Valuations matter: Implications for portfolio risk & return

Keith Poore | AMP Capital | 14 May 2014

Traditional strategic asset allocation works under the assumption that asset returns, volatility and correlations are static over time. This means the "efficient frontier" and, hence, asset allocation mix is also static. The long-term investor simply chooses an asset allocation on the frontier to meet his/her target level of risk or return.

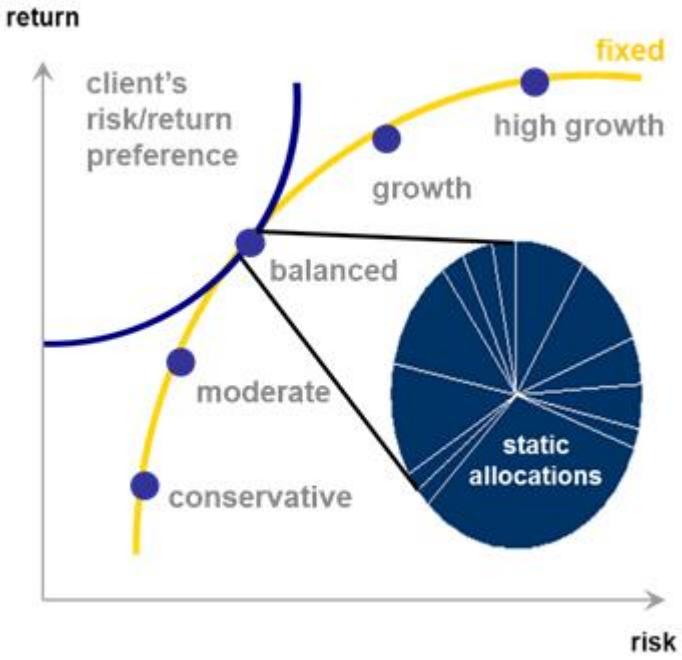
It is well established that equity valuations impact medium-term equity returns. It is probably less well known that starting period equity valuations also impact medium-term equity volatility and medium-term bond-equity correlations. For example, when equities are expensive, there is a greater chance of below average equity returns and above average equity volatility over the next five years. When equities are expensive, there is also a greater chance bond returns will be positive if equities decline.

Investors who are focused on medium-term risk and return outcomes should be factoring this into their expectations and asset allocations. Dynamic allocation strategies that focus on metrics such as PE ratios, PB ratios and dividend yields (valuation based tilting) therefore have the capacity to improve investor outcomes.

THE TRADITIONAL APPROACH

Traditional strategic asset allocation works under the assumption that asset returns, volatility and correlations are static over time. This means the “efficient frontier” and hence asset allocation mix is also static. The long term investor simply chooses an asset allocation on the frontier to meet their target level of risk or return.

Figure 1: The traditional approach to investing



Source: AMP Capital

Under this approach, portfolio asset allocations change only when there is a change to investor circumstances. For example, an investor moves to a more conservative portfolio as they approach retirement.

There is no change in asset allocations due to market dynamics – that is, unless the market impinges directly on particular investor circumstances, such as a lower tolerance for risk following a large equity market decline.

EQUITY VALUATIONS AND MEDIUM-TERM RETURNS

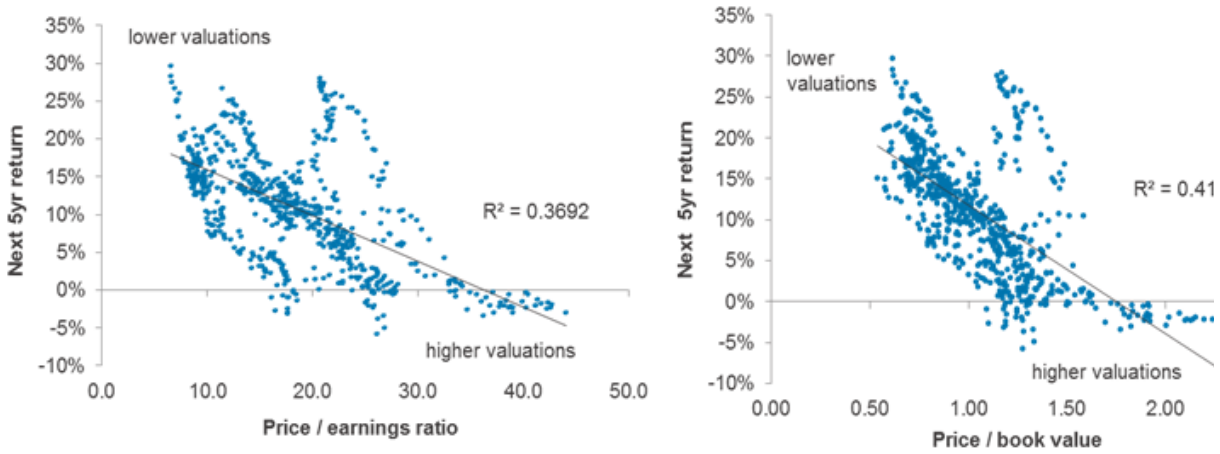
It is well established that equity market valuations, such as the price to earnings ratio, are useful predictors of medium-term equity returns. For example, Campbell and Shiller (2001) persuasively demonstrate that, contrary to efficient market theory, high valuation levels are followed by low returns and vice versa. The reason is that equity valuation ratios exhibit mean-reversion properties. If valuations are relatively stable over the long term, extreme valuations must mean-revert either through changes in prices, or through changes in fundamentals such as earnings.

Campbell and Shiller (2001) also show that – again, contrary to efficient market theory – mean-reversion principally occurs through prices with very little through fundamentals. In other words, valuation ratios provide poor estimates of future dividend or earnings growth.

It is worth noting that if market valuation ratios show little earnings or dividend forecasting ability, higher valuation ratios imply lower returns (and vice versa) even without valuation mean-reversion[1].

Equity valuation ratios can be constructed by comparing prices against annual 'flows' from the profit statement (earnings, dividends, free cash flow) or against 'stock' measures from the balance sheet (book value, net tangible assets). Figure 2 employs both of these valuation methods, plotted against subsequent five-year US equity market returns.

Figure 2: US equity valuation and returns



Sources: Shiller (2005), US Federal Reserve Board, author's calculations.
Price/earnings ratio is price to 10-year median real earnings. Price/book is non-financial corporate equity market value / non-financial corporate net worth from the US flow of funds data (source US Federal Reserve Board). The next five-year return on the left hand graph is from the month after the valuation observation over the next five years (annualised). Return data is monthly observations from 1950 to 2013 from Shiller (2005).

The graph on the left in Figure 2 uses price to 10-year median real earnings for the valuation measure on the horizontal axis. This is similar to the price to 10-year average real earnings used by Campbell and Shiller, but is smoother as there is less adjustment when large earnings outliers move out of the 10-year window.

The graph on the right in Figure 2 uses price to book value as the valuation measure, where book value is corporate net worth from the US flow of funds data. This valuation measure is similar to Tobin's q, first popularised by Smithers and Wright (2000). The only difference is this measure uses the historical cost estimate of net worth, not the market value of net worth. Using market values would be making the mistake of assuming asset book values are fairly valued by the market, to analyse whether stock markets are fairly valued by the market.

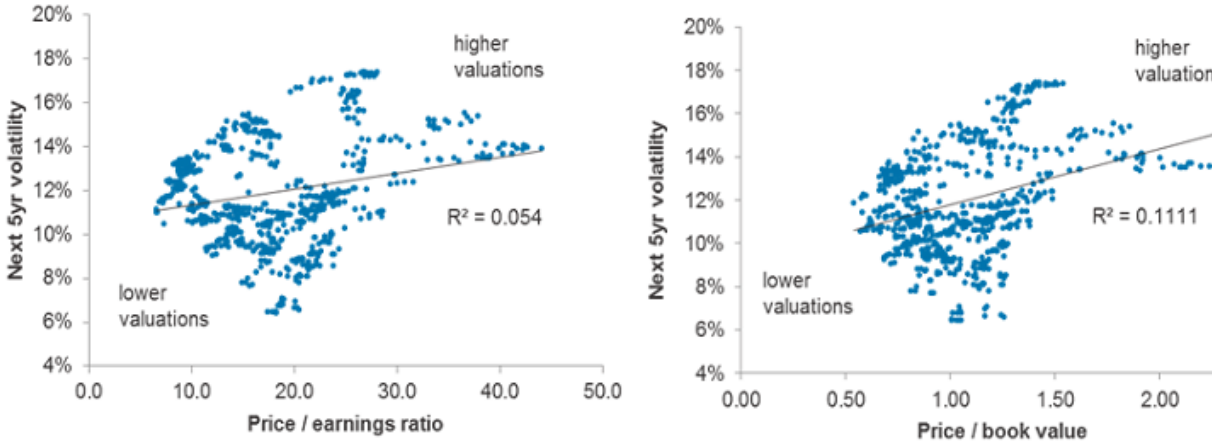
Both graphs show that lower valuations are often associated with higher subsequent five-

year returns, whereas higher valuations are often associated with lower subsequent five-year returns. These observations should be no surprise to students of financial markets or investment practitioners.

EQUITY VALUATIONS EFFECTS ON MEDIUM TERM VOLATILITY AND CORRELATION

It is probably less well known that starting period equity valuations also impact medium term equity volatility and medium term bond-equity correlations. Figure 3 uses the same equity valuation data as Figure 2 above, but shows five-year volatility on the vertical axis.

Figure 3: US equity valuation and volatility



Sources: Shiller (2005), US Federal Reserve Board, author's calculations.
Price/earnings ratio is price to 10-year median real earnings. Price/book is non-financial corporate equity market value / non-financial corporate net worth from the US flow of funds data (source US Federal Reserve Board). Volatility on the vertical axis is the standard deviation of returns from the month after the valuation observation, over the next five years (annualised).

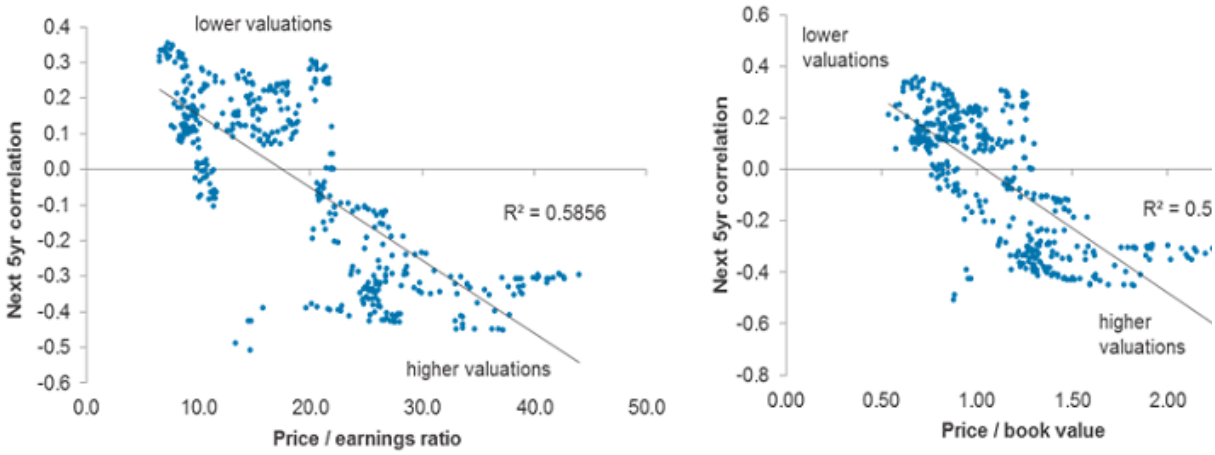
Although the relationship between valuations and volatility is not as clear cut in Figure 3 as that between valuations and returns (much lower R^2), one can see that higher volatility is often associated with higher valuations, and lower volatility is often associated with lower valuations. The relationship is stronger if more recent data is used (R^2 rises to 0.25 using data from 1990 as shown in Annex 1).

The effect of equity valuations on subsequent equity returns and volatility is extended in the Annex 2, for domestic and global markets. While the available data set is shorter, the relationship is generally the same (i.e. stronger for returns, less so for volatility).

Figure 4 shows the relationship between US valuations and equity-bond correlation is shown (Figure 4). Bond returns are sourced from the Barclays US Treasury Index which has data

starting from 1973. The same equity return and valuation measures are used as above but from 1973 to 2013. As can be seen, lower valuations are associated with higher bond-equity correlations, whereas higher valuations are often associated with lower (negative) correlations over the subsequent five years. In other words, when equities are expensive, there is a greater chance bonds will rally if equities decline.

Figure 4: US equity valuation and bond-equity correlation



Sources: Shiller (2005), US Federal Reserve Board, author's calculations. Price/earnings ratio is price to 10-year median real earnings. Price/book is non-financial corporate equity market value / non-financial corporate net worth from the US flow of funds data (source US Federal Reserve Board). Return data is monthly observations from 1950 to 2013 from Shiller (2005). Correlation on the vertical axis is the correlation of US bond and equity returns from the month after the valuation observation over the next five years.

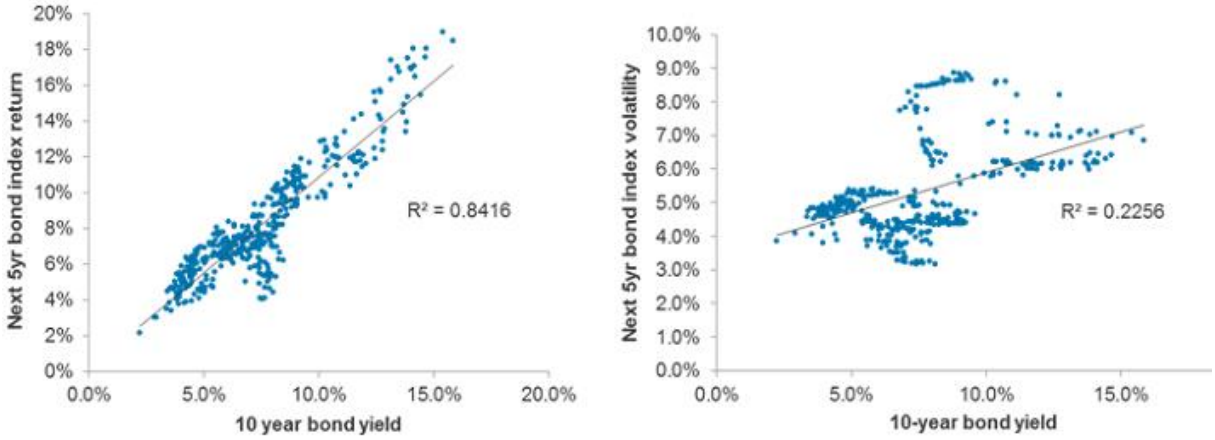
BOND YIELDS, RETURNS AND VOLATILITY

The implications of equity valuations on portfolios are the main focus of this paper - but that is not to ignore bond valuation effects.

The graph on the left of Figure 5 shows the US 10-year treasury yield versus the return of the Barclays US Treasury Index over the subsequent five years. There is a very close relationship between bond yields and subsequent returns (graph on the left), as can be seen. Again, this should be no surprise to students of financial markets or investment practitioners.

The graph on the right of Figure 5 plots the 10-year bond yield against bond index volatility over the subsequent five years. The relationship is not so tight, but it does indicate higher yields are associated with higher volatility.

Figure 5: US treasury yields versus return and volatility



Sources: Barclays, Bloomberg, author's calculations.
US 10-year bond yield is month end data sourced from Bloomberg 1973 to 2013. The next five-year return on the left hand graph is from the month after the valuation observation over the next five years (annualised). Volatility in the right hand graph is the standard deviation of returns from the month after the bond yield observation over the next five years (annualised).

PORTFOLIO IMPLICATIONS

The relationship between equity valuations and subsequent return characteristics has implications for medium-term outcomes for portfolios, especially at valuation extremes.

To illustrate this, Figure 6 below shows the average five-year return characteristics of a 50-50 US equity-bond portfolio for the bottom 25% monthly equity valuation observations compared to the top 25% monthly valuation observations. To focus on equity valuation effects, bond return and volatility are held constant at the period average. From an outcome perspective, these really look like different portfolios, although the allocation to bonds and equities is the same for both.

Figure 6: 50-50 equity-bond portfolio - top & bottom equity valuation quintiles

Bottom 25% equity valuations

	Weight	Return	Volatility	Correlation
Equities	50%	15.2%	8.6%	
Bonds	50%	6.2%	4.5%	0.01
Portfolio	100%	10.7%	4.9%	

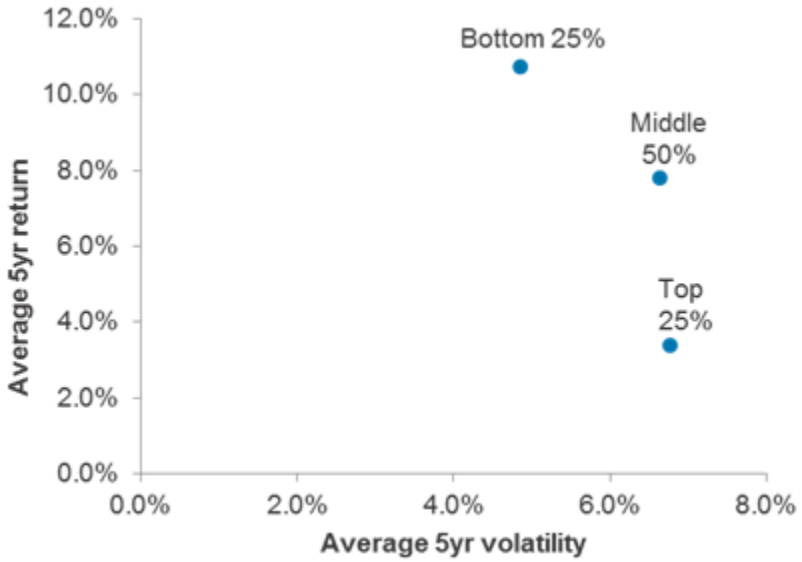
Top 25% equity valuations

	Weight	Return	Volatility	Correlation
Equities	50%	0.5%	14.4%	
Bonds	50%	6.2%	4.5%	-0.34
Portfolio	100%	3.4%	6.8%	

Source: Shiller (2005), Barclays, US Federal Reserve Board, author's calculations. Data is average five-year return on US equities (S&P500) and bonds (Barclays US Treasury Index) from January 1990 to February 2014, sorted on equity market price / book as previously. Volatility (standard deviation of monthly returns) and correlation are calculated from the month after the valuation observation.

Figure 7 shows the same results on the usual risk-return chart, together with the remaining middle 50% monthly valuation observations. While the bottom 25% equity valuation portfolio has a higher return and lower risk than the top 25% equity valuation portfolio, the risk of the later is not that different from the middle 50% equity valuation portfolio. This is because during periods of high valuation, the higher negative correlation (between equity and bonds) largely offsets the higher equity volatility.

Figure 7: 50-50 equity-bond portfolio - risk and return quintiles



Sources: Shiller (2005), Barclays, US Federal Reserve Board, author's calculations. Figure shows portfolio return characteristics for a 50-50 US equity-bond portfolio for the bottom 25% monthly equity valuation observations, the middle 50% equity valuation observations and the top 25% equity valuation observations. Data is average five-year return on US equities (S&P500) and bonds (Barclays US Treasury Index) from January 1990 to February 2014, sorted on equity market price / book as previously. Volatility (standard deviation of monthly returns) is calculated from the month after the valuation observation.

SUMMARY OF KEY FINDINGS

The results can be summarised into four key findings:

1. Equity valuations and returns - When equities are expensive, there is a greater chance of below average returns over the next five years.

2. Equity valuations and volatility - When equities are expensive, there is a greater chance of above average volatility over the next five years.

3. Equity valuations and diversification - When equities are expensive, there is a greater chance bond returns will be positive if equities decline over the next five years.

4. Bond yields, returns and volatility - When bond yields are low, there is a greater chance of below average returns and volatility over the next five years.

SOME RISKS TO CONSIDER

There are risks to overstating the 'greater chance' quoted above. History might not repeat; the observed relations might not hold in the future; valuations could go through a structural break or could stay at extremes for an extended period.

Some of these warnings have been raised before. In something of a challenge to Campbell and Shiller (2001), The Federal Reserve Bank of Cleveland (2001) cited lower transaction costs, low inflation and increased diversification as arguments to explain an empirical structural break in the mean PE ratio from the long-term average of 16 to "somewhere between 20 and 25, perhaps even higher". The arguments appeared reasonable at the time (the PE was over 30). Unfortunately, they preceded one of the worst decades on record for equity market investors.

One potential guard against structural breaks in valuation ratios is to only tilt portfolios at valuation extremes. This should provide a margin of safety against structural changes in the mean valuation.

Another risk to be mindful of is some exogenous shock occurring following an increase in the equity allocation, which could lead to increased pressure to close a loss-making position. Well-constructed and well-disclosed risk metrics such as projected tracking error, value at risk and portfolio drawdown should help forestall this eventuality.

Of course, there are also risks to not acting on the key findings above - including adverse investment outcomes, missed investment opportunities and failed investment objectives.

CONCLUSION

Traditional strategic asset allocation does not capture many dynamic market properties. Expected returns, volatilities and correlations are not constant over time. Investors who are focused on medium-term risk and return outcomes should be factoring this into portfolio return estimates and, hence, asset allocations.

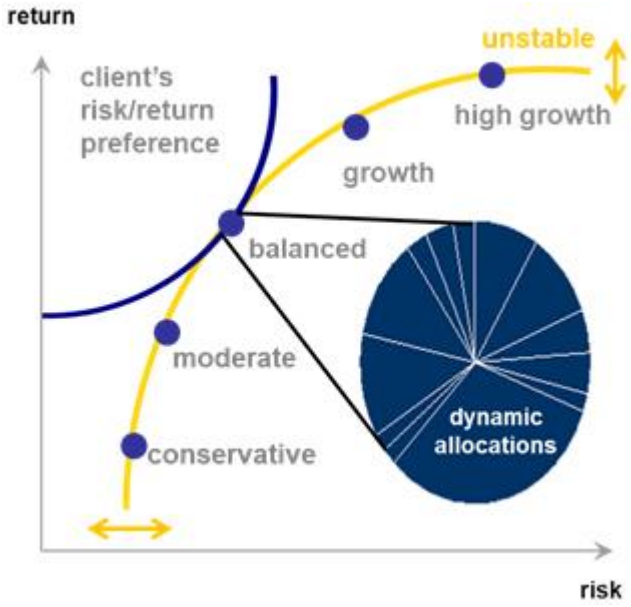
This means dynamic strategies that focus on metrics such as price to earnings ratios, price to book ratios and dividend yields (i.e. valuation-based tilting) have the capacity to improve investor outcomes.

Confidence in the results presented here and elsewhere should determine how far one goes down the dynamic strategy path. One could start by giving traditional diversified funds constrained ranges to tilt asset allocations. Those with higher confidence in the results are removing ranges altogether and concentrating solely on expected return and risk outcomes (e.g. CPI + x%, with minimum volatility).

Doing nothing and sticking with a static asset allocation is no longer the easy option it once was. The consensus is shifting and there is less 'safety in numbers' as more investors choose

to act on the evidence against market efficiency.

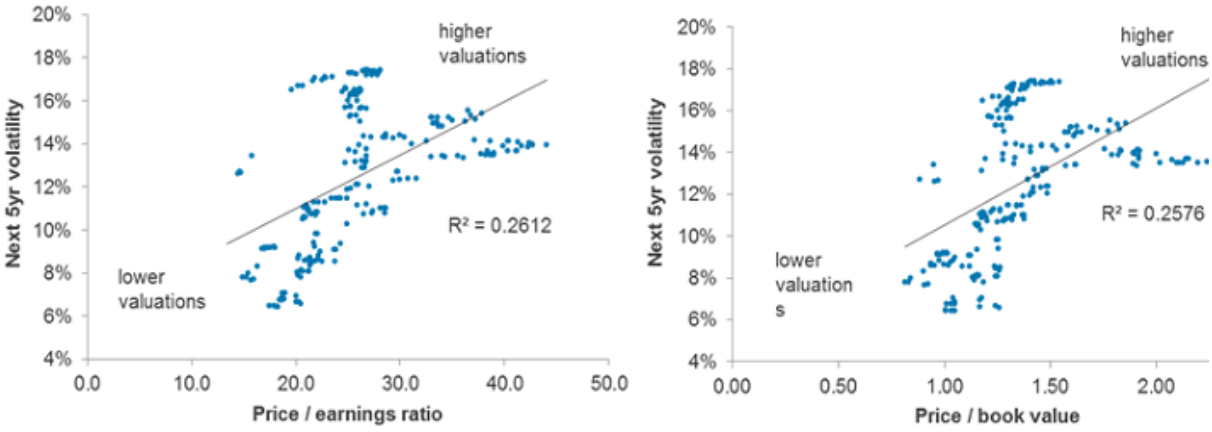
Figure 8: The new approach



Source: AMP Capital

ANNEX 1 – US EQUITY VALUATION AND VOLATILITY

Figure 9: US equity valuation and volatility
(1990–2013)

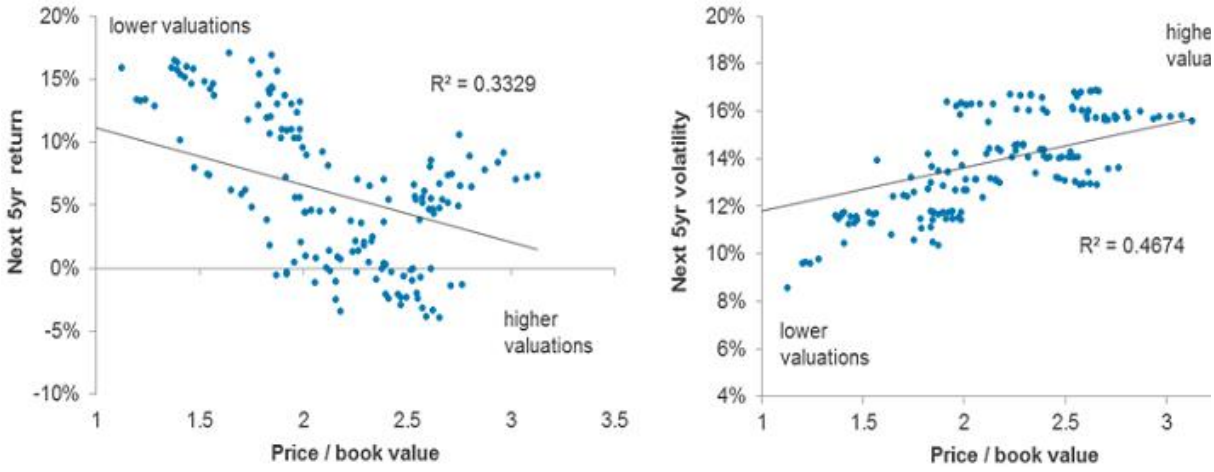


Sources: Shiller (2005), US Federal Reserve Board, author's calculations.
This is the same chart as Figure 3 above, but using data from 1990 not 1950. Price/earnings ratio is price to 10-year median real earnings. Price/book is non-financial corporate equity market value / non-financial corporate net worth from the US flow of funds data (source US Federal Reserve Board). Volatility on the vertical axis is the standard deviation of returns from the month after the valuation observation, over the next five years (annualised).

ANNEX 2 - DOMESTIC AND GLOBAL EQUITY MARKETS

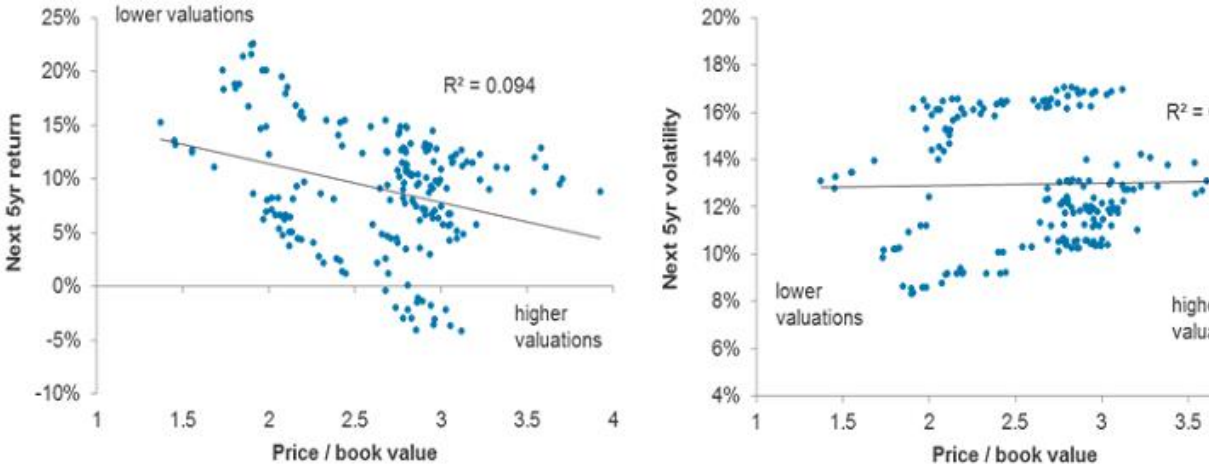
The effect of equity valuations on subsequent equity returns and volatility is extended below for domestic and global markets. The data set (from Bloomberg) is shorter than for US markets. Figures 10 to 12 show a noticeable relationship between valuations and returns, but the relationship between valuations and volatility is less discernable.

Figure 10: NZX All Ordinaries Index (1994-2014)



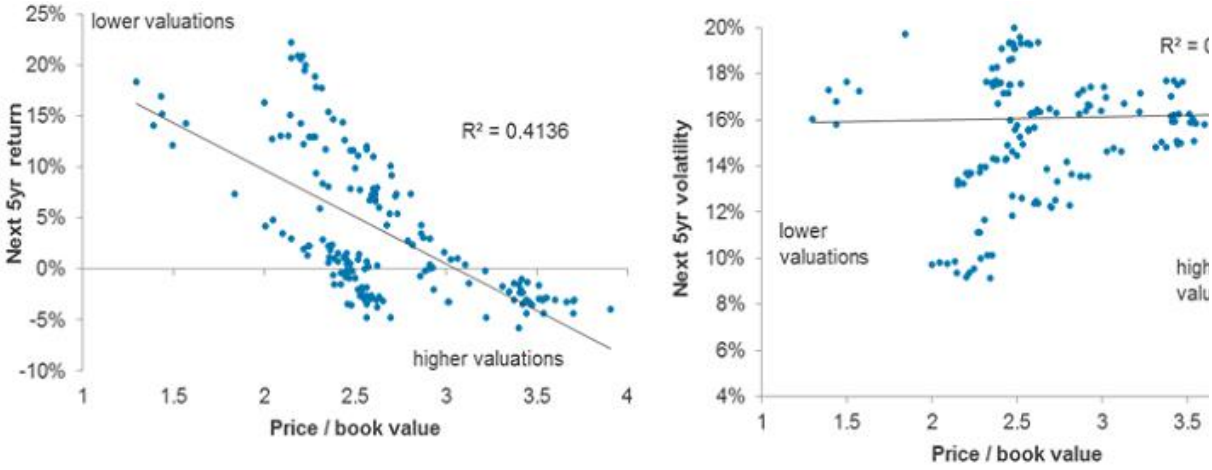
Sources: Bloomberg, author's calculations.
For each region, price/book on the horizontal axes is Bloomberg's estimate of market price/book value. As above, volatility (standard deviation of monthly returns) is calculated from the month after the valuation observation.

Figure 11: ASX All Ordinaries Index
(1993-2013)



Sources: Bloomberg, author's calculations.
For each region, price/book on the horizontal axes is Bloomberg's estimate of market price/book value. As above, volatility (standard deviation of monthly returns) is calculated from the month after the valuation observation.

Figure 12: MSCI World Index
(1995-2013)



Sources: Bloomberg, author's calculations.
For each region, price/book on the horizontal axes is Bloomberg's estimate of market price/book value. As above, volatility (standard deviation of monthly returns) is calculated from the month after the valuation observation.

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END NOTES

1. If market valuation ratios show little earnings or dividend forecasting ability, higher ratios imply lower returns (and vice versa) even without valuation mean reversion. For example, assuming no change in the price/dividend and price/earnings valuation ratios, the return from equities is simply the dividend yield + dividend growth = (earnings yield + earnings growth) x dividend pay-out ratio. By definition, lower dividend yields and earnings yields (i.e. higher valuations) equate to lower equity returns.

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