portfolio construction forum

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Using risk factors to evaluate investments and build portfolios

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Agenda

* Capital Asset Pricing Model
  * Portfolio decisions and Beta
* Multi-factor Models
  * Breaking down alpha and using it for portfolio decisions
* Key Takeouts

Capital Asset Pricing Model

* Capital Asset Pricing Model
  * $R_p - R_f = \underbrace{\beta.(R_m - R_f)}_{\text{Market Risk}} + \underbrace{\alpha + \varepsilon}_{\text{Portfolio-Specific Risk}}$

* Where β is the sensitivity of the expected excess asset returns to the expected excess market returns
  * $\beta = Cov(r_p, r_m) / Var(r_m)$ … r=excess returns over R_f
* α is the average under or over performance… skill or luck
* ε represents the idiosyncratic/non-market/portfolio specific risk in achieving α
* R^2 is the "goodness of fit" of the model...between 0 and 1

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Judging a book by its cover

- What type of funds are each of these?
- What is their Market beta?
- Is there any Alpha?

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Judging a book by its cover

Fund	Alpha (pa)	Beta	R^2
A	2.14%	2.17	95%
E	-2.62%	1.62	96%

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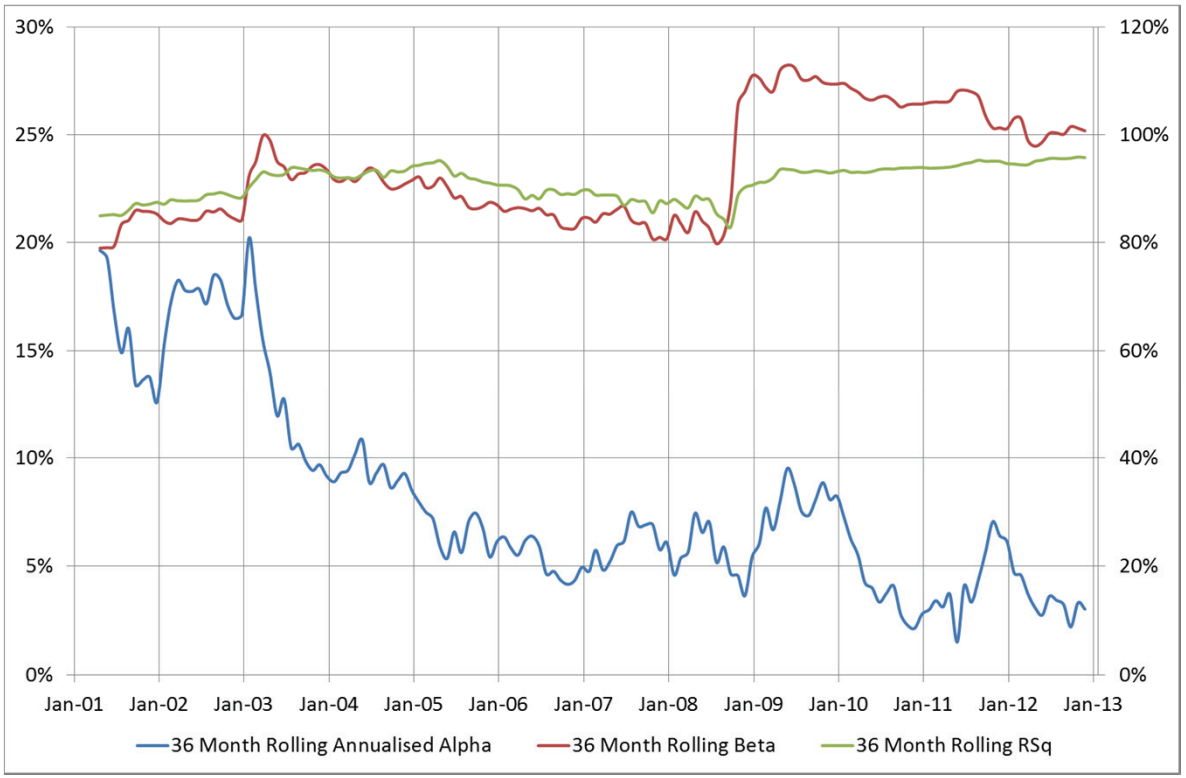
Jack's Fund over Time

MicroCap Benchmark



* What information does this provide?
* Would you choose this fund?

Alpha	Beta	R^2
8.5%	93%	89%

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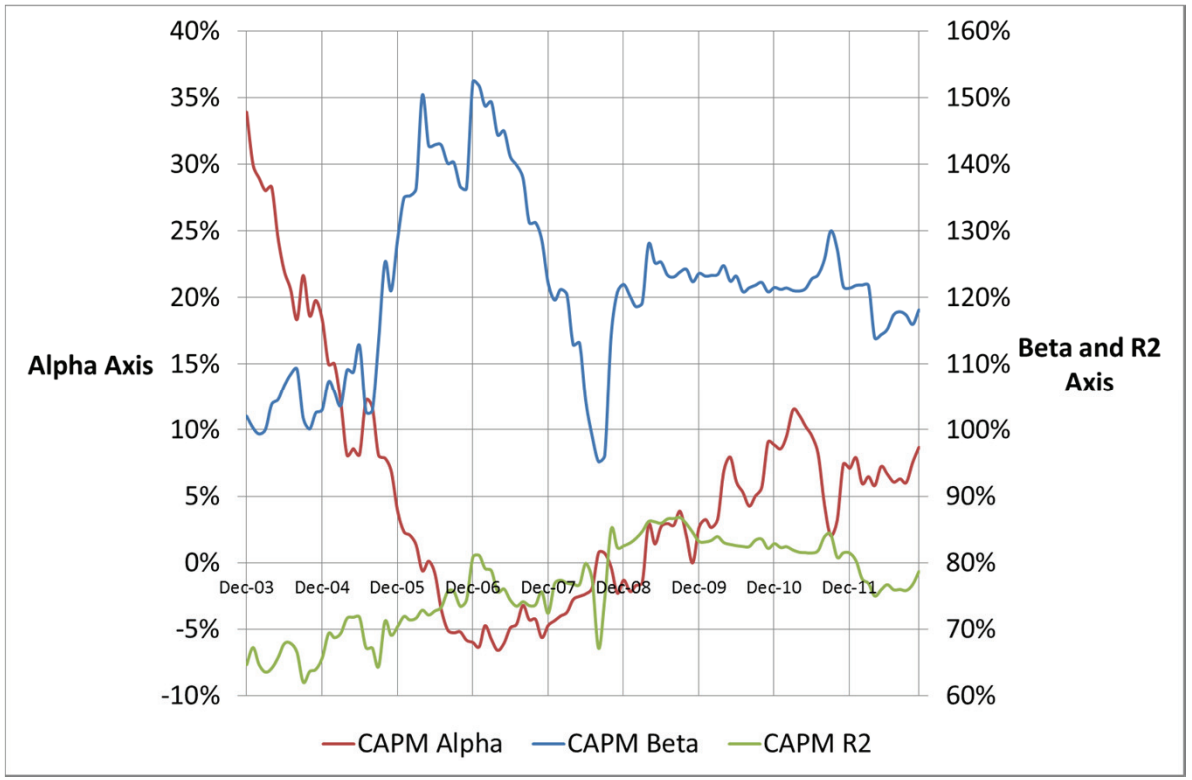
Jack's Fund over Time

MSCI World Benchmark



* But many of us use MSCI World as our Asset Allocation benchmark… would you choose this fund now?

Alpha	Beta	R^2
9.6%	116%	75%

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Multi-Factor Models

* Multi-factor Risk Models
  * $R_p - R_f = \beta_1.(F_1) + \beta_2.(F_2) + \ldots + \beta_n.(F_n) + \alpha + \varepsilon$

Each factor is independent or uncorrelated

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Multi-Factor Models

* Multi-factor Models
  * $R_p - R_f = \beta_1.(F_1) + \beta_2.(F_2) + \ldots + \beta_n.(F_n) + \alpha + \varepsilon$
* Fama-French 3 Factor Model
  * $R_p - R_f = \beta_1.(R_m - R_f) + \beta_2.(HML) + \beta_3.(SMB) + \alpha + \varepsilon$

Each factor is independent or uncorrelated

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Multi-Factor Models

* Multi-factor Models
  * $R_p - R_f = \beta_1.(F_1) + \beta_2.(F_2) + \ldots + \beta_n.(F_n) + \alpha + \varepsilon$
* Fama-French 3 Factor Model
  * $R_p - R_f = \beta_1.(R_m - R_f) + \beta_2.(HML) + \beta_3.(SMB) + \alpha + \varepsilon$
* Carhart 4 Factor Model
  * $R_p - R_f = \beta_1.(R_m - R_f) + \beta_2.(HML) + \beta_3.(SMB) + \beta_4.(WML) + \alpha + \varepsilon$

Each factor is independent or uncorrelated

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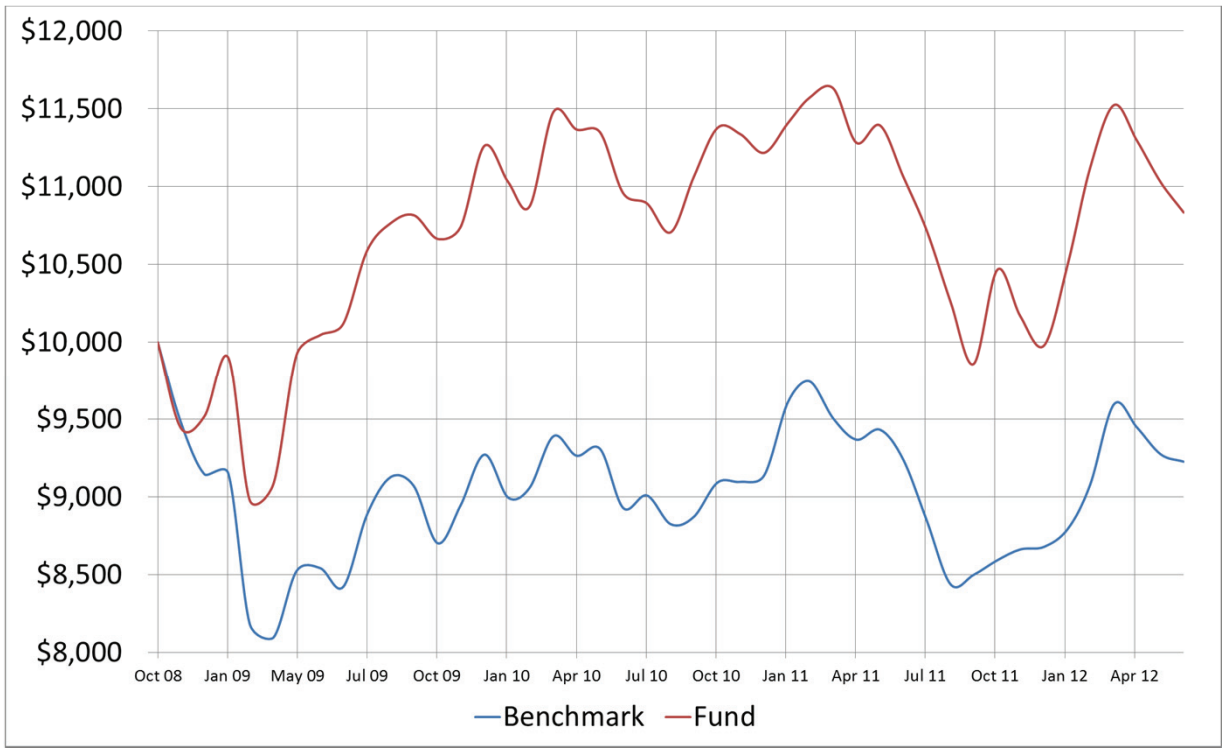
Performance of Global Equity Fund



Alpha	Beta	R^2
3.9%	88%	63%

* Would you invest in this fund?

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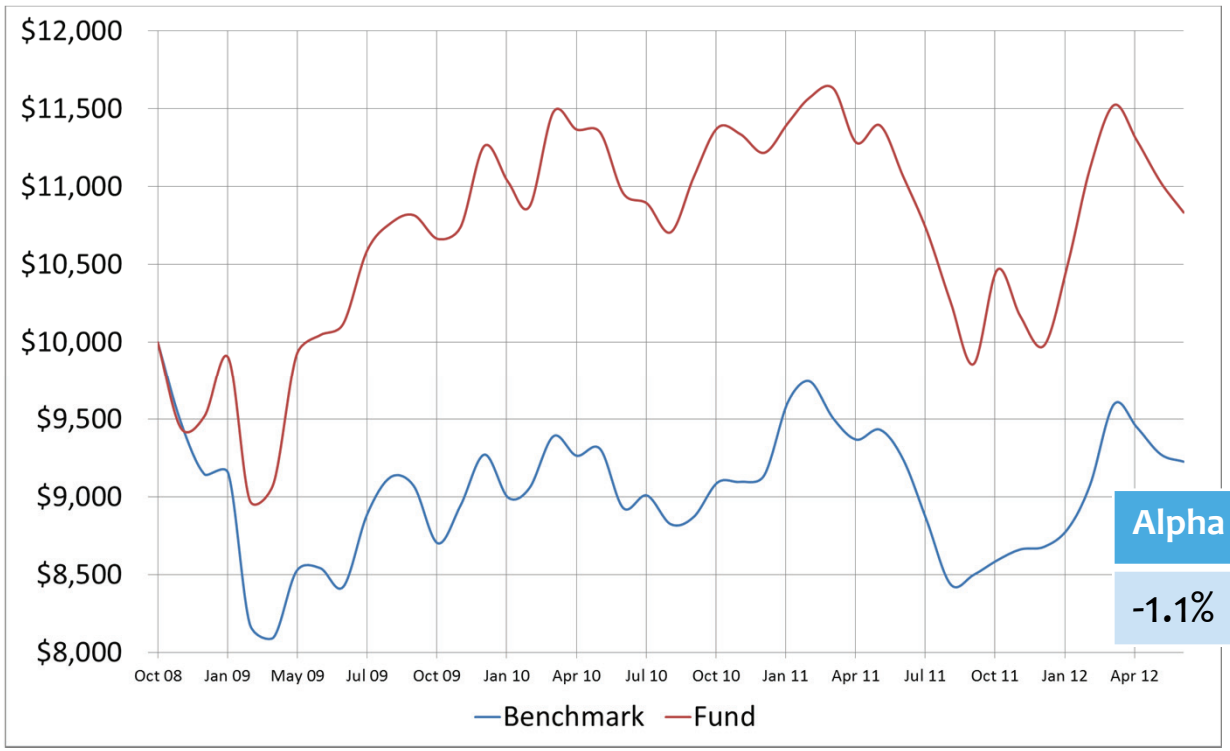
Performance of Global Equity Fund



Alpha	Beta	R^2
3.9%	88%	63%

* Would you invest in this fund?

Alpha	Beta	SMB	VMG	R^2
-1.1%	86%	67%	-31%	78%

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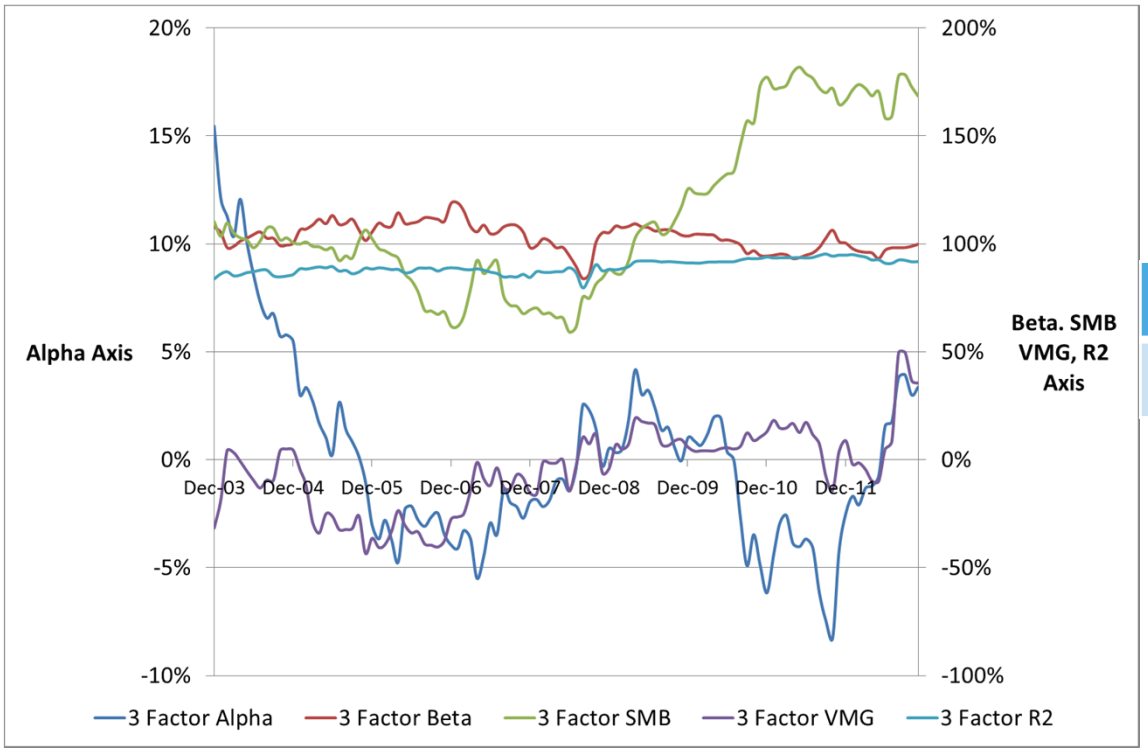
3 Factor Results on Jack's Fund

MSCI World Benchmark



Alpha	Beta	R^2
9.6%	116%	75%

Alpha	Beta	SMB	VMG*	R^2
2.7%	105%	112%	-9.6%	88%

* Would you invest in this fund?
* How should this fund be used in a portfolio?

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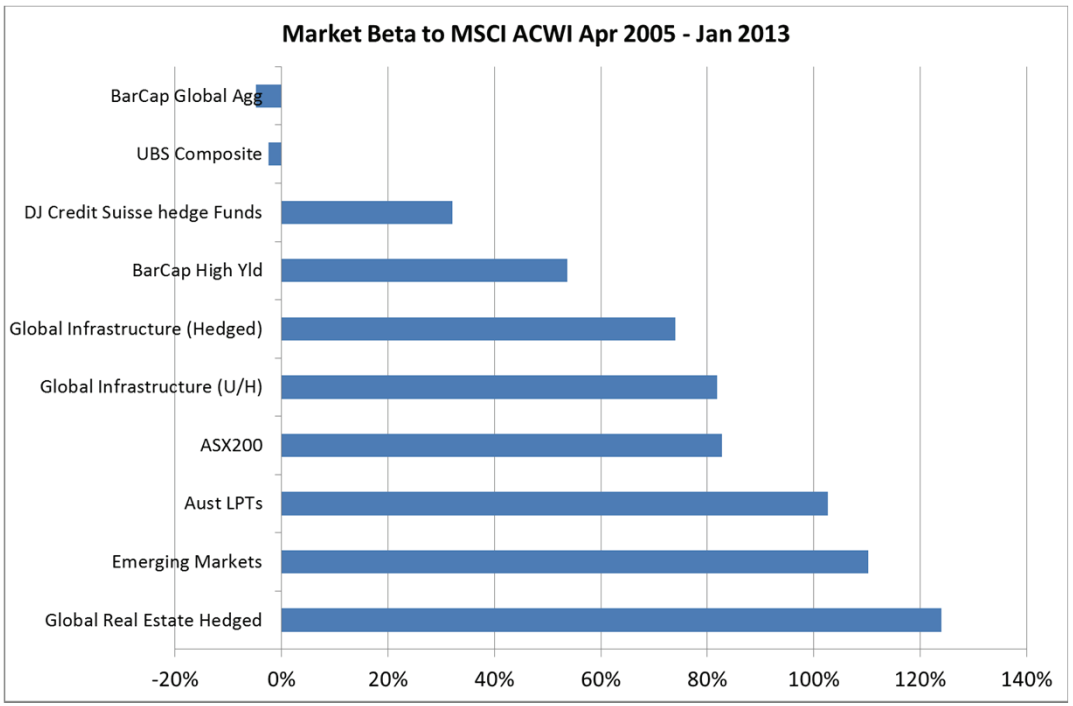
Issues in Portfolio Construction

* Step ~1 – Asset Allocation
  * This is typically a beta decision;
  * Sometimes alpha is sought at the asset allocation level
* Step ~2 – Manager Selection
  * Often introduces numerous risk factors
* Issues?

Asset Class Decisions



* These results support what we already know… that there is equity-type risk from many asset classes.
* Will putting a figure on potential contribution based on the past contribute to better risk management or construction of portfolios?

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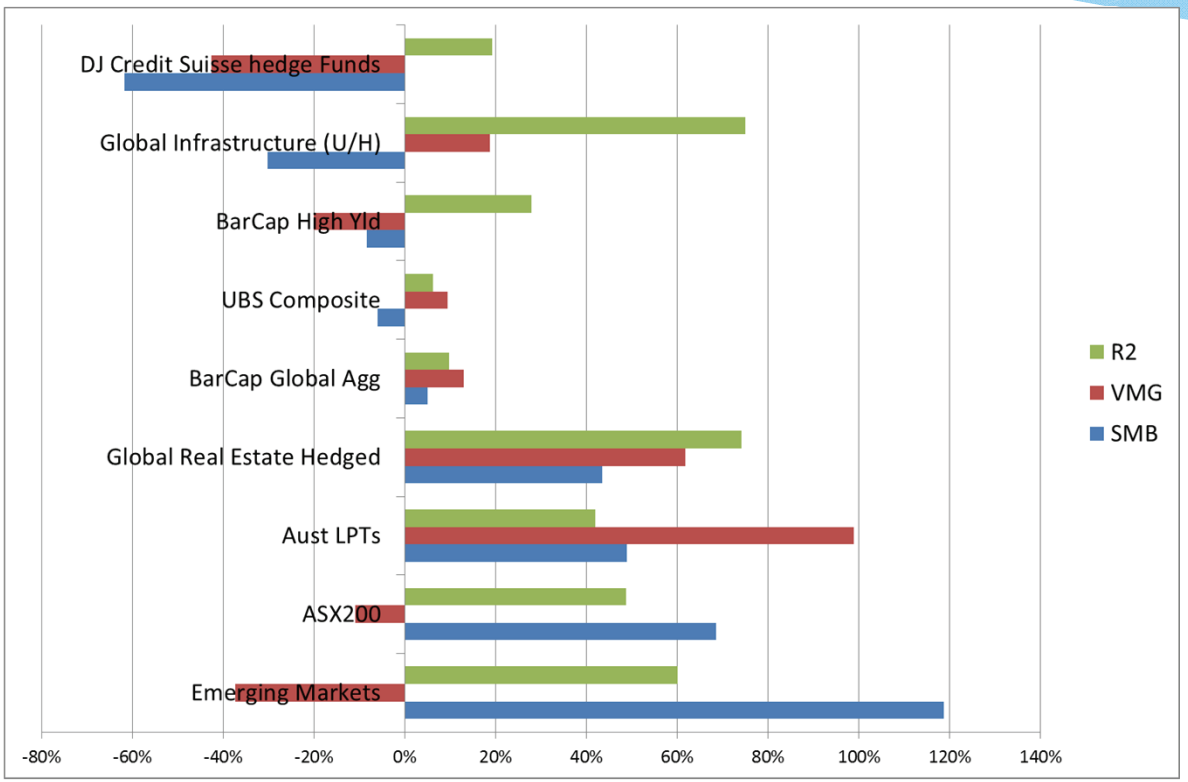
Style and Size Factors

across Asset Classes (MSCI ACWI)



* If you are building a global portfolio with a style or size bias, should you consider the potential impact from other asset classes?

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Key Takeouts

* Discussion

My conclusions

* Asset Allocation
  * The analysis is a guide as to the potential risks and behaviours (e.g. Emerging Markets has behaved like small cap, growth stocks)
* Manager Selection
  * As above
  * Confirms styles and whether 'true to label'
  * Has skill existed?

Thank you

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Lifecycle Investing

Accumulation Decumulation

Pillars for building better quality investor portfolios | PortfolioConstruction.com.au | 21–22 Aug 2013