



# Global Quantitative Research 'SMART BETA' IN AUSTRALIA

## INTRODUCTION

Global growth in equity 'smart beta' assets has been nothing short of monumental. By one estimate, total assets in 'smart beta' ETFs and mutual funds in the United States alone have increased more than 170% in the last 5 years to more than \$500 billion AUD<sup>1</sup>. Similar funds in Europe have witnessed inflows on the order of 3000% over the last decade<sup>2</sup>. Although difficult to quantify, this figure is dwarfed, no doubt, by global assets managed in separate accounts and against off-the-shelf 'smart beta' indexes. The total value of global 'smart beta' assets must easily be in the trillions of AUD.

The appeal of these products is not difficult to understand. By overweighting factors like size, value, low volatility and momentum, 'smart beta' strategies seek to outperform traditional capitalization-weighted indexes, often with lower risk, greater transparency and lower cost. At their core is a robust set of empirical evidence that factors have historically produced positive excess returns and a belief they will continue to do so in the future.

The empirical case for factors in global markets is easy to demonstrate. The top of Table 1 shows the returns of popular 'smart beta' factors using the MSCI World IMI universe.<sup>3</sup> As highlighted in yellow, stocks of smaller size, higher value, higher momentum, lower volatility and higher dividend yield have all produced higher returns than the capitalization-weighted MSCI World IMI.

<sup>1</sup> <http://www.cnbc.com/2015/03/16/are-smart-beta-funds-intelligent-investments.html>

<sup>2</sup> <http://www.fundsglobalasia.com/worldwide-news/15002-explosive-growth-for-smart-beta-in-europe>

<sup>3</sup> Each month we place stocks into tertiles based on their factor exposure rank and measure the subsequent one-month equally-weighted return to each tertile with Table 1 detailing their annualized arithmetic average return. Factor exposures are as defined by MSCI Barra for all factors except dividend yield and quality. Dividend yield is from Worldscope and quality is the Northern Trust definition discussed in our white paper What is Quality?

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Of course, incremental returns must provide adequate compensation for additional risk incurred in pursuit of factor exposure. Thus, if ‘smart beta’ strategies are to be viable they must also produce risk-adjusted returns greater than or equal to their cap-weighted benchmarks. The bottom of Table 1 details the return per unit of risk of each factor tertile. Here again, we note stocks of small size, high value, high momentum, low volatility, high quality and high dividend yield all produced higher risk-adjusted returns than the MSCI World index. This is what makes ‘smart beta’ strategies so fascinating: higher return with lower risk.

In a previous Northern Trust white paper titled Understanding Factor Tilts, we demonstrated this pattern of factor returns persists across most geographies. Higher risk-adjusted returns were evident in factors in the United States, developed markets ex-US and even emerging markets. However, we do not see this same pattern within Australia. Table 2 shows a similar analysis for the ASX 300 universe. The most notable difference is size, among the most researched and confirmed factors globally, which shows dramatic underperformance. Dividend yield, a powerful factor in most markets, is lackluster, even when adjusted to a fully-franked equivalent. Curiously, high value stocks underperform as do low value stocks. On the other hand quality, low volatility and momentum have been very potent.

These disparities have raised healthy skepticism of ‘smart beta’ strategies for Australian equities. In this paper we address some common concerns and questions fielded from our clients including:

- Why have small cap stocks shown such poor performance in Australia when they have done relatively well elsewhere? Will size and value ever be a source of positive excess return?
- Why have high quality, low volatility and high momentum stocks done so well? Will these factors continue to be sources of risk-adjusted returns?
- Have quality, low volatility and momentum factors become too expensive? In other words, are they over-invested? Are size and value correspondingly cheap?

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*If ‘smart beta’ strategies are to be viable they must also produce risk-adjusted returns greater than or equal to their cap-weighted benchmarks.*

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**TABLE 1: FACTOR RETURNS FOR THE MSCI WORLD IMI UNIVERSE (JANUARY 2000 TO JUNE 2015) IN AUD<sup>4</sup>**

RETURNS							
Tertile	MSCI World IMI	Size	Value	Momentum	Volatility	Quality	Dividend Yield
<b>High T1</b>	7.5%	4.7%	<b>14.9%</b>	<b>12.0%</b>	9.8%	<b>13.1%</b>	<b>13.1%</b>
<b>T2</b>		8.0%	9.7%	10.2%	10.2%	10.8%	7.6%
<b>Low T3</b>		<b>10.6%</b>	6.7%	8.9%	<b>11.1%</b>	7.3%	10.6%

RETURNS/RISK							
Tertile	MSCI World IMI	Size	Value	Momentum	Volatility	Quality	Dividend Yield
<b>High T1</b>	0.63	0.38	<b>1.01</b>	<b>0.90</b>	0.44	<b>1.06</b>	<b>1.00</b>
<b>T2</b>		0.65	0.80	0.87	0.80	0.84	0.66
<b>Low T3</b>		<b>0.78</b>	0.42	0.47	<b>1.14</b>	0.49	0.56

Source: Northern Trust Quantitative Research

<sup>4</sup> The period January 2000 to June 2015 matches data availability for the ASX 300

**TABLE 2: FACTOR RETURNS FOR THE ASX 300 UNIVERSE (JANUARY 2000 TO JUNE 2015) IN AUD**

RETURNS							
Tertile	ASX 300	Size	Value	Momentum	Low Volatility	Quality	Dividend Yield
<b>High T1</b>	9.0%	10.3%	<b>5.2%</b>	<b>15.7%</b>	-3.4%	<b>11.7%</b>	<b>9.4%</b>
<b>T2</b>		8.6%	9.1%	8.5%	10.1%	9.4%	9.2%
<b>Low T3</b>		<b>5.4%</b>	2.7%	-6.2%	<b>10.7%</b>	1.1%	-0.9%

RETURNS/RISK							
Tertile	ASX 300	Size	Value	Momentum	Low Volatility	Quality	Dividend Yield
<b>High T1</b>	0.70	0.65	<b>0.22</b>	<b>0.91</b>	-0.11	<b>0.70</b>	<b>0.47</b>
<b>T2</b>		0.73	0.61	0.56	0.59	0.55	0.61
<b>Low T3</b>		<b>0.28</b>	0.13	-0.22	<b>0.94</b>	0.05	-0.03

Source: Northern Trust Quantitative Research

To answer these questions we must consider the dynamics of the Australian economy and financial markets including the heavy influence of macroeconomic forces, the behavior of major trading partners and the oligopolistic structure and high concentration of most industries. Our findings indicate:

- Factors are extremely sensitive to commodity prices, to a degree not seen elsewhere in the world.
- The returns of value, quality, and dividend yield factors are closely tied to the economic growth rate of China, by far Australia’s largest trading partner.
- Even after the influence of commodity prices and Chinese GDP are removed, classic factors such as size, volatility, momentum, etc. are highly correlated. We observe just two independent dimensions of equity returns most closely reflected in the volatility and value factors. Volatility encompasses most other factors.
- Low volatility stocks in Australia are dominated by large oligopolies and near-monopolies, many born in privatization programs of the 1980s and 1990s. These companies are concentrated in sectors with significant scale economies and natural or government-supported barriers to entry.
- Low volatility stocks also tend to be high quality, high dividend yield and high momentum. These companies have produced strong positive excess returns over the last 15 years. High volatility stocks are predominately small, low quality, low dividend yielding and low momentum. These stocks have produced negative excess returns over the same time horizon.
- Oligopolies tend to fall in the midrange of valuation, not as expensive as some speculative stocks but not as cheap as smaller, lower quality names. Because returns have been concentrated in this midrange, the value factor has not performed rather peculiarly. Both low-value and high-value names have underperformed those of moderate valuation.

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*We must consider the dynamics of the Australian economy and financial market*

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These findings suggest the historical performance of Australian factors is likely to persist, so long as the concentrated, oligopolistic structure of the Australian economy remains intact. If large companies remain consistently profitable, these stocks will continue to be lower volatility and higher quality, while paying higher dividend yields. Small stocks face more competition that will erode profitability and result in lower dividends. Being very sensitive to commodities, their prices will continue to be volatile and translate into low price momentum. Barring major commodity price increases or positive shocks to Chinese GDP, size and value factors will likely continue to underperform.

These results, of course, are unusual. While factor returns are traditionally given behavioral explanations, we will demonstrate that the impact of exogenous macroeconomic forces and internal microeconomic structure are too powerful for behavioral effects to be manifest. In the first section of this paper we show about half of the variation in factor returns is attributable to macro risks. The second section suggests the remaining variation is due to the industrial organization of the Australian economy. These findings, however, are positive. If these macro and micro conditions persist so will the historical performance of Australian factors. If designed intelligently, 'smart beta' products can effectively harvest extant factor risk premiums.

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#### **AUSTRALIAN EQUITY FACTORS: MACRO FOUNDATIONS**

Australia is a trade-intensive economy with exports accounting for more than 20% of GDP<sup>5</sup>. Commodities such as iron ore, coal and natural gas account for well over half of all exports with China, Australia's dominant destination for outbound goods<sup>6</sup>. This is reflected in the industry distribution of companies with almost a third of ASX 300 members falling into the materials, energy or commodity-focused components of the industrial sector. The commodity price sensitivity of real economic variables has also been well documented by Stevens (2008), Downes, Hanslow and Tulip (2014), among many others.

<sup>5</sup> <http://data.worldbank.org/indicator/NE.EXP.GNFS.ZS>

<sup>6</sup> <http://dfat.gov.au/trade/resources/trade-at-a-glance/Pages/top-goods-services.aspx> and <http://dfat.gov.au/about-us/publications/trade-investment/australias-trade-in-goods-and-services/Pages/australias-trade-in-goods-and-services-2014.aspx>

**TABLE 3: ASX 300 FACTOR SPREAD REGRESSION PARAMETERS, 2000 TO 2014**

Factor Return Spread		Intercept	CRB Index Return	Change in China GDP	R-Squared	Standard Error
<b>Size</b>	<b>Parameter</b>	(0.094)	0.881		0.725	0.083
(Sm – Lg)	t-stat	(4.291)	10.695			
<b>Value</b>	<b>Parameter</b>	0.031		8.361	0.496	0.159
(Hi – Lo)	t-stat	0.740		5.271		
<b>Volatility</b>	<b>Parameter</b>	0.276	(1.981)		0.699	0.199
(Lo – Hi)	t-stat	5.664	(9.454)			
<b>Momentum</b>	<b>Parameter</b>	0.326	(1.386)		0.519	0.204
(Hi – Lo)	t-stat	9.928	(3.533)			
<b>Quality</b>	<b>Parameter</b>	0.157	(0.882)	2.816	0.531	0.097
(Hi – Lo)	t-stat	6.634	(4.214)	1.994		
<b>Yield<sup>7</sup></b>	<b>Parameter</b>	0.186	(1.497)	11.252	0.314	0.227
(Hi – Lo)	t-stat	2.841	(5.183)	3.000		

Source: Northern Trust Quantitative Research

With this insight we posit a macroeconomic explanation for factor returns. Table 3 details the measured relationship among commodity returns, the year-over-year acceleration in Chinese GDP growth and annual factor return spreads, i.e., the return difference between positively and negatively compensated factor tertiles such as the highest quality tertile minus the lowest quality tertile, low volatility minus high volatility, small size minus large size, etc. Annual data for the ASX 300 and commodity returns of the Thomson Reuters/Jefferies CRB Index were utilized<sup>8</sup>. Parameters with insignificant betas are removed from the model and shown as blanks<sup>9</sup>. Other variables such as world and Australian GDP growth were modeled but found to have less explanatory power.

First we note all factors had strong and statistically significant sensitivity to macroeconomic variables as evidenced by the t-stats in the CRB Index Return and Change in China GDP columns. As shown in the R-squared column, these variables explain about half of the overall variation in factor returns, a degree unseen in any other developed market we have studied with the possible exception of Canada<sup>10</sup>.

However, with macroeconomic influences removed from factor returns they still exhibit the same pattern as seen in Table 2. We note Intercept values, which reflect the performance of factor spreads independent of macro variables, are negative for size and positive for volatility, momentum, quality and yield. This means net of macroeconomic influence large stocks still outperform small stocks, low volatility outperform high volatility, high momentum/quality/yield outperform low momentum/quality/yield. All of these intercept parameters are statistically very significant. The exception is value which has a very small and statistically insignificant t-stat showing as much ambiguity as the returns in Table 2.

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*Interestingly, the value spread in Table 3 has no sensitivity to commodity prices but instead reflects a very strong relationship to the acceleration of GDP growth in China.*

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<sup>7</sup> Fully franked equivalent yield

<sup>8</sup> Data for the Thomson Reuters/Jefferies CRB Index and Chinese GDP growth are from Bloomberg

<sup>9</sup> Betas were computed using ordinary least squares and parameter standard errors with the heteroskedastic and autocorrelation consistent method of Newey and West (1987)

<sup>10</sup> Although not shown, Canadian factors exhibit similar sensitivity to commodities but not Chinese growth acceleration

Starting with size spread we note a positive and statistically very significant beta to the CRB index. This suggests small cap stocks outperform large cap stocks as commodity prices rise. The R-squared of this regression is a remarkable 0.725 indicating most of the variation in size spread can be attributed to commodities and commodities alone.

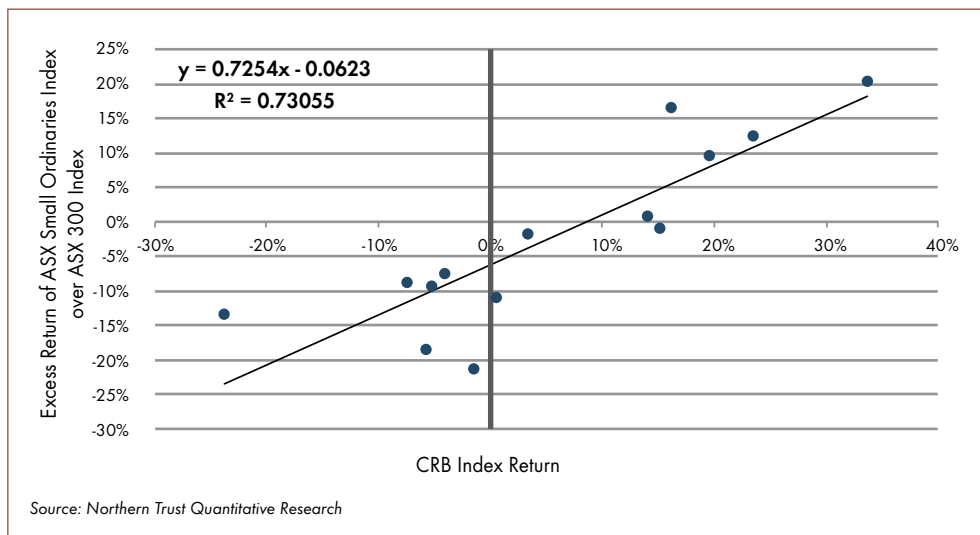
To confirm this result holds for investable indices we graph the excess return of the S&P ASX Small Ordinaries index over the ASX 300 benchmark versus the CRB index in Chart 1. Here we find nearly identical outcomes: betas are statistically indistinguishable and have almost identical r-squared values. Further, and very importantly, both have negative and statistically significant intercepts suggesting small-caps underperform large-caps by 9.4% annually independent of commodity prices.

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**CHART 1: PERFORMANCE OF SMALL CAP STOCKS VS CRB INDEX, 2000 TO 2014**



Interestingly, the value spread in Table 3 has no sensitivity to commodity prices but instead reflects a very strong relationship to the acceleration of GDP growth in China. We interpret this as a depiction of non-commodity exports to China, particularly from consumer discretionary and consumer staples sectors. Here again, we note the r-squared for this regression to be unusually high where Chinese GDP acceleration accounts for about half of the variance of value spread volatility. The intercept is not statistically different from zero suggesting the value factor shows no excess return independent of exposure to Chinese growth. In other words, value is a pure play on non-commodity Chinese growth and nothing else.

Like value, dividend yield has a very strong and statistically significant relationship to Chinese growth but with added sensitivity to commodities. In this way it may be viewed as something of an intermediate between value and quality. This is confirmed in Table 4A as yield and quality have a relatively high correlation at 0.63, yield and value have a strong correlation at 0.61 but quality and value are almost perfectly uncorrelated. Although dividend yield is a natural valuation signal, it appears that companies that pay dividends are also of higher quality, which contributes a positive and statistically significant intercept to the yield regression.

The volatility and momentum factors behave very similarly, each having a significantly negative beta to commodities, a high R-squared and statistically positive intercept. Indeed, as shown in Table 4A, the correlation between volatility and momentum spreads runs in excess of 0.80, the highest correlation of any two factors studied, suggesting they are one in the same factor. This occurs as high volatility is the antagonist of consistent price return and, hence, momentum. Thus for very volatile markets we expect low-volatility stocks to register the highest momentum which is indeed the case. Even after removing macroeconomic effects, this correlation pattern is maintained as shown in Table 4B.

**TABLE 4A: FACTOR SPREAD CORRELATIONS, 2000 TO 2014**

	Size	Value	Volatility	Momentum	Quality	Yield <sup>11</sup>
Size	1.00					
Value	0.47	1.00				
Volatility	(0.76)	(0.15)	1.00			
Momentum	(0.73)	(0.53)	0.80	1.00		
Quality	(0.73)	0.01	0.76	0.58	1.00	
Yield	(0.27)	0.61	0.55	0.23	0.63	1.00

Source: Northern Trust Quantitative Research

**TABLE 4B: FACTOR SPREAD CORRELATION, NET OF MACROECONOMIC EFFECTS, 2000 TO 2014**

	Size	Value	Volatility	Momentum	Quality	Yield <sup>12</sup>
Size	1.00					
Value	0.10	1.00				
Volatility	(0.17)	0.59	1.00			
Momentum	(0.33)	(0.17)	0.66	1.00		
Quality	(0.43)	0.25	0.46	0.28	1.00	
Yield	(0.21)	0.69	0.72	0.27	0.60	1.00

Source: Northern Trust Quantitative Research

The key findings of Tables 3 and 4 are twofold: factor returns are largely explained by a common set of macroeconomic drivers and thus tend to be highly correlated and these correlations are largely maintained when macro effects are removed. In this sense we do not observe the six discrete and independent factors of size, value, etc. as we do in other global markets but instead a much smaller number of factors that do not abide classical definitions.

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<sup>11</sup> Fully franked equivalent yield

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How many independent factors exist in the Australian equity market and how are they identified? To answer this question we employ a statistical technique known as principal component analysis (PCA) to decompose the variance of our factor return spreads<sup>13</sup>. The first column of Table 5A details the primary component that on its own explains 64.3% of the cross-sectional variation in factor returns. This component is simply a weighting of our six classical factors to characterize a consistent “theme” with weights provided in the component vector. Component 1 reveals the most important theme in Australian ‘smart beta’: with the highest absolute weighting at 0.71, the cross sectional dispersion of returns can be largely explained through the volatility dimension alone. Low volatility stocks tend to be larger size (-0.26), higher momentum (0.53), higher quality (0.22) and higher yielding (0.29), thus encompassing many other factors. Conversely, high volatility stocks are smaller, have lower momentum, quality and yield. From Table 2 we know low volatility stocks have strong risk-adjusted returns while high volatility stocks do not.

**TABLE 5A: PRINCIPAL COMPONENT ANALYSIS OF FACTOR SPREAD COVARIANCE MATRIX, 2000 TO 2014**

COMPONENTS						
	1	2	3	4	5	6
<b>Size</b>	-0.26	0.12	0.41	-0.54	-0.29	0.61
<b>Value</b>	-0.11	0.66	0.11	-0.24	-0.33	-0.62
<b>Volatility</b>	0.71	0.08	-0.40	-0.56	0.04	0.09
<b>Momentum</b>	0.53	-0.32	0.73	0.05	-0.17	-0.24
<b>Quality</b>	0.22	0.10	-0.24	0.46	-0.78	0.27
<b>Yield</b>	0.29	0.46	0.26	0.36	0.41	0.34
<b>% Explained</b>	<b>64.3%</b>	<b>27.5%</b>	<b>3.6%</b>	<b>3.0%</b>	<b>1.1%</b>	<b>0.5%</b>
<b>Cumulative</b>	<b>64.3%</b>	<b>91.8%</b>	<b>95.4%</b>	<b>98.4%</b>	<b>99.5%</b>	<b>100.0%</b>

Source: Northern Trust Quantitative Research

**TABLE 5B: PRINCIPAL COMPONENT ANALYSIS OF FACTOR SPREAD COVARIANCE MATRIX, NET OF MACROECONOMIC EFFECTS, 2000 TO 2014**

COMPONENTS						
	1	2	3	4	5	6
<b>Size</b>	-0.55	0.25	0.25	-0.14	0.58	0.45
<b>Value</b>	0.22	0.65	0.17	0.01	-0.52	0.49
<b>Volatility</b>	0.51	0.04	0.59	-0.65	0.14	-0.26
<b>Momentum</b>	0.30	-0.64	0.32	0.19	0.00	0.60
<b>Quality</b>	0.48	0.08	-0.64	-0.34	0.38	0.30
<b>Yield</b>	0.42	0.32	0.21	0.64	0.48	-0.19
<b>% Explained</b>	<b>64.2%</b>	<b>28.6%</b>	<b>6.4%</b>	<b>0.7%</b>	<b>0.1%</b>	<b>0.0%</b>
<b>Cumulative</b>	<b>64.2%</b>	<b>92.8%</b>	<b>99.2%</b>	<b>99.9%</b>	<b>100.0%</b>	<b>100.0%</b>

Source: Northern Trust Quantitative Research

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From Table 2 we know low volatility stocks have strong risk-adjusted returns while high volatility stocks do not

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<sup>13</sup> For a thorough discussion of principal component analysis see Johnson and Wichern (2002)



The second component suggests value stocks belong in a separate grouping that explains an additional 27.5% of cross sectional variation. In the first component the weighting of value was very low but in the second it is the dominate weighting at 0.66. We note from Table 2 high value stocks have historically underperformed the ASX 300 benchmark as have low value stocks. The middle tertile of valuation had, by far, the strongest performance. Collectively components 1 and 2 explain almost 92% of the cross sectional variation in returns over the last 15 years. The remaining components are largely noise that can be ignored. Table 5B details the same PCA analysis using returns net of macroeconomic effects and we note the themes and factors identified are identical.

To summarize, we've observed about half of Australian factor performance is explained by exogenous macroeconomic sensitivities. With or without these sensitivities removed factor returns are highly correlated suggesting factors are not independent as in other developed markets. PCA analysis reveals there are only two independent dimensions of return in Australian equity markets, one of which is associated with volatility, size, momentum, quality and dividend yield and the other associated with value. Empirical evidence suggests tilt toward low volatility/large size/high momentum/high quality/high yield stocks would have been very effective. This dimension is summarized in Table 6.

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*About half of Australian factor performance is explained by exogenous macroeconomic sensitivities*

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**TABLE 6: PRIMARY AUSTRALIAN EQUITY FACTOR "THEMES"**

Theme	Tend to Be	Macroeconomic Sensitivity	Historical Excess Returns
<b>Low Volatility</b>	Larger Size High Momentum High Quality High Dividend Yield	Excess returns increase as commodity prices fall	Strongly Positive
<b>High Volatility</b>	Small Size Low Momentum Low Quality Low Dividend Yield	Excess returns increase as commodity prices rise	Strongly Negative

Source: Northern Trust Quantitative Research

As we discuss in our whitepaper Understanding Factor Tilts, the existence of positively compensated factors in global equity markets is typically attributed to microeconomic considerations such as market structure or investor behavior. What microeconomic considerations explain the potency of the volatility factor in Australia? More importantly, will these considerations persist? In other words, will low volatility, large, high momentum/quality/yield stocks continue to outperform?

### **Australian Equity Factors: Micro Foundations**

Tyers and Rees (2008) suggests most industries in Australia are oligopolies or near-monopolies including transport, electricity, water supply, gas distribution, telecommunications, finance, insurance, education and health. They conclude:

*"Oligopoly rents...are potentially very large...exploitation of market power in all sectors is shown to leave the economy smaller by a third"*

This suggests pricing power in these oligopolies is significant and, as such, large companies should be very profitable. Table 7 supports that conclusion and shows the largest ASX 300 companies generated the highest return on equity over the last one and five year periods.

**TABLE 7: RETURN ON EQUITY BY SIZE AND PREVIOUS OWNERSHIP, AS OF 30 JUNE 2015, ASX 300 UNIVERSE**

Category	Return on Equity (12M Normalized)	Return on Equity (5Y Normalized)
<b>Tertile 1 – Largest Companies</b>	13.9%	14.2%
<b>Tertile 2</b>	8.6%	9.0%
<b>Tertile 3 – Smallest Companies</b>	3.2%	5.9%
<b>Formerly Government Owned<sup>14</sup></b>	17.0%	15.2%
<b>Not Government Owned</b>	8.4%	9.6%

Source: Northern Trust Quantitative Research

These oligopolies and monopolies are the result of two driving forces. First, government privatization programs of the 1980s and 1990s yielded behemoths like Telstra, Qantas, CLS and Commonwealth Bank, essentially government sponsored monopolies spun off into large private companies able to maintain their pricing power on size and government favoritism. One report by the Reserve Bank of Australia details 75 separate floats/trade sales of public enterprises between 1990 and 1997, with many more occurring before and since<sup>15</sup>.

Second, scale economies of Australia’s dominant industries have given rise to natural oligopolies, especially in the materials, banking and food retailing industries. Although scale economies in the banking sector are hotly debated, Stimpert and Laux (2011) find the “very largest banks are able to enjoy net income that increases at an increasing rate as size increases”. Wheelock and Wilson (2012) draw the same conclusion. Analyses of scale returns in the materials sector are ubiquitous with most finding increasing returns to scale in the mining of coal, e.g., Fare and Yoon (1985), gold, e.g., Gajigo and Ben Dhaou (2015), and the production of iron, e.g., Crompton and Lesourd (2004). Other authors find significant scale economies in other Australian industries such as tourism, Shi and Smyth (2011) and utilities, Worthington and Higgs (2014).

Of course, oligopolies are not exclusive to the industries noted. Table 8 computes the Herfindahl-Hirschman index for all GICS industry groups in the ASX 300, see Hirschman (1964) for details. An index value of 0.25 or greater indicates a highly concentrated industry and a potentially oligopolistic structure. From Table 8 we see that 11 of the 21 industries are considered highly concentrated such as banks (CBA, NAB, ANZ, Westpac), capital goods (CIMIC, Seven Group), diversified financials (Macquarie, ASX Ltd), food & staples retailing (Woolworths, Wesfarmers/Coles), pharmaceuticals (CSL) and telecommunication services (Telstra). Collectively, highly concentrated industry groups constitute 64.2% of the market capitalization of the ASX 300 index. For comparison, we also compute the same index for the MSCI World ex Australia universe. The only industry group with even moderate concentration is Technology and Hardware Equipment.

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*These oligopolies and monopolies are the result of two driving forces.*

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<sup>14</sup> These include the Commonwealth Bank of Australia, Telstra, CSL, Suncorp, Sydney Airport, Aurizon Holdings, Auckland International Airport and Tabcorp Holdings

<sup>15</sup> “Privatisation in Australia”, Reserve Bank of Australia Bulletin, December 1997

**TABLE 8: HERFINDAHL-HIRSCHMAN INDEX, AS OF 30 JUNE 2015, ASX 300 AND MSCI WORLD EX AUSTRALIA UNIVERSES**

GICS Industry Group	ASX 300 # Names	ASX 300 % Market Cap	ASX 300 Herfindahl -Hirschman In	ASX 300 Concentration	MSCI World ex Australia Herfindahl -Hirschman Index
Automobiles & Components	1	0.1%	1.00	High	0.06
Banks	8	25.6%	0.25	High	0.03
Capital Goods	13	0.8%	0.34	High	0.02
Commercial & Professional Services	20	2.5%	0.20	Moderate	0.04
Consumer Durables & Apparel	2	0.1%	0.51	High	0.04
Consumer Services	21	2.8%	0.09	Low	0.06
Diversified Financials	13	3.6%	0.25	High	0.04
Energy	20	4.8%	0.20	Moderate	0.04
Food & Staples Retailing	3	4.7%	0.49	High	0.12
Food Beverage & Tobacco	9	1.3%	0.23	Moderate	0.04
Health Care Equipment & Services	18	3.4%	0.13	Low	0.04
Household & Personal Products	1	0.1%	1.00	High	0.12
Insurance	8	4.6%	0.20	Moderate	0.02
Materials	49	21.0%	0.25	High	0.02
Media	14	1.6%	0.21	Moderate	0.06
Pharmaceuticals & Biotech	8	2.7%	0.81	High	0.04
Real Estate	31	7.3%	0.09	Low	0.02
Retailing	17	1.1%	0.13	Low	0.05
Semiconductors	0	0.0%			0.09
Software & Services	15	1.0%	0.20	Moderate	0.05
Technology Hardware & Equipment	1	0.0%	1.00	High	0.21
Telecommunication Services	7	5.5%	0.68	High	0.06
Transportation	9	3.7%	0.17	Low	0.03
Utilities	8	1.9%	0.23	Moderate	0.02

Source: Northern Trust Quantitative Research

As discussed by Varian (1992), regardless of their origin, oligopolies tend to enjoy abnormal profits and high barriers to entry. For this reason they tend to be simultaneously larger, higher quality, lower volatility, pay higher dividends and have higher momentum. They also typically trade at higher multiples as indicated in Table 9. We note here while large, formerly government owned companies trade at higher P/B and P/E multiples, they are far from the most expensive names in the ASX 300. As of 30 June 2015 the top tertile of stocks ranked on P/E had an average multiple of more than 72. A similar sort for P/B yields an average for the top third of more than 5.8. This suggests large oligopolies occupy the mid-range of valuation which from Table 2 we note has markedly higher returns than the cheaper or more expensive tertiles.

**TABLE 7: RETURN ON EQUITY BY SIZE AND PREVIOUS OWNERSHIP, AS OF 30 JUNE 2015, ASX 300 UNIVERSE**

Category	Price to Book Ratio	Price to Earnings Ratio
<b>Tertile 1 – Largest Companies</b>	3.3	21.3
<b>Tertile 2</b>	3.0	21.2
<b>Tertile 3 – Smallest Companies</b>	2.1	16.4
<b>Formerly Government Owned<sup>16</sup></b>	4.5	24.8
<b>Not Government Owned</b>	2.3	20.2

Source: Northern Trust Quantitative Research

The existence of oligopolies thus explains why equity factors are highly correlated. Large companies occupying highly concentrated industries have remarkable similarity in their factor rankings owing to their similar competitive position. It also explains why small stocks have historically underperformed in the Australian market, they simply can't compete with the larger, more profitable firms. Finally, oligopolies occupy the middle of the valuation spectrum – more expensive than smaller companies but cheaper than the more speculative stocks. This justifies why the value factor has been relatively impotent, owning the highest value names has steered you away from oligopolies.

Will this pattern persist? Provided the competitive organization of the Australian economy does not undergo dramatic change we believe it will. However, we note some commentators are forecasting a gradual decline in the pricing power of Australia's biggest firms and calling for "the death of the oligopoly"<sup>17</sup>. Over the intermediate term we expect the microeconomic climate to be maintained, factors to behave as they have in the past and, most importantly, the opportunity to harvest the volatility/size/quality/momentum/yield premium will be sustained. Likewise, the pattern of value returns will be maintained and potentially harvested, if portfolios are constructed with the prevailing pattern in mind.

### HARVESTING 'SMART BETA' FACTOR PREMIUMS

To capture the full potential of Australian factors, 'smart beta' products must be designed with the findings of the previous two sections in mind. First, it is clear classic single-factor portfolios are ineffective owing to high correlations. Although popular in other markets, products attempting to capture the premium of a single factor while neutralizing exposure to others are nearly impossible to construct. This is recognized by the **Northern Trust Quality Low Volatility Strategy** which seeks simultaneous exposure to high quality and low volatility stocks while allowing overweights to momentum, dividend yield and large size. The performance of this strategy is highlighted in Chart 2 and we note strong returns have been accompanied by a reduction in volatility of about 15% relative to the ASX 300 benchmark<sup>18</sup>. Over the last 10 years this strategy achieved a Sharpe ratio of 0.44 while the benchmark Sharpe ratio measured 0.34.

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*The pattern of value returns will be maintained and potentially harvested, if portfolios are constructed with the prevailing pattern in mind.*

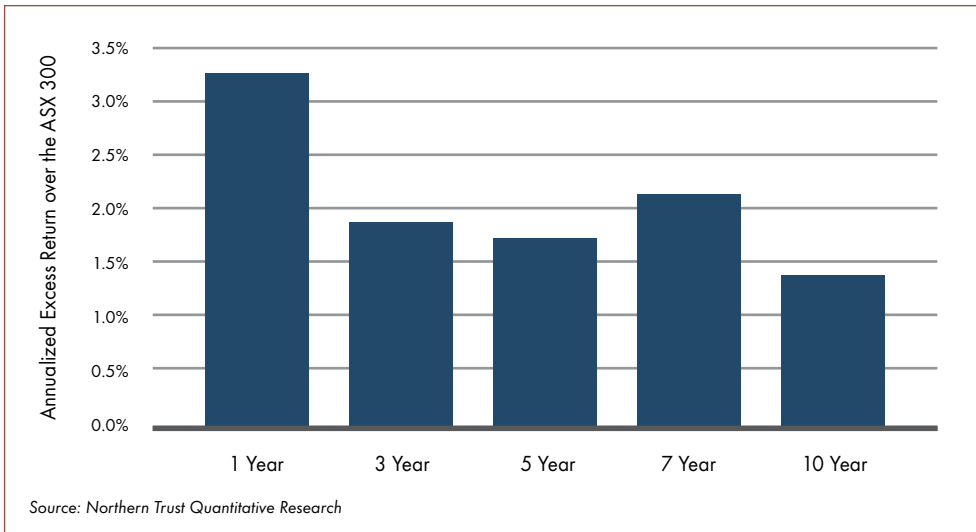
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<sup>16</sup> These include the Commonwealth Bank of Australia, Telstra, CSL, Suncorp, Sydney Airport, Aurizon Holdings, Auckland International Airport and Tabcorp Holdings

<sup>17</sup> <http://www.afr.com/brand/chanticleer/the-death-of-the-oligopoly-australias-incumbents-face-new-rivals-20150421-1mq11b>

<sup>18</sup> Low volatility products in most global developed markets are able to achieve a 30 to 40% reduction in volatility. This is more difficult in Australia owing to the extreme concentration with the top 15 names comprising about 60% of total market capitalization. As a result, this small handful of stocks defines total market volatility and since they are so large are unlikely to be excluded from any 'smart beta' strategy measured against cap-weighted benchmarks

**CHART 2: NORTHERN TRUST QUALITY LOW VOLATILITY, AS OF 30 JUNE 2015**



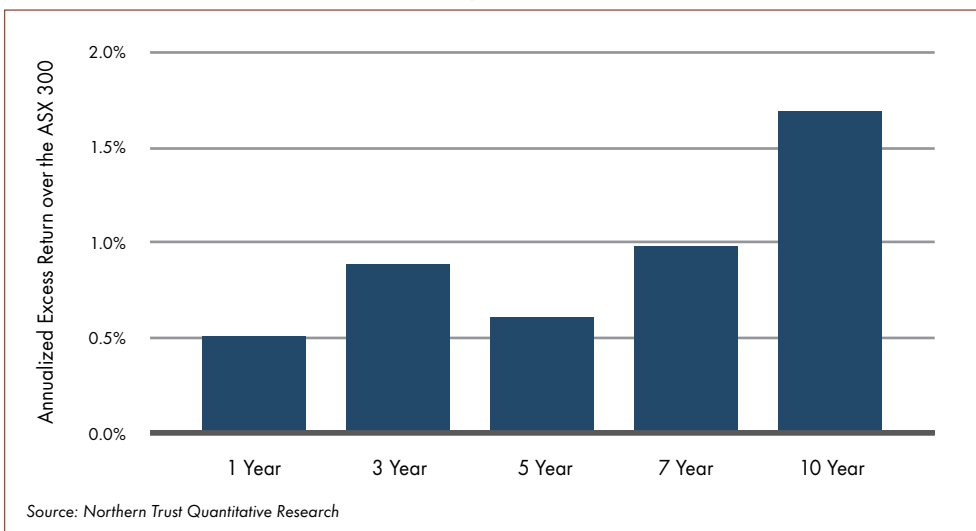
The strongest returns to the value factor were found in the midrange of valuation metrics. **The Northern Trust Quality Value Strategy** emphasizes this in portfolio construction. First, the strategy screens out roughly 40% of the universe with the lowest valuation metrics, corresponding to the worst returns from Table 2. Next it adds quality as a second factor to push the portfolio towards more profitable, lower volatility names. The result is a portfolio with midrange value exposure with the intent of targeting mispriced higher quality names and avoiding volatile, speculative stocks, even if they appear attractively priced. This strategy has also produced consistent returns as shown in Chart 3. Over the last 10 years this strategy achieved an information ratio of 0.48.

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*The strongest returns to the value factor were found in the midrange of valuation metrics.*

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**CHART 3: NORTHERN TRUST QUALITY VALUE, AS OF 30 JUNE 2015**

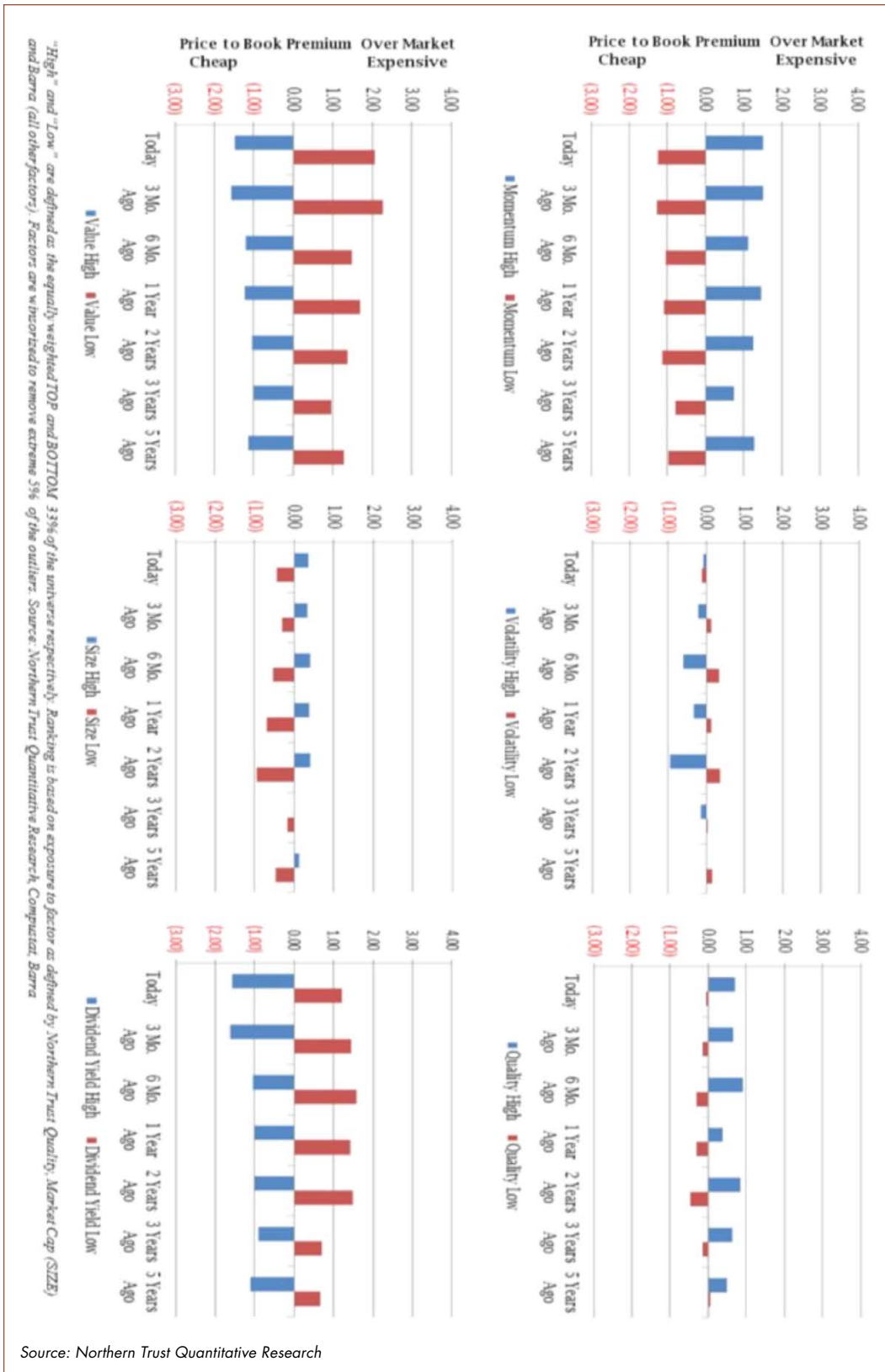


Of course, these results lead to an obvious question: if the quality and low volatility factors have performed so well have they become overbought? Are they now too expensive? Appendix 1 graphs the price to book premium over the ASX 300 benchmark for each factor as of 30 June 2015. We note first low volatility stocks have declined in price over the last two years and are currently at their lowest price in 5 years. High quality stocks have shown little movement in price with P/B premiums only slightly higher than 5 years ago. The largest changes have occurred in value with high value stocks being as cheap as they have been over the period of analysis. It seems now is not a bad time for 'smart beta' in Australia.

## CONCLUSIONS

'Smart beta' strategies can be very effective in Australia. However, in order to harvest factor premiums there, we must appreciate the nuances of the Australian market place. We have seen factor returns in Australia that are the result of macroeconomic influence and micro market structure, whereas globally they are usually given behavioral explanations. Using traditional 'smart beta' portfolio construction techniques that are unaware of the true drivers of factor returns in Australia may prove ineffective. Australian equity investors are more likely to achieve their factor based objectives if they understand the drivers of factor returns and apply that knowledge to portfolio construction.

APPENDIX 1: FACTOR PRICING OF ASX 300 UNIVERSE





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