

Quality factors and their place in portfolio construction

This paper reviews the usefulness of Quality factors in building a developed market equity portfolio under 3 differing construction methodologies – market cap weighted, equally weighted and total earnings weighted.

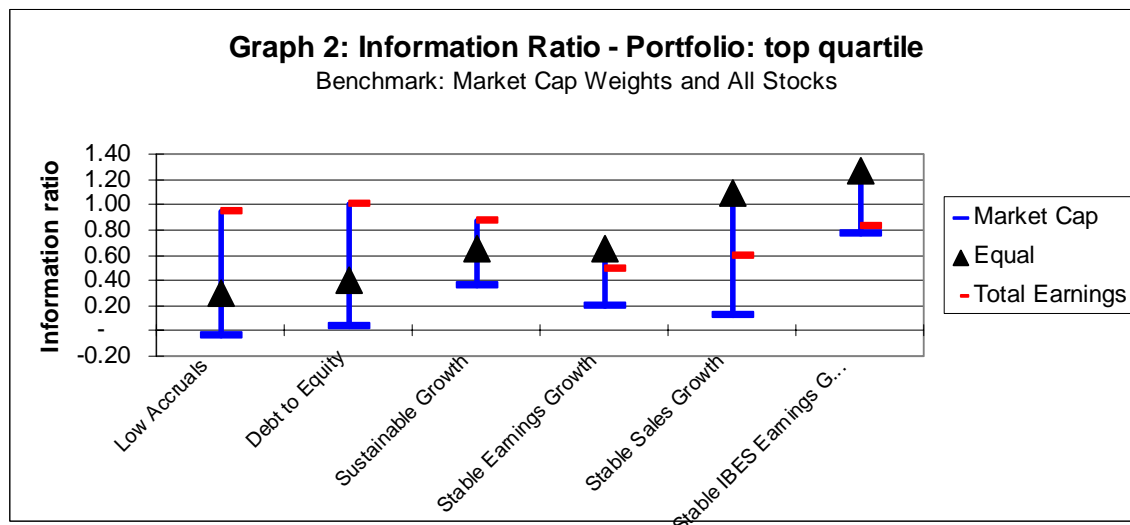
The analysis of a AW Developed World Portfolio was undertaken using Style Research’s Market Analyzer. This product is an internet-based equity research facility designed to specify, run, and statistically verify Style-based and factor-based research enquiries. Further details of the approach used are provided at the end of this paper.

The main findings are:

- Quality factors can be broken into 2 broad groups:

Name	Factors	Correlation to Value	Best Weighting
Balance Sheet Measures	Debt to Equity Low Accruals Sustainable Growth Rate	Negative	Total Earnings
Stability of a factor over time	Stability of Earnings Growth Stability of IBES 12 month Growth Forecast Stability of Sales Growth	Positive	Equal

- In general, top quartile Quality based portfolios added risk adjusted returns to a market portfolio over the last 20 years as graph 2 shows:

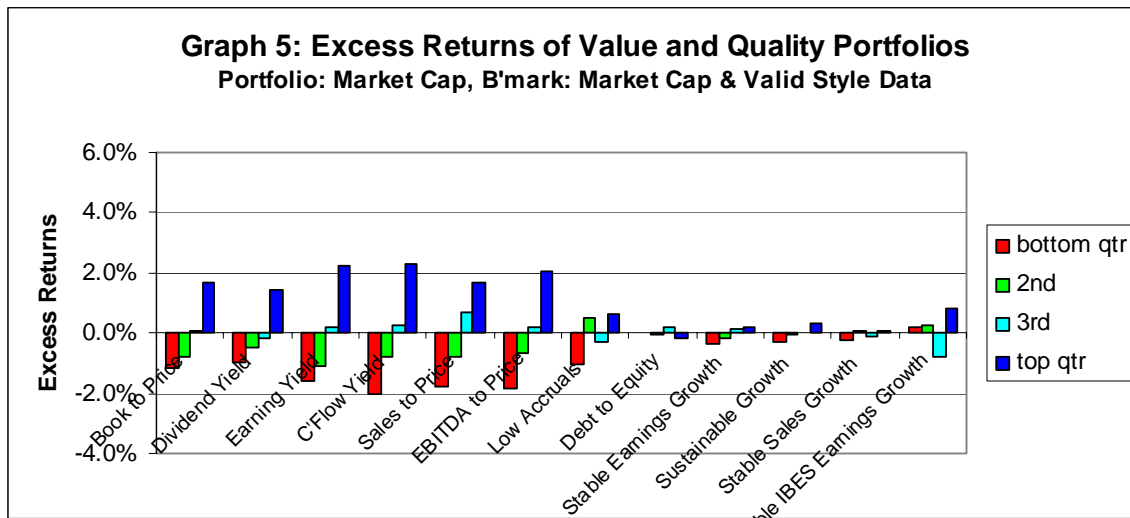


Graph 2 shows 20 year information ratios to end Jan 08 by top quartile portfolios, weighted by market cap, equally or total earnings. The benchmark is market cap weighted using all available stocks.

- Adding a Quality screen to a negative Value portfolio increases its long term by about 1%.

The outperformance of Quality portfolios across all quartile ranges reflects the benchmark used – all the stocks in the market with a market cap of more than USD 100 million. This benchmark most closely approximates ones used by institutional investment managers and represents the widest benchmark.

Redefining the benchmark to cover only those stocks with Style data means Quality portfolios generate a normal return pattern - top quartile Quality portfolios generally outperform portfolios from the bottom quartile. This can be seen in Graph 5 that shows excess returns of the market cap weighted portfolios against the more restricted valid data benchmark. Using this benchmark top quartile low accrual portfolios outperform the bottom quartile one.



Graph 5 shows excess returns of portfolios built on the quartile characteristic. The benchmark covers only stocks with the relevant factor characteristic. Note the lack of range and small size of returns from Quality.

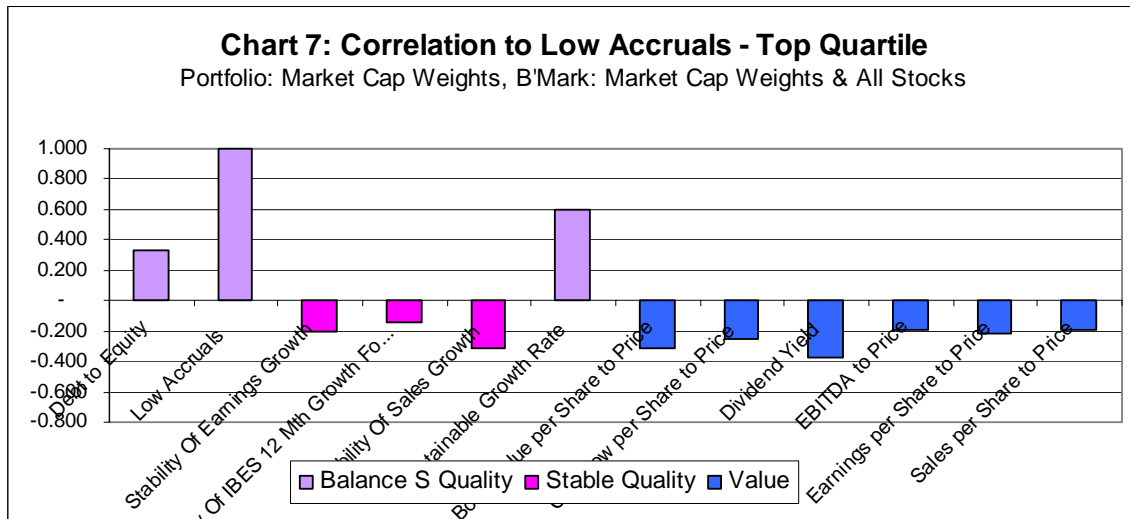
As expected, where data for the stock's characteristics are plentiful (Value and Stable Quality) there is little difference between the two benchmarks. Conversely, for those stocks where data is limited (EBITDA to Price, Low Accruals and Stability of IBES Growth Forecast factors) the restricted benchmark had higher returns than the market benchmark.

While excess returns are useful in looking at portfolios, it is important to understand the incremental risk involved in generating these returns.

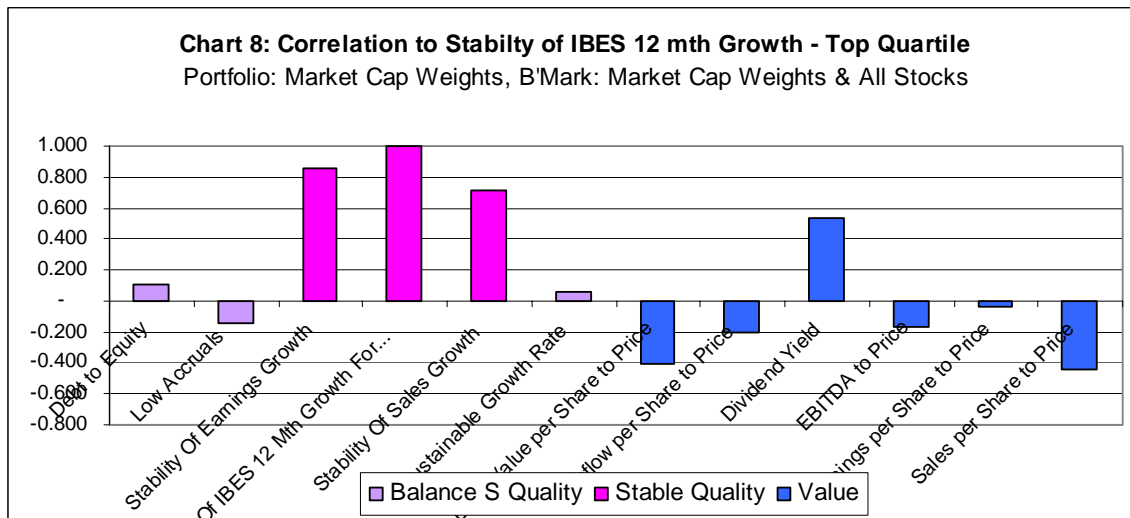
Graph 6 shows information ratios for Quality and Value portfolios against the all stock benchmark. It can be seen that:

- The extra risk of building top quartile Quality and Value portfolios is justified by higher returns;
- While Quality information ratios are generally lower than Value, they are almost always positive (only two quartiles have very small negatives);
- For negative value portfolios the risk is not justified – the information ratios for the bottom half of the distribution are negative;

7) and Stability of IBES 12 month Growth (Chart 8). From these charts it can be seen the two types of Quality are inversely related!



Graph 7 shows 5 year correlations of returns of top quartile Value and Quality market cap weighted portfolios. Value factor portfolios are highly correlated with each other. Quality factor portfolios shows as 2 groups: (a) Balance Sheet Quality factor portfolios are negatively correlated with Value; (b) Stability Quality factor portfolios are positively correlated with Value.



Graph 8 shows 5 year correlations of returns of top quartile Value and Quality market cap weighted portfolios. Quality factor portfolios show as 2 groups - Balance Sheet Quality and Stable Quality.

2. Results for Equally Weighted Portfolios

The analysis was repeated for equally weighted portfolios, and as expected, created more extreme portfolios in terms of returns and risks.

Chart 9 shows excess return by quartile portfolio and it can be seen:

- Quality strategies provide more consistent returns across the quartiles;
- Quality returns are positive across the 4 quartiles suggesting some Quality stocks have low market cap weights;

Table 2: 5 years Top Quartile Correlations of Value and Quality Returns for Equal weighted portfolio Market Cap weighted benchmark

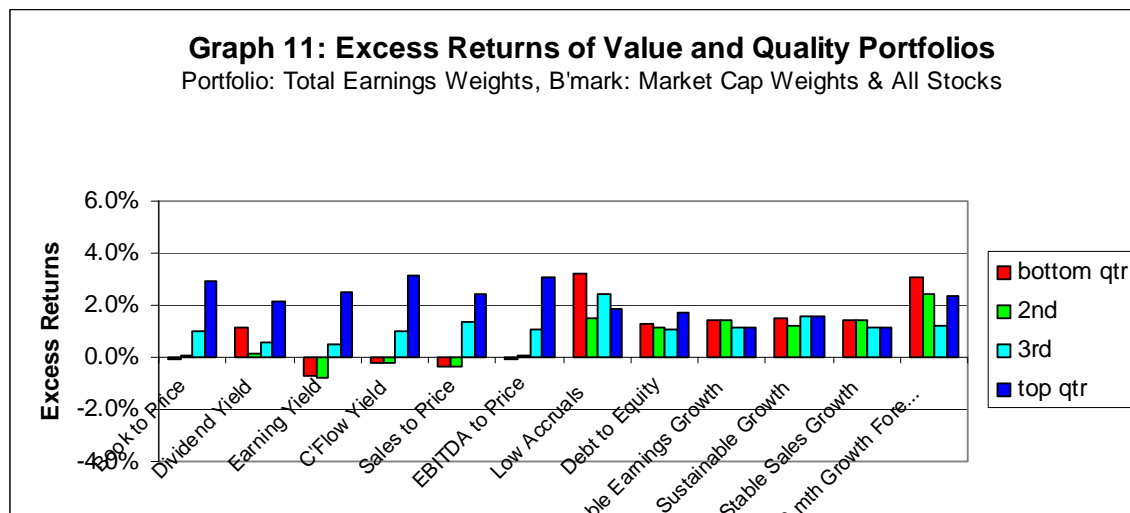
	Debt to Equity 0-25%	Low Accruals 0-25%	Stability Of Earnings Growth 100%	Stability Of IBES 12 Mth Growth Forecast 75-100%	Stability Of Sales Growth 100%	Sustainable Growth Rate 100%	Book Value per Share to Price 100%	Cashflow per Share to Price 75-100%	Dividend Yield 100%	EBITDA to Price 75-100%	Earnings per Share to Price 75-100%	Sales per Share to Price 75-100%
Correlation Relative - Equal												
Debt to Equity 0-25%	1.000	0.915	0.742	0.081	0.723	0.885	0.908	0.873	0.563	0.837	0.859	0.915
Low Accruals 0-25%	0.915	1.000	0.588	-0.075	0.562	0.903	0.795	0.784	0.376	0.729	0.761	0.830
Stability Of Earnings Growth 75-100%	0.742	0.588	1.000	0.596	0.832	0.603	0.749	0.684	0.788	0.717	0.724	0.678
Stability Of IBES 12 Mth Growth Forecast 75-100%	0.081	-0.075	0.596	1.000	0.550	0.051	0.164	0.154	0.554	0.203	0.219	0.090
Stability Of Sales Growth 75-100%	0.723	0.562	0.832	0.550	1.000	0.588	0.784	0.762	0.778	0.806	0.791	0.741
Sustainable Growth Rate 75-100%	0.885	0.903	0.603	0.051	0.588	1.000	0.775	0.793	0.446	0.749	0.803	0.824
Book Value per Share to Price 75-100%	0.908	0.795	0.749	0.164	0.784	0.775	1.000	0.961	0.728	0.954	0.945	0.966
Cashflow per Share to Price 75-100%	0.873	0.784	0.684	0.154	0.762	0.793	0.961	1.000	0.723	0.975	0.966	0.973
Dividend Yield 75-100%	0.563	0.376	0.788	0.554	0.778	0.446	0.728	0.723	1.000	0.777	0.766	0.648
EBITDA to Price 75-100%	0.837	0.729	0.717	0.203	0.806	0.749	0.954	0.975	0.777	1.000	0.978	0.941
Earnings per Share to Price 75-100%	0.859	0.761	0.724	0.219	0.791	0.803	0.945	0.966	0.766	0.978	1.000	0.938
Sales per Share to Price 75-100%	0.915	0.830	0.678	0.090	0.741	0.824	0.966	0.973	0.648	0.941	0.938	1.000

Table 2. 5 year correlations. Numbers range from +1 (both series move perfectly together), to -1 (both series move perfectly in the opposite direction).

3. Results for Total Earnings Weighted (Fundamental Weighted) Portfolios

Repeating the analysis for portfolios weighted by total earnings (an example of a fundamentally weighted portfolio) it can be seen:

- Quality based portfolios provide very consistent returns across the quartiles;
- Top quartile Quality strategies provide good returns and the best performer is bottom quartile Low Accruals (that is high levels of accruals);
- Returns from Value portfolios are more consistent between the quartiles compared with those constructed using market cap or equally weighted methodologies. This has occurred because of a reduction in the losses from bottom quartile portfolios – effectively the rebalancing way from large market cap stocks. This effect has been observed in the literature by others.



Graph 11 shows excess returns from total earnings weighted portfolios built on the characteristic shown against a market cap weighted benchmark containing all stocks. Like the findings from equally weight portfolios, the returns from Quality are more consistent than Value. Returns from total earnings weighted portfolios are between market cap and equally weighted portfolios.

Details of Approach

The analysis was undertaken using Style Research's Market Analyzer. This product is an internet-based equity research facility designed to specify, run, and statistically verify Style-based and factor-based research enquiries.

The analysis used portfolios built using quartile ranges for 6 Value and 6 Quality factors over the last 20 years.

Portfolios covered the AW Developed World (24 countries) and the base currency was Australian dollars.

The quartile portfolios were built within sectors within countries to avoid any distortions associated with country/sector biases to particular factors. For example the Australian market is heavily exposed to the finance sector where high gearing is a common characteristic. Using Debt to Equity across the market would tilt to portfolio to Finance and not properly reflect the impact of the Style factor.

The portfolios were rebalanced every 6 months and repriced every month. The calculated returns include dividends but exclude transaction costs.

Benchmark returns are gross, excluding transaction costs, and using market cap weights, rebalanced every 6 months and repriced every month.

For both the portfolio and benchmark, stocks with a market cap of less than USD 100 million were excluded.

The Style factors considered by quartile were:

Value	Quality
Book to Price	Low Accruals
Dividend Yield	Debt to Equity
Earnings Yield	Sustainable Growth
C'Flow Yield	Stable Earnings Growth
Sales to Price	Stable Sales Growth
EBITDA to Price	Stable IBES 12 month Growth Forecast

To determine if weighting patterns influenced portfolio returns, three different stock weighting schemes were analysed:

1. market cap
2. equal
3. total earnings

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