000 Index Futures (represented in a total estimated improvement of some 1.4 percentage points in annualized returns).

Figure 3: More diversified alternative sources of alpha

	Large-cap equity comparison		Total portfolio impact	
	S&P 500 Index	Capital-efficient solution	Family office portfolio	Family office portfolio with capital-efficient solution
Estimated return ¹	3.2%	4.6%	4.4%	4.6%
Estimated volatility ²	14.6%	16.0%	13.5%	13.7%
Estimated equity beta (S&P)	1.00	1.08	0.87	0.88
Estimated CVaR 95% ²	32.2%	33.7%	29.5%	29.7%
Return contribution from U.S. equity beta	3.2%	3.2%	0.5%	0.5%
Return contribution from bond strategy	–	0.4%	–	0.1%
Return contribution from hedge funds	–	1.0%	–	0.1%

Capital efficiency improves returns with similar levels of risk



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- 2 See disclaimer at the end of this paper for additional information regarding estimated volatility and CVaR

As of 30 September 2020. Source: PIMCO. **Hypothetical example for illustrative purposes only.** Capital-efficient solution: 100% S&P 500 Index synthetically net of 3M LIBOR financing costs, 45% HFRI Composite Index, 25% Absolute Return Fixed Income, 30% 3M USD LIBOR Index. Family Office Portfolio: 14% S&P 500 Index, 16% MSCI EAFE Index, 6% MSCI EM Index, 4% 3M USD LIBOR Index, 7% BBG BC US Agg, 1% BBG BC US High Yield Index, 5% Private Core Real Estate Model, 14% Private Equity Model, 8% Venture Capital Model, 19% HFRI Composite Index, 1% BBG BC US TIPS Index, 6% Private Natural Resource Model. Capital-efficient solution switches the S&P 500 exposure with the capital-efficient solution portfolio. Weightings may not add to 100% due to rounding. The estimated returns do not include investment management fees and expenses. If these fees and expenses were reflected, performance would be lower. Figure provided for illustrative purposes and is not indicative of the past or future performance of any PIMCO product.

For a better understanding of how active management has the potential to add alpha in fixed income, please see [“Bonds Are Different: Active Versus Passive Management in 12 Points.”](#)

2. Seek higher and more consistent alpha with alternatives

An international family office was looking to increase their allocation to hedge funds. They considered a capital-efficient approach in which a portion of their S&P 500 allocation could be obtained synthetically through futures, thus freeing up capital to allocate to hedge funds. A capital-efficient portfolio could enable this investor to increase its hedge fund allocation while maintaining its equity beta target.

The family office needed to ensure there was sufficient liquidity to meet margin calls in case of significant losses from the S&P 500 futures overlay. The hedge funds considered by the family office offered quarterly redemptions, so they couldn't be relied upon as a source of liquidity in the event of a sharp S&P 500 sell-off.

Thus, they explored a tiered approach to managing collateral. They planned to reserve 25% in cash and cash equivalents to provide a source of daily liquidity to meet margin calls, which they believed was enough to withstand an extreme move in equities over a quarterly horizon. They also reserved an additional 35% in capital as a backstop to the cash tier in the event an equity market sell-off exceeded 25%. Given that this secondary tier was likely to be tapped infrequently, they were comfortable investing it in a conservative active fixed income strategy that could generate potential returns in excess of the implied financing rate of S&P futures yet was expected to remain liquid enough for a severe equity market sell-off. Finally, with what they deemed to be sufficient capital reserved for extreme market moves, the investor could plan to allocate the remaining 40% of their capital to their desired hedge funds within the last tier of their unencumbered capital.

Figure 3 shows that if the family office incorporated the capital-efficient portfolio into their S&P 500 allocation, the resulting portfolio may have had about the same risk exposure as their original passive equity exposure (estimated volatility increased modestly from 13.5% to 13.7%), and estimated returns would have improved due to the additional sources of returns in the form of the fixed income alpha strategy and the hedge fund (resulting in a total estimated improvement of some 1.4 percentage points in annualized returns).

3. Seek improved portfolio diversification by adding interest rate duration

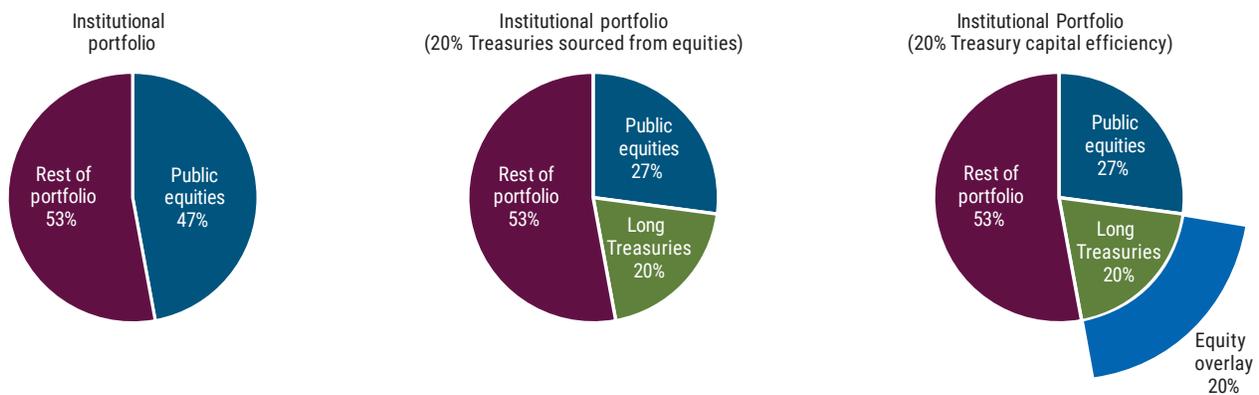
A core issue facing investors today is the paucity of perceived “safe assets” (all investments contain risk and may lose value) with an acceptable level of yield that can deliver low-to-negative correlation with equity markets on a consistent basis. Most investors recognize the importance of having high quality duration as an anchor in their portfolios, but find it increasingly hard to allocate to an asset that has an expected return significantly below their lofty policy targets.

A U.S. public pension plan considered building a capital-efficient portfolio that allowed them to add to long U.S. Treasuries without having to give up exposure to

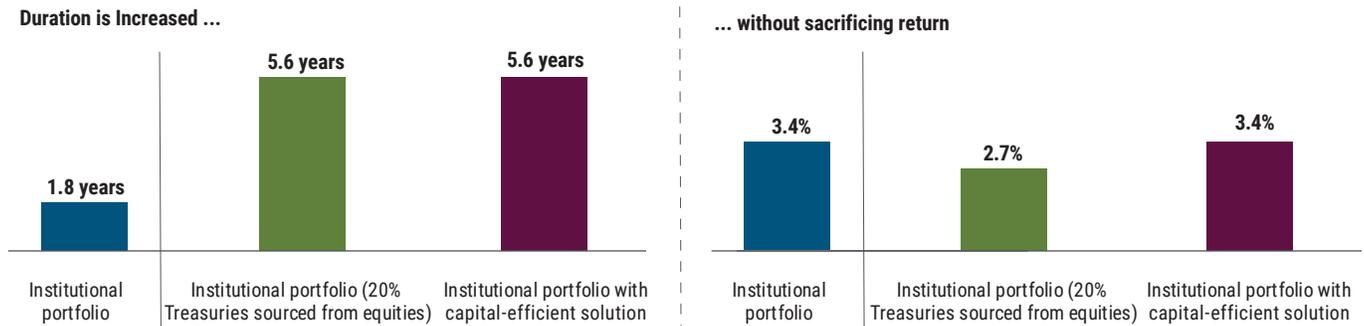
higher-returning assets. Like many asset owners, this organization has a sizable passive equity allocation to the S&P 500 Index. They planned to shift some of their exposure to a capital-efficient portfolio that used the freed-up capital to invest in long-duration U.S. Treasuries – an ideal asset to serve as collateral due to its liquidity profile and negative expected correlation to equities. The capital-efficient approach could allow the investor to access more interest rate duration within their plan via their equity allocation, providing exposure to two asset classes for every dollar invested. This structure could also enable tactical rebalancing and adjustments to plan-level duration (by changing the duration of the Treasury portfolio) without having to make changes to other parts of their asset allocation.

Figure 4 shows that if the U.S. public plan incorporated the long Treasury exposure into its equity allocation, the plan-level return could have remained practically the same because interest rate duration is diversifying to the existing equity risk exposure (overall plan-level volatility declined from 11.0% to 10.3%). The alternative, which would have been to sell equities and buy bonds, would have likely resulted in lower estimated volatility but also come at a cost to long-term returns.

Figure 4: Improving diversification with fixed income



	Asset class comparison		Total portfolio impact		
	Long Treasuries	Public equities	Institutional portfolio	Institutional portfolio (20% Treasuries sourced from equities)	Institutional portfolio with capital-efficient solution
Estimated return ¹	1.0%	4.0%	3.4%	2.7%	3.4%
Estimated volatility ²	9.5%	15.1%	11.0%	7.4%	10.3%
Estimated interest rate duration	19.4 years	-	1.8 years	5.6 years	5.6 years
Estimated equity beta (S&P)	-0.31	0.98	0.72	0.46	0.66
Estimated CVaR 95% ²	19.2%	32.3%	24.0%	15.3%	21.7%



1 Return estimates are based upon the product of risk factor exposures and projected risk factor premia which rely on historical data, valuation metrics and qualitative inputs from senior PIMCO investment professionals

2 See disclaimer at the end of this paper for additional information regarding estimated volatility and CVaR

As of 30 September 2020 Source: PIMCO. **Hypothetical example for illustrative purposes only.** Long Treasuries: BBG BC US Long Treasury Index. Public Equities: 49% S&P 500 Index, 30% MSCI EAFE Index, 15% MSCI EM Index, 6% Russell 2000 Index. Institutional Portfolio: 25% S&P 500 Index, 15% MSCI EAFE Index, 7.5% MSCI EM Index, 2% 3M USD LIBOR Index, 8% private equity model, 7% HFRI Composite Index, 3% BBG BC US TIPS Index, 7% Private Core Real Estate Model, 20% BBG BC US Universal Index, 2% BBG BC Global Agg Index (USD-H), 1% BBG Commodity Index. Weightings may not add to 100% due to rounding. The capital-efficient solution takes 20% of public equity exposure synthetically net of 3M LIBOR financing costs and invests in Long Treasuries. The estimated returns do not include investment management fees and expenses. If these fees and expenses were reflected, performance would be lower. Figure provided for illustrative purposes and is not indicative of the past or future performance of any PIMCO product.

4. Enhance returns of fixed income allocation by adding defensive risk premia

Instead of layering duration onto equity portfolios through capital-efficient strategies, as described above, some investors are using capital-efficiency techniques to seek to increase the returns of their fixed income portfolios while seeking to maintain or enhance their defensive qualities. This can involve the addition of strategies such as trend-following or alternative risk premia (ARP) that seek to mimic the diversification benefits of core fixed income while targeting much higher returns. A U.S.-based university endowment explored capital-efficient techniques to implement their risk mitigation portfolio.

The investor was seeking a single investment manager who had the capabilities to run trend-following and alternative risk premia as an overlay on their long maturity Treasury portfolio. It is worth noting, however, that all three exposures can be accessed via derivatives, allowing additional flexibility in capital-efficient portfolio construction. For example, if a pension plan wanted to have one specialist manager running the trend strategy and a different specialist running the ARP portfolio, the capital-efficient portfolio could be set up similar to example 3, with the interest rate duration as the overlay.

Figure 5 shows the potential benefits of adding the capital-efficient risk-mitigation solution to the university endowment's portfolio, replacing a 5% portion of their allocation to core fixed income. Total portfolio estimated returns increased by some 0.3 percentage point while the volatility of the total portfolio was reduced by about 0.6 percentage point.

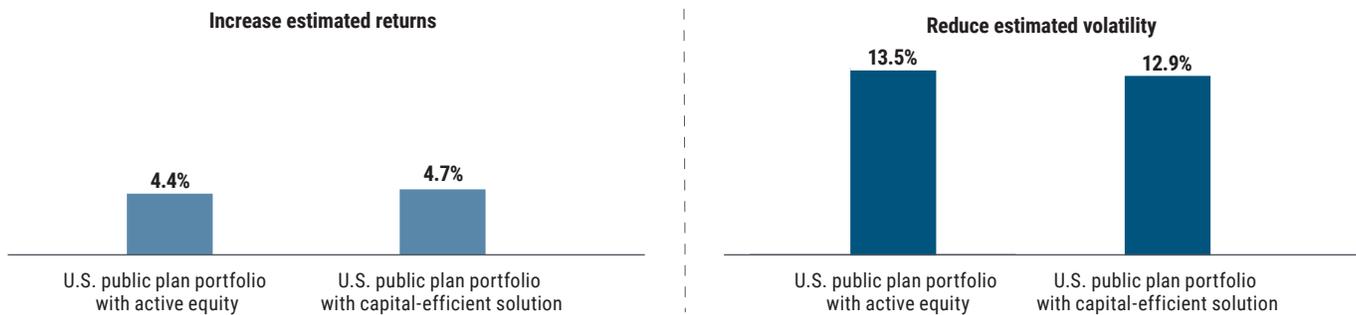
GETTING COMFORTABLE WITH LEVERAGE

All these examples illustrate how capital-efficient investing entails getting comfortable with the direct use of leverage. Employed prudently, we believe leverage can be a powerful tool for engineering portfolios and should be a part of an institution's arsenal.

It is critical to recognize that leverage can, but doesn't always lead to higher risk. When leverage is employed to increase exposure to diversifying or negatively correlated assets, it can be used to seek a reduction in portfolio risk. As the case studies in this paper demonstrate, applying leverage through capital-efficient solutions has the potential to improve the potential risk-adjusted return in almost all cases.

Figure 5: Improving diversification with alternatives

	Treasury allocation comparison		Total portfolio impact	
	U.S. 10-year Treasuries	50% ARP and 50% trend overlay on long U.S. Treasuries	Institutional portfolio	Institutional portfolio with capital-efficient solution
Estimated return ¹	0.3%	4.9%	4.4%	4.7%
Estimated volatility ²	3.8%	15.3%	13.5%	12.9%
Estimated interest rate duration	7.9 years	19.4 years	0.8 years	1.7 years
Estimated equity beta (S&P)	-0.12	-0.60	0.87	0.83
Estimated CVaR 95% ²	8.6%	24.1%	29.5%	27.4%



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2 See disclaimer at the end of this paper for additional information regarding estimated volatility and CVaR

As of 30 September 2020. Source: PIMCO. **Hypothetical example for illustrative purposes only.** U.S. 10Y Treasuries: BBG BC 7-10Y US Treasury Index. ARP: Societe General Multi-Alternative Risk Premia Index; Trend: Societe Generale Trend Index; Long Treasuries: BBG BC US Long Treasury Index. Institutional Portfolio: 14% S&P 500 Index, 16% MSCI EAFE Index, 6% MSCI EM Index, 4% 3M USD LIBOR Index, 7% BBG BC US Agg, 1% BBG BC US High Yield Index, 5% Private Core Real Estate Model, 14% Private Equity Model, 8% Venture Capital Model, 19% HFRI Composite Index, 1% BBG BC US TIPS Index, 6% Private Natural Resource Model. Capital Efficient Portfolio replaces 7% core fixed income allocation with the ARP/Trend/Long TSY allocation. Weightings may not add to 100% due to rounding. The estimated returns do not include investment management fees and expenses. If these fees and expenses were reflected, performance would be lower. Figure provided for illustrative purposes and is not indicative of the past or future performance of any PIMCO product.

The aversion to leverage is somewhat of a conundrum as most institutional portfolios have plenty of it. Public equities, which dominate risk in most portfolios, are a leveraged asset class; nearly all publicly traded companies borrow to invest in growth. Leverage is also embedded into the investment structure in private equity, private credit, real estate, and hedge funds. Risk parity, a popular investment approach used by many institutional investors, systematically employs leverage. Capital-efficient investing is another tool investors can use to seek the potential investment benefits they already strive for from leverage in their portfolios – although capital-efficient approaches offer investors the ability to channel leverage exposure in ways that may be more risk/return efficient and beneficial in their portfolios.

CONCLUSION

Adopting capital efficiency can be a highly effective tool in the endeavor to achieve the lofty return targets that many institutional investors require in spite of current market conditions. For starters, it can free up cash to increase overall portfolio liquidity and gain flexibility. Second, it can give investors access to desired alpha strategies without affecting their beta allocation. Finally, it can be used to increase allocation to diversifying strategies without having to fund those allocations by taking capital away from other assets.

Today’s historically low financing costs can make the use of this tool even more compelling.

This paper includes hypothetical assumptions and scenarios. HYPOTHETICAL PERFORMANCE RESULTS HAVE MANY INHERENT LIMITATIONS, SOME OF WHICH ARE DESCRIBED BELOW. NO REPRESENTATION IS BEING MADE THAT ANY ACCOUNT WILL OR IS LIKELY TO ACHIEVE PROFITS OR LOSSES SIMILAR TO THOSE SHOWN. IN FACT, THERE ARE FREQUENTLY SHARP DIFFERENCES BETWEEN HYPOTHETICAL PERFORMANCE RESULTS AND THE ACTUAL RESULTS SUBSEQUENTLY ACHIEVED BY ANY PARTICULAR TRADING PROGRAM.

ONE OF THE LIMITATIONS OF HYPOTHETICAL PERFORMANCE RESULTS IS THAT THEY ARE GENERALLY PREPARED WITH THE BENEFIT OF HINDSIGHT. IN ADDITION, HYPOTHETICAL TRADING DOES NOT INVOLVE FINANCIAL RISK, AND NO HYPOTHETICAL TRADING RECORD CAN COMPLETELY ACCOUNT FOR THE IMPACT OF FINANCIAL RISK IN ACTUAL TRADING. FOR EXAMPLE, THE ABILITY TO WITHSTAND LOSSES OR TO ADHERE TO A PARTICULAR TRADING PROGRAM IN SPITE OF TRADING LOSSES ARE MATERIAL POINTS WHICH CAN ALSO ADVERSELY AFFECT ACTUAL TRADING RESULTS. THERE ARE NUMEROUS OTHER FACTORS RELATED TO THE MARKETS IN GENERAL OR TO THE IMPLEMENTATION OF ANY SPECIFIC TRADING PROGRAM WHICH CANNOT BE FULLY ACCOUNTED FOR IN THE PREPARATION OF HYPOTHETICAL PERFORMANCE RESULTS AND ALL OF WHICH CAN ADVERSELY AFFECT ACTUAL TRADING RESULTS.

Figures are provided for illustrative purposes and are not indicative of the past or future performance of any PIMCO product.

Return assumptions are for illustrative purposes only and are not a prediction or a projection of return. Return assumption is an estimate of what investments may earn on average over the long term. Actual returns may be higher or lower than those shown and may vary substantially over shorter time periods.

We employed a block bootstrap methodology to calculate volatilities. We start by computing historical factor returns that underlie each asset class proxy from January 1997 through the present date. We then draw a set of 12 monthly returns within the dataset to come up with an annual return number. This process is repeated 25,000 times to have a return series with 25,000 annualized returns. The standard deviation of these annual returns is used to model the volatility for each factor. We then use the same return series for each factor to compute covariance between factors. Finally, volatility of each asset class proxy is calculated as the sum of variances and covariance of factors that underlie that particular proxy. For each asset class, index, or strategy proxy, we will look at either a point in time estimate or historical average of factor exposures in order to determine the total volatility. Please contact your PIMCO representative for more details on how specific proxy factor exposures are estimated.

Value at Risk (VAR) and Conditional Value at Risk (CVAR) estimate the risk of loss of an investment or portfolio over a given time period under normal market conditions in terms of an average of loss after a specific percentile threshold of loss (i.e., for a given threshold of X%, under the specific modeling assumptions used, the portfolio will incur an average loss in excess of the VAR/CVAR X percent of the time. Different VAR/CVAR calculation methodologies may be used. VAR/CVAR models can help understand what future return or loss profiles might be. However, the effectiveness of a VAR/CVAR calculation is in fact constrained by its limited assumptions (for example, assumptions may involve, among other things, probability distributions, historical return modeling, factor selection, risk factor correlation, simulation methodologies). It is important that investors understand the nature of these limitations when relying upon VAR/CVAR analyses.

All investments contain risk and may lose value. Investing in the **bond market** is subject to risks, including market, interest rate, issuer, credit, inflation risk, and liquidity risk. The value of most bonds and bond strategies are impacted by changes in interest rates. Bonds and bond strategies with longer durations tend to be more sensitive and volatile than those with shorter durations; bond prices generally fall as interest rates rise, and low interest rate environments increase this risk. Reductions in bond counterparty capacity may contribute to decreased market liquidity and increased price volatility. Bond investments may be worth more or less than the original cost when redeemed. **Equities** may decline in value due to both real and perceived general market, economic and industry conditions. **Swaps** are a type of derivative; swaps are increasingly subject to central clearing and exchange-trading. Swaps that are not centrally cleared and exchange-traded may be less liquid than exchange-traded instruments. **Derivatives** may involve certain costs and risks, such as liquidity, interest rate, market, credit, management and the risk that a position could not be closed when most advantageous. Investing in derivatives could lose more than the amount invested. **Diversification** does not ensure against loss. **Management risk** is the risk that the investment techniques and risk analyses applied by an investment manager will not produce the desired results, and that certain policies or developments may affect the investment techniques available to the manager in connection with managing the strategy.

Statements concerning financial market trends or portfolio strategies are based on current market conditions, which will fluctuate. There is no guarantee that these investment strategies will work under all market conditions or are appropriate for all investors and each investor should evaluate their ability to invest for the long term, especially during periods of downturn in the market. Investors should consult their investment professional prior to making an investment decision. Outlook and strategies are subject to change without notice.

Alpha is a measure of performance on a risk-adjusted basis calculated by comparing the volatility (price risk) of a portfolio vs. its risk-adjusted performance to a benchmark index; the excess return relative to the benchmark is alpha. **Beta** is a measure of price sensitivity to market movements. Market beta is 1. The correlation of various indexes or securities against one another or against inflation is based upon data over a certain time period. These **correlations** may vary substantially in the future or over different time periods that can result in greater volatility.

The **3 Month USD LIBOR** (London Interbank Offered Rate) Index is an average interest rate, determined by the ICE Benchmark Administration, that banks charge one another for the use of short-term money (3 months) in England's Eurodollar market. The **Bloomberg Barclays 7-10 Year Intermediate U.S. Treasury Index** is an unmanaged index representing public organizations of the U.S. Treasury with remaining maturity of 7-10 years. **Bloomberg Barclays Global Aggregate (USD Hedged) Index** provides a broad-based measure of the global investment-grade fixed income markets. The three major components of this index are the U.S. Aggregate, the Pan-European Aggregate, and the Asian-Pacific Aggregate Indices. The index also includes Eurodollar and Euro-Yen corporate bonds, Canadian Government securities, and USD investment grade 144A securities. The **Bloomberg Barclays U.S. Corporate High-Yield Index** covers the USD-denominated, non-investment grade, fixed-rate, taxable corporate bond market. Securities are classified as high-yield if the middle rating of Moody's, Fitch, and S&P is Ba1/BB+/BB+ or below. The index excludes Emerging Markets debt. **Bloomberg Barclays U.S. Long Treasury Index** includes all publicly issued, U.S. Treasury securities that have a remaining maturity of 10 or more years, are rated investment grade, and have \$250 million or more of outstanding face value. **Bloomberg Barclays U.S. TIPS Index** is an unmanaged market index comprised of all U.S. Treasury Inflation-Protected Securities rated investment grade (Baa3 or better), have at least one year to final maturity, and at least \$500 million par amount outstanding. The **Bloomberg Barclays U.S. Universal Index** represents the union of the U.S. Aggregate Index, the U.S. High-Yield Corporate Index, the 144A Index, the Eurodollar Index, the Emerging Markets Index, and the non-ERISA portion of the CMBS Index. Municipal debt, private placements, and non-dollar-denominated issues are excluded from the Universal Index. The only constituent of the index that includes floating-rate debt is the Emerging Markets Index. **Bloomberg Commodity Index Total Return** is an unmanaged index composed of futures contracts on a number of physical commodities. The index is designed to be a highly liquid and diversified benchmark for commodities as an asset class. The futures exposures of the benchmark are collateralized by US T-bills. The **HFRI Fund Weighted Composite Index** is comprised of over 2000 domestic and offshore constituent funds. All funds report assets in USD and report net of fees returns on a monthly basis. There is no Fund of Funds included in the index and each has at least \$50 million under management or have been actively trading for at least twelve months. **MSCI EAFE Index** is an unmanaged index designed to represent the performance of large and mid-cap securities across 21 developed markets, including countries in Europe, Australasia and the Far East, excluding the U.S. and Canada. The **MSCI Emerging Markets Index** is a free float-adjusted market capitalization index that is designed to measure equity market performance of emerging markets. **Russell 2000® Index** is composed of 2,000 of the smallest companies in the Russell 3000 Index and is considered to be representative of the small cap market in general. **S&P 500 Index** is an unmanaged market index generally considered representative of the stock market as a whole. The Index focuses on the large-cap segment of the U.S. equities market. The **SG Multi Alternative Risk Premia Index** includes the ten largest qualifying multi alternative

risk premia managers. The constituents manage investment programs that are diversified across multiple asset classes and multiple risk premia factors. The managers aim to systematically capture a diversity of discrete risk premia, including value, carry, momentum, and equity style premia. The **SG Trend Index** calculates the net daily rate of return for a group of 10 trend following CTAs selected from the largest managers open to new investment. The SG Trend Index is equal-weighted and reconstituted annually and has become recognized as the key managed futures trend following performance benchmark. The PIMCO models are non-investable and are provided as a proxy for the respective asset class. It is not possible to invest directly in an unmanaged index.

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