CASE STUDY

A Portfolio Guide to Equity + Convexity

SIMPLIFY

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Introduction

Without the right tools for the job you are either setting yourself up for a painful experience or are guaranteed to fail, a premise that applies to building investment portfolios as much as it does to any other project. When asset allocators build portfolios with specific goals and capital market forecasts, the efficacy of the portfolio can be limited, and potentially completely hamstrung, with an incomplete set of investable assets to choose from.

Simplify was founded to address this issue by creating new portfolio building blocks that help asset allocators build the portfolios they actually want. Simplify launched this endeavor by introducing a new asset class, called Equity + Convexity, that could help allocators more efficiently tackle the most pressing issues facing portfolios today. In this paper we review a general framework for deploying Equity + Convexity in portfolios and review the most common use cases today for the new asset class. But first let's review what it means to add convexity to core equities.

What is Equity + Convexity

Equity + Convexity is a modification of the core equity return distribution such that the new asset is designed to positively diverge from the core holding when markets are extreme. At Simplify we make these modifications through the addition of a systematic put and/or call option overlay to the core equity position. Simplify has introduced three flavors of this new asset class: downside convexity, upside convexity, and symmetric convexity, as depicted in Figure 1.

Figure 1: Equity + Convexity Modifies Core Equity Return Distributions

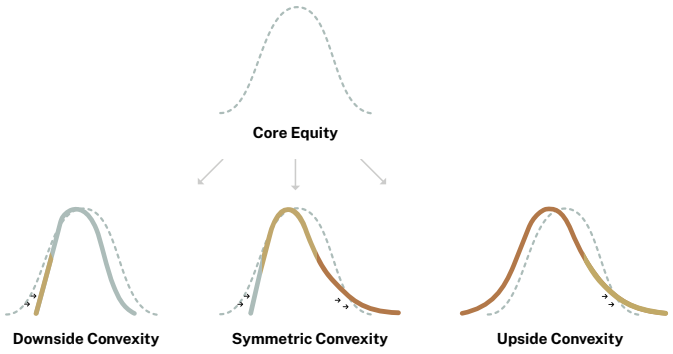


Figure 1 doesn't specify the return frequency of the distribution we are plotting (i.e. daily vs monthly vs annual returns), and this is for good reason: at Simplify we are focused on modifying returns distributions over any continuous horizon extreme moves can occur on. In this way, you can think of our convexity to work on a more continuous rolling basis, rather than over a specific calendar horizon.

Reimagining What's Possible with Equity + Convexity

Before we dig in on specific ways to deploy equity convexity, it is instructive to begin with a 30,000 foot view of the potential. Figure 2 outlines four ways these convex equity building blocks can be deployed in portfolios. Given our discussion in the previous section the first row of Figure 2 is likely intuitive: one can modify a core equity holding in the left tail, the right tail, or both. The second row may be a bit less intuitive, because now we are going to replace non-core equity with a modified core equity holding. Diversifying assets like bonds are fundamentally in portfolios to help protect capital, but if they are inefficient for whatever reason (e.g. low expected return forecast), one may want to consider Equity + Downside Convexity as an alternative solution to protecting portfolios. Similarly, for those investors with performance assets, that have say become overvalued, Equity + Upside Convexity can be swapped for these high beta or levered holdings in an effort to maintain upside potential via a different mechanism.

Figure 2: A General Guide to Using Equity Convexity in Portfolios

	Downside Convexity	Upside Convexity
Modify Core Equity Beta	Cut Off Left Tail	Flatten Right Tail
Replace Other Types of Beta	Replace Low Volatility Diversifiers	Replace Higher Volatility Performance Assets

Now that we have a high-level perspective on deploying convex equities in portfolios, let us proceed to the most common use cases today. We will review the motivating factors behind each use case and provide guidelines for how equity convexity can be deployed in each situation.

Today's Most Common Use Cases for Equity + Convexity

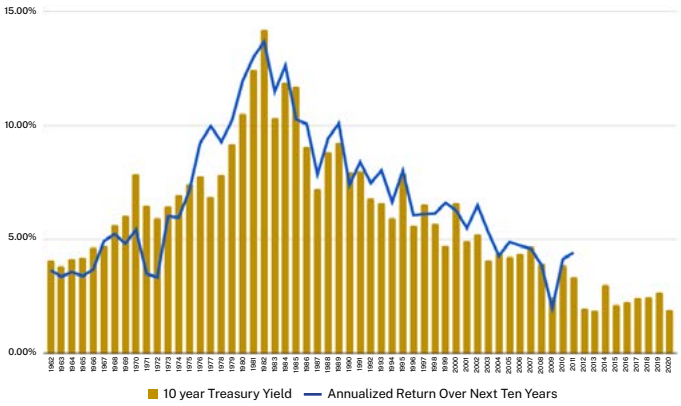
USE CASE #1	TRADE MOTIVATION	TRADE DETAILS
Bond Replacement	• Muted Bond Return Forecasts • Challenged Downside Protection From Bonds	• Trim Bonds • Replace Core Equity with Equity + Downside Convexity

TRADE MOTIVATION

Investors have traditionally protected their portfolios against downside risk by allocating a significant portion of their assets to fixed income. This strategy worked well over the past four decades because 1. the opportunity cost to diversify equities with bonds has been low and 2. the ability for bonds to protect during equity selloffs has been unimpeded. Unfortunately, both of these salient features are now challenges for bonds.

Many investment grade bonds now yield less than the rate of inflation, and since a bond's current yield is a good indicator of its future returns (see Figure 3), a significant bond allocation may cause a major drag on portfolio returns going forward.

Figure 3: Bond Expected Returns are Driven by Starting Yields



Source: New York University, Stern School of Business; Macrotrends.

Additionally, the presumption that bonds will always protect investors during equity selloffs is also challenged by low starting yields. In the top half of Figure 4 we see the intuitive result that bond yields have less room to drop during equity selloffs as starting yields drop. To make matters worse, during inflationary periods (which we very well may be headed into) bonds can deeply sell off during equity crises, as shown in the second half of Figure 4.

Figure 4: Bond Protection Ability

US Treasury Bond Yield Changes During Stock Market Declines

Start	End	S&P 500 Total Return	10Yr Yield – Start	10Yr Yield - End	Yield Change
Stock market declines where bond yields declined					
3/27/2000	10/9/2002	-49.03%	6.19%	3.57%	-2.62%
10/10/2007	3/9/2009	-56.70%	4.65%	2.86%	-1.79%
2/20/2020	3/23/2020	-31.11%	1.52%	0.79%	-0.73%
Stock markets decines where bond yields increased					
12/2/1968	5/26/1970	-36%	5.89%	8.22%	2.33%
1/12/1973	10/3/1974	-48%	6.44%	8.04%	1.60%
12/1/1980	8/12/1982	-27%	12.92%	13.55%	0.63%

Source: Koyfin. Calculations by Simplify Asset Management. The results are NOT an indicator of future results. Additional information regarding the construction of these results is available upon request. PLEASE SEE FULL DISCLOSURES BELOW.

TRADE DETAIL

Our goal here is to replace the downside protection of bonds with the downside protection inherent in Equity + Downside Convexity. But how does one decide how much of their bond portfolio to replace with Equity + Downside Convexity? Since our downside convexity products are focused on benchmark divergences during more extreme markets, one should view this replacement from the lens of drawdown control, not volatility control. Figure 5 compares the drawdown profile during the COVID selloff of a 60% SPY/40% AGG portfolio and a 99% SPY/1% Deep OTM Put portfolio (this toy model, built only for back of the envelope insights into deep OTM puts, rolls 25bps in 50% OTM SPY puts every three months). As you can see, the drawdown of the 2 portfolios is roughly the same, hence the rule of thumb from this drawdown-matching lens is to swap one-for-one slugs of 60/40 in your portfolio for equities with downside convexity created via deep OTM puts.

It should be noted that the portfolio volatility will go up post-swap for downside convexity, since we are effectively increasing equity beta of the portfolio, which is a key factor to consider when deciding the total amount to actually swap from 60/40 to Equity

+ Downside Convexity. A reasonable approach here for many is to swap half of one's 60/40 exposure for the downside equity convexity products, effectively diversifying one's diversifiers, with half of your downside protection focused on bonds and the other half focused on downside equity convexity.

USE CASE #2	TRADE MOTIVATION	TRADE DETAILS
Black Swan Insurance	• Extreme Market Moves are Becoming More Frequent	• Swap Core Equity with Equity + Downside Convexity

Figure 5: Drawdowns Using Options vs Bonds



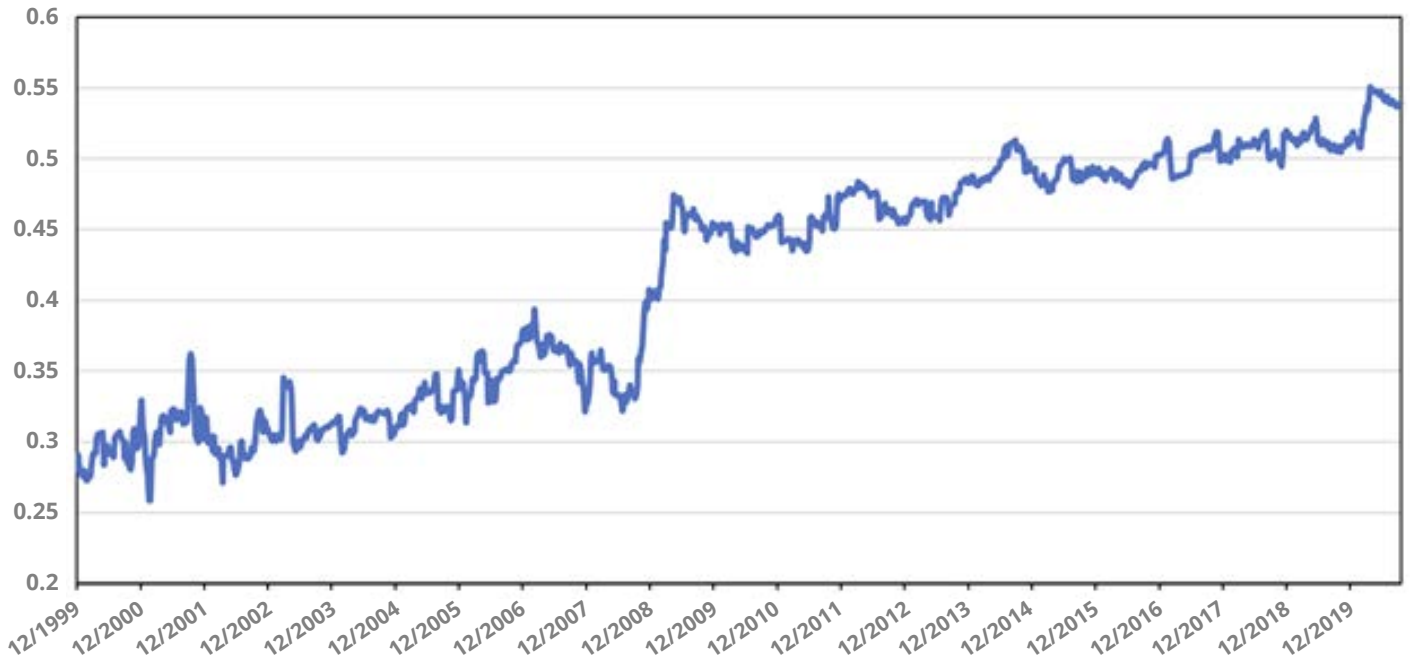
Sources: QuantQuote & Options Price Reporting Authority. Calculations by Simplify Asset Management. The results are hypothetical results and are NOT an indicator of future results and do NOT represent returns that any investor actually attained. Hypothetical strategies and indices presented are unmanaged, do not reflect management or trading fees, and one cannot invest directly in an index. Additional information regarding the construction of these results is available upon request. PLEASE SEE FULL DISCLOSURES BELOW.

TRADE MOTIVATION

Markets are expected to have spectacular runs and scary crashes as part of their normal functioning, but it sure does seem like substantial drawdowns are becoming a bigger part of our reality, and your clients are likely taking note and expressing their concerns. And that's not surprising considering that in the past twenty years we've experienced market declines of -49%, -55% and -33%. This trend towards more frequent tail events over the past two decades is succinctly documented in Figure 6, where we see the fat-tailedness of the S&P500 slowly creeping up in time.

This trend is likely due to a "market incentive loop" that helps accelerate equity moves up and inevitably leads to dramatic moves down. In a nutshell, equity moves up are accelerated as federal backstops encourage investors up the risk curve (into larger equity allocations, higher

Figure 6: Excess Tail Weight of the S&P 500



Source: Newfound Research Q4 2020 Commentary.

volatility assets, and selling of volatility), which in turn lowers equity volatility and forces risk-contingent strategies to increase equity allocations, a fragile state that can lead to incredibly fast corrections as investors trim risk, risk-focused mandates follow suit, and dealers hedge their short volatility insurance positions by selling the market (for an excellent lens on this check out Corey Hoffstein's recent article).

So how can we arm portfolios to be better equipped for these top-of-mind tail events?

TRADE DETAILS

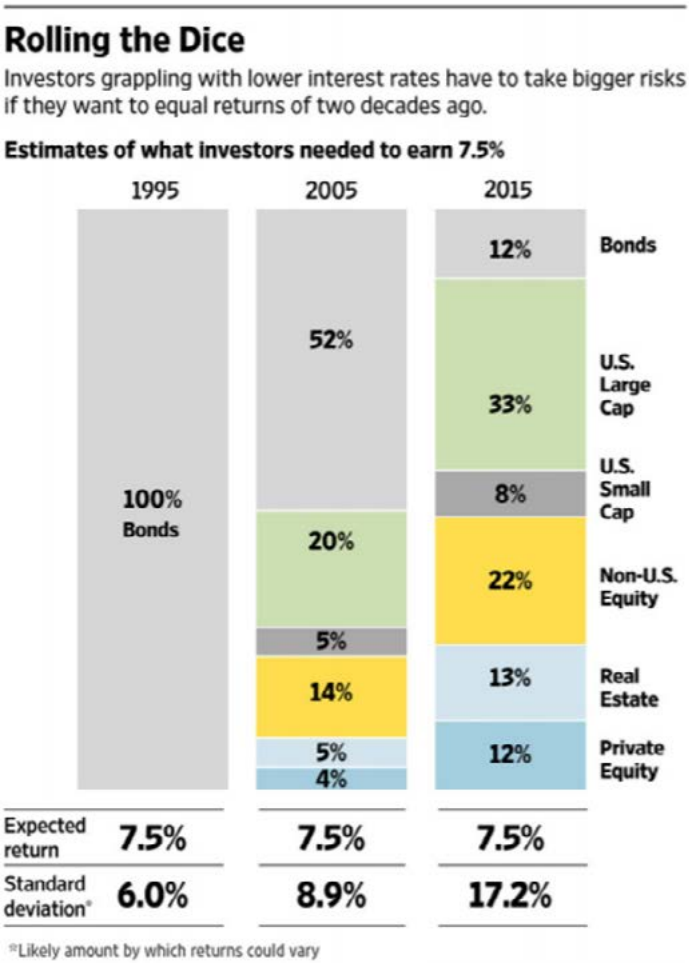
Our goal is to keep our equity exposure steady while boosting protection against tail events. To achieve this in the portfolio one would just swap their core equity holding with Equity + Downside Convexity. In this swap the volatility will stay constant, so there are no potential constraints around this swap re: volatility targets of the portfolio like we saw in use case #1. The only consideration one must make when deciding how much to core equity to swap for downside convexity equity is the portfolio drag from the option budget used to modify the equity tails. Barring strong tactical views on tail events, one should minimally swap half of the core equity allocation to get a meaningful amount of tail protection, but can certainly contemplate a full swap in the case of Simplify's downside convexity strategy since it is built to have only a modest drag of 2% annually that can be sustained over strategic horizons.

USE CASE #3	TRADE MOTIVATION	TRADE DETAILS
Avoid Frothy Performance Assets	• Low Yields Have Forced Investors "Up The Risk Curve" for Two Decades • Stretched Valuations Make This Even More Dangerous	• Swap Traditional Performance Assets with Equity + Upside Convexity

TRADE MOTIVATION

Low interest rates over the past two decades have forced investors to slowly creep "up the risk curve" in order to keep their investment portfolio returns steady. Figure 7 estimates how portfolios have needed to evolve over the past two decades to grapple with low rates and keep growth constant. As you can see, investors have needed to increase their equity allocations, but not just that, they have also needed to increase their allocations to higher volatility "performance assets" like small caps and foreign equities (especially emerging markets). But portfolios have arguably reached too far up the risk curve, taking on almost triple the original volatility, and are now being presented with great headwinds. Volatility is elevated relative to historic norms, further exaggerating the roller coaster of peaks and troughs that clients need to sit through. Additionally, equity valuations are near the highs not seen since just before the tech crash, increasing the likelihood of a moderate to severe correction, and putting any portfolios that have drifted up the risk curve, as depicted in Figure 7, in serious danger. Is their another way to reach for high growth without taking on so much excess volatility and valuation risk by way of traditional performance assets?

Figure 7: Low Yields Have Driven Portfolios up the Risk Curve



Source: Wall Street Journal.

TRADE DETAILS

Our goal here is to provide access to strong equity upside without overextending portfolio volatility or foraying into high valuation sectors, regions, or factors, a symptom of many portfolios as just discussed. To remedy any overreach in volatility or valuation one can simply swap the performance equity holding(s) under discussion with Equity + Upside Convexity, instantaneously lowering portfolio volatility and mitigating any idiosyncratic valuation concerns. The main decision points advisors need to consider when making this swap are 1. valuation attractiveness of the beta being pivoted to in the convexity product vs. valuation attractiveness of the performance sectors/regions/factors being pivoted from, 2. broader portfolio diversification benefits of the convexity beta vs the performance asset beta and 3. the importance of volatility reduction for a given client. For many clients, the potential for a swift and large reduction in volatility from this swap can easily drown out the valuation or diversification benefits from the performance assets.

USE CASE #4	TRADE MOTIVATION	TRADE DETAILS
Prepare Low Risk Portfolios for Extreme Moves Up	• Risk Averse Clients Are Poorly Positioned for Extreme Growth Scenarios • Recent Fed Activity Has Increased This Upside Risk	• Swap Core Equity with Equity + Upside Convexity

TRADE MOTIVATION

A significant fraction of our population has low risk tolerance, a client preference advisors must take seriously, else they risk exposing clients to a volatile asset allocation that can't be adhered to. But as monetary and fiscal support continues to reach groundbreaking levels, one must seriously consider the possibility of runaway growth that can leave risk averse clients far worse off than their more risk tolerant neighbors. A portfolio with a good amount of inflation protection may alleviate some of this assuming the growth is accompanied by inflation, but MMT-centric folks implore us to take the risk of upside without inflation seriously, and most portfolios are under-allocated to inflation protection anyway.

So how can we protect low volatility mandates from extreme moves to the upside on the heels of the recent tide of stimulus with no end in sight?

TRADE DETAILS

Our goal is to provide risk averse clients with a way to capture extreme upside moves without increasing portfolio volatility. To achieve this in the portfolio one would just swap their core equity holding with Equity + Upside Convexity, the mirror image of the swap we performed in the black swan use case, now focused on refining the right tail. And similar to the trade in use case #2, the swap from core equity to Equity + Upside Convexity keeps volatility constant and the risk averse risk profile intact. The only decision point regarding the sizing of this trade is the allocator's view on the strategic budget spent on the convexity overlay vs the probability-weighted expected payoff of extreme upside events.

Parting Words

The convenience of a simple equity vs bond asset allocation decision has faded as bonds face an impending bear market and market extremes are increasingly the new normal. Equities bolstered by convexity provide a new exposure that can help position portfolios for these new normals in ways traditional assets cannot.

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