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Volatility Cycles of Value Stocks

Examining the Volatility of Absolute and Active Returns

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March 2011

From time to time, Value portfolios may experience higher risk (relative to other portfolios) or increased tracking error. To better understand these occurrences, this paper considers the volatility cycle of Value stocks globally. Corresponding to tracking error and total risk, the volatility of both active and absolute returns is considered. It was found that high volatility in the active returns of Value stocks was closely linked with the active performance cycle of these stocks, and tended to occur during episodes in which this cycle was in the late stages of a cyclical decline. In terms of absolute returns, the volatility of Value stocks (relative to other stocks) was observed to be more closely associated with the overall stock market cycle, being low during market peaks and high during market troughs.

Introduction

The Value strategy is a well-known and common approach employed by various investors. As an investment style, it has many advocates; the research findings of Fama and French (1993, 1996) have lent further support to the perception that Value stocks perform better than other stocks in the long run. While the relative performance of these stocks has attracted much interest, the volatility of that performance has not received as much attention. This paper takes a step towards filling this gap by examining the volatility cycle of Value stocks. Understanding this cycle can help an active manager get a better sense of why a Value portfolio experiences increased tracking error at certain points. For investors focused on absolute returns, the volatility cycle could shed light on changes in the relative contributions of Value and non-Value portfolios to total risk.

In Barra risk models, Value is one of the key style factors that can be applied to study the volatility of Value stocks. For the Barra Global Equity Model (GEM2) in particular, the Value factor captures differences across stocks in terms of five financial ratios: (1) price-to-forward earnings, (2) price-to-trailing earnings, (3) price-to-dividend, (4) price-to-book, and (5) price-to-cash earnings. Due to the comparability issues of these financial ratios across countries, for each stock these characteristics are only compared to other stocks within the same country.

One advantage of using the Barra analytical framework is that other style effects (as well as industry effects) are hedged away, allowing the Value factor to represent a purer measure of the impact of the Value style.[1] We can interpret the return of the Value factor as the active return or relative return of Value stocks compared to other stocks. In the next section, we will use this factor as a basis to examine the relative performance of Value stocks and the cyclical variation in both its return as well as its volatility.

Performance and Volatility of Value Stocks

The Value factor is one of the most significant global risk factors. The cumulative performance of this factor in GEM2 is shown in Exhibit 1, together with its forecast volatility from the same model, as well as the corresponding market index (the MSCI All Country World Index - ACWI). The uptrend displayed by the broken line, which represents the cumulative return of the Barra Value factor, indicates that Value stocks compare favorably with the overall market during the sample period.

The bold line in Exhibit 1 represents the volatility of the Barra Value factor, which is actually the forecast volatility of the Value factor in GEM2. It is computed from applying an exponentially-weighted moving average on the returns of the Barra Value factor, with more recent observations having a higher weight than those from the more distant past. The relative weight is determined by setting the half-life of the rate of decay, and it differs between the short-term and long-term versions of the model (GEM2S and GEM2L, respectively). The short-term version has

[1] The Barra multiple-factor risk model simultaneously accounts for different factors with multivariate, cross-sectional regressions. These involve regressing excess returns of various stocks on style factors as well as industry factors. Value is among the style factors here.

a shorter half-life and gives more weight to more recent factor returns, thus making its forecast volatility more responsive to changing market conditions. The long-term model uses a longer half-life, producing a forecast volatility that acts as a smoothed version of its short-term counterpart. The volatility shown in Exhibit 1 comes from the short-term model.

Within the sample period that covers the last fifteen years, there were two periods when this volatility rose significantly. The first was during the tech bubble in the late nineties, while the start of the second was marked by the Quant Meltdown in August 2007. There is no obvious link between the volatility cycle and the overall stock market, since the first period occurred during a bull market and the second period fell mostly within a bear market.

Because Barra Value factors have been used here, it should be noted that the Value factor return does not reflect the actual performance of a Value portfolio taken from the global universe, but rather the performance of Value in the Barra multiple-factor framework. To compare the above results for Value volatility with those from actual portfolio returns, we will need to construct Value portfolios based on commonly used fundamental data.

At the beginning of each month, all stocks in the entire global universe are ranked in descending order based on one of the following financial ratios: trailing or forward price-to-earnings (P/E); or price-to-book (P/B); or price-to-cash earnings (P/CE). For these fundamental data, the latest available month-end values from the preceding month are used. The ranked sample is then divided into three equal parts, namely high (H), mid (M) and low (L). Because the stocks are ranked in descending order, the first group contains stocks that (according to the respective criteria) have the highest Value ratings, while the bottom group includes stocks that are in comparison non-Value. The cap-weighted returns of the top third (H) and the bottom third (L) are then computed after eliminating stocks with single-day returns exceeding 100% or below -100%. Following that, the standard deviation of the return differential (H-L) for all trading days within that month is derived and appropriately annualized. The same procedure is repeated every month in order to ensure monthly rebalancing; the return volatilities associated with the four financial ratios are shown in Exhibit 1A.

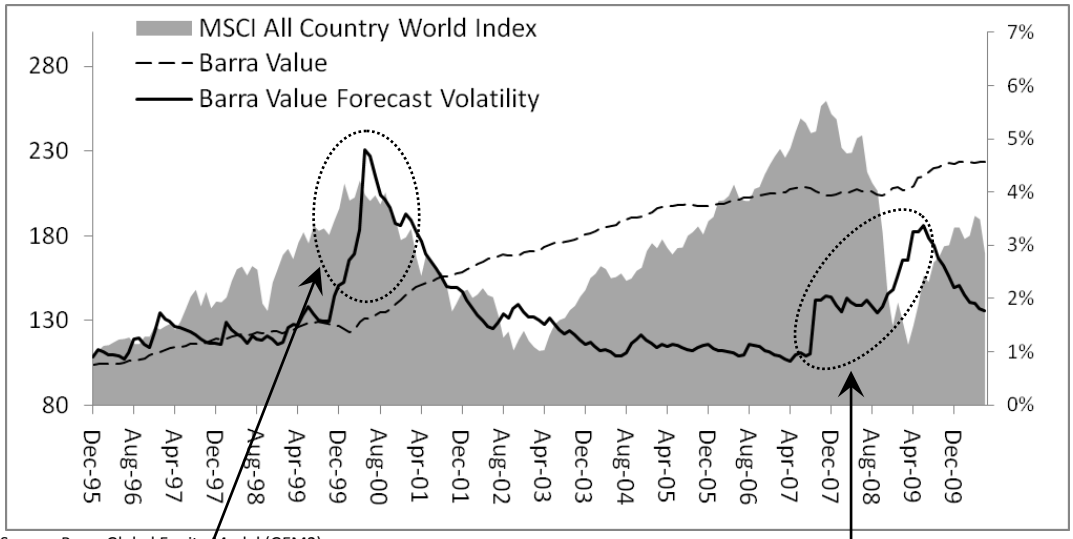
Comparing Exhibit 1A with Exhibit 1 shows how the general trends of Value volatilities obtained using the Barra Value factor and from actual Value portfolios are largely similar. In particular, the peaks in these volatility series were reached during cyclical downturns in Value that occurred in the Tech Bubble and near the Quant Meltdown. This supports the earlier evidence that the tracking error of a Value portfolio is more likely to experience sharp increases during a cyclical downturn in the Value cycle.

Because the Barra Value factor is derived after hedging out exposure to other factors in the model, it is meaningful to compare the relative performance of Value against other major factors. For this purpose we will consider Momentum and Small Caps strategies, since together with Value they are among the most common strategies used in global markets. The cumulative form of the return differentials, which is either Value relative to Momentum or Value relative to Small Caps, is shown in Exhibit 2. Note that there is no Small Caps factor in GEM2, and it is obtained by simply reversing the sign of the Barra Size factor.

Exhibit 2 indicates that, on a relative basis, Value performed better than both Momentum and Small Caps within the sample. Momentum actually compared favorably during two bull runs in the late nineties and in 2005-2008, but Value made greater progress during the rest of the sample period. The Value cycle, which refers to the cyclical variation of the relative performance of Value stocks, is examined in detail in a recent and related paper.[2] We will reconsider this cycle in the context of volatility in the next section.

[2] Owyong, David. "Value Stocks and the Macro Cycle," MSCI Research Insight, January 2011.

Exhibit 1: Level and Volatility of the Relative Performance of Value Stocks Globally (1995 to 2010; December 1995 = 100)

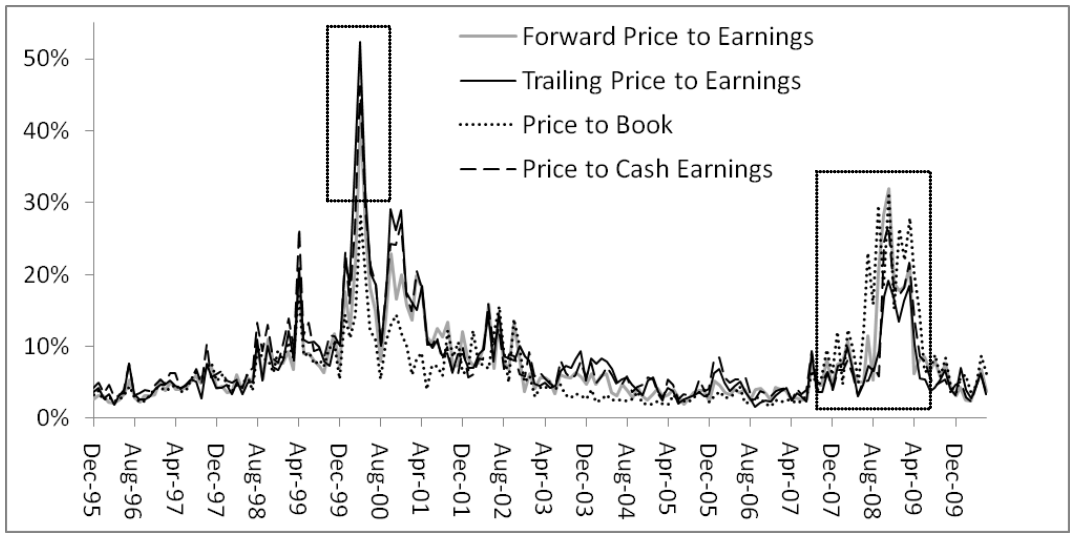


Source: Barra Global Equity Model (GEM2).

Tech Boom led to high volatility in relative Value performance.

Quant Meltdown in 2007 triggered increased volatility in Value stocks.

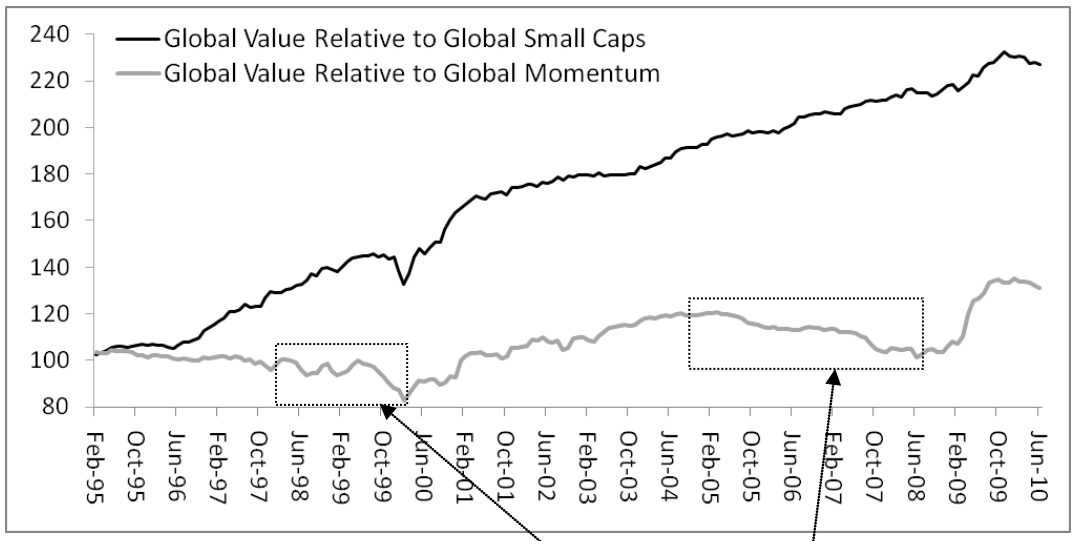
Exhibit 1A: Return Volatility of Various Value Portfolios (with monthly rebalancing)



Note: Stocks were ranked according to Value criterion (i.e. P/E or P/B or P/CE) and then universe was divided into three equal parts. For each month, the standard deviation of the daily cap-weighted return differential between the top third and the bottom third – for all days within that month – was computed and shown in above chart in annualized form.

Peaks reached during the Tech Boom and Quant Meltdown periods coincided with those for the forecast volatility of the Barra Value factor in Exhibit 1.

Exhibit 2: Performance of Value Relative to Other Factors, Global Equities (1995 to 2010, December 1995 = 100)



Source: Barra Global Equity Model (GEM2). The displayed series are derived from the difference in cumulative Barra factor returns. The sign of the Barra Size factor is reversed to represent the corresponding return for small cap stocks.

Momentum compared favorably during hottest phases of bull markets.

Value Volatility and the Global Value Cycle

Just like the overall stock market, the relative performance of Value stocks goes through cycles. However, these cycles may not coincide with those of the overall market. This Value cycle is shown in the upper chart of Exhibit 3 to facilitate the analysis of volatility in the present context.

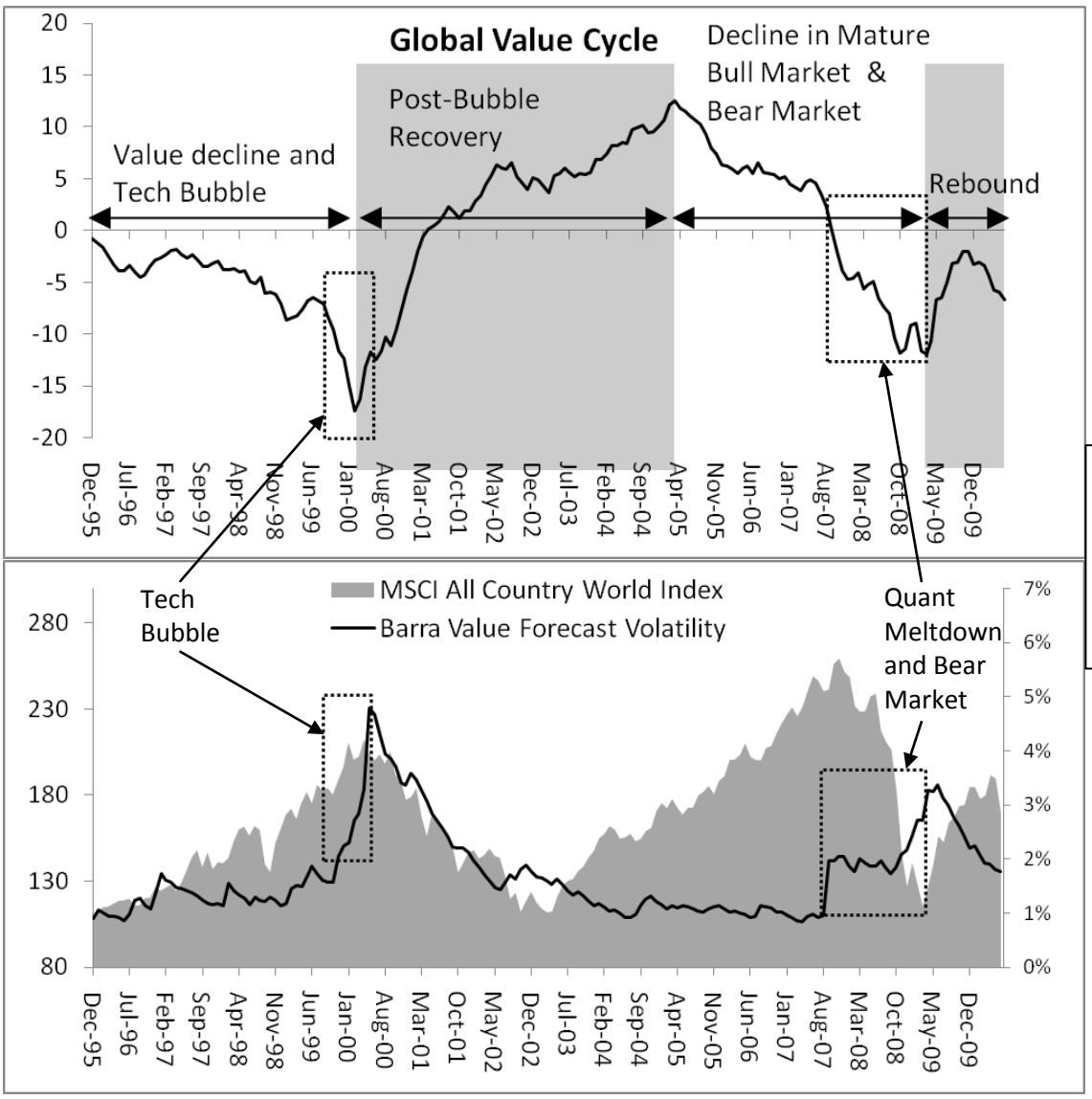
The Value cycle here is derived by subtracting a fitted linear trend from the cumulative returns of the Barra Value factor. In the upper chart of Exhibit 3, the global Value cycle is shown in its four phases. The first of four phases was in the second half of the 1990s, which was a period of relative Value decline marked by the rise of technology and growth companies at the expense of Value firms. After the bubble burst, the second phase started and a resurgence in Value stocks occurred. The cycle peaked five years later in 2005 and the subsequent decline accelerated after the Quant Meltdown in August 2007. Finally, the fourth and final phase occurred in 2009 as the overall stock market recovered.

The turning points in the Value cycle was close to that for the overall stock market in 2000 and 2009, but the uptrend in Value continued even after the stock market rebounded in 2003. It was not until 2005 that Value started to reverse, which was the beginning of the third phase shown in Exhibit 3. Moreover, the first bull market up to 2000 was to a large extent style-driven given the prominence of growth stocks and so it was not surprising that its end coincided with the turning point of the Value cycle. There is therefore no obvious link between the Value cycle and the stock market cycle. For interested readers, Owyong (2001) has presented evidence that the Value cycle is influenced by risk aversion and the interest rate cycle.

As for the volatility of the Value factor, there were two episodes in which it rose significantly, as pointed out earlier. The first was during the Tech Bubble in the late nineties, while the second was after the Quant Meltdown from 2007 to 2009. Comparing with the Value cycle, however, shows that both of these episodes had a common

characteristic: both happened during downturns in the Value cycle. In fact, it was during the last phase of these downturns, when Value's cyclical decline was the quickest, that Value's volatility increased markedly.

Exhibit 3: The Value Cycle and Value Volatility (1995-2010)



Source: Barra Global Equity Model (GEM2). The Global Value Cycle is based on the cumulative Barra Value factor return net of a fitted straight-line trend. The forecast volatility of the Barra Value factor is generated from GEM2.

Because the volatility considered above is based on the Barra Value factor, which is in turn based on the relative performance of Value stocks compared to other stocks, it may be interpreted as the volatility of the *active returns* of these stocks. Hence the volatility cycle considered here would have implications for the tracking error of a Value portfolio.

However, it is also interesting to examine the volatility in terms of absolute returns. This will be the focus of the next section. Unlike the findings from this section, the volatility of Value stocks in absolute returns will be more related to the overall stock market cycle than the Value cycle.

Volatility Cycle from Perspective of Absolute Returns

The Barra Value factor has the advantage that it considers relative performance of Value stocks as a single figure at the aggregate level. However, from the perspective of absolute returns, the Barra Value factor is not relevant and so we turn to raw data for individual stocks. In GEM2, there is a Volatility factor based on various measures of variability in excess returns at the stock level. These are realized volatility measures that are based on raw data and are not derived from the Barra model itself. The exposure of a stock to this factor is a measure of how volatile that stock is as compared to other stocks. Likewise, the exposure of a stock to the Value factor indicates the relative extent to which it is a Value stock. For the present context, a problem that arises with GEM2 is that the exposure for Volatility is global-relative, while that for Value is country-relative, inhibiting direct comparability. Global-relative implies that the Volatility exposure is computed based on a stock's volatility ranking within the entire global universe, while country-relative may imply the same, but only within a single country.

Due to this difference, we will employ the respective Volatility and Value Measures from the respective Barra risk models for the US (USE3), Europe (EUE3) and Asia Pacific (ASE1). Data series used in the computation of exposures may differ slightly across these models, but that is not a major issue in the present context because we are comparing Volatility and Value exposures for each model separately. Doing it on a geographically disaggregated basis also has the advantage of spotting differences across the three regions. For each month, and for each of these three models separately, we compute the cross-sectional correlation between the Volatility and Value exposures across stocks. This is done across all stocks within the entire coverage universe under each model, not just those in the estimation universe. The results are not qualitatively affected if this is changed.

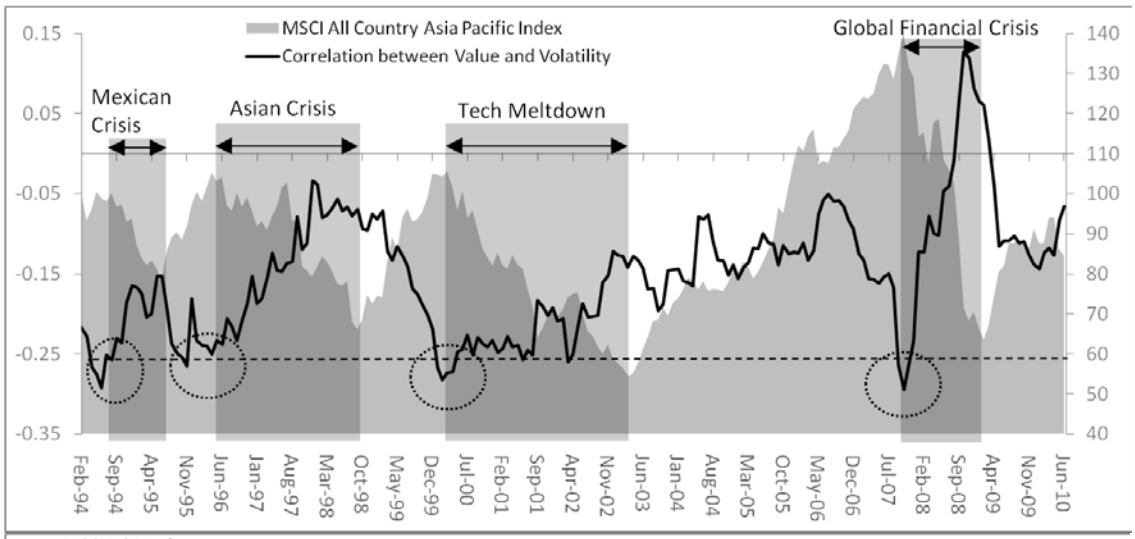
The correlation between Volatility and Value may be interpreted as a measure of the volatility of the excess returns of Value stocks relative to that for non-Value stocks. When the correlation is high, it is an indication that stocks with high Value exposures also tend to have high Volatility exposures, and vice versa. This correlation is therefore a measure of the volatility of Value stocks relative to that of non-Value stocks. Furthermore, by linking these cross-sectional correlations across time, the time-series variation would also uncover their cyclical patterns. These are displayed separately for Asia Pacific, US and Europe in Exhibit 4.

Exhibit 4 reveals an interesting phenomenon, which is that low levels in relative volatility – which implies that Value stocks are relatively less volatile than non-Value stocks – were associated with peaks in the overall stock market (as circled in the exhibit). Intuitively, Value stocks may experience greater stability in the late stages of a bull market, when investors tend to focus more on Momentum plays. The earlier evidence from Exhibit 2 that shows the superior performance of Momentum over Value during the bull runs in the late nineties, as well as 2005-2008, supports this view. On the other hand, during stock market troughs the relative volatility of Value stocks was high, although this was more striking in the case of Europe. One possible explanation is the Fama-French assertion that Value stocks tend to suffer more during periods of financial distress, suggesting that Value stocks may experience greater volatility compared to other stocks in a bear market period.

A second observation is that there is a widening trend for the relative volatility of Value stocks in the US and a narrowing trend in Europe. The widening trend in the US implies that the volatility ratio of Value to non-Value portfolios has been becoming more volatile, while in Europe it is stabilizing. This in turn suggests that the drivers of risk in Value portfolios are becoming more different than those for non-Value portfolios in the US, while the converse applies to Europe. In the case of the Asia Pacific region, relative volatility also rose above the usual upper bound during the Global Financial Crisis in late 2008 to early 2009, but that could be due to the severity of the event and does not necessarily indicate that a widening trend was emerging.

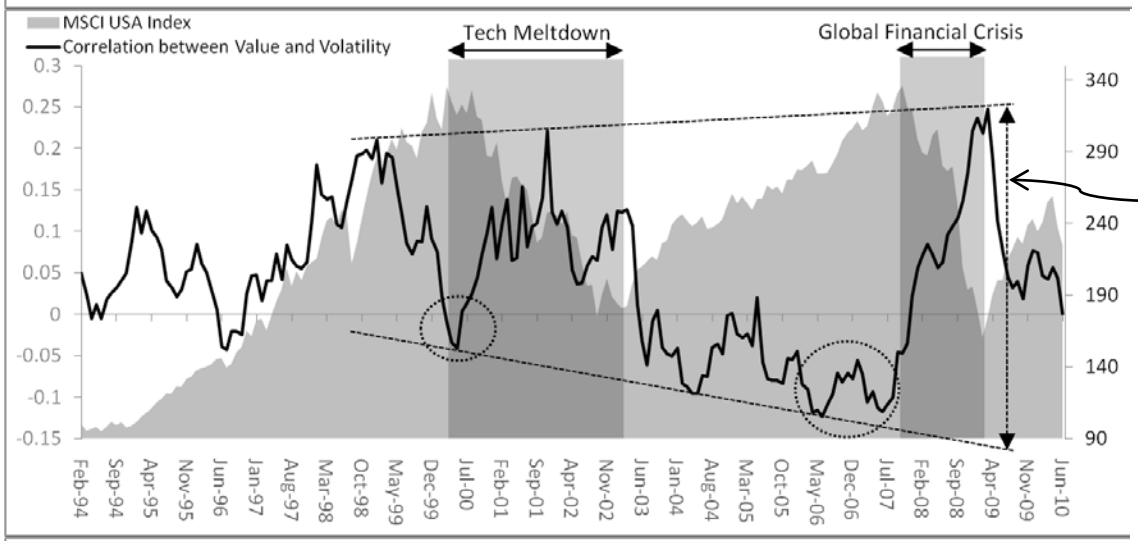
Exhibit 4: Volatility Cycles (Absolute Returns) in Asia Pacific, US and Europe (1994-2010)

Asia Pacific



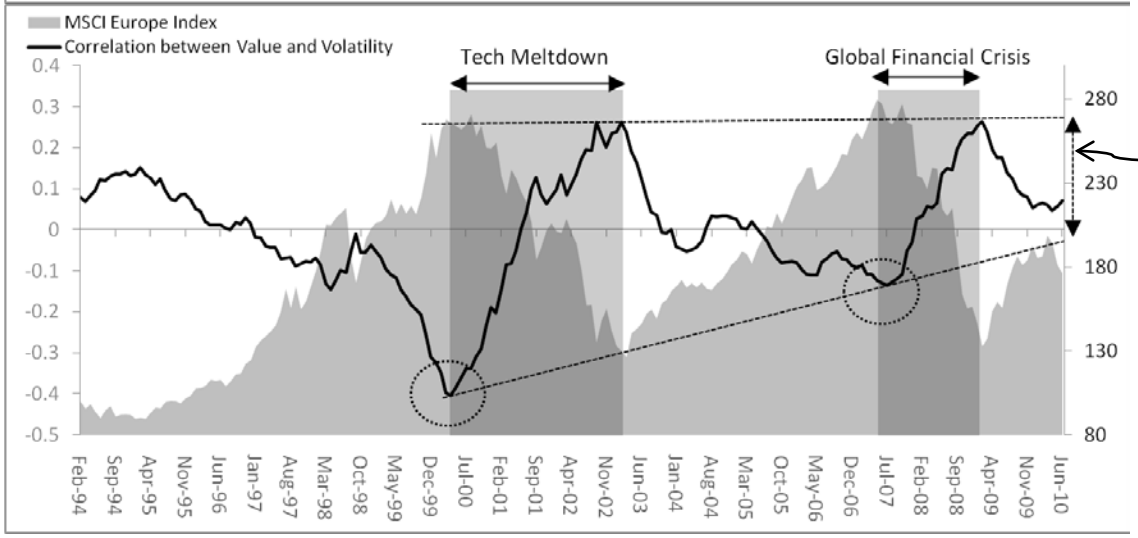
Relative Volatility of Value stocks was low before bear markets (as circled).

USA



Widening Trend

Europe



Narrowing Trend

Source: Barra models for Asia Pacific (ASE1), US (USE3) and Europe (EUE3).

Conclusion

From time to time, Value portfolios may experience higher risk, relative to other portfolios, or increased tracking error. To better understand these occurrences, this paper considers the volatility cycle of Value stocks globally. The volatility of both active as well as absolute returns was considered separately, with the former being related to the tracking error of a Value portfolio, while the latter had implications for the relative risk levels of Value and non-Value portfolios. It was found that the volatility in the active returns of Value stocks was closely linked with the Value cycle. High volatility tended to occur during downturns in the Value cycle, and especially during the late stages of a cyclical downturn.

In terms of absolute returns, the volatility of Value stocks compared to other stocks was observed to be more closely associated with the overall stock market cycle. In particular, this relative volatility was found to be low when the overall stock market was near its peak. This implies that Value stocks were relatively stable near the late stages of a bull market, possibly because investors tended to focus more on Momentum plays during such times. To a lesser extent, the reverse is also true, meaning that the relative volatility was generally high near market troughs. The Fama-French explanation that Value stocks tend to suffer more during periods of financial distress suggests that Value stocks may experience greater volatility compared to other stocks in a bear market. This could explain the higher levels of relative volatility during stock market troughs.

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