Delta Factors

Understanding Investment Performance Behaviour

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Delta Factors - Purpose

- Delta Factors is designed to provide insights into a managed fund's past investment performance behaviour
  - It is intentionally designed to compliment fund analysis from qualitative research or simple performance analysis
- It assesses through time
  - A fund's risk profile
  - A fund's style therefore whether it is true to label
  - Indicators of skill via Risk-adjusted value-add metrics
- It does this using time series analysis of:
  - Contribution to overall portfolio risk (R-Squared metrics)
  - Exposures to various factors (Betas)
  - Value-add from style, security selection, and non-market risks (Alphas)

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Delta Factors - Database

- The latest Delta Factors …
  - Analyses more than 1,800 funds drawn from Financial Express
  - Including hedge funds, diversified funds, property, regional, infrastructure, traditional and non-traditional equity asset classes
- This enables apples-and-apples comparisons of various funds to enable better portfolio construction decisions by providing potential answers to the following questions …
  - What is the potential market exposure of adding Infrastructure(Hedge funds, et al.) to a Global Equities asset class?
  - What style factors do non-traditional equity strategies (e.g. long-short, market neutral, et al.) potentially bring to the major equity asset classes?

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Delta Factors - Methodology

- A combination of:
  - Performance Based Style Analysis – William Sharpe
  - Arbitrage Pricing Theory – Stephen Ross

2 of only 4 Wharton Jacobs-Levy Prizewinners for Quantitative Financial Innovation

The Arbitrage Pricing Theory (APT) Model:

$$E(r_j) = r_f + \beta_1 RP_1 + \beta_2 RP_2 + \cdots + \beta_n RP_n$$

Where:

- $E(r_j)$ – Expected return on portfolio
- r_f – Risk-free rate (e.g. RBA rate)
- β_n – Sensitivity of the asset to risk factor
- RP_n – Risk premium associated with factor n

The beta coefficients in the APT model are estimated using linear regression. In general, historical securities returns (e.g. monthly returns) are regressed on the factor to estimate its beta

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6 Factor Definitions - Equities

- **Markets** – MSCI Australia, MSCI Australia IMI, MSCI World, MSCI ACWI, or MSCI Emerging Markets
- **Value minus Growth** (VMG) – This is the value factor and the beta is positive if value style, or negative if growth style.
  - Value securities have low Price/Book, Fwd PE, or high Dividend Yield;
  - Growth securities have high EPS Growth, Revenue growth, and/or Internal growth
- **Small minus Big** (SMB) – This is the Size factor and the beta is positive if the portfolio is biased towards smaller securities and negative for large-cap securities.
  - Size is based on market capitalisation
- **Momentum** – Positive Momentum beta occurs if a portfolio is biased towards holding best performing securities over previous 6/12 months
- **Quality** – Quality securities generally have low levels of debt; positive and consistent profit
- **Minimum Volatility** – Low beta to index, lower volatility than index, Lower cap bias, and boas towards securities with low idiosyncratic risk

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6 Factor Definitions – Equities (Technical)

- **The following factors are calculated for each of the 4 equity markets analysed - i.e. Australia, Emerging Mkts, World, and ACWI**
- **Market**
  - $R_m - R_f$ = Market Return minus Risk-Free rate (RBA Cash Rate)
- **Value minus Growth** (VMG)
  - MSCI Value Index – MSCI Growth Index
- **Small minus Big** (SMB)
  - MSCI Small index – MSCI Large Index
- **Momentum**
  - MSCI Momentum – Market Index (e.g. MSCI World)
  - Adjusted for VMG, SMB, and Quality due to long-run medium correlations
  - After adjustment this factor is uncorrelated/independent to all others from 2004 to latest available data
- **Quality**
  - MSCI Quality – Market Index (e.g. MSCI World)
  - Is adjusted for VMG, SMB, and Momentum due to long-run medium correlations
  - After adjustment this factor is uncorrelated/independent to all others from 2004 to latest available data
- **Min_Vol**
  - MSCI Min_Vol – Market Index (e.g. MSCI World)
  - Is adjusted for VMG, SMB, Momentum, and Quailty due to some correlations and ensure independence
  - After adjustment this factor is uncorrelated/independent to all others from 2004 to latest available data

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2 Factor Definitions (Global Bonds)

- **Market** – Bloomberg Barclays Global Aggregate (Hdg AUD) … this is an investment grade
  global bond index that is generally used for benchmark the global bond asset class
- **Hi-Yield** – Bloomberg Barclays Global High Yield (Hdg AUD) … this is a non-investment grade global bond index. The factor used in Delta Factors is a market neutral application that is represents the return premium of Bloomberg Barclays Global High Yield over the **Market**
- **Other benchmarks used …**
  - **Government Bond Index** … this is the Vanguard International Fixed Interest (Hdg AUD)
    index … this is widely used as a passive alternative to actively managed global bond funds
  - **Australian Market**
    - **Composite** – Bloomberg Ausbond Composite
    - **Duration** – Bloomberg Ausbond Treasury
    - **Credit** – Bloomberg Ausbond Credit
    - **Inflation** – Bloomberg Ausbond Inflation

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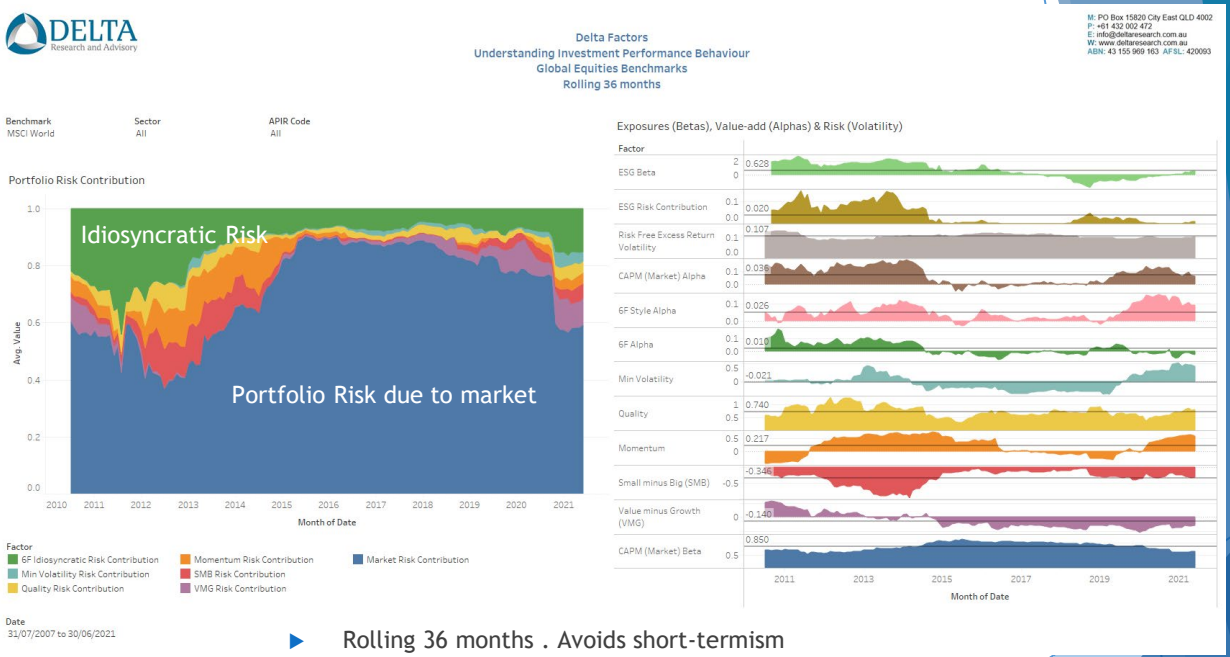
Delta Factors – 6 Factor Example



- Rolling 36 months . Avoids short-termism
- LH Chart – Break-up of portfolio risk (Variance)
- RH Charts – Volatility (Grey), Alphas and Betas

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Delta Factors – Analysis Interpretation

- Portfolio Risk - Left Hand Chart
  - The proportion of market risk (Blue) has been highly variable since inception. Thi strategy has reverted to previous very low levels of market risk and is therefore quite benchmark unaware (i.e. MSCI World)
- Exposures (Betas) – Right Hand Charts
  - Market Beta (Blue) has increased from low (0.6-0.8) to Beta =1 (or market equal risk)
  - Shifted from Value to Growth style over recent years (Purple from positive to negative)
  - Mostly Large Cap (Red is mostly negative)
  - Mostly positive momentum (Orange) but has become contrarian (negative Orange) in recent years
  - Consistent and very strong Quality (Yellow) style
  - ESG Beta and ESG Risk contribution do not indicate strong ESG considerations as part of the investment process
- Value-Add (Alphas) – Right Hand Charts
  - Lower levels of idiosyncratic risk has potentially led to declining security selection/market timing alpha (Green 6F Alpha).
  - Style Alpha (Pink) has consistently been positive and is largely due to strong Quality bias which has produced strong positive alpha since the GFC
  - Market adjusted Alpha (Brown – CAPM Alpha) was around zero from 2015 to early 2019

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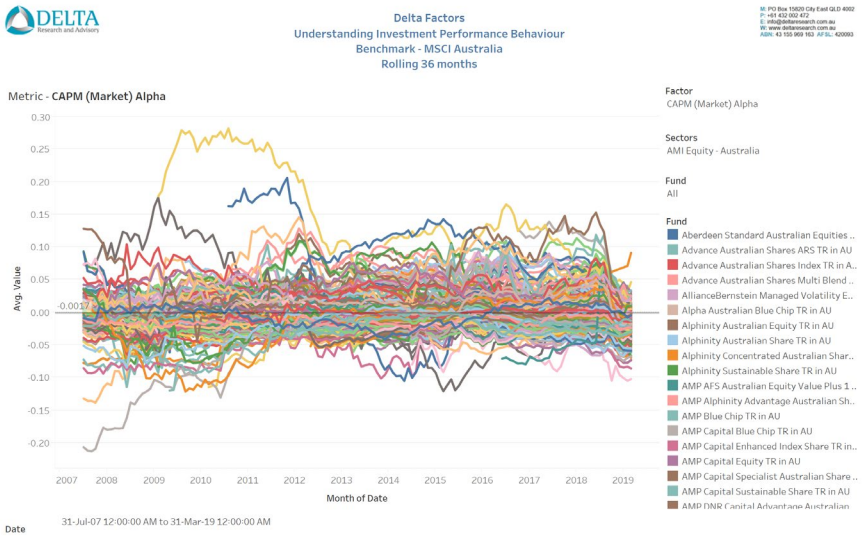
Comparison of Funds across all metrics is also available …



- … and we can easily reduce the number of funds to make it useful!

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Factor Performance

- The following 4 charts show the rolling 36 month performance of all 5 factors for the 4 markets (Australia, World, ACWI, and Emerging Markets)
- It shows that different factors will outperform for long periods of time at different points in time, and may differ between markets

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Factor Performance – MSCI Australia

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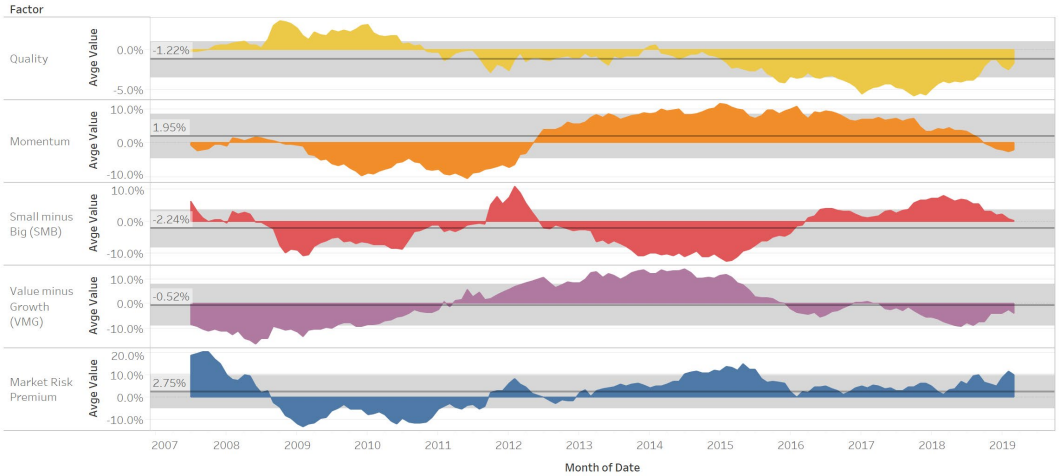
Equity Factor Performance
Source: MSCI, Delta Research & Advisory

Annualised Returns over rolling **36 months** for **MSCI Australia**

Benchmark
MSCI Australia



Date
31-Jul-07 to 31-Mar-19

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Factor Performance – MSCI World

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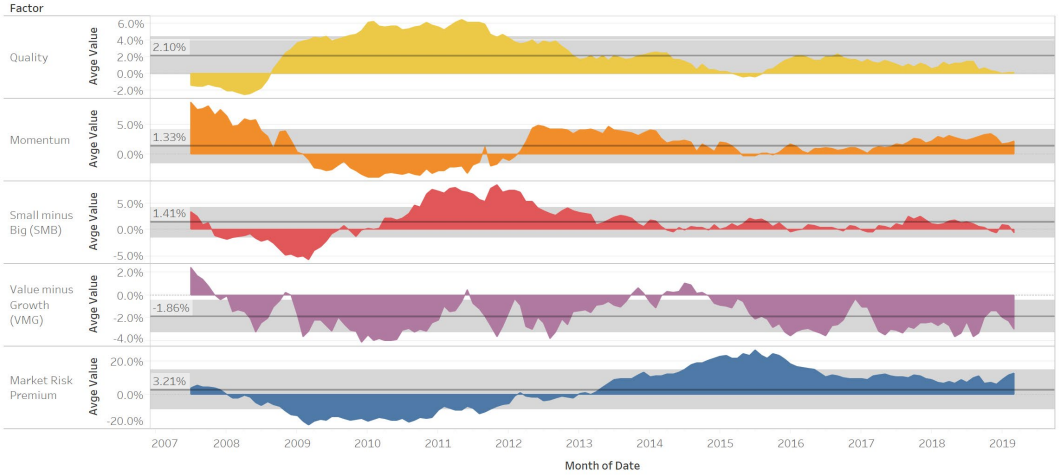
Source: MSCI, Delta Research & Advisory

Annualised Returns over rolling **36 months** for **MSCI World**

Benchmark
MSCI World



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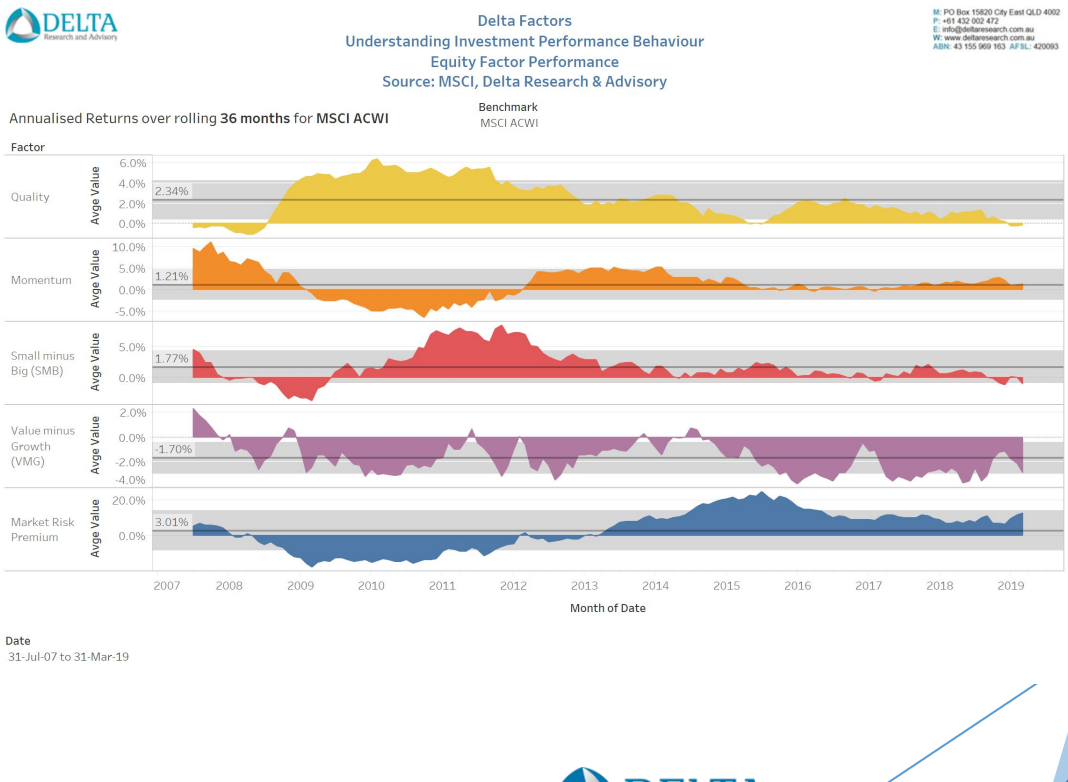
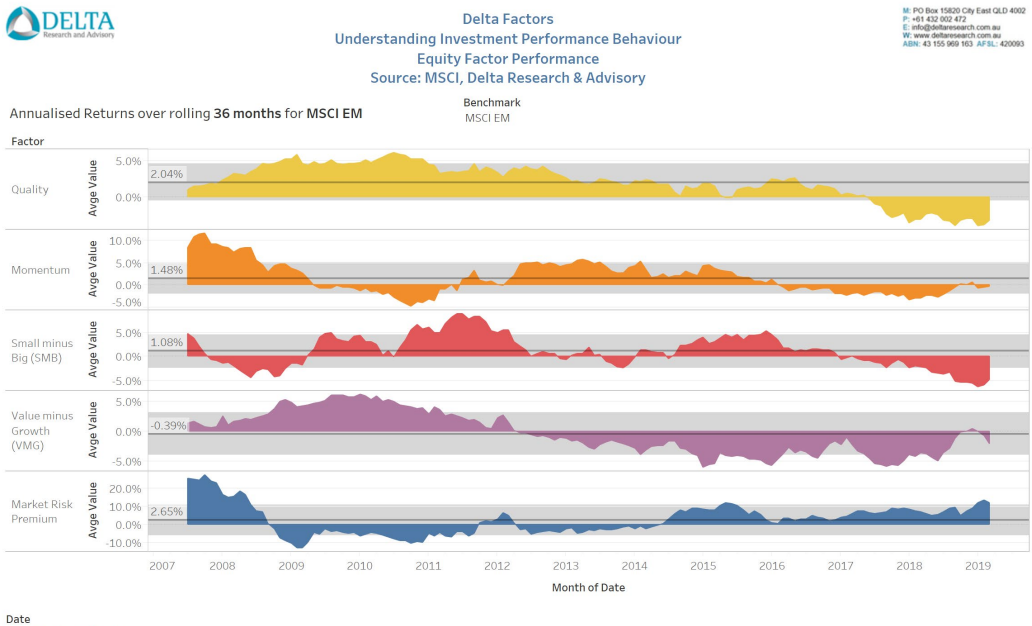
Factor Performance – MSCI ACWI



Factor Performance – MSCI Emerging Mkts



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Thank you

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