# Alternative asset management during market distress

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# Alternative Asset Management

Alternative assets are those with performance independent of market directions.

Their returns come from market movements, but their correlations to market moves are much less than 1.

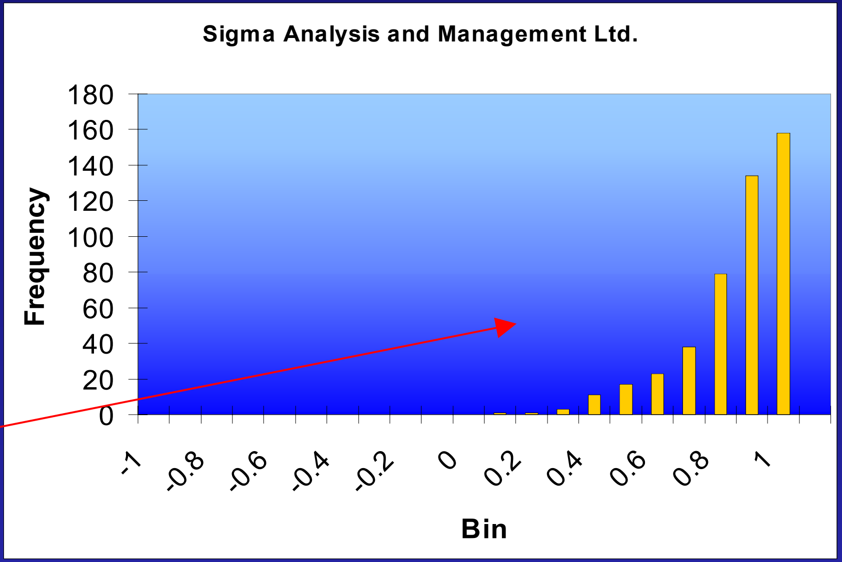
They have been a focal point for investors for almost 100 years, but they are experiencing unprecedented interest in the last 5 years.

Hedge funds and CTA (Commodity Trading Advisors) are considered to be the paradigm of alternative investments today.

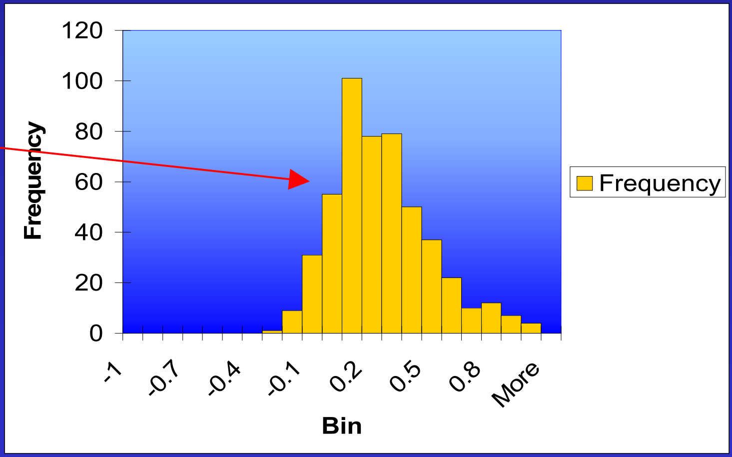
# The fund-of-hedge-fund sales pitch

- Hedge funds are uncorrelated to traditional markets, and to themselves.
- They provide excellent diversification strategies.

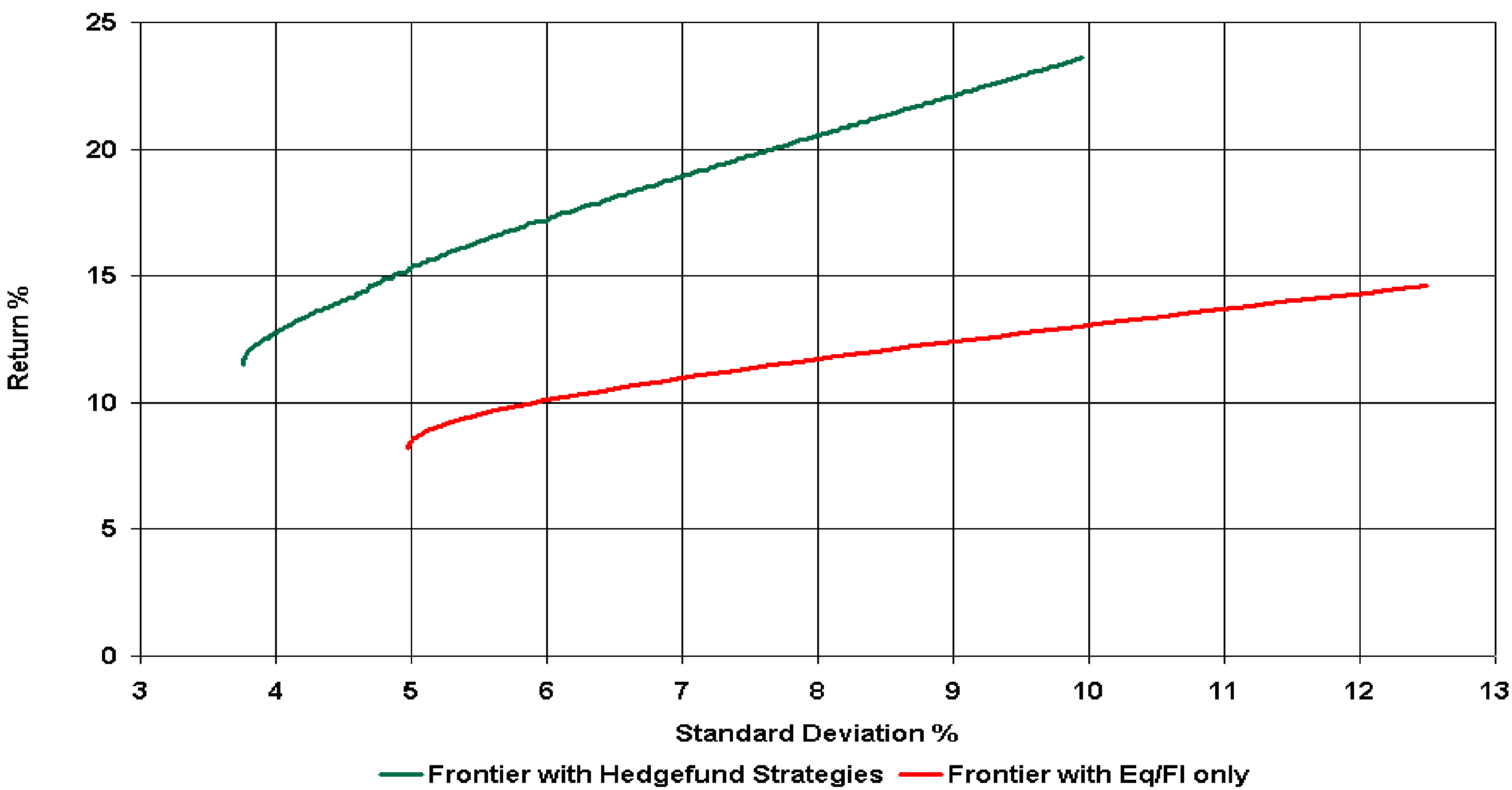
Correlation histogram for Dow stocks




Correlation histogram for hedge funds



# The traditional Markowitz story



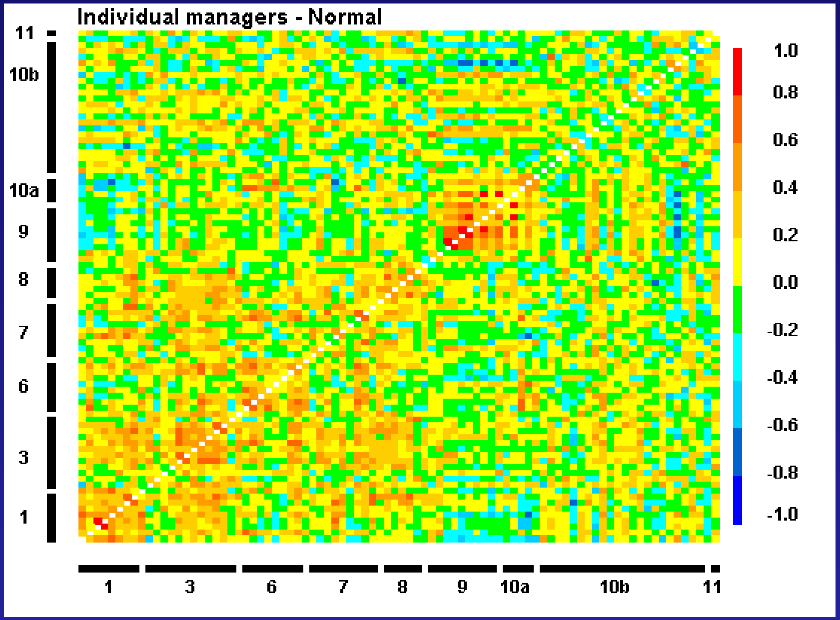
# The reality:

Hedge funds exhibit (at least) two regimes of correlations: normal and distressed.

While correlations in normal market conditions are quite low, they usually switch to very high during periods of market distress.

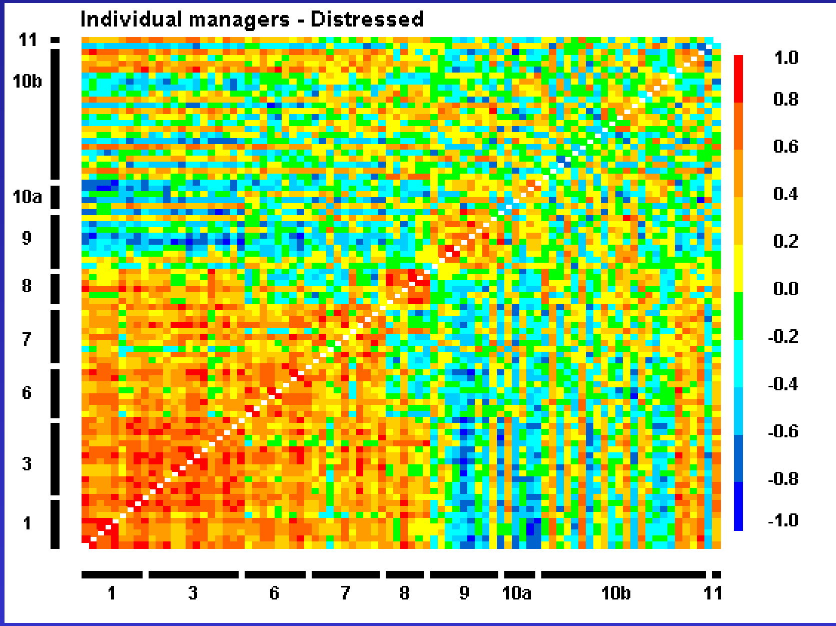
One needs to monitor both kinds of correlations, and make allocation decisions taking both into account.

# Correlation switching




We represent correlation between managers with pixels in a sheet. Each pixel represents a correlation number between the funds, one from each axis.

This is an example of how individual managers change correlations during distress, and how to use this information to classify them into coherent groups



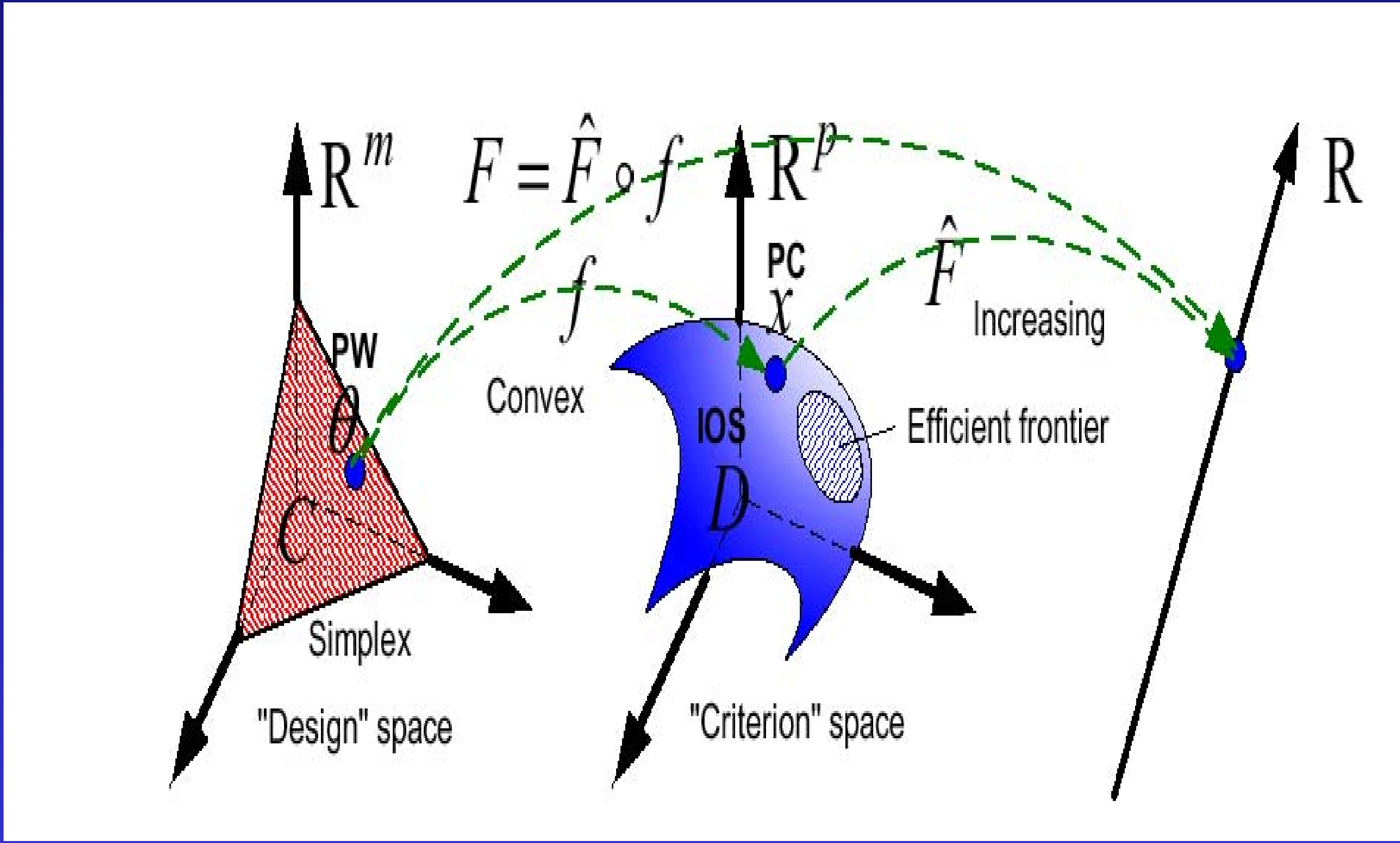
# New portfolio theory

We need a new type of portfolio theory that allows us to account for both types of fund dependence, and perhaps also different return and risk parameters.

We are going to choose a mixture of *multivariate* gaussians, as the probabilistic setting to pose our investment allocation decision.

$$\frac{p e^{-\frac{1}{2}(X-M_1)^t A (X-M_1)}}{\sqrt{\det(2\pi A)}} + \frac{(1-p) e^{-\frac{1}{2}(X-M_2)^t B (X-M_2)}}{\sqrt{\det(2\pi B)}}$$

# A generlized Markowitz picture



# Utility is key

When doing multi-regime Markowitz, having a correct portfolio objective is key:

- In gaussian regimes, Sharpe ratio is equivalent to probability of shortfall and probability of over-performance.

- In a mixture of two gaussian regimes, this is no longer the case.

  - Probability of shortfall works.
  - Probability of over-performance does not work.
  - Convex utility however, works.

# Applications: CFO

A CDO with a fund-of-hedge fund collateral.

A financial structure with equity investors, and lenders; all the assets (equity and bonds) are invested in a portfolio of hedge funds

The lenders earn a spread over interest rates

The equity holder earn the total return of the fund, minus the financing fees.

If the fund drops in value, shareholders lose first, followed by the different bond holders according to the seniority of the bond issues.

# The CFO challenge

The internal leverage within a CFO makes it more vulnerable to deviations from historical scenarios

Sensitivity analysis is crucial to get a complete risk picture.

A key sensitivity that must be used is the increase in distress situations.

Moreover, the underlying fund must be designed with objectives in mind to make the CFO work well as a structure, not just the fund portfolio.

The rating of the underlying bond issues must also take into account potential deviations from historical means of distress components of future markets.

# S&P CTA CFO. A case study.