

# THE GREAT RISK/RETURN INVERSION - WHO LOSES OUT?

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Risk and return go hand in hand as companion variables central to the teaching and practice of economics and finance. Standard theory and common sense both dictate that high risk assets should offer higher returns than low risk ones. Yet studies of long-run equity and bond returns across all major securities markets have repeatedly shown the opposite to be true. Only some widespread and deep-rooted malfunction could account for an inversion of this basic relationship on such an extraordinary scale. We report a new theoretical explanation based on the commonplace practice of benchmarking asset managers' performance to a market cap index.<sup>1</sup>

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## STANDARD THEORY AND EVIDENCE

Purchasers of high risk assets expect to receive extra return to compensate for the additional risk. If that were not true and low or zero risk assets produced the best returns, who in their right mind would trouble to invest in these high risk assets? So a positive correlation between risk and return is integral to both theory and practice. At the everyday level, a bank will offer high risk/high return products for the bold and young, and low risk/low return ones for the cautious and elderly. Pension trustees will be advised by their consultants to select a mix of assets that offers the best return for the risk level commensurate with the maturity of the scheme. There is no hint that the highest returns might come from taking the least risk. Meanwhile corporate treasurers expect to pay a higher cost of capital if they increase leverage and make equity earnings more volatile. They will also apply a higher discount rate to their most risky projects.

Standard finance theory, as developed in the 1960s, teaches that the riskiness of an asset determines its price. The risk that matters is the variability of an asset's

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<sup>1</sup> "Asset Management Contracts and Equilibrium Prices" Buffa, Vayanos, and Woolley, working paper 2014, <http://personal.lse.ac.uk/vayanos/WPapers/AMCEP.pdf>

price that cannot be diversified away and that is its variability in relation to the market as a whole. The Capital Asset Pricing model predicts that the required return, and therefore an asset's price, will be directly proportional to its market-related risk, or "beta". High beta stocks should unequivocally deliver higher returns than low beta stocks.

Early studies, such as Black et al (1972), failed to corroborate the theory's prediction, showing either that there was no observable link between beta and return, or that the correlation was inverse. The authors explained their finding by pointing to borrowing constraints faced by some investors, such as mutual funds, who sought instead to leverage their portfolios by buying high beta stocks, forcing up prices and lowering their returns.

A new and more extensive study, Frazzini and Pedersen (2012), reports similar findings based on 80 years of data on US stocks and 23 years of available data in 19 international markets. They show that an inverse relationship has prevailed not only between beta and return, but between total volatility and return and come to the same conclusions as Black et al on the causes. The paper reports similar findings for other asset classes such as US Treasuries and corporate borrowings.

Table 1 shows just how significant this distortion is to the investor in the raw returns, let alone on a risk-adjusted basis.

Table 1: Beta Anomaly

| US Equities, 1970-2011 |        |      |                      |
|------------------------|--------|------|----------------------|
| % Quartiles            | Return | Risk | Risk-adjusted return |
| Low beta               | 10.6   | 12.5 | 0.85                 |
| High beta              | 7.2    | 24.5 | 0.29                 |

| Global Equities, 1984 -2011 |        |      |                      |
|-----------------------------|--------|------|----------------------|
| % Quartiles                 | Return | Risk | Risk-adjusted return |
| Low beta                    | 10.1   | 11.9 | 0.85                 |
| High beta                   | 4.1    | 24.6 | 0.16                 |

Source: GMO

The leverage explanation can account for some flattening out of the positive relationship between beta and return but not for its complete inversion. Even leverage-constrained investors would shun high-beta securities if these were to

yield lower expected returns than low beta ones. There must be something else going on, such as basic flaw in the way investors are going about their business, to account for a distortion of this magnitude and persistence.

Buffa, Vayanos and Woolley (2014) develop an analytical framework showing how the inversion arises from the commonplace practice of benchmarking. The analysis builds upon work in an earlier paper showing that asset prices are determined not only by cash flows, but also by the flows of funds among market participants (Vayanos and Woolley, 2013). The new paper shows that when investors use a measure of relative performance that reflects their collective actions, such as market cap-based indexes or peer group performance, incentives and valuations become distorted to the detriment of private returns and economic prosperity.

## ANALYSIS OF BENCHMARKING

Fund management these days is mostly conducted by professional managers (agents) acting for asset owners (principals). The delegation process creates what is known as asymmetric information: the agents have better information and different objectives than the principals and the principals are uncertain of the competence and diligence of agents. The appointment contract drawn up between the two parties seeks to minimize these agency frictions and at the same time provide appropriate incentives to the manager. In practice, neither side may think of the process in these precise terms and are simply following convention, but this is what is happening.

The seemingly obvious solution is to benchmark the portfolio to an appropriate market cap index, including constraints on the margin by which the annual returns may diverge from index returns. A typical instruction would be for the manager to aim for rolling returns four percentage points over benchmark returns, subject to an annual tracking error (standard deviation) of plus/minus six percentage points. Such terms limit the damage potentially done by an incompetent manager taking excessive risk. This also has the advantage of comparing the return of the fund with that of the default option of a passive investment in the index. For the fund manager, it provides a well-defined objective and a clear basis for measuring his contribution and determining any performance-related fee. It is therefore an optimal contract that strikes a mutually acceptable balance between the risk and return objectives of both sides.

To comply with tracking error constraints, the manager must control how far the composition of the portfolio departs from that of the index. He has to be most vigilant of underweight positions in securities with large weights in the index,

especially those with volatile and rising prices. The significance of the last condition is that if a security doubles in price and the investor is half-weight, the mismatch doubles; if he is double-weighted and the price halves, the mismatch halves also. Underweight positions in large, risky securities therefore have the greatest potential to cause the manager grief. The effect is strongest when an investment or industry sector is involved as in the Tech bubble of 1999/2000, or an entire asset class as in the Japanese equities bubble of the late 1980s.

Buffa et al (2014) provides a formal framework for studying how investment contracts impact and interact with asset prices. Rather than taking the two stages separately and specifying the contract exogenously, this is done as a joint determination of fund manager contracts, including fee structure, and the formation of equilibrium market prices. Prices find their level given the contracts and contracts are optimal given prices.

The model, which comprises asset owners, managers, and multiple securities, traces in detail how benchmarking pressures distort prices. A positive earnings shock for a security or sector causes prices to rise to a new and higher valuation level. Managers who were underweight to start with now find their mismatch has increased and need to make additional purchases to satisfy their tracking constraint. This describes the plight of value managers forced to buy bubble stocks they know to be over-priced. There is no such pressure on managers with overweight positions because they have gained a contribution to their target return and have encountered no tracking error concerns. The initial price rise to the new valuation level is thus amplified, making these stocks both more expensive and more volatile. There is an opposing force upon stocks suffering negative shocks but the effect is stronger for stocks that increase in price because they account for a larger fraction of market movements.

This is all captured in the general equilibrium framework of the model which shows the amplification effects on valuation and volatility. The result is that high beta and high volatility securities become significantly over-priced whereas low beta and low volatility stocks become under-priced. However the first effect is stronger than the second, implying that the overall market becomes permanently over-valued and prone to sectoral bubbles.

## RELATING THEORY TO PRACTICE

The bulk of investment, whether professional or personal, is based on index benchmarks. An alternative is to have performance benchmarked to peer-group funds but these too reflect market cap values and generate similar outcomes. Even where no benchmark is specified, the manager will often protect his commercial

risk by tracking competitors' returns because, in Keynes' words, "wisdom teaches that it is better for reputation to fail conventionally than to succeed unconventionally".

Calibration of the model shows that the effects of benchmarking can be powerful enough to cause inversion of risk and return on the scale observed in empirical studies. The predictions are also in line with the empirical observation of an inverse relationship between a security's return and its total volatility (i.e., market-related plus idiosyncratic risk), as well as between its beta (market-related) and return.

The model shows that when agency frictions increase and managers are accorded less freedom, benchmarking results in an even steeper inversion and a greater propensity for bubbles. There is no clearer demonstration of how asset owners' attempts to reduce their private risks exacerbate the riskiness of the overall market.

One might imagine that there would be plenty of investors eager to exploit the higher returns offered by low risk securities and that their buying should go some way to correcting the distortion. After all, the advantages of "betting against beta" have been well-documented over the years. But unbenchmarked funds are equally attracted by the short-term opportunities offered by the amplification effects created by benchmarked funds. They target the momentum gains on offer from the securities that move the most and are easily traded, which are the same volatile, large cap securities bought by benchmarked funds. Then there are the funds denied borrowing and seeking the leverage of high beta securities, identified by Black and others. In practice therefore, unbenchmarked funds are as likely to compound the inversion as to correct it.

## THE BOTTOM LINE

The analysis shows how benchmarking to market cap indexes distorts incentives and prices across all securities markets. In dealing tidily with the private matter of agency friction, asset owners are unwittingly creating a far greater problem for themselves and for the economy at large. At the individual fund level, benchmarking obliges managers, on average and over time, to commit the largest weights to the least attractive investments, those offering high risk combined with low expected returns.

The relative winners from this are the asset owners who either self-invest or liberate managers from the short-term constraints of tight tracking to market cap benchmarks, and allow them to select portfolios guided only by assessments of

fundamental value. Offset against the higher returns and lower risk come the greater potential for agency problems. These now have to be addressed by a more searching set of criteria that include fuller disclosure by managers about the way they evaluate securities, closer scrutiny of investment strategies, and longer periods for performance assessment and reward.

But the overriding concern is that benchmarking does not merely alter the distribution of wealth among asset owners. Everyone suffers because misallocated capital and asset price bubbles damage the real economy.

## REFERENCES

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