

CTA Convexity You Can Afford

One of the most attractive features of CTAs is “convexity”. CTAs tend to make money when the going is good but also when the going is bad. And that gradient: “how much better does trend perform per absolute performance of the underlying asset” is how we would measure it. If equity goes down 5% (or up) and a CTA goes up 2.5%, we will estimate its equity convexity as 0.5.

I was at Winton in 2008 when the Great Financial Crisis happened, overseeing the fixed income portfolio. Trend was making money hand over fist and CTAs became very prominent as one of the few investment vehicles that offered convexity. Katy Kaminski coined the brilliant phrase “Crisis Alpha” to describe how CTAs perform well during equity crisis.

So I am likely to upset quite a few people by taking an allocator’s point of view and casting a critical look at the crisis alpha narrative we have been using to market CTAs ever since.

Allocators care about allocation: every dollar invested in one product is a dollar that could have been invested elsewhere. Any allocator who diverted money from their equity beta in the last three years and put it in risk-mitigating bonds, is acutely aware of the pain associated with that decision.

As we will see shortly, CTA allocation does buy you equity convexity but loses you quite a lot of equity beta. I aim to convince you that using CTAs for crisis alpha is a distraction. Not because it doesn’t work, but because realistically, you cannot afford to make it a meaningful part of your equity portfolio. But fear not, CTAs’ real convexity benefits lie elsewhere.

TLDR: Even a 10% allocation to trend will not buy you enough convexity to put a dent in your 60% equity allocation. Yet, if done properly, you can use CTAs to put effective inflation and rate convexity in your 40% bond portfolio.

Treasuries’ Returns Convexity

Until recently, if you held an equity portfolio, complementing it with exposure to bonds was a winning strategy. You may have thought this is just because bonds had a negative correlation to equities: negative correlation certainly helped in diversifying the 60/40 portfolio. But bonds gave us something *better*: bonds gave us *returns convexity*. If we plot equity quarterly returns in the US or across developed markets in low/falling inflation regimes in the last 70 years, you can see a convex “smile” emerging. Bonds made money when equities dropped (which you would expect from negative correlation) but also when equities rose!

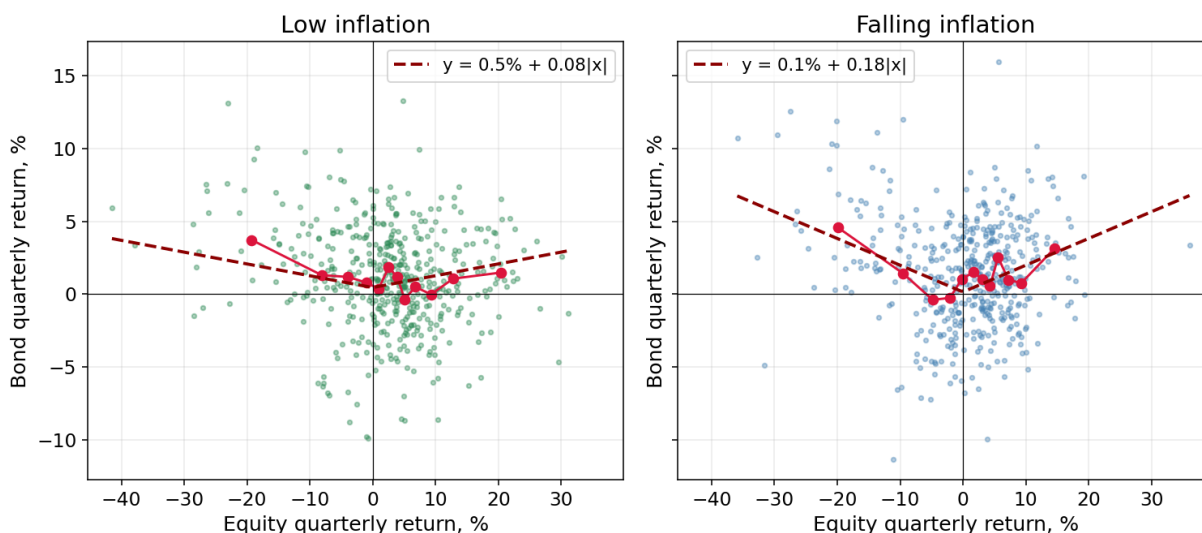


Figure 1: Bond convexity to equity returns: A 10% drop or rise in equity led, on average, to an additional rise of 0.8% or 1.8% in bonds during low/falling inflation regimes (1961-2026)

Returns convexity is immediate but is not guaranteed, it just happens when different assets co-move in different macro regimes or during a crisis. For example, during high inflation periods (and right now), return convexity has vanished. Even worse, bond-equity correlation has turned positive, so bonds also offer less diversification.

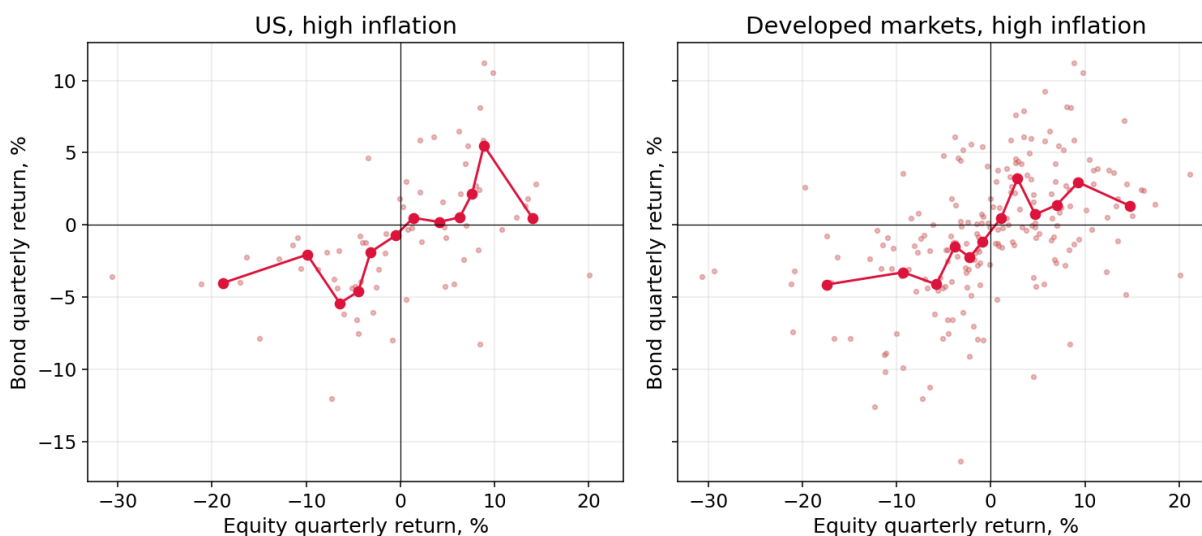


Figure 2: Bonds become positively correlated to equity in high inflation regimes. (1961-2026)

CTAs: Exposure Convexity

CTAs have historically been diversifiers because they are broadly uncorrelated to any long-only holdings, and they also offered historically some equity *returns convexity*. But crisis alpha is about a different form of convexity, achieved through equity-trend's positioning.

Unlike the **returns convexity** we saw in bonds, trend's equity convexity is structural: you get **exposure convexity**: trend will *short* stocks if equity prices go down consistently¹.

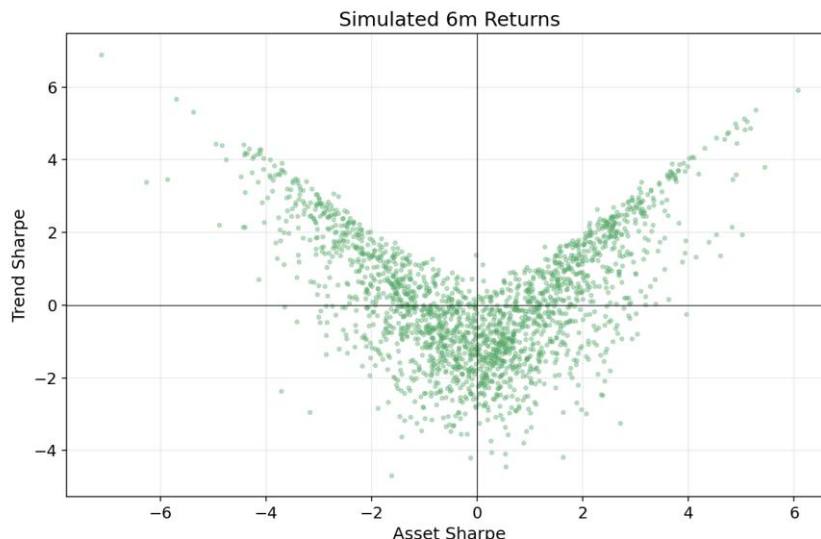


Figure 3: CTA convexity for a single market, mid-speed trend. Simulated gross performance.

The Hidden Cost of Exposure Convexity

There are two costs to holding *exposure convexity*: The first is an obvious one: if nothing happens, you lose money. That's simple enough to understand and we can see it in the chart above: no trend translates to negative performance².

The second cost of convexity is more subtle: if the asset does well, trend, on average, will not be “fully in”. You pay for active risk management with an average position that is less than the full risk committed. For example, if an asset vol had a Sharpe 1 run over two to five years, a \$100 invested in a fast trend will have given you ~\$30 exposure³. Mid-speed trend will have given you ~\$50 exposure and slow trend around ~\$60. Of course, the reason for allocating to trend is that if the asset does *badly*, trend will get you a beta in the opposite direction!

¹ Exposure convexity is a “second responder”: At the beginning of an equity drawdown, trend will be most likely long-equity and will suffer initially.

² Negative gross trend returns, in the absence of underlying asset trend, affects slow and fast trend system alike, it is not due to just trading costs.

³ Strictly speaking this \$30 is the risk adjusted exposure. The actual exposure to the underlying asset will depend on the leverage required by the CTA, as we shall see in a moment.

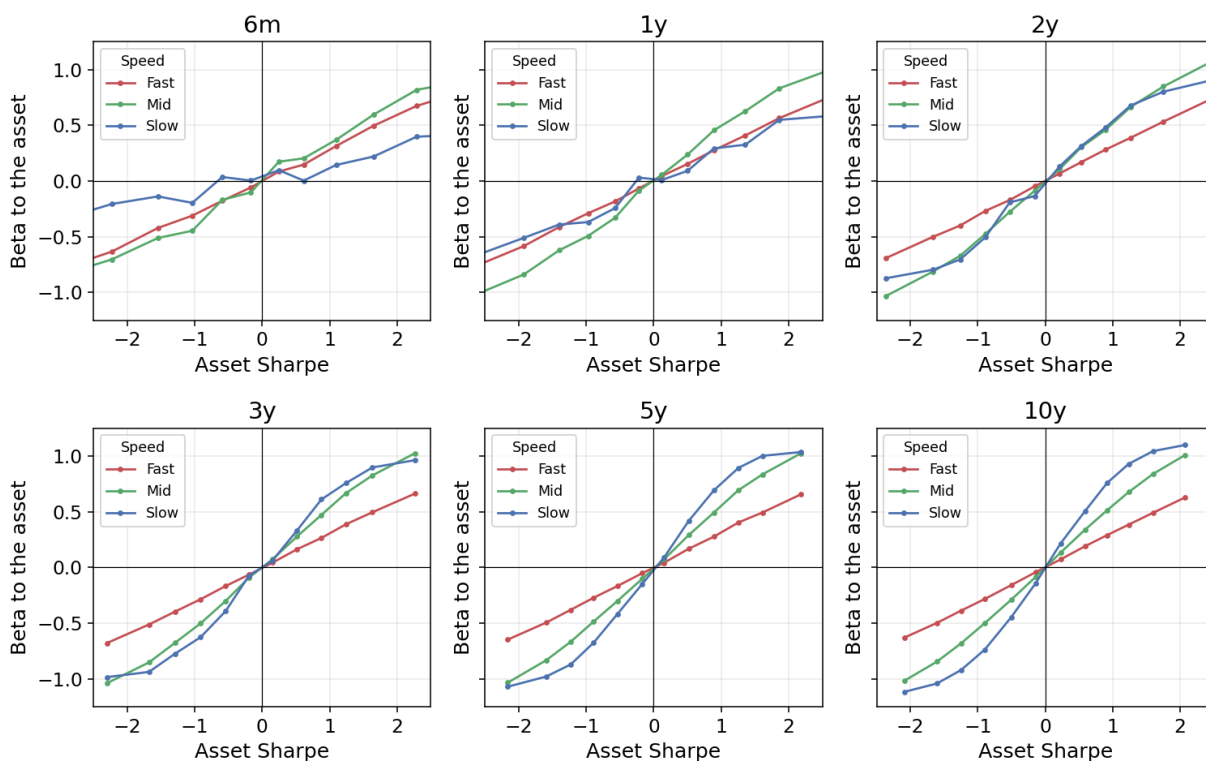


Figure 4: Simulated average beta of fast/mid/slow speed trends to the underlying market, conditioned on the final Sharpe performance of the asset at different time horizons.

CTA Exposure Convexity Depends on Volatility

CTAs like to think in “risk adjusted” space, where all positions have the same *volatility*, but in real life, an allocator invests in real *dollars*. In dollar terms, bonds and equity trends are very different beasts because bonds and equities have very different underlying volatilities, of roughly 6% and 20% respectively. To show this, we go back to 1961 and construct a 15% risk target CTA trading mid-speed trend in developed market 10y-bonds and equities...

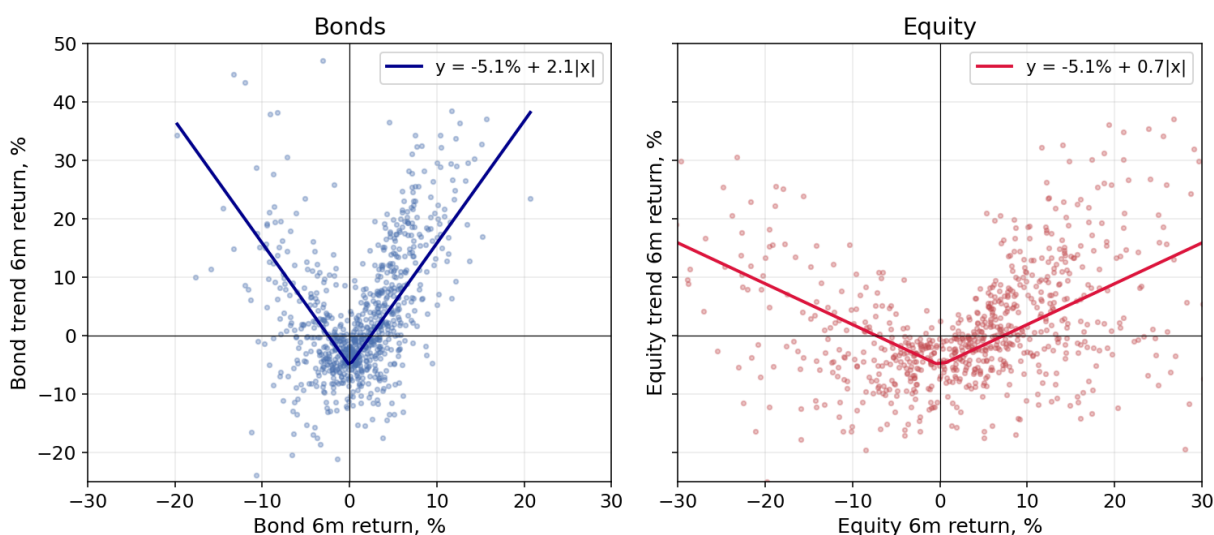


Figure 5: CTA convexity in developed markets 10y bonds (lhs) and equities (rhs) (1961-2026). Convexity for bonds has been around 2.1 while for equity it has been approximately 0.7

There is *much* more convexity in bonds than in equities and it's not accidental, CTAs trade in units of risk, so our CTA backtest has *deleveraged* its 20%-vol equity position down to 15% and has *leveraged* its 6%-vol 10y bond position all the way to 15%.

Dollar for dollar, CTAs provide approximately three times more bond convexity than equity convexity (and *much* more than that for shorter duration bonds).

You Cannot Afford Crisis Alpha

Suppose you *really* care about risk mitigation in a crisis. You have 60% in your growth portfolio: i.e. equities. You have a chunky defensive portfolio, with 30% in bonds and 10% in macro/vol/risk premia. You decide to boost up your defensive bucket by selling 10%, taken from your equities growth portfolio and buying a CTA to protect against an equity downturn.

Let us assume our average CTA has a 25% risk allocation to equities, 25% to bonds and 50% of other stuff (such as commodities & FX)

If equities experience a one-Sharpe decline or rise over a two-to-five years period, how much equity exposure convexity did your CTA allocation buy you?

$$10\% \times 25\% \times 3 \times (15\%/20\%) \times 50\% = 2.8\%$$

- 10% is your CTA allocation
- 25% is typical allocation to equity within your multi-asset CTA
- 3 is the internal leverage of most CTAs, due to cross asset diversification

Opinion Piece. Please see Important Disclosures in the Endnotes.

- 15%/20% is the internal deleverage of equities within the CTA to hit their 15% risk target
- 50% is the beta exposure for a mid-speed trend strategy, in response to a Sharpe -1 trend.

From a 50% equity allocation, your new shiny defensive CTA has cut your equity exposure to 47.2%. If equities did well, the CTA will have increased your beta to 52.8%.

I would argue that you did not get your money's worth: You paid 10% of your allocation but you got very little equity convexity in return. “Crisis Alpha” CTAs cannot deliver on their promise of equity exposure convexity.

But how much bond exposure convexity did your CTA buy for you? The ratio of 20%/6% means bond exposure convexity is ~9.4%, which is a chunky third of your overall bond allocation! In a bond downturn, you will have cut your bond exposure from 30% to just over 20% and equally, if inflation resolves itself and bonds perform well in the next two-to-five years, you will get an exposure of nearly 40%. You get almost a full dollar of bond convexity per dollar allocated to the CTA.

Suppose we construct our CTA to include no equity trend allocation at all and include instead a 50% bond allocation. Capital efficiency is even better: you don't need to sell the full 10% of your growth portfolio: even a 5% allocation could offer excellent bond convexity, at the small loss of the almost irrelevant equity exposure convexity.

Using CTAs Effectively

As CTA managers, if we wanted to design a CTA to help a typical 60/40 allocator, we should be honest about what convexity we can deliver and what convexity we cannot provide. CTA strategies can offer diversification across asset classes and over time, but marketing CTAs based on equity exposure convexity is over-promising what we do.

As an allocator, at a time when the US fiscal position is weak, supply chains are under strain globally, inflation is sticky and rising, and bond performance is uncertain, you should be aware that CTAs, if not side-tracked by the “crisis alpha” narrative, offer a real capital-efficient opportunity to protect your bond portfolio against both inflation (see [The Eras Tour](#)) and fiscal shocks while releasing capital to be used to fund your long term growth.

Appendix: Historic data sources and construction methodology

We look at US (1961-), Germany (1972-), UK (1979-), Japan (1974-), Canada (1989-), Australia (1969-), France (1990-), Italy (1993-) and Switzerland (1988-) markets. We used daily 9y-10y futures data once it is available. Prior to that, we construct both bond and equity total returns using constant maturity curves and dividends & prices (validated the construction when they overlap with the futures). We use daily Bloomberg data where available for that. Prior to that, we used FRED data for CPI and some deposit rates. We rejected using average yield monthly data from FRED/OECD because it introduced artificially higher autocorrelation between monthly bonds returns and led to unrealistically optimistic bond trend results. Instead, we use multiple central banks yield curves⁴ where available. It does mean that during 1961-1969, the bond portfolio is just a single US 10y bond.

Mid-speed trend used throughout is an equally weighted of 1m-3m and 2m-6m crossovers, vol-adjusted and capped at 1.5 standard deviations. When we geared the portfolio as more markets are added, we used equal weights to all markets and a single constant correlation number for each trend program. All performance numbers are gross of trading costs and any fees.

⁴ See <https://www.bankofengland.co.uk/statistics/yield-curves>,
https://www.mof.go.jp/english/policy/jgbs/reference/interest_rate/index.htm,
<https://data.snb.ch/en/topics/ziredev/cube/rendoblid>, and
<https://www.bundesbank.de/en/statistics/money-and-capital-markets/-/capital-market-indicators-809498>

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