How True Diversification™ Preserves Capital

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August 10, 2009

The bedrock of asset allocation for the last 50 years has been the concept of diversification and the science of mean variance analysis. Mean Variance Optimization (MVO) was, of course, created by Nobel laureate Harry Markowitz. MVO is a quadratic search utility that finds portfolios maximizing the ratio of returns (mean) to variance (usually standard deviation.) As portfolio components combine the portfolio level volatility is reduced because of imperfect correlations among the assets. In this way, MVO uses diversification to create better portfolios. The use of diversification is indirect and is channeled through the assets volatilities. MVO is diversification through risk-colored glasses. Because of this, MVO leaves extra diversification on the table as it favors low volatility assets.

Advancements in diversification measurement and optimization at Gravity Investments have given investors a choice: Optimize for risk? Or optimize for diversification?

What is a better focus for optimization?

First, let us define better. For this research, we define better as more total returns. We assume that everything else is just a means to that end. To avoid bias, we also look at a complete market cycle as the risk, return and diversification relationships shift.

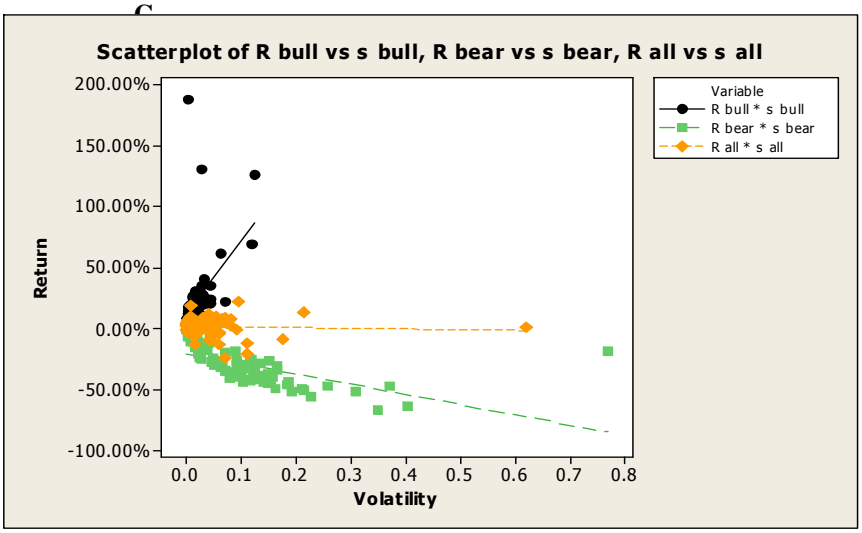
Gravity Investments measures diversification as the Intra-Portfolio Correlation (IPC). This patented measure returns the weighted average of all unique correlations in the portfolio and thus provides a measurement of diversification specifically tuned to systematic risk.

Data: This research was conducted on 95 actual portfolios that United States S.E.C Registered Investment Advisors had in place between the years 2002 and 2009. These advisors volunteered the portfolio information to Gravity Investments as part of their due diligence of the Gravity Investment diversification platform; G-sphere. Qualifying portfolios had assets limited to: US and Canadian equities, US Mutual Funds, ETF's and indices.

The tests were conducted in G-Sphere portfolio diversification platform. We examined the portfolios in three time periods which were bull market period, bear market period, and the whole period (the combination of the bull and bear periods). Dates were judged by the highs and lows in the S&P 500.

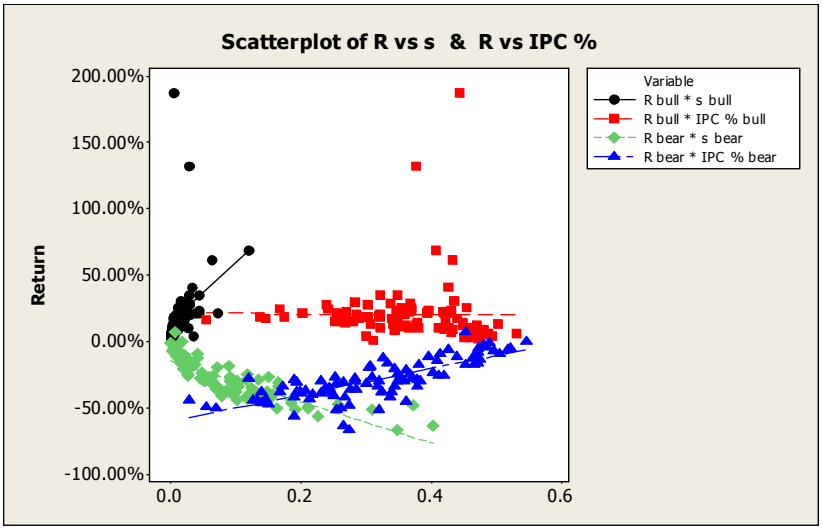
Bull Market:	Bear Market:
10/4/2002 to 10/12/2007	10/12/2007 to 3/6/2009

Analysis: Risk has a significant negative correlation in the bear market. Without a commensurate or larger increase in the relationship of return and risk in the bull market, it is obvious that investors were better off focusing optimization on diversification rather than risk.



In *Chart 1*examine how the risk-return relationships in the bull and bear market cancel each other, as the black and green dots represented bull and bear market respectively. The orange dots which represent the portfolios in the whole period (bull and bear) show a very flat risk-return relationship. The positive correlation assumption about risk and return is not supported across the full market cycle; demonstrating the cancelling effect and questioning the efficacy of risk return relationships as forward positioned decision support.

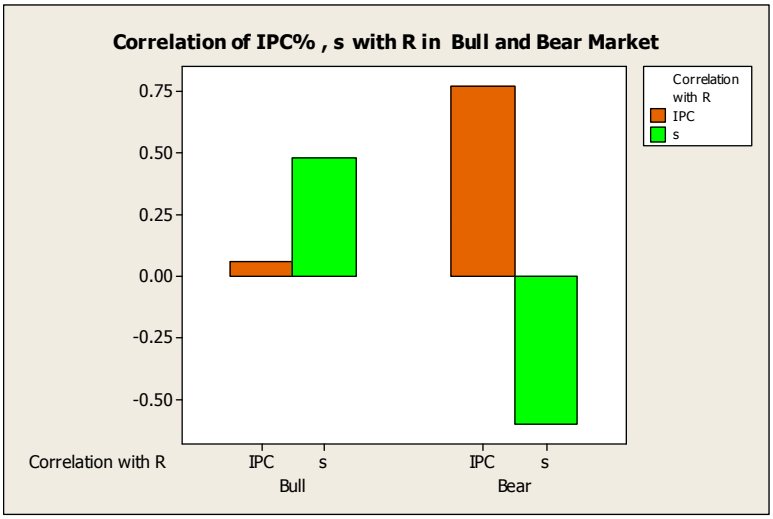
Chart 2:



In *Chart 2*, the red dots display the IPC% in the bull market and the horizontal least squared line shows no significant relationship while the strong upward sloped blue dots show how diversification delivers capital preservation through a bear market.

Because there are no significant relationships between market diversification and returns in the bull market, **the significant and large correlation in the bear market is the first quantitative evidence of a true free lunch impact of diversification.**

Chart 3:



The orange values (IPC%) of the bar chart (*chart 3*) show the strong increase in the relationship of returns and diversifications through the bear market, while the green value (standard deviation) show the overall inconsistency of the risk-return correlation.

Correlation Matrix

	Bull	Bear
IPC	**0.06**	**0.77**
Standard deviation	**0.48**	**-0.6**

A regression test of the relationships produced the following results at the 95 confidence interval. Every input variable which has P-value below 5% is considered highly significant predictor in the model. Only the IPC% and bull market returns have a statistically insignificant result.

Regression Analysis: Bull Market ↑

Return bull versus IPC % bull

Predictor	Coef	P	R-Sq
IPC % bull	0.16	**59%**	0%

Return bull versus σ bull

Regression Analysis: Bear Market ↓

Return bear versus IPC % bear

Predictor	Coef	P	R-Sq
IPC % bear	0.98	**0%**	60%

Return bear versus σ bear

Predictor	Coef	P	R-Sq		Predictor	Coef	P	R-Sq
σ bull	6.12	0%	23%		σ bear	-0.84	0%	36%

The 60% R-Square shown for the IPC%-Return regression test indicate a strong relationship in the bear market. In comparison, standard deviation shows a much weaker relationship in both the bull and bear markets. Based on the weakness of this relationship the traditional practice of using a Markowitz efficient frontier as a menu of portfolios may have dubious merit.

O**ne extra percent of IPC was responsible for protecting 98 basis points of capital during the bear market.** There was no significant relationship between market diversification and returns during the bull market.

Turning to risk we see that an incremental decrease of standard deviation saved 84 basis points during that bear market. However, the risk / return relationship came at a much greater cost than the return / diversification relationship, costing investors 612 BP for every percent that standard deviation was decreased though the bull market.

Summary: Diversification did a better job of preserving capital across a full bull / bear market cycle, providing a significant impact to bear market returns with no cost of the diversification in the bull market. Diversification, not risk, was thus warranted as the focus of portfolio optimization and your asset allocation...free lunch anyone?