



ALTERNATIVE INVESTING

Risk Parity: Why We Lever

September 24, 2014

The role of leverage in risk parity is often misunderstood. All else equal, more leverage increases both risk and expected return. But all else is not equal here. The willingness to use modest leverage allows a risk parity investor to build a more diversified, more balanced, higher-return-for-the-risk-taken portfolio. In our view, this more than compensates risk parity investors for the necessity of employing some leverage. Let's first step back and consider the basics.

We believe that to be called a risk parity strategy there are two crucial ingredients:

- 1 Asset allocation must be balanced by risk, not by dollars. There is no requirement for exact parity, that's a marketing term, but the bias should be toward risk balance among asset classes.
- 2 If, and this will most commonly be the case, after your best efforts at balancing risk across the asset classes, your expected return is too low, leverage should be applied to this portfolio rather than changing the allocation toward higher-return asset classes. With risk parity we take the risk we need by making the "best" portfolio risky enough with leverage. The traditional approach takes the risk it needs by departing from this "best" portfolio and instead concentrating the portfolio into risky assets.

In 1, no agreement on how to measure risk is necessary for different investors to rightly claim to be doing risk parity (just like different investors legitimately pursuing "value" investing won't share the precise same methodology or current views). One investor can believe risk is best approximated by estimates of volatility, another by more left tail sensitive measures. One investor can be purely quantitative when assessing risk, another can apply any degree of subjective judgment. One investor can vary their risk estimates through time, while another can eschew short-term estimates. All can fall under "risk parity" — except the investors who think of balance and diversification, as is so often the case, only by dollar allocation. By doing this, they ignore, literally or effectively, the fact that if you put half your money in an asset that's much riskier than the other half, you are not a risk-balanced investor (i.e., you ain't "50/50").

In 2, leverage is used only after deciding on the best unlevered portfolio. This is not some newfangled idea. Rather, it's among the earliest and most established ideas in finance. If you have a view on what's the best risk-adjusted return portfolio and you desire more return, there are only two ways to get there at the asset class level: you can sell low-risk to buy high-risk assets; or you can lever the best unlevered portfolio. Basic theory favors the latter, which retains the best portfolio, while the former moves away from it. In other words, to get more expected return without leverage you must get less diversified and more concentrated in the riskier asset classes.

The best unlevered portfolio tends to differ systematically from traditional portfolios. The risk parity portfolio almost always has more weight in lower-risk assets (like bonds) and better diversifiers (like commodities, which may be risky viewed alone but don't add as much risk in a portfolio context); and less weight in the aggressive assets that drive conventional portfolios, namely equities. In other work we have discussed why we believe more risk balanced allocations are superior (see Asness, Frazzini and Pedersen, "[Leverage Aversion and Risk Parity](#)") with lower risk assets having higher risk-adjusted returns than they "should" have. Ironically, we believe that much of risk parity's benefit arises precisely because investors overly fear the leverage we discuss here (or simply cannot undertake it). Moreover, this same observation, that lower risk assets have higher Sharpe ratios than simple theory says they should, shows up not just across asset classes as we discuss here, but within asset class after asset class (see Frazzini and Pedersen, "[Betting Against Beta](#)"), most famously seen within stocks as the "low-beta" anomaly. While "better balance" is a great way to think about risk parity, it's actually not enough to believe in it. You need a reason why concentrating in equities, the asset that still dominates market-capitalization-weighted portfolios, is not better rewarded (or equivalently why low-risk assets are rewarded more than simple theory would suggest). We believe leverage aversion is just such a reason — simple, intuitive, and strongly supported by long-term data, in- and out-of-sample, from a wide variety of investments.

Putting it starkly, if you start with your opinion of the best risk-adjusted unlevered portfolio you can create, but believe that its expected return is just too low, you have two choices. Both are forms of risk. Nobody should tell you otherwise. One choice is take on the risks that come with leveraging that portfolio. The other choice is to take on the risk of concentration — in this case, most often concentration in the riskiest asset, namely equities. The first is the risk chosen by investors preferring risk parity. The second is the risk investors in traditional portfolios often take, perhaps without consciously choosing to do so.

We do not think leverage is riskless. Run screaming from anyone who believes that. We simply believe, in moderation, leverage is a better risk to take in pursuit of higher returns than is the risk of concentration. Moreover, basic economics says that for the same risk taken, leveraging the best unlevered portfolio should gain you extra return versus concentrating in the best single asset class. In other words,

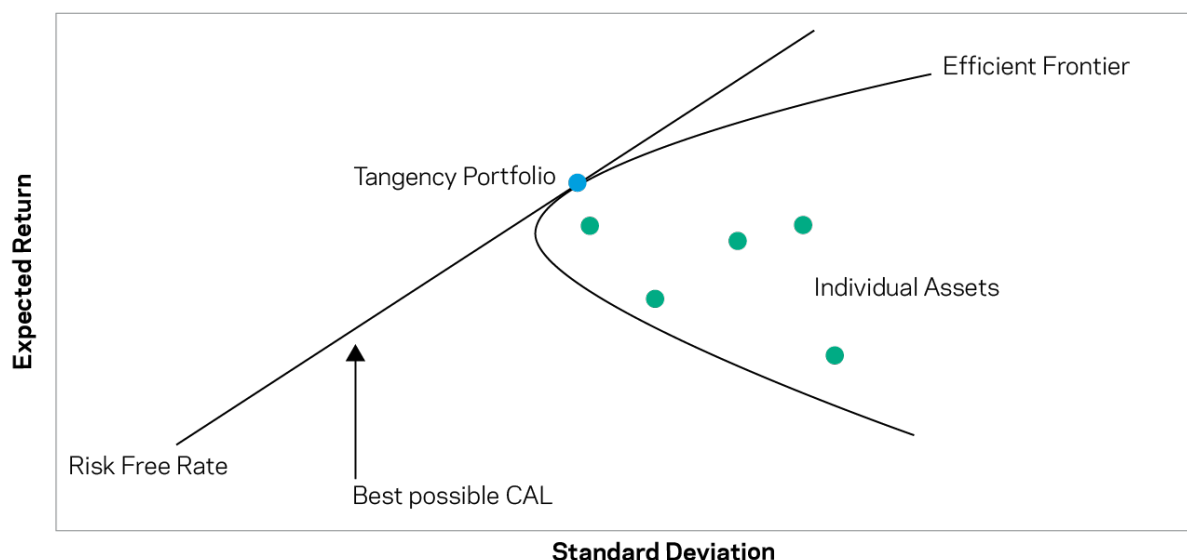
both leverage and concentration are risks, but we believe leverage is more manageable than concentration, and you get rewarded for it with a higher expected return. There is little you can do to manage concentration risk, save pray it doesn't kill you.

Even radical efficient marketers accept that leveraging the best portfolio is the way to go (though they'd probably prefer to lever a capitalization-weighted portfolio) if more expected return is needed and more risk acceptable. The power of diversification — given up by those who chose concentration, but harnessed by those who lever their best portfolio — is close to the only thing generally agreed upon in finance. Taking risks is what long-term investors do, and again, leverage is a risk. However, taking unmanageable poorly rewarded risks, like long-term concentration in one risky asset class, is not a good idea for anyone.

Now, let's talk about some specifics regarding leverage that often come up in discussions:

- Risk parity is often referred to as a “levered bet on bonds.” It's more accurate to think of risk parity as leveraging an entire diversified portfolio (equities, bonds, commodities, etc.). Bonds get a bigger role in risk parity versus traditional portfolios before leverage is ever applied (because of our belief and long-term empirics that lower-risk assets have higher risk-adjusted returns than they “should” have). It's to this assumed best portfolio, not to bonds alone, that leverage is applied.
- Leverage is not used simply to get more aggressive. It's used to balance risks better across the asset classes. After that's accomplished, it's used to get as aggressive as desired, usually only getting back to the risk of more traditional allocations like the canonical 60/40 dollar allocation to stocks and bonds.
- Risk Parity is not based on a radical idea. Far from it. Rather, it's about the oldest and most basic idea in modern finance! If one takes a finance class the famous diagram describing this idea (the efficient frontier) is usually covered in Week 1 or 2... This is not the place to get into the math, but it's not much, and for those who are more visual I share this image obtained from my super-secret sources available only to those high in the echelons of academic finance and money management (i.e., from Wikipedia):

Efficient Frontier



“CAL” stands for “capital asset line” and more discussion of this is not necessary here (though we love to talk about it long into the evening if you're ever up for it).

- “Risk parity” is not a dogma that must be pursued with the entirety of your portfolio or not at all. If you see the appeal of the ideas but also have reservations or real world limitations, the correct action, as it is for all deviations from convention that you believe beneficial, is to move your portfolio toward risk balance, a lot or a little depending on the strength of the appeal.
- Excessive leverage is dangerous, but unlike the concentration, there are things you can do to ameliorate and manage leverage risk. You can and should decide how much is acceptable. You can and should consider the liquidity of your assets and stability of your financing carefully (leverage plus illiquidity is the combination we'd be cautious about). You can, and we believe you should, reduce leverage when market risk (however you estimate it) gets higher and increase leverage up to a prudent preset maximum when market risk gets lower. You can, and we believe you should, reduce leverage when losses have been severe (and all investors have a breaking point where they will do so; anything else is kidding yourself). Having a plan to systematically reduce leverage in the face of severe losses, and systemically add it back when things start to get better (which we think is actually the harder part!) is a much better plan than reducing leverage only when your back is against the wall and the decision is forced and likely expensive. Furthermore, such a strategy is historically little to no drag on returns (you miss about as many continued losses as gains) even versus the nearly impossible strategy of never cutting leverage. Most importantly, we believe these actions will allow an investor to stick with a good strategy that might otherwise be abandoned near the bottom (and who hasn't done that? We have!), and thus we believe this policy will actually add to practical realizable return over time.
- Leverage may appear particularly dangerous to some right now as bond yields are historically low. We certainly don't argue with the

observation that bond yields, nominal and real, are low. But we believe equity valuations measured versus the appropriate long-term are about as expensive as bond yields are low, and the yield curve is still reasonably steep giving bonds a boost unless rates rise very sharply. While we wish everything were cheap instead of everything expensive, this is a problem for all investors, and all portfolios. This is not specific to risk parity, and shouldn't and doesn't change our forecast that risk parity will, on average, still outperform traditional concentrated asset allocations. We wish we were better short-term market timers, but we're not (and we are cynical about any claiming to be great at this). So barring extreme evidence, we stick with our long-term views, from theory and long-term data, that the risk-adjusted return of each asset class is broadly similar, even if we believe they are all lower than their own average going forward right now.

By-the-way, risk parity — that is, leveraging the best risk balanced portfolio instead of concentrating in the best asset — is actually not dependent on falling interest rates, or even doomed if rates rise. It outperforms back to 1926, which includes a massive 90-year near-round-trip in interest rates (and since 1947, which includes a near-exact round trip in rates). In contrast, during this period equities experienced significant multiple expansion. Therefore, this period should be somewhat biased to favor equities over other assets like bonds. However, it turns out that the power of diversification in risk parity overcomes even this period-specific bias against it.

Furthermore, [simple simulations](#) show that risk parity would even have outperformed during long periods of rising rates (from the superior diversification and the fact that bonds can still deliver a positive return even when rates rise modestly). Admittedly, risk parity underperforms concentrated equity-risk portfolios in times of very sharply rising rates, more so when following flat yield curves. More generally, it underperforms when equities outperform everything else by a lot. Conversely, traditional portfolios underperform risk parity in times of crashing equity prices (or equities underperforming everything else by a lot). What matters is that basic economics, and the simulated and real-life evidence, both give the edge to risk parity over the long haul, and we believe timing these short sharp periods of risk parity underperformance (not just saying “rates will rise one day”) is very difficult.

- The track record for the use of leverage in risk parity, in [simulations](#), and in the important real life crucible of the 2007–09 financial crisis, supports our contention that leverage is manageable, and ultimately no riskier than a comparable (in risk terms) equity concentration. But, that risk must indeed be managed (as it was in 2007–09).

Of course, there are times you can point to risk parity underperforming, like the second quarter of 2013, but there are also many (in fact more) times you can point to it outperforming. While correlated to traditional allocations, risk parity doesn't follow the same return path. That's obviously the idea! While all periods should be examined, and the short-term must be survivable, all strategies will have periods of both relative and absolute underperformance, some quite painful. We find this at least as true for traditional portfolios as it is for risk parity, and encourage everyone to examine the very long-term records, including the many short-term events that have happened along the way, not focus on one bad period (absolute or relative) for either strategy.

- One of the arguments against risk parity and other quantitative techniques that attempt to balance risk and return is “you can't eat Sharpe ratio.” This leads to the “stocks for the long run” idea that equity concentration, generating a high expected return but not the best Sharpe ratio, is not really a risk to the very long-term because the high expected return on stocks will eventually bail you out of any hole dug by the horrendous crashes or lost decades. Well, with moderate leverage, a better Sharpe ratio actually makes a fine meal. It gives you the high expected return you get from equities along with the benefits of a higher Sharpe ratio. Same bail out, smaller holes (or same holes, bigger bail out!). It monetizes the gain from lower and more predictable volatility so you can extract more cash flow from your portfolio, or see it grow faster. Risk parity uses leverage because the goal is real, tangible, spendable portfolio performance, not winning an award for the best Sharpe ratio (though if they have such an award it should be called “The Sharpies” and be sponsored by the marker people).

Even if one does not believe, as we do, that the “best” portfolio is more balanced than traditional allocations, this logic still applies. We believe an investor would, for instance, be better off applying mild (in this case very mild) leverage to the traditional 60/40 portfolio rather than moving to all equities (in fact, we've been making this argument for quite a while now — see [Why Not 100% Equities](#)). Again, risk parity is not a theoretical exercise. Rather, it's about expecting to end up with more money!

There are no guarantees, and that of course applies to risk parity, and any strategy, over even the long-term. We believe it offers a modest but real long-term edge versus traditional approaches and that it is diversifying, and we do not believe current times are an actionable exception to this long-term truth. But, we try not to overstate our case. A “modest” edge means risk parity can have long tough periods in both absolute (sometimes all investments stink) and relative (to equities or equity dominated portfolios) terms. Having said that, again, that goes both ways, as the same is true for traditional allocations. Unless you can time the market with great precision or have very low return goals that allow you the luxury of taking very little risk, you must face long tough periods whatever you do.

Remember, saying things like “rates will someday go up a lot” is not enough to predict that risk parity will underperform. To predict this, you must correctly forecast a sharp jump in rates soon that also doesn't overly hurt stocks or help commodities. That scenario is possible, of course, but it's only one of many possibilities, including the possibility that not much changes in the near future. Unless you can make specific, accurate forecasts that include getting the timing right (that is the aspect most often forgotten) we do not think you can overcome the long-term advantages of better diversification made possible by using leverage to balance the asset classes and to achieve desired expected returns, the basics of risk parity. There is no riskless way to achieve your goals through asset allocation, specifically a return goal that is above that offered by low risk assets. You can concentrate in the higher risk/return asset, usually equities, as is so common, or you can use risk parity and some modest leverage to spread your bets more widely and get there, we believe, with more long-term reliability.

We understand there is a comfort to concentrating in equities. When you lose a lot of money, you have a lot of company, and plenty of experts to say it isn't your fault. When risk parity underperforms — and we certainly aren't predicting this for any particular time, either because equities soar or bonds or commodities crash — you'll have only us and a few loyal friends who still like you even when you're (short-term, ex post) wrong. But we believe the drug of equity concentration and the comfort and conformity it brings is purchased at the

expense of long-term portfolio health.

Leverage is a tool. Hidden leverage, unmanaged leverage, excessive leverage and insecure leverage have all sunk many ships. But if used with moderation and care to balance and diversify, not just amplify, and thus build a better portfolio, we believe, and basic financial theory teaches, it is long-term prudent not scary.

P.S. There are of course arguments back and forth about risk-parity that are not focused primarily on leverage. This is not the place to go into them in any depth, but just to mention two we've heard recently:

- 1 A number of recent critiques of risk parity assert that it pursues the inferior goal of forecasting risk and not returns. This is the market timing discussion again in different form. As discussed above we would agree that if you can forecast returns accurately (and timely) enough to offset the benefits of diversification, by all means use those forecasts to tilt your portfolio to favor the better assets. A number of risk parity funds attempt this very thing. We believe risk parity is a better strategic starting point than traditional portfolios, but tactical skill, if it exists, can be used on top of either. Those arguing against risk parity along this line are bringing a tactical argument to a strategic fight. Of course, a fortune teller beats an actuary every time, if you find an accurate fortune teller!
- 2 Some have argued that equities look better, and earn back some of their dominant role in a portfolio, if we greatly lengthen the holding periods we examine. First, we wish we had nearly enough data to determine if that's true (we don't get to see a whole lot of very long term periods). In academia the long-term mean reversion of equity returns (which cause equity volatility to rise slower than it otherwise would over time) is far from a settled subject. Second, while we think a 20-year unwavering holding period is something to aspire to, and even then still don't have enough evidence to evaluate this issue, we believe most investors in the real world would be quite happy to have enhanced returns for the risk taken, with risk measured over the more realistic, but still multiyear, time horizons we all must live through and survive.

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