# Value Enhancement using Momentum Indicators:
## The European Experience

**Ron Bird**
School of Finance and Economics
University of Technology, Sydney
PO Box 123, Broadway, NSW 2007, Australia
Tel: + 612 9514 7716
Fax: + 612 9514 7711
e-mail: ron.bird@uts.edu.au

and

**Lorenzo Casavecchia***
School of Finance and Economics
University of Technology, Sydney
PO Box 123, Broadway, NSW 2007, Australia
Tel: + 612 9514 7772
Fax: + 612 9514 7711
e-mail: lorenzo.casavecchia@uts.edu.au

First draft: January 2005
Second draft: April 2005

Comments welcomed

-

* Corresponding author

# Value Enhancement using Momentum Indicators:
## The European Experience


## Abstract

In recent years much empirical evidence has been provided on, and many attempts have been made to explain, over- and under-reaction in stock prices which is suggestive that many stocks will oscillate between being over- and under-valued. A number of indicators have been found that prove useful in exploiting these mispricings by identifying cheap stocks to form value portfolios which outperform the market. We establish two characteristics of the individual stocks within these portfolios: (i) the majority of them underperform the market over all reasonable holding periods and (ii) all of the premium associated with value investing is attributable to only a handful of stocks with stellar performance that are included in these portfolios. This highlights the potential of being able to come to a better understanding of the price cycle at the level of the individual stock and so be able better time entry into the stocks that are identified as being cheap by a traditional value indicator but in so doing avoid any erosion in the contribution to the value premium from the small number of stellar stocks typically included. We test a number of momentum/sentiment indicators that can be used to address these issues and so enhance a value strategy using, as our sample, stocks listed on the major European markets over the last 15 years. We find that price momentum combined with its associated acceleration proves to be the best of all the indicators examined, resulting in a doubling of the performance of a pure value strategy and a more than four-fold increase in that of a long/short strategy based on value and growth. Not surprisingly this strategy results in a significant increase in the hit rate of stocks included in this enhanced value portfolio without a significant lose in the stellar stocks that make such an important contribution to the value premium.



JEL classification: G11, G14, G15

## 1. Introduction

Over the last twenty-five years, we have seen a plethora of empirical findings relating to both value and momentum investing, which call into question the basic tenets of the Efficient Market Hypothesis (from hereafter *EMH*). Since the statement of Black (1986) who wrote that "*In the end, my response to others is to make a prediction,…The influence of noise traders will become apparent*", we have observed the development of many models which attempt to explain the widely documented pricing departures from fair value through the interplay of different kinds of investors, who differentiate themselves in terms of the degree of rationality in their activity. In this paper we attempt to provide further insights into the nature of the cycle of pricing behaviour that gives rise to the identified pricing anomalies, and especially the under- and over-reaction to information that has received much attention in recent years.

Consistent with the literature on over- and under-reaction to information releases and in the spirit of the work on stock life cycle by writers such as Lee and Swaminathan (2000) and Bernstein (1993), we propose that many (but not all stocks) follow a price cycle made up on somewhat consistent movements towards mispricing in either direction which nearly results in a turnaround[1]. The stocks that become overly cheap as often classified as value stocks while those that become overly expensive are referred to as growth (glamour) stocks. In this study we will introduce the traditional valuation indicators (e.g. Book-to-Market, Earnings-to-Price, etc.) that are often used to differentiate between value and growth stocks. However, it will be established that these indicators tell us little about the timing of any turnaround in market performance or, indeed, if it will happen at all. It is in an attempt to address this largely timing issue that we introduce some momentum/sentiment indicators largely drawn from the price and earnings momentum literature to be used in combination with the value indicators to provide us with greater insights as to whether a turnaround in a value (or growth) stock is likely to occur (or is likely to have already occurred). We focus our analysis on a number

[1] In the case of over-pricing we would suggest that the turnaround applies in 100% of cases, but in the case of under-pricing , some stocks will never recover.

of value, price and earnings momentum indicators, implemented either alone or in combination across fifteen European countries as a means of providing a better understanding of just how markets "work". There are three main motivations for concentrating our analysis on the European markets: the lack of extensive research to date on the value and momentum phenomena in Europe, the evaluation of the cross-country differences in investor behaviours in the area considered, and the analysis of the existence of market irregularities across European countries in comparison with those evidenced in the many studies focused on the US market.

Our expectation is that superimposing the sentiment signals on the market-based indicators will permit us to better comprehend the transitional process by which stock prices drift away from, and revert back to, fair value. By so doing, we will also provide insights to the investment community that might permit the better exploitation of these mispricings and as a consequence make a contribution towards more efficient pricing. After first examining a simply overlay of price momentum on a traditional value strategy, we then turn to more complex momentum indicators which we believe will be better attuned to identifying turning points in the pricing cycle. The two momentum signals used as an overlay on a value strategy are (i) price momentum enhanced by acceleration indices and (ii) earnings momentum as measured by analyst forecast revisions enhanced by the dispersion in the analyst forecasts. Unfortunately the filtering process, *via* the interaction of value, price and earnings momentum phenomena cannot be performed without limits because it would imply the construction of portfolios consisting of only a few stocks, the use of which would jeopardise the possibility of providing significant indications in a statistical sense.

We find that a value strategy in isolation would have performed reasonably well if implemented across the European markets over the last 15 years. However, one major factor which detracts from performance is that traditional value indicators designate many stocks as being cheap which do not recover in the immediate future. As hypothesised, the momentum/sentiment indicators used do make a positive contribution to the timing of the turnaround in value (growth) stocks and so enhance the performance

of a value strategy. In section 2 of this paper we will review the literature as it relates to value strategies, momentum strategies and many of the explanation put forward to explain market anomalies. In Section 3, we introduce our data and the research methods that we employ. Our findings are reported in Section 4 while Section 5 provides us with the opportunity to review and consolidate the implications of these findings.

## 2. Literature

A large number of studies have both documented and attempted to explain the anomalous outperformance of naïve strategies based on simple valuation multiples. The evidence from studies conducted over the last 30 years is that simple strategies identify value stocks with high levels of these multiples that outperform growth stocks with low values for the same multilples (such as earnings-to-price, Basu, 1977; book-to-market, Fama and French, 1992; cash flow-to-price, Lakonishok et al, 1994). Indeed, it appears that a value premium exists in most markets which many writers have attempted to explain. One proposal put forward by Fama and French (1993) is that the value premium exists to compensate investors for risk inherent in value stocks relative to growth stocks which is not captured by the CAPM of Sharpe (1964) and Lintner (1965). A second proposal is that a value premium does not really exist but is simply the product of "data-snooping" (Black, 1993) or "data selection biases" (Kothari et al, 1995).

Whereas the first two explanations attempt to reconcile the empirical evidence with the EMH, that proposed by Lakonishok et al. (1994) is at variance with market efficiency in that it suggests that the value premium is a consequence of judgemental mistakes committed by investors during the valuation process of the firms. Lakonishok et al support the philosophy of Graham and Dodd (1934) that a value strategy works because it is *contrary* to market cycles, that reflect consistent errors with respect to expectation of future earnings. The value indicators seem to have forecasting power of future stock return because they represent a noisy proxy for the systematic errors made by investors. For examples, a high (low) value for BM maybe is indicative that the current price of the stocks is temporarily depressed (inflated) as a consequence of investors irrationally

attributing too much a weight to recent poor (good) performance by assuming that this pattern will continue way out into the future. When (and if) the stock eventually fails to live up to these expectations, there will be a correction in both the BM multiple and also the price of the stock. As such the value indicators can provide useful insights into those stocks that are good candidates for mean reversion in both fundamentals and market performance. However, they provide little insight into the timing of any mean reversion with evidence that this can extend out several years into the future (La Porta et al, 1997).

Even though the performance of portfolios composed of value stocks has been found to provide impressive outperformance in most markets, one should be cautious of such strategies as typically the outperformance is attributable to a handful of stocks with the majority of the stocks included in the portfolios actually underperforming the market. (Rousseau, 2003). The simple proposition behind each of these value indicator being that as the value of the indicator for a particular stock becomes more extreme, the probability increases that there will be an adjustment in the stock's price as part of the process by the value indicator that moves back to a more typical level. However, the weakness of these indicators is that they tell us little about when this adjustment will occur, or indeed whether it will happen at all. On the other hand the momentum (sentiment) indicators provide very useful insights as to the likely direction of the movement in a stock's price in the immediate future. As such the marriage of the momentum indicator with the value indicator provides us with indications into which stock whose price is likely to move in a particular direction in the immediate future. This being the case, the addition of the momentum indicators offers one possible means for overcoming the deficiencies of the rather crude indicators typically used to identify value stocks with the two types of indicators in combination, having the potential of providing us with better insights as to the nature of the cycles in a stock's price. As stated by Asness (1997), even if it is likely that a firm with high BM is distressed (Fama and French, 1992), it is very unlikely that a firm with both high BM and high recent past price performance might be distressed. This statement is very important because sheds light on the strong and inverse relationship existing between value and momentum investing.

Momentum investing is based on the past trends related either to prices or returns (price momentum) or to variables linked to earnings (earnings momentum). Since Jegadeesh and Titman (1993), who evidenced a continuation anomaly in the returns for both winners and losers over an intermediate time horizon (ranging between 3 and 12 months), numerous studies have both identified and attempted to explain the price and earnings momentum puzzle. These models, in their attempt to reconcile mid-term momentum (under-reaction) with the long-term reversal (over-reaction), are based on different assumptions about the nature of the behavioural biases that support various aspects of this price pattern including the magnitude of the reaction to information release. With a risk-loading explanation not providing us with a justification for these anomalies (Fama and French, 1996), an obvious option is to turn to behavioural finance, which proposes two possible explanations for market irregularities: (i) behavioural factors that cause the price distortions and (ii) limits to arbitrage which mean that they persist for extended periods of time.

One of the earlier models to explain under- and over-reaction was provided by DeLong et al (1990), who proposed a model where rational traders support the expected future buying stream by noise traders instead of bucking the trend to eliminate any mispricing. A similar framework was proposed by Hong and Stein (1999), where the inefficient fluctuation of price around the fundamentals is due to the interplay of the "newswatchers" and the early or late "momentum traders". Also, there is the behavioural model proposed by Barberis et al(1998), where investor's errors in their estimates not coherent to the Bayesian model determine the underreaction (*conservatism*) to a single information signal that subsequently produces an overreaction in prices to a series of information releases (*representativeness*).

Recent empirical research by Bird and Casavecchia (2004) has demonstrated that price momentum combined with its acceleration can be used to identify investor sentiment over intermediate periods. The findings suggest that acceleration provides a valuable signal not only relating to the extent of the return continuation, but also its persistency, and so attenuates the information captured by the "crude" price momentum signal. Specifically,

stocks experiencing positive momentum and low (high) acceleration are likely to be in the late (early) stages, approaching the end (early stages) of an upward phase of their price cycle and similarly stocks experiencing negative momentum with high (low) acceleration are likely to be in the early (late) stages of their correction phase.

Lee and Swaminathan (2000), in a way similar to the Bernstein's earnings cycle, proposed a momentum life cycle framework where a stock's price cycles in a sequential way. According to the momentum life cycle, an effective strategy would consist of buying value stocks classified as early-stage winners (high price momentum combined with high acceleration or low volume)[2]. The blend of value and momentum investing results in an improvement in the proportion of the upward price drift caught by the trading model and an increase in the hit rate of the strategy, because superimposing the momentum on the value strategy provides us with a better picture of the time (when to enter or exit) and dynamics of the price cycle experienced by the stocks (Bird and Whitaker, 2003 and 2004).

## 3. Data and Methodology

### *The Data*

Our sample is constituted by almost 8000 stocks from fifteen European countries: France, Italy, The Netherlands, Germany, Spain, United Kingdom, Belgium, Portugal, Ireland, Austria, Greece, Norway, Sweden, Denmark, and Finland. We evaluated the returns - expressed in pounds- of the strategies over the 15-year period[3] from January 1989 to May 2004, using accounting data extracted from the Worldscope database, return data provided by GMO Woolley London, and data on sell-side analyst's earnings forecasts

[2] The stocks to "sell" under this strategy are growth stocks classified as early-stage losers (poor momentum combined with high acceleration or high volume).

[3] The period considered, indeed, is composed of a bull market phase during all the nineties which is immediately followed by a strong and still ongoing share price correction; hence, it provides a sample with different and sometimes extremes investors behaviors. The heterogeneity of the investment horizon is important because the nature –positive or negative - of the business cycle strongly affects the performance of value or glamour stocks, with the fundamentals of value firms responding more negatively and rapidly to negative shocks because of their less flexibility in scaling down than growth firms (Xing and Zhang, 2004).

provided by I\B\E\S[4]. We excluded from our data all stocks that belonged to the financial sector, those with a negative book value and those whose share price was less than one pound (or the equivalent in other currencies).

With respect to the earnings forecasts dataset, we exclude all estimates formulated by less than 3 analysts in order to filter possible noise in the revision measure among low coverage firms[5] (Hong, Lee and Swaminathan, 2003, and Dische, 2001). We did not specifically exclude stocks with extreme returns as, documented also by Kothari et al (1999), the active truncation on a right skewed data would not be random and therefore, can produce the apparent evidence of mispricings.

The average number of firms and their characteristics (average deciles) in terms of Book-to-Market, Sales-to-Price, volume and market capitalization, are illustrated in Table 1. The table highlights the potential effect of country biases if we do not take into consideration the differences in terms of accounting and market features across the sample considered.

***The Methodology***

To ensure the elimination of any "look ahead" bias from assuming access to accounting data before it becomes available, we effectively assume a four month delay in the release of such information. The approach we take is to calculate for all fiscal years the value ratios by dividing the accounting data (e.g. book value) ending in the calendar year t-1 with the prices for the period from month j (e.g. April) of year t to month j-1 (March) of year t+1. In order to take into account the timing of the firms' information release, we considered a firm's book value of equity, earnings and sales at the end of month j-4, i.e. four months before that of the price use to compute the BM, EP, and SP ratios (e.g.

[4] The authors would like to thank Thomson Financial for providing the I\B\E\S data.
[5] As stated in our previous work (2004), the results are almost the same even when we use the total sample.

December for April)[6]. Therefore, to be included in our sample for month j of year t, a firm must have data in Worldscope on book value, sales and earnings for the year ending in calendar t-1.

As mentioned before, using the ratios of book value (BV)[7], as resulting in December of fiscal year t-1, on market value of equity (MV), we sort stocks into quintiles with the additional requirement that all firms included in our sample must have a positive BV. The value portfolio consists of stocks in the highest quintile (*BM5*), whereas the growth portfolio is composed of stocks in the lowest quintile (*BM1*). The same procedure is applied to determine the value portfolios based on Sales-to-Price (*SP5*) and earnings-to price (*EP5*). Since these portfolios are built across the fifteen countries, the combined ranking in a month might bias the portfolios towards stocks from a particular country. For example, it might be that in a particular month the value indicator being used (e.g. *Sales-to-Price*) in a country (e.g. France) are very high resulting in French stocks being over-represented in the "top quintile" portfolio for the month considered. As a consequence, the calculated returns from the resulting portfolio will not only reflect their association with the value indicator but also the country bias. In order to mitigate this potential impact, we formed portfolios on a country-adjusted basis. The country-adjusted value indicator (e.g. *Sales-to-Price*) for each stock each month is obtained by subtracting the average value for the indicator across all stocks in the country for that month from each stock's value indicator. The same procedure is followed for the stocks in each of the 15 countries and so we are able to both rank stocks and then form portfolios on a country-adjusted basis. We have found previously that the country correction procedure results in only slight erosion in the returns of the strategies (Bird and Casavecchia, 2004) and for

[6] The month j-4 varies according to the different fiscal year-end in each country belonging to our sample. Therefore, the portfolio construction considers the different accounting procedure adopted in the European zone.

[7] In the calculation of the book value, we considered the intangibles of the firms in order to take into account the potential of the firm in creating the yearly economic value for investors. Indeed, the value a firm must realize in order to justify the current share price depends not only on earnings but also on the positive or negative variation in the intangibles. Therefore, if we do not include the change in the intangibles in our valuation multiples, we will lose valuable information which could justify the current market performance of a stock.

this reason all of the analysis reported in this paper is undertaken on a country-adjusted basis.

The construction of the momentum portfolios in this study is performed using the methodology developed by Jegadeesh and Titman (1993). At the beginning of every month stocks are ranked on the basis of their returns over the previous six months, this ranking is divided into quintiles which are then used as the basis of forming five portfolios[8]. The portfolio consisting of the best performing stocks is referred to as the "winners" while that consisting of the worst performing stocks is referred to as the "losers". The performance of these portfolios are tracked over various holding periods (ranging from one month to 36 months). As portfolios are formed monthly but most holding periods extend well beyond, the various monthly portfolios overlap to form the final portfolio. For example, if the holding period is 12 months, it means that the portfolio at any point of time is a composite of the current month's portfolio and those for the previous 11 months and when it is rebalanced each month, the current months portfolio replaces that from 12 months earlier.

We further decompose the portfolios formed on the basis of each stock's price momentum according to the degree of price acceleration for each stock. In other words we not only determine the rate of return for each stock over the previous six months but also the rate at which these returns are changing. In Bird and Casavecchia (2004), we found that the persistency in past performance was heavily influenced by this acceleration measure with winning stocks experiencing high (upward) acceleration performing their best in the future and losing stocks experiencing high (downward) acceleration performing the worst. In contrast to Lee and Swaminathan (2000), we found acceleration to be a better metric than volume to differentiate between stocks with similar price momentum and so to provide a useful means for determining the positioning of each stock in its price cycle.

[8] For a detailed description of the methodology used to calculate the price and earnings momentum measures, the reader are referred to R. Bird and L. Casavecchia, "The Profitability of Price and Earnings Momentum Across European Markets", Working Papers, University of Technology, Sydney, 2004.In this paper we found six months to be the optimal formation period

In our analysis we partitioned the value and price momentum portfolios into two clusters, according to their winning or losing characteristics and then applied a short or long acceleration measure depending on the stock's 6-month past performance. We superimposed the short acceleration index, constructed as the 3-month over 6-month[9] price momentum, to the bottom 50% of the value-momentum universe and a long acceleration index, constructed as the 12-month over 24-month price momentum, to the top 50% of the value-momentum universe. The reason we use a different acceleration measure depending upon whether a stocks is going up or down is because the periodicity of upward movements tends to be much longer than that for downward movements.

Because value (growth) stocks are likely to be stocks experiencing the most extreme of earnings expectations, they are potentially the stocks that are likely to be the most affected by an earnings surprises and/or large and frequent revisions in earnings estimates. In this vein we turned our attention to two measures of earnings momentum represented by analysts' EPS forecasts revisions (hereafter *FREVs*) and the frequency of EPS up- or down-ward revision of estimates (hereafter *Agreement*)[4]. The reason for this choice is to get a finer glance on how investors, analysts and firms generally interact among themselves in response to information flows.
The first measure (Forecast Revisions addressed as *FREVs*) is calculated as follow:

$$FREV_{i,t} = \sum_{j=0}^{T} \frac{FEST_{i,t-j} - FEST_{i,t-j-1}}{StdDev_{i,t-j-1}}$$

It means that the *3-month* forecast revision of *i*'s firm ($FREV_{i,t}$) is the sum in month *t* of the firm's median *FY1* earnings estimate in month *t-j* ($FEST_{i,t-j}$) minus its median *FY1* estimate in month *t-j-1* ($FEST_{i,t-j-1}$), divided by the standard deviation of estimates in

[9] As stated by Bird and Casavecchia (2004), the choice for the length of the acceleration indices depends on the number of contradictory signals generated by the price momentum.

month *t-j-1* ( $StdDev_{i,t-j-1}$ ) in order to scale the criterion, with *j* lagged up to T months (length of the formation period minus one).

The I\B\E\S dataset provides each month also the standard deviation of the analysts' EPS estimates (that we addressed as "*forecast dispersion*") for each stock for a particular fiscal year. The forecast dispersion thus constitutes supplementary information in terms of the weight or relevance of the information signal as measured by the dispersion in combination with the magnitude or frequency of the signals quantified respectively by the *FREVs*. The combination of earnings momentum and the dispersion permits to better discriminate the nature of the information flowing from the analysts.

The second measure (*Agreement*) is calculated as follow:

$$Agreement_{i,t} = \frac{\sum_{j=1}^{T} \frac{NumUp_{i,j} - NumDown_{i,j}}{NumEst_{i,j}}}{T},$$

where *NumUp* is the number of upward revisions of the EPS forecasts by the analysts during the period, *NumDown* is the corresponding number of downward revisions, *NumEst* is the total number of revisions during this period, and T is the formation period over which these forecast are calculated (*i.e.* 3 months)[10]. Agreement is fundamentally the number of times the average analyst revises his earnings forecast either upwards (if positive) or downwards in a particular month.

Once having calculated the value for the two earning momentum strategies (*FREV* and *Agreement*) we need to use them to rank stocks and form portfolios. The first step in this process is to correct for any country bias following the same approach as mentioned above. The second step involves the use of these country-corrected values to rank the stocks each month from the lowest to the highest. These rankings are then used to

[10] Bird and Casavecchia (2004) found three months to be the optimum period over which to calculate the Agreement parameter.

separate the stocks into quintiles which provide the basis for forming five portfolios each month.

After constructing the portfolios in the various ways described above, we then proceed to track their monthly performance by calculating equally weighted returns with all portfolios being constructed on the basis of each stock included being assigned an equal weight. To evaluate the significance of the returns, we adopted a hypothesis test which takes into account the particular distribution of the returns. Indeed, the returns evidence a high level of autocorrelation and/or heteroskedasticity. For this reason, we calculated the p-value for each quintile and each long-short strategy by using the Newey-West estimation of the covariance matrix, because it provides a *heteroskedasticity*- and *autocorrelation-consistent* p-value for the hypothesis test (Newey and West, 1987).

Finally, we will also report the characteristics of the portfolios in terms of:

- Portfolio's average size;
- Portfolio's average Book-to-Market as a measure of its valuation;
- Portfolio's standard deviation of its Book-to-Market, as a measure of the volatility of its valuation;
- Portfolio's 6-month price momentum as a measure of its past performance;
- Portfolio's average forecast revision of estimates, in order to analyse the characteristics in terms of magnitude of upward or downward revisions;
- Portfolio's average agreement, with the aim to quantify the frequency of positive or negative revisions of the estimates.

## 4. Empirical Results

### *The Univariate Tests*

Before analysing the benefits generated by a combination of value and momentum strategies, we first turn our attention to the performance of value portfolios constructed on a single-criterion. Table II documents the equally-weighted and raw returns, the p-value (corrected for *autocorrelation* and *heteroskedasticity*), and standard deviation of a

value strategy over several holding period: 3, 6, 12, 24, and 36 months. We use three different value indicators to rank the stocks and form portfolios: BM (*panel A*), SP (*panel B*), and EP (*panel C*). The last column of each panel reports the results of a long (value portfolio) – short (growth portfolio) strategy. In each case, the value (growth) portfolio are composed of stocks that rank in the highest (lowest) 20% of all stocks when ranked by the value indicator being used.

Although there is not always a monotonic relationship as one proceeds across the return realised by each of the five portfolios, it is universally true across all three indicators and all five holding periods that the value portfolios outperform the growth portfolios. A review of each of the Panels in Table II clearly indicates that over our data set the SP multiple provides the best basis for differentiating between value and growth stocks as evidenced by the fact that it produces the highest return on a long-short strategy based on value and growth. Of the other two multiples, EP performs better over the shorter time horizons, but overall BM would appear to be a better measure yielding the higher and significant returns over the longer time horizons.

For portfolios based on SP and BM there is a steady expansion of the value premium as one extends out to the longest holding period evaluated of 36 months. A long-short portfolio derived using SP over a 36-month holding period realised almost 1% per month while that based on BM realised 0.65% per month. The fact that the performance of the value strategies improves, as one extends the holding period, is consistent with previous evidence (La Porta *et alt*., 1997) and suggests that many value stocks take a long time to reach a turning point in their market performance and hence that a relatively long holding period is required to extract the full benefits from a value-based strategy.

In Table III we gathered the characteristics of the portfolios constructed by using the two best market-based indicators SP (panel A) and BM (panel B), as documented in table II. The actual characteristics of the portfolios formed using these two indicators are very similar: the value (growth) stocks being among the smaller (larger) firms, having a slightly lower (higher) price momentum, a higher (lower) standard deviation of the BM

indicator, a negative (positive) country-adjusted magnitude of the analysts' EPS forecast revisions and high (low) frequency of downward revision of earnings estimates. These findings are suggestive a high commonality of the stocks included in the portfolios constructed using each indicator which indicates that we may see little in the way of improved performance when we combine the two measures in the next section.

***The Multi-criteria Tests***

Now that we have confirmed that the two value indicators, SP and BM individually are able to differentiate between value and growth stocks, the question is whether they can do a better job in combination. The proposition being that they may be reflecting different information sources and so in combination might provide us with more and finer signals on the way the price drift is "fuelled" by the market valuations. In table IV we document this point by collecting the returns for portfolios formed based on a combination of these two value indicators. The portfolios are constructed in the following way: each month from 1989 all stocks in the GMO London datasets are ranked according to their BM in that month, and then divided in quintiles. The stocks belonging to the BM quintiles are successively "scanned" and sorted by a second criteria, SP, and the performances from the resulting 25 portfolios are tracked over different holding periods equal to 6, 12, 24, and 36 months with returns being measured on an equally-weighted and absolute basis.

Consistent with our expectations conditioned by the fact that the portfolios constructed individually using the two indicators have very similar characteristics, we find that, the interaction of the two value indicators is not able to add value over and above that realised using the SP value indicator by itself. As an example, the value premium realised using SP alone over a 12-month holding period is identical to that which would have been realised using the best combination of the two indicators. This suggests to us that there is no advantage in combining these indicators and so when it comes to determining whether momentum indicators can be used to enhance value, we use SP as the sole indicator for separating the value stocks from the growth stocks.

***Interim Summary***

Taking stock of our findings on the performance of value portfolios in the European markets over the 15 years covered by our data, it proved that the use of SP as the value indicator generated significant returns on a long-short portfolio for period of upwards of 12 months where portfolios were formed on an equally-weighted basis. We have previously argued that traditional valuation indicators provide a very crude basis for identifying cheap and expensive stocks, particularly because they tell us very little about when an apparent cheap stock is likely to experience a turnaround in performance. This suggests that significant improvements might be able to be made for choosing stocks to be included in a value portfolio if one could gain some insight as to the likely timing of such turnaround in performance. This is something to which we will soon give greater attention when we consider how momentum indicators might be used to enhance SP in identifying the best value stocks in which to invest. However, before turning to consider such combinations we will seek to gain a better understanding of the behaviour of the individual stocks included in the value portfolios performed on the basis of SP.

In Figure I we report the distributions of the excess returns of the individual stocks included in the value portfolios formed using SP over different holding periods[11]. The distributions illustrate the equally-weighted monthly returns for value portfolios based on the top 20% by SP for holding periods ranging from six to 36 months. Piotroski (2000) and Rousseau (2004) evidenced that less than 44% of value stocks earn positive excess returns over a 12-month holding period. Our findings are very much in tune with the findings of these other authors with only 40% of the stocks included in our European value portfolios realise a positive excess return (i.e outperform the market) over a 6-month holding period with a slight improvement in this "hit rate" as we lengthen the holding period. These findings suggest the potential for a significant improvement in the performance of the value portfolios if a method could be found to increase the proportion of the stocks included in these portfolios that actually make a positive contribution to the

[11] The excess returns are calculated relative to a benchmark portfolio composed of all of the stocks included in our sample.

performance[12]. Another aspect of the distributions that contribute to an improvement in the performance of the value portfolios, as the holding period is lengthened, is captured in the right-hand tail of each of the distributions. We see here that the proportion of stocks that realise a return in excess of 50% grows dramatically as one extends the holding period for the stocks. For example, this proportion is 7% for a holding period of six months but more than doubles to 15% for a 36-month holding period. This emphasises a point that we have made previously: a major contribution to the value premium comes from a small but increasing number of stocks that very significantly outperform the market.

The previous *excursus* accentuates the importance of a timing indicator in disciplining a contrarian approach. Indeed, a value approach requires patience as evidenced by the fact that the value added from such a strategy increases as one extends the holding period out several years. Of course, patience in holding these stocks is a second best solution with it being much more preferable to delay entry into value stocks until it is closer to the time when any turnaround in performance will occur.

It is instructive to think of the value stocks as behaving in one of three possible ways:

- Those that will begin to perform well soon after being identified as value stocks and there is clear evidence that these exist because value strategies do appear to outperform over even short holding periods of three months (*Type 1* value stocks);
- Those that will eventually begin to outperform but not for a substantial time after being classified as value stocks and there is evidence of this given that the hit rate of value portfolios increase with the holding period (*Type 2* value stocks);
- Those that will never outperform and the supporting evidence for this is the still relatively low hit rate and increasing proportion of stocks with extremely large negative excess returns over a 36 month holding period which is indicative that they are never likely to outperform (*Type 3* value stocks).

[12] The way that Piotroski (2000) went about achieving an improvement in performance was to use accounting data to differentiate between the value stocks.

What one would like to achieve is to totally avoid investing in Type 3 value stocks; delay entry into Type 2 value stocks and immediately invest in Type 1 value stocks. We have proposed the use of momentum indicators to time entry into the value stocks as a way dealing with the problem associated with the Type 2 value stocks. Such an approach is unlikely to sufficiently deal with the problems associated with the Type 3 value stocks which are more preferably addressed using an approach based on fundamental variables similar to that proposed by Piotroski. However, the use of a momentum indicator might mitigate the problem of the Type 3 value stocks to the extent that if they simply continue to decline in value, the sentiment indicator would continue to exclude them from the final portfolios. We will now turn to examining the impact of introducing momentum indicators to overlay a value strategy and will subsequently report on the implications of such overlays for the distribution of excess returns of the stocks included in the value portfolios.

***Enhancing Value with Momentum Indicators***

In table V we report the performance of a value strategy enhanced using price momentum where the stocks are held for 12 months. Each month we rank all stocks according to their SP and then further divide the stocks on the basis of their past six-month performances. The result is a decomposition of the earnings and momentum life cycle into 25 portfolios whose equally-weighted performance is reported in Table V. The last row in the right-hand column reports the performances of a long-short strategy of buying value stocks with good price momentum and selling growth stocks with poor price momentum. The return realised of 1.59% per month represents an improvement of 0.75% per month over the previously reported return for a strategy solely based on SP. This improvement in performance is attributed to the ability of the momentum indicator to differentiate between growth stocks (as it demonstrates little in the way of ability to differentiate between value stocks). As such the addition of price momentum alone adds little to the performance of a long-only value strategy. It is also interesting to note the extent to which a value indicator could be used to enhance a momentum strategy. It proves that the value indicator provides a good basis for differentiating between losing

stocks (also see, Asness, 1997) which reflects that stocks in free fall are unlikely to turnaround until they become relatively cheap. In contrast, a valuation indicator is not good means for determining the turning point for a stock in rapid ascent.

The price momentum thus is a beneficial instrument to introduce to a value strategy because it better identifies the position of a stock in terms of its price cycle and so enables one to have a better idea of the timing of a turnaround for value (and growth) stocks beyond that which can be obtained from the value indicator alone. However, we have seen that the additional insights that can be gleaned from combining price momentum with a value indicator are limited in some instances and so we will now turn to enhancing the value indicator beyond price momentum by including acceleration to see if this further increases our understanding of a stock's price cycle.

In table VI we focus our attention on the value (top 30% by Sales-to-Price) and growth (bottom 30%) quintiles through the combination of price momentum and its acceleration index in order to discern where a stock is placed in its price cycle, analysing the possibility for a more detailed sequence of the market valuation and reaction to the implied information diffusion

We would expect value stocks (Panel A) with winner characteristics and high acceleration (i.e. cheap stocks going up quickly) to be the best performers and growth stocks (Panel B) with losing characteristics and high acceleration (i.e expensive stocks going down quickly) to be the worst performers. This indeed proved to be the case with the difference between the performance of portfolios composed of stocks with these characteristics being 3.77% per month when measured over a 12-month holding period. This represents a more than doubling of the return on the equivalent strategy when value and price momentum were used in combination (Table V) and emphasizes the additional insights obtained from including acceleration as another indicator. We have previously seen that the addition of price momentum was only of limited value in providing us with insights on the turnaround point for a value stocks. However, all this changes with the introduction of acceleration, as can be seen from the right-hand column of Panel B, which

clearly indicates that high acceleration is a very good (bad) signal for winning (losing) value stocks. We see that cheap stocks whose price has been going up for several months at a rapid rate are highly likely to keep rising for an extended period while cheap stocks that are still falling at a rapid rate and highly likely to continue to fall for some time yet. We can see the advantages of introducing acceleration for a long-only value strategy when we compare the monthly returns from investing in winning value stocks with high acceleration (2.46% per month) with those from investing only in winning value stocks (1.65% per month). Of course, *in neither case* are we actually predicting the turning point in advance but rather what we are attempting to do is to make a judgment on whether a relatively short burst of performance by a value stock is permanent. There will be numerous false signals for value stocks but what we have seen is that acceleration provides extremely good insights into the permanency of a turnaround of the market performance of a value stock.

We get similar insights as to the future performance of growth stocks when we introduce acceleration as an additional indicator (see Panel B). Indeed, growth stocks falling quickly in value realised a monthly return of -1.31% over our sample period. This miserable return is indicative of the "torpedo effect" for growth companies once information flows reveal that the company is failing to meet the market expectations (Bernstein, 1993). At the other extreme we see that growth (expensive) stocks whose price is still rapidly rising are likely to continue to do so for some time into the future, which is indicative of the dangers of choosing to ignore such stocks on the grounds of valuation.

Our discussion to date has focussed on the use of price momentum along with a value indicator to obtain insights as to the position of a stock in its price cycle and so its likely future performance. We now turn our attention to the introduction of two earnings momentum indicators, Agreement and *FREV*, to use as alternative metrics to determine where value and growth stocks are positioned in their price cycle.

In Table VII we report on the performance formed by applying the two earnings momentum indicators as an overlay to stocks ranked on the basis of SP. Both earnings

momentum indicators, but particularly Agreement, enjoy some success in differentiating between value and growth stock. The difference in monthly returns between the growth stocks with the lowest Agreement (*FREV*) and the value stocks with the highest level of Agreement (FREV) is a highly significant 1.17% (0.79%). Indeed, Agreement provides a very good basis for differentiating between both value and growth stocks. In contrast, SP is nowhere near as effective in differentiating between the future performance of stocks with similar levels of Agreement (*FREV*).

We next turn our attention to whether earnings momentum indicator can better differentiate between value and growth stocks when combined with another measure based upon analysts' forecast, the dispersion of these forecasts. Dispersion has previously been found by a number of authors to provide a good means to differentiate between stocks and Bird and Casavecchia (2004) have found that it works very well in combination with our earnings momentum indicators. We report in Table VIII the monthly returns of value portfolios (Panel A) and growth portfolios (Panel B) which are further decomposed by both Agreement and dispersion. It proves that dispersion provides a very good means for further differentiating between growth stocks, with the growth stocks with the highest Agreement and lowest dispersion outperforming those with low Agreement and high dispersion by 1.44% per month. In contrast dispersion adds nothing when used in combination with Agreement to differentiate between value stocks. This is a very interesting finding in that it suggests that dispersion operates as a measure of the signal provided by the analyst with respect to stocks that have been performing well but that the dispersion signal is regarded to be of no relevance when judging the information value of the analysts forecasts for the out-of-favour stocks. Indeed, dispersion assists us to better place a growth stock in its pricing cycle but is of no help in similarly placing value stocks in their pricing cycle. As a consequence of the inability of dispersion to further differentiate between value stocks when ranked by Agreement we find that the introduction of the dispersion measure does not enable us to better differentiate between the worst of the growth stocks and the best of the value stocks.

***Final Summary***

We commenced by looking at the performance of value stocks over a 15-year period across most European markets and found evidence of a modest value premium existing during this period with SP being the best value indicator. We then examined the return distribution of excess returns for stocks included in a value strategy across several holding periods, which lead us to suggest that (i) a particular problem in implementing a value strategy is that one often has to wait for an extended period for many of these stocks to turnaround, and (ii) the bulk of the premium associated with a value strategy comes from the exceptional performance of a relatively small number of stocks. We hypothesised that a momentum/sentiment indicator such as price momentum and/or earnings momentum might provide useful insights as to when a sustained turnaround in the price cycle of a value stocks might have occurred which would provide useful information as to when time entry into these stocks but hopefully would exclude little or none of the stellar performers upon which the success of a value strategy is so dependent. We combined value with price momentum and found that this combination did display the capacity of improving the performance of a traditional value strategy but found that this could be further improved by the introduction of price acceleration. We then looked at two earnings momentum measures, Agreement and *FREV*, as an alternative means to better time entry when using a value strategy. We found that Agreement in particular showed potential to be used in this way, but even when used in combination with dispersion produced nowhere near as good results as the combination of price momentum with price acceleration.

The empirical findings are suggestive that a momentum/sentiment indicator has the potential to add to the performance of a value strategy by enabling the better timing of the entry into these stocks. This is something that we can get a better insight into from again comparing the distribution of the excess returns of the stocks that would be included in portfolios under each of the three of the forms of enhancement evaluated. In Graph 1 of Figure II, we report the return distribution for value portfolios based on SP with a 12-month holding period. This can be compared with the distribution in Graph 2 where the same strategy has been enhanced by the introduction of price momentum. We see from the information presented in Table V that this enhancement did result in improved

performance and a comparison of the information contained in these two graphs indicates that the percentage of stocks outperforming the market (hit rate) increases from 42% to 45%. This indicates that the price momentum indicator has been able to successfully identify a significant number of value stocks that failed to perform over a 12-month holding period. Further, the introduction of the price momentum indicators has resulted in the proportion of stocks realising a return in excess of 50% over the 12-month horizon increasing from 9% to 18%. This suggest that the price momentum indicator has been able to exclude a much higher proportion of the stocks that underperformed than it did the relatively low percentage of stocks that achieved the stellar performance which is so important to the success of a value strategy.

We have seen that the introduction of earnings momentum with price momentum resulted in only a marginal improvement in the performance of the value strategy. We can gain hints into why this might be the case by comparing the return distributions in Graph 1 with those in Graph 3 of Figure II. The first thing that we should notice is that this enhancement has resulted in the hit rate now going to 51% which is a large improvement on the 42% realised by a value strategy in isolation. It is also true that the proportion of stocks achieving a return above 50% has risen to 14% from 9+%. Although these two results might initially appear good, the proportion of stellar performers has fallen from the 18% figure achieved when only a price momentum indicator was applied to the value stocks. Given that the dual application of price and earnings momentum results in a very large reduction in the size of our sample, it appears that the addition of the earnings momentum signal has resulted in a significant number of stellar performers from the enhanced value portfolios and so offsets much of the potential gain to be made as a consequence of a significant improvement in the hit rate. Finally, we saw that the significant improvement in performance came when we added acceleration to our price momentum indicator. An examination of Graph 4 provides useful insights as why this has occurred with the probability of positive returns for this strategy increasing to 53% and an improvement in the hit rate for stellar stocks to 25%. This indicates that a momentum/sentiment indicator that includes both price momentum and acceleration can

result in a significant enhancement in the timing of entry in a value without unduly delaying entry into many of the stellar stocks. As such this indicator provides a means to pinpoint at a relatively early stage when a sustainable turnaround in the performance of a value stock is occurring. As a consequence it can be used to determine where a stock is currently placed in its pricing cycle and so provides a potential means for using along with value indicators to augment the performance of a value investment strategy.

***Value with Momentum at the Country/Region Level***

We have clearly identified by our previous analysis that a momentum/sentiment indicator incorporating both price momentum and price acceleration provided a good basis for differentiating between both value and growth stocks when evaluated over our entire sample. We now examine how it operates at the country/region level: the UK, France, Germany, Italy, Scandinavia (Norway, Sweden, Denmark, and Finland) and Other Europe (The Netherlands, Spain, Belgium, Portugal, Ireland, Austria and Greece)[13]. Because of the reduced sample size, we define value (growth) as the top 30% (bottom 30%) by SP, winners (losers) as the top 33.3% (bottom 33.3%) of the stocks by price momentum over the previous six months, and price acceleration as the top 33.3% (bottom 33.3%) according to the definitions set forth earlier in the article.

The monthly returns set out in Table IX for value stocks establish that this momentum/sentiment indicator works well in differentiating between value stocks in all countries/regions except the UK. This can be seen by comparing the returns for on losing value stocks with high acceleration to those for winning value stocks with high acceleration. These returns for each country region vary from 0.87% (France) to 1.74% (Other Europe). The contribution to this added value from price momentum and price acceleration tends to vary across the countries/regions with it largely coming from price momentum in Scandinavia, largely from price acceleration in Italy and being fairly equally distributed across both in the other cases.

[13] This disaggregation provides with a minimum sample size of above 1,000 companies in all countries/regions with the exception of Italy.

The same analysis was also conducted for growth stocks with the returns reported in Table X. It seems that the combined momentum/sentiment indicators worked even better for growth stocks than they did for value stocks with outstanding results being realised in all but Italy. For the other countries/regions, the added value ranged from 1.04% (France) to 2.15% (Scandinavia) and was highly significant in all five instances. In almost all cases the improved performance from better differentiating between growth stocks was fairly equally attributable to the price momentum indicator and the price acceleration indicator.

Finally, a comparison of the returns reported in Tables IX and X allow us to measure the potential performance of a long/short strategy where one buys value stocks enjoying high price momentum and acceleration and shorts growth stocks with low price momentum and high acceleration. This strategy would have realised very high returns in all country/regions other than Italy (0.44% per month). For the other countries/regions, the monthly returns range from 1.25% (France) to 2.36% (Scandinavia). The overall conclusion that we reach is that the excellent performance of using the price momentum and acceleration indicator to differentiate between value (and growth) stocks at the aggregated level also held in each of countries/regions evaluated with the exception of Italy.

## 5. Summary and Implications

The focus on this paper has been on the price cycle of a stock with special emphasis on determining the turning point for value stocks. We established that a particular problem of the traditional value indicators is that they suggest acquiring the value stocks too far in advance of any turnaround; we found that one way to ameliorate this problem is to delay entry into them until it has been established that a change in market sentiment towards the stock has happened. We illustrated that the hit rate from investing in value stocks could be increased from 42% to 53% over a one-year holding period by using a price momentum indicator enhanced by acceleration as a means to time entry into value stocks.

Given the difficulty of predicting the point of turnaround for value (and growth) firms, it would appear that it may be preferable to react to sentiment swings rather than trying to forecast them.

Although the introduction of earnings momentum as an indicator was found to provide some incremental information when trying to forecast the future performance of growth stocks, the information provided was no where near as great as that provided by the price momentum signals. This suggests that the analysts in their forecasts are more reactionary to market movements rather than predictive of them and is consistent with previous findings relating to the information content of the forecasts and recommendation provided by European analysts (Bird and Casavecchia, 2004; Azzi et al, 2004) The insights provided by this paper should be useful to all with an interest in understanding market behaviour whether they be academics pontificating on market efficiency, investment managers trying to exploit market inefficiencies or regulators attempting to ensure equity in markets.

Most of the work on investment styles such as value and momentum tends to be concentrated at the portfolios but this study represents an initial attempt to gain a better understanding at the stock level which gives rise to the performance at the portfolio level. In this vein, there are many information sources relating to a stock that have been ignored in this study which might assist in predicting turning points in a stock's price cycle. Examples of such information include earnings announcements, the use of accruals, inventory build-ups, trading volume and many more. We plan to evaluate such information sources in order to establish whether it is preferable to be reactive to turnaround points in a stock's price cycle rather than try to predict it. There is much still to be understood about the behaviour of stocks through their price cycle and our knowledge can only be advanced by investigating this using different indicators and applying them in different markets.

**References**

Asness, C., 1997. The Interaction of Value and Momentum Strategies, *Financial Analysts Journal*, 29-36.

Azzi, S., Bird, R., Ghiringhelli, P., and Rossi, E.F., 2004. Biases and Information in Analysts' Recommendations: The European Experience. UTS Working Paper..

Barberis, N., A. Shleifer, and R. Vishny, 1998. A model of investor sentiment, *Journal of Financial Economics*, 49. 307-343..

Basu, S., 1977. Investment Performance of Common Stocks in Relation to Their Price Earnings Ratios: A Test of the Efficient Market Hypothesis. *Journal of Finance*, 32, 3.

Bauman, W.S., Conover, C.M., Miller, R.E., 1998. Growth versus Value and Large-Cap Stocks versus Small-Cap Stocks in International Markets. *Financial Analysts Journal,* 54.

Bernstein, R. 1993. The Earnings Expectations Life Cycle. *Financial Analysts Journal*, 49, 90-93.

Bird, R. and Casavecchia, L.,2004. The Profitability of Price and Earnings Momentum Across European Markets, *UTS Working Paper*.

Bird, R., Whitaker, J., 2003. The performance of value and momentum portfolios: recent experience in the major European markets. *Journal of Asset Management* 4, 221-246.

Bird, R., Whitaker, J., 2004. The performance of value and momentum investment portfolios: Recent experience in the major European markets Part 2. *Journal of Asset Management* 5, 157-175.

Black, F., 1986. Noise. *Journal of Finance* 41, 529-543.

Black, F., 1993. Beta and Return. *Journal of Portfolio Management,* 20, 8-18.

Dische, A., 2001. Dispersion in analyst forecasts and the profitability of earnings momentum strategies. Working paper, University of St. Gallen, Switzerland.

Fama, E. and French, K., 1992. The Cross-Section of Expected Returns. *Journal of Finance*, 47, 427-465.

Fama, E. and French, K., 1993. Common Risk Factors in the Returns on Stocks and Bonds. *Journal of Financial Economics*, 33, 1.

Fama, Eugene F. and Kenneth R. French, 1996. Multifactor explanations of asset pricing anomalies. *Journal of Finance* 51, 55-84.

Graham, B. and Dodd, D, 1934. Security Analysis, *McGraw Hill*, New York.

Hong, H., Lim, T., Stein, J.C., 1999. A unified theory of underreaction, momentum trading and overreaction in asset markets, *Journal of Finance* 54, 2143-2184.

Hong, D., Lee, C.M.C., Swaminathan, B., 2003. Earnings momentum in international markets. Working paper, Cornell University.

Jegadeesh, N., Titman, S., 1993. Returns to buying winners and selling losers: implications for stock market efficiency. *Journal of Finance* 48, 65-91.

Kothari, S.P., Shanken, J., Sloan, R.G., 1995. Another look at the cross-section of expected stock returns. *Journal of Finance*, 50, 185-224.

Kothari, S.P., Sabino, J.S., Zach, T., 1999. Implications of data restrictions on the performance measurement and tests of rational pricing. Working Paper. MIT Sloan School of Management.

La Porta, R., Lakonishok, J., Shleifer, A., Vishny, R., 1997. Goods news for value stocks: further evidence on market efficiency. *Journal of Finance* 52, 859-874.

Lee, C.M.C., Swaminathan, B., 2000. Price momentum and trading volume. *Journal of Finance* 55, 2017-2069.

Newey, W.K., West, K.D., 1987. A simple, positive semi-definite, heteroskedasticity and autocorrelation consistent covariance matrix. *Econometrica* 55, 3.

Rousseau, R. and van Rensburg, P., 2004, Time and the payoff to value investing, *Journal of Asset Management*, 4, 318 – 325.

Xing, Y. and Zhang, L., 2004. Value versus Growth: Movements in Economic Fundamentals. Working Paper, Jesse H. Jones Graduate School of Management, Rice University, Houston.

# Table I
# Characteristics of the European Markets

The table summarises the main characteristics of the European countries considered in our analysis. We report the number of stocks included in the sample for each country, the average deciles of Book-to-Market, Sales-to-Price, Market Capitalization and Volume computed over 185 months with the time period ranging from January 1989 to May 2004.

| European Countries | Number of Stocks | Book-to-Market (avg deciles) | Sales-to-Price (avg deciles) | Mkt Cap (avg deciles) | Volume (avg deciles) |
|---|---|---|---|---|---|
| France | 1020 | 5 | 4 | 6 | 4 |
| Italy | 368 | 1 | 1 | 6 | 3 |
| Netherlands | 336 | 7 | 6 | 6 | 6 |
| Germany | 1050 | 7 | 6 | 5 | 5 |
| Spain | 167 | 2 | 2 | 7 | 4 |
| Belgium | 224 | 3 | 2 | 6 | 3 |
| Ireland | 76 | 8 | 7 | 5 | 7 |
| Norway | 291 | 8 | 7 | 5 | 6 |
| Sweden | 566 | 8 | 7 | 6 | 5 |
| Portugal | 103 | 2 | 2 | 5 | 2 |
| Denmark | 244 | 9 | 8 | 5 | 4 |
| Austria | 139 | 4 | 4 | 5 | 3 |
| Greece | 339 | 2 | 1 | 4 | 3 |
| Finland | 184 | 5 | 5 | 6 | 5 |
| UK | 2883 | 7 | 7 | 5 | 9 |

# Table II
# Returns to Value and Glamour stocks: Equally-weighted and Raw Performances

The table summarises the main results obtained from the application of a value strategy on the previous month returns. The total number of months in the sample is 185. Each month from January 1989, all stocks included in the GMO London files are sorted based on their Book-to-Market, Sales-to-Price and Earnings-to-Price and are subsequently divided into equally-weighted and raw quintiles. The consecutive long-short strategies are realized as follows. A stock that is in the top (bottom) 20% of all stocks sorted by their past returns during the formation period *J*, are classified as Cheap (Expensive). The portfolios are then held over the next *K* months and the monthly arithmetic averages of the returns are documented in the following table, with *K* equal to 3, 6, 12, 24, and 36 months. We also report the Newey-West p-value corrected for the *autocorrelation* and *heteroskedasticity* to test the significance of the results in each holding period *K*, and the standard deviation of the performances of either every quintile or the long (value) - short (glamour) portfolio returns.

**Panel A:** ***Book-to-Market Returns***

| ***3M*** | ***Growth*** | ***bm2*** | ***bm3*** | ***bm4*** | ***Value*** | ***V-G*** |
|---|---|---|---|---|---|---|
| Mean | 0.77 | 0.65 | 0.68 | 0.78 | 1.08 | 0.31 |
| p-value | 0.11 | 0.10 | 0.06 | 0.04 | 0.01 | 0.37 |
| Std Dev | 0.05 | 0.04 | 0.04 | 0.05 | 0.04 | 0.03 |
| ***6M*** | ***Growth*** | ***bm2*** | ***bm3*** | ***bm4*** | ***Value*** | ***V-G*** |
| Mean | 0.65 | 0.55 | 0.61 | 0.74 | 0.99 | 0.35 |
| p-value | 0.18 | 0.15 | 0.10 | 0.05 | 0.01 | 0.31 |
| Std Dev | 0.05 | 0.04 | 0.04 | 0.04 | 0.04 | 0.03 |
| ***12M*** | ***Growth*** | ***bm2*** | ***bm3*** | ***bm4*** | ***Value*** | ***V-G*** |
| Mean | 0.48 | 0.43 | 0.56 | 0.72 | 0.98 | 0.49 |
| p-value | 0.32 | 0.27 | 0.14 | 0.06 | 0.01 | 0.13 |
| Std Dev | 0.05 | 0.04 | 0.04 | 0.04 | 0.04 | 0.03 |
| ***24M*** | ***Growth*** | ***bm2*** | ***bm3*** | ***bm4*** | ***Value*** | ***V-G*** |
| Mean | 0.56 | 0.59 | 0.81 | 0.95 | 1.18 | 0.62 |
| p-value | 0.24 | 0.12 | 0.03 | 0.01 | 0.00 | 0.03 |
| Std Dev | 0.05 | 0.04 | 0.04 | 0.04 | 0.04 | 0.03 |
| ***36M*** | ***Growth*** | ***bm2*** | ***bm3*** | ***bm4*** | ***Value*** | ***V-G*** |
| Mean | 0.54 | 0.68 | 0.90 | 1.00 | 1.19 | 0.65 |
| p-value | 0.28 | 0.09 | 0.02 | 0.01 | 0.00 | 0.02 |
| Std Dev | 0.05 | 0.04 | 0.04 | 0.04 | 0.04 | 0.03 |

**Panel B:** ***Sales-to-Price Returns***

| ***3M*** | ***Growth*** | ***sp2*** | ***sp3*** | ***sp4*** | ***Value*** | ***V-G*** |
|---|---|---|---|---|---|---|
| Mean | 0.63 | 0.83 | 0.67 | 0.75 | 1.18 | 0.55 |
| p-value | 0.21 | 0.03 | 0.09 | 0.04 | 0.01 | 0.13 |
| Std Dev | 0.05 | 0.04 | 0.04 | 0.05 | 0.05 | 0.03 |
| ***6M*** | ***Growth*** | ***sp2*** | ***sp3*** | ***sp4*** | ***Value*** | ***V-G*** |
| Mean | 0.50 | 0.82 | 0.57 | 0.72 | 1.19 | 0.68 |
| p-value | 0.32 | 0.04 | 0.16 | 0.05 | 0.02 | 0.08 |
| Std Dev | 0.05 | 0.04 | 0.04 | 0.04 | 0.06 | 0.04 |
| ***12M*** | ***Growth*** | ***sp2*** | ***sp3*** | ***sp4*** | ***Value*** | ***V-G*** |
| Mean | 0.43 | 0.79 | 0.45 | 0.72 | 1.28 | 0.84 |
| p-value | 0.40 | 0.05 | 0.28 | 0.06 | 0.01 | 0.04 |
| Std Dev | 0.05 | 0.04 | 0.05 | 0.04 | 0.06 | 0.04 |
| ***24M*** | ***Growth*** | ***sp2*** | ***sp3*** | ***sp4*** | ***Value*** | ***V-G*** |
| Mean | 0.61 | 0.92 | 0.67 | 1.01 | 1.57 | 0.96 |
| p-value | 0.23 | 0.02 | 0.09 | 0.00 | 0.00 | 0.03 |
| Std Dev | 0.05 | 0.04 | 0.04 | 0.04 | 0.06 | 0.05 |
| ***36M*** | ***Growth*** | ***sp2*** | ***sp3*** | ***sp4*** | ***Value*** | ***V-G*** |
| Mean | 0.66 | 0.91 | 0.71 | 1.04 | 1.63 | 0.97 |
| p-value | 0.21 | 0.03 | 0.09 | 0.01 | 0.00 | 0.04 |
| Std Dev | 0.05 | 0.04 | 0.04 | 0.04 | 0.06 | 0.05 |

**Panel C**: ***Earnings-to-Price Returns***

| ***3M*** | ***Growth*** | ***ep2*** | ***ep3*** | ***ep4*** | ***Value*** | ***V-G*** |
|---|---|---|---|---|---|---|
| Mean | 0.24 | 0.30 | 0.68 | 0.72 | 0.79 | 0.54 |
| p-value | 0.64 | 0.50 | 0.11 | 0.04 | 0.02 | 0.12 |
| Std Dev | 0.06 | 0.05 | 0.05 | 0.04 | 0.04 | 0.04 |
| ***6M*** | ***Growth*** | ***ep2*** | ***ep3*** | ***ep4*** | ***Value*** | ***V-G*** |
| Mean | 0.26 | 0.19 | 0.54 | 0.68 | 0.75 | 0.49 |
| p-value | 0.64 | 0.68 | 0.20 | 0.06 | 0.03 | 0.20 |
| Std Dev | 0.06 | 0.05 | 0.04 | 0.04 | 0.04 | 0.04 |
| ***12M*** | ***Growth*** | ***ep2*** | ***ep3*** | ***ep4*** | ***Value*** | ***V-G*** |
| Mean | 0.26 | 0.06 | 0.46 | 0.69 | 0.74 | 0.48 |
| p-value | 0.66 | 0.89 | 0.28 | 0.06 | 0.03 | 0.24 |
| Std Dev | 0.06 | 0.05 | 0.04 | 0.04 | 0.04 | 0.04 |
| ***24M*** | ***Growth*** | ***ep2*** | ***ep3*** | ***ep4*** | ***Value*** | ***V-G*** |
| Mean | 0.46 | 0.23 | 0.62 | 0.88 | 0.95 | 0.49 |
| p-value | 0.45 | 0.60 | 0.13 | 0.02 | 0.00 | 0.28 |
| Std Dev | 0.06 | 0.05 | 0.04 | 0.04 | 0.04 | 0.05 |
| ***36M*** | ***Growth*** | ***ep2*** | ***ep3*** | ***ep4*** | ***Value*** | ***V-G*** |
| Mean | 0.38 | 0.35 | 0.66 | 0.87 | 1.07 | 0.69 |
| p-value | 0.50 | 0.44 | 0.11 | 0.03 | 0.00 | 0.03 |
| Std Dev | 0.06 | 0.05 | 0.04 | 0.04 | 0.04 | 0.03 |

# Table III
# Characteristics of Portfolios Constructed Applying Value Indicators

The table summarises the main characteristics over the previous months of portfolios obtained from the application of the univariate value criteria. The total number of months in the sample is 185. Each month from January 1989, all stocks included in the GMO London files are sorted based on their past criterion considered and divided into 5 quintiles. For these portfolios. we investigate the main features during the formation period. In particular, we document the nature of the strategies in terms either of average deciles of market capitalization (size), 6-month price momentum (PM), value of country-adjusted Book-to-Market (BM), standard deviation of country-adjusted Book-to-Market, or of absolute values of both the country-adjusted forecast revisions of estimates (FREVs) and the country-adjusted number of up- or down-ward forecast revisions (Agreement).

***Panel A: Value Criterion (Sales-to-Price) over the formation period.***

| **Portfolios** | **Size** *(average deciles)* | **Price Momentum** *(6-months)* | **Book-to-Market** *(average deciles)* | **Book-to-Market** *(standard deviation)* | **FREVs** *(country-adjusted)* | **Agreement** *(country-adjusted)* |
|---|---|---|---|---|---|---|
| ***Growth*** | **7** | **6** | **4** | **0.55** | **0.06** | **0.12** |
| ***SP2*** | **6** | **6** | **5** | **0.39** | **0.03** | **0.06** |
| ***SP3*** | **6** | **6** | **5** | **0.33** | **0.00** | **0.01** |
| ***SP4*** | **5** | **5** | **6** | **0.44** | **-0.05** | **-0.09** |
| ***Value*** | **4** | **5** | **7** | **1.92** | **-0.11** | **-0.17** |

***Panel B: Value Criterion (Book-to-Market) over the formation period.***

| **Portfolios** | **Size** *(average deciles)* | **Price Momentum** *(6-months)* | **Book-to-Market** *(average deciles)* | **Book-to-Market** *(standard deviation)* | **FREVs** *(country-adjusted)* | **Agreement** *(country-adjusted)* |
|---|---|---|---|---|---|---|
| ***Growth*** | **7** | **6** | **1** | **0.19** | **0.07** | **0. 11** |
| ***BM2*** | **6** | **6** | **3** | **0.05** | **0.04** | **0.06** |
| ***BM3*** | **5** | **6** | **5** | **0.03** | **0.00** | **0.01** |
| ***SP4*** | **5** | **5** | **7** | **0.06** | **-0.05** | **-0.09** |
| ***Value*** | **4** | **5** | **9** | **1.79** | **-0.12** | **-0.16** |

# Table IV

## Returns to a Multi-criteria Value Investing: Sales-to-Price and Book-to-Market

The table summarises the main results obtained from the application of a multi-criteria value approach based on the interaction of Sales-to-Price and Book-to-Market The total number of months in the sample is 185. Each month from January 1989, all stocks included in the GMO London files are sorted based on their Book-to-Market and divided in quintiles. These quintiles are then intersected with those of low to high Sales-to-Price determined in the previous month. Therefore, the 5 consecutive cheap to expensive portfolios by the Book-to-Market are overlapped with the 5 consecutive cheap to expensive portfolios by the Sales-to-Price giving raise to a total of 25 portfolios. The portfolios are then held over the next *K months* equal to 6, 12, 24, and 36 and the monthly equally weighted and raw returns are documented in the following table. We also report the Newey-West p-value corrected for the *autocorrelation* and *heteroskedasticity* to test the significance of the results in the holding period, and the standard deviation of the performances of either every portfolio or the long - short returns.

| | | *Sales-to-Price* | | | | | | *Sales-to-Price* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **6-month** | ***Growth*** | ***SP2*** | ***SP3*** | ***SP4*** | ***Value*** | ***V - G*** | **12-month** | ***Growth*** | ***SP2*** | ***SP3*** | ***SP4*** | ***Value*** | ***V - G*** |
| ***Growth*** | | | | | | | ***Growth*** | | | | | | |
| Mean | 0.43 | 0.94 | 0.97 | 0.82 | 0.66 | 0.23 | Mean | 0.22 | 0.84 | 0.87 | 0.79 | 0.64 | 0.41 |
| p-value | 0.44 | 0.04 | 0.01 | 0.04 | 0.11 | 0.50 | p-value | 0.69 | 0.07 | 0.03 | 0.05 | 0.14 | 0.22 |
| Std Dev | 0.06 | 0.05 | 0.05 | 0.05 | 0.05 | 0.04 | Std Dev | 0.06 | 0.05 | 0.05 | 0.05 | 0.05 | 0.03 |
| ***BM2*** | | | | | | | ***BM2*** | | | | | | |
| Mean | 0.46 | 0.56 | 0.38 | 0.77 | 0.98 | 0.52 | Mean | 0.55 | 0.51 | 0.10 | 0.60 | 0.98 | 0.43 |
| p-value | 0.28 | 0.14 | 0.39 | 0.05 | 0.01 | 0.06 | p-value | 0.22 | 0.18 | 0.83 | 0.13 | 0.01 | 0.10 |
| Std Dev | 0.05 | 0.04 | 0.05 | 0.05 | 0.05 | 0.03 | Std Dev | 0.05 | 0.04 | 0.05 | 0.05 | 0.05 | 0.03 |
| ***BM3*** | | | | | | | ***BM3*** | | | | | | |
| Mean | 0.60 | 0.67 | 0.50 | 0.64 | 1.04 | 0.44 | Mean | 0.56 | 0.70 | 0.43 | 0.58 | 0.93 | 0.37 |
| p-value | 0.13 | 0.07 | 0.22 | 0.09 | 0.01 | 0.10 | p-value | 0.14 | 0.06 | 0.30 | 0.13 | 0.02 | 0.08 |
| Std Dev | 0.05 | 0.04 | 0.05 | 0.05 | 0.05 | 0.03 | Std Dev | 0.04 | 0.04 | 0.05 | 0.05 | 0.04 | 0.02 |
| ***BM4*** | | | | | | | ***BM4*** | | | | | | |
| Mean | 0.59 | 0.99 | 0.63 | 0.67 | 0.91 | 0.32 | Mean | 0.48 | 0.97 | 0.60 | 0.63 | 0.84 | 0.37 |
| p-value | 0.12 | 0.01 | 0.12 | 0.10 | 0.02 | 0.24 | p-value | 0.19 | 0.00 | 0.15 | 0.11 | 0.03 | 0.13 |
| Std Dev | 0.04 | 0.04 | 0.05 | 0.05 | 0.05 | 0.03 | Std Dev | 0.04 | 0.04 | 0.05 | 0.05 | 0.05 | 0.03 |
| ***Value*** | | | | | | | ***Value*** | | | | | | |
| Mean | 0.47 | 0.94 | 0.97 | 1.14 | 1.06 | 0.59 | Mean | 0.55 | 0.97 | 0.80 | 1.08 | 1.06 | 0.51 |
| p-value | 0.26 | 0.02 | 0.03 | 0.00 | 0.01 | 0.01 | p-value | 0.19 | 0.01 | 0.06 | 0.00 | 0.01 | 0.03 |
| Std Dev | 0.05 | 0.04 | 0.05 | 0.04 | 0.04 | 0.03 | Std Dev | 0.05 | 0.04 | 0.04 | 0.04 | 0.04 | 0.03 |
| ***V - G*** | | | | | | | ***V - G*** | | | | | | |
| Mean | 0.04 | 0.00 | 0.00 | 0.32 | 0.40 | 0.63 | Mean | 0.33 | 0.12 | -0.07 | 0.30 | 0.42 | 0.84 |
| p-value | 0.91 | 0.99 | 1.00 | 0.11 | 0.05 | 0.17 | p-value | 0.36 | 0.70 | 0.76 | 0.09 | 0.02 | 0.06 |
| Std Dev | 0.04 | 0.03 | 0.03 | 0.03 | 0.02 | 0.04 | Std Dev | 0.04 | 0.03 | 0.03 | 0.02 | 0.02 | 0.04 |

| | | *Sales-to-Price* | | | | | | *Sales-to-Price* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **24-month** | ***Growth*** | ***SP2*** | ***SP3*** | ***SP4*** | ***Value*** | ***V - G*** | **36-month** | ***Growth*** | ***SP2*** | ***SP3*** | ***SP4*** | ***Value*** | ***V - G*** |
| ***Growth*** | | | | | | | ***Growth*** | | | | | | |
| Mean | 0.33 | 0.81 | 0.94 | 0.90 | 0.95 | 0.62 | Mean | 0.35 | 0.76 | 0.75 | 0.85 | 0.88 | 0.53 |
| p-value | 0.54 | 0.07 | 0.02 | 0.01 | 0.02 | 0.04 | p-value | 0.53 | 0.11 | 0.07 | 0.04 | 0.04 | 0.06 |
| Std Dev | 0.06 | 0.05 | 0.05 | 0.05 | 0.05 | 0.03 | Std Dev | 0.06 | 0.05 | 0.05 | 0.04 | 0.04 | 0.03 |
| ***BM2*** | | | | | | | ***BM2*** | | | | | | |
| Mean | 0.74 | 0.69 | 0.30 | 0.76 | 0.94 | 0.20 | Mean | 0.83 | 0.73 | 0.45 | 0.86 | 0.88 | 0.05 |
| p-value | 0.08 | 0.07 | 0.50 | 0.05 | 0.01 | 0.39 | p-value | 0.04 | 0.07 | 0.33 | 0.03 | 0.01 | 0.81 |
| Std Dev | 0.04 | 0.04 | 0.05 | 0.04 | 0.04 | 0.02 | Std Dev | 0.04 | 0.04 | 0.05 | 0.04 | 0.04 | 0.02 |
| ***BM3*** | | | | | | | ***BM3*** | | | | | | |
| Mean | 0.72 | 0.97 | 0.69 | 0.87 | 1.12 | 0.40 | Mean | 0.83 | 1.04 | 0.76 | 0.96 | 1.21 | 0.38 |
| p-value | 0.05 | 0.01 | 0.07 | 0.02 | 0.00 | 0.06 | p-value | 0.02 | 0.00 | 0.05 | 0.01 | 0.00 | 0.08 |
| Std Dev | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.02 | Std Dev | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.02 |
| ***BM4*** | | | | | | | ***BM4*** | | | | | | |
| Mean | 0.73 | 1.11 | 0.88 | 0.92 | 1.02 | 0.29 | Mean | 0.86 | 1.14 | 0.91 | 0.97 | 1.04 | 0.18 |
| p-value | 0.04 | 0.00 | 0.02 | 0.01 | 0.01 | 0.18 | p-value | 0.02 | 0.00 | 0.01 | 0.01 | 0.00 | 0.37 |
| Std Dev | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.02 | Std Dev | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.02 |
| ***Value*** | | | | | | | ***Value*** | | | | | | |
| Mean | 0.78 | 1.16 | 1.03 | 1.36 | 1.21 | 0.43 | Mean | 0.78 | 1.24 | 1.14 | 1.29 | 1.23 | 0.45 |
| p-value | 0.06 | 0.00 | 0.01 | 0.00 | 0.00 | 0.06 | p-value | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 |
| Std Dev | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.02 | Std Dev | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.02 |
| ***V - G*** | | | | | | | ***V - G*** | | | | | | |
| Mean | 0.45 | 0.34 | 0.09 | 0.45 | 0.26 | 0.88 | Mean | 0.43 | 0.47 | 0.38 | 0.44 | 0.35 | 0.88 |
| p-value | 0.15 | 0.23 | 0.64 | 0.00 | 0.15 | 0.03 | p-value | 0.12 | 0.11 | 0.02 | 0.00 | 0.07 | 0.02 |
| Std Dev | 0.03 | 0.03 | 0.02 | 0.02 | 0.02 | 0.04 | Std Dev | 0.03 | 0.03 | 0.02 | 0.02 | 0.02 | 0.04 |

# Table V
# Value Enhancement through the Price Momentum

The table summarises the main results obtained from the application of a value strategy split by the return continuation along the Momentum Life Cycle. The total number of months in the sample is 185. Each month from January 1989, all stocks included in the GMO London files are sorted based on their Sales-to-Price and divided in quintiles. These quintiles are then intersected with those of low to high price momentum determined over the previous six months. Therefore, the 5 consecutive cheap to expensive portfolios by the Sales-to-Price are overlapped with the 5 consecutive losing to winning portfolios by the price momentum, giving raise to a total of 25 portfolios. The portfolios are then held over the next *K* equal to 12 months and the monthly equally weighted returns are documented in the following table. We also report the Newey-West p-value corrected for the *autocorrelation* and *heteroskedasticity* to test the significance of the results in the holding period, and the standard deviation of the performances of either every portfolio or the long - short returns.

| | | | ***Price Momentum*** | | | |
|---|---|---|---|---|---|---|
| **12-month** | ***Losers*** | ***pm2*** | ***pm3*** | ***pm4*** | ***Winners*** | ***W – L*** |
| ***Growth*** | | | | | | |
| Mean | 0.06 | 0.20 | 0.49 | 0.66 | 1.44 | 1.38 |
| p-value | 0.93 | 0.67 | 0.19 | 0.08 | 0.03 | 0.01 |
| Std Dev | 0.07 | 0.05 | 0.04 | 0.04 | 0.05 | 0.04 |
| ***sp2*** | | | | | | |
| Mean | 0.17 | 0.53 | 0.74 | 0.94 | 1.39 | 1.23 |
| p-value | 0.78 | 0.19 | 0.02 | 0.00 | 0.00 | 0.00 |
| Std Dev | 0.06 | 0.04 | 0.04 | 0.04 | 0.04 | 0.03 |
| ***sp3*** | | | | | | |
| Mean | -0.35 | 0.22 | 0.53 | 0.72 | 0.99 | 1.33 |
| p-value | 0.57 | 0.59 | 0.12 | 0.02 | 0.01 | 0.00 |
| Std Dev | 0.06 | 0.05 | 0.04 | 0.04 | 0.04 | 0.04 |
| ***sp4*** | | | | | | |
| Mean | 0.14 | 0.52 | 0.74 | 0.91 | 1.29 | 1.16 |
| p-value | 0.80 | 0.17 | 0.02 | 0.00 | 0.00 | 0.00 |
| Std Dev | 0.06 | 0.05 | 0.04 | 0.04 | 0.04 | 0.03 |
| ***Value*** | | | | | | |
| Mean | 1.36 | 1.21 | 1.03 | 1.26 | 1.65 | 0.29 |
| p-value | 0.14 | 0.03 | 0.00 | 0.00 | 0.00 | 0.70 |
| Std Dev | 0.11 | 0.07 | 0.04 | 0.04 | 0.04 | 0.09 |
| ***V-G*** | | | | | | |
| Mean | 1.30 | 1.02 | 0.54 | 0.60 | 0.21 | 1.59 |
| p-value | 0.03 | 0.02 | 0.02 | 0.01 | 0.18 | 0.00 |
| Std Dev | 0.07 | 0.05 | 0.02 | 0.02 | 0.03 | 0.05 |

# Table VI

## Value Investing Enhanced with PM and subsequently decomposed by Acceleration Indices

The table summarises the main results obtained from the application of a value and growth strategy split by the price momentum and subsequently intersected with different indices of acceleration along the Momentum Life Cycle. The total number of months in the sample is 185. Each month from January 1989, all stocks are ranked on the basis of SP with the top 30% being assigned as value stock and the bottom 30% being assigned as growth stocks. These stocks are then assigned to 25 portfolios based on the intersection of price momentum measured over the last six months determined over the previous *X* months, ranging between 3 and 24 months according to the momentum quintiles considered. The portfolios are then held over the next *K* equal to 12 months and the monthly equally weighted returns are calculated and documented in the following table. We also report the Newey-West p-value corrected for the *autocorrelation* and *heteroskedasticity,* and the standard deviation of the performances.

***Panel A: Value Stocks Split by Price Momentum and Acceleration***

| | ***Acceleration Index*** | | | | | |
|---|---|---|---|---|---|---|
| **12-month** | ***Low*** | ***A2*** | ***A3*** | ***A4*** | ***High*** | ***H-L*** |
| ***Losers*** | | | | | | |
| Mean | 0.40 | 0.54 | 0.94 | 0.23 | -0.15 | -0.55 |
| p-value | 0.47 | 0.37 | 0.14 | 0.50 | 0.62 | 0.48 |
| Std Dev | 0.06 | 0.06 | 0.06 | 0.08 | 0.09 | 0.06 |
| ***pm2*** | | | | | | |
| Mean | 0.78 | 0.74 | 0.76 | 0.52 | 0.3 | -0.48 |
| p-value | 0.04 | 0.04 | 0.05 | 0.3 | 0.17 | 0.66 |
| Std Dev | 0.04 | 0.04 | 0.04 | 0.05 | 0.07 | 0.05 |
| ***pm3*** | | | | | | |
| Mean | 1.04 | 1.08 | 0.94 | 0.85 | 0.98 | -0.06 |
| p-value | 0.00 | 0.00 | 0.00 | 0.03 | 0.12 | 0.91 |
| Std Dev | 0.04 | 0.03 | 0.03 | 0.04 | 0.06 | 0.05 |
| ***pm4*** | | | | | | |
| Mean | 1.37 | 1.18 | 1.14 | 1.21 | 1.77 | 0.40 |
| p-value | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 |
| Std Dev | 0.05 | 0.03 | 0.03 | 0.03 | 0.04 | 0.03 |
| ***Winners*** | | | | | | |
| Mean | 0.63 | 1.18 | 1.21 | 1.34 | 2.46 | 1.83 |
| p-value | 0.27 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Std Dev | 0.06 | 0.04 | 0.04 | 0.04 | 0.04 | 0.05 |
| ***W-L*** | | | | | | |
| Mean | 0.23 | 0.64 | 0.27 | 1.11 | 2.61 | 2.38 |
| p-value | 0.58 | 0.09 | 0.56 | 0.07 | 0.01 | 0.01 |
| Std Dev | 0.05 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 |

***Panel B: Growth Stocks Split by Price Momentum and Acceleration***

| | ***Acceleration Index*** | | | | | |
|---|---|---|---|---|---|---|
| **12-month** | ***Low*** | ***A2*** | ***A3*** | ***A4*** | ***High*** | ***H-L*** |
| ***Losers*** | | | | | | |
| Mean | -0.32 | -0.16 | -0.09 | -0.16 | -1.31 | -0.99 |
| p-value | 0.61 | 0.77 | 0.89 | 0.83 | 0.07 | 0.03 |
| Std Dev | 0.07 | 0.06 | 0.06 | 0.07 | 0.08 | 0.05 |
| ***pm2*** | | | | | | |
| Mean | 0.38 | 0.35 | 0.44 | 0.27 | -0.17 | -0.55 |
| p-value | 0.42 | 0.34 | 0.25 | 0.55 | 0.78 | 0.16 |
| Std Dev | 0.05 | 0.04 | 0.04 | 0.05 | 0.06 | 0.04 |
| ***pm3*** | | | | | | |
| Mean | 0.4 | 0.75 | 0.59 | 0.49 | 0.29 | -0.11 |
| p-value | 0.37 | 0.01 | 0.05 | 0.17 | 0.57 | 0.77 |
| Std Dev | 0.05 | 0.04 | 0.04 | 0.04 | 0.05 | 0.04 |
| ***pm4*** | | | | | | |
| Mean | 0.46 | 0.76 | 0.97 | 1.01 | 1.02 | 0.56 |
| p-value | 0.21 | 0.02 | 0.00 | 0.00 | 0.01 | 0.04 |
| Std Dev | 0.05 | 0.04 | 0.03 | 0.04 | 0.05 | 0.02 |
| ***Winners*** | | | | | | |
| Mean | 0.38 | 0.85 | 1.50 | 1.02 | 1.11 | 0.73 |
| p-value | 0.15 | 0.11 | 0.14 | 0.2 | 0.01 | 0 |
| Std Dev | 0.06 | 0.05 | 0.05 | 0.04 | 0.05 | 0.04 |
| ***W-L*** | | | | | | |
| Mean | 0.70 | 1.01 | 1.59 | 1.18 | 2.42 | 1.72 |
| p-value | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 |
| Std Dev | 0.05 | 0.04 | 0.05 | 0.05 | 0.06 | 0.08 |

# Table VII
# Value Enhancement through Earnings Momentum

The table summarises the main results obtained from the application of a value strategy split by the earnings momentum. The total number of months in the sample is 185. Each month from January 1989, all stocks included in the GMO London files are sorted based on their Sales-to-Price and divided into quintiles. These quintiles are then intersected with those of low to high either magnitude (*FREVs*) or frequency (*Agreement*) of analysts' EPS forecast revisions determined over the previous 3 months. Therefore. the five consecutive cheap to expensive portfolios by the SP are overlapped with the 5 consecutive low to high earnings momentum portfolios, giving raise to a total of 25 portfolios. The portfolios are then held over the next *12* months and the monthly equally weighted portfolio returns are documented in the following table. We also report the Newey-West p-value corrected for the *autocorrelation* and *heteroskedasticity* to test the significance of the results in the holding period, and the standard deviation of the performances of either every portfolio or the long - short returns.

***Panel A: Sales-to-Price and Frequency of Analysts' EPS Forecast Revisions***

| | | | *Agreement* | | | |
|---|---|---|---|---|---|---|
| **12-month** | ***Low*** | ***q2*** | ***q3*** | ***q4*** | ***High*** | ***H - L*** |
| ***Growth*** | | | | | | |
| Mean | 0.17 | 0.37 | 0.49 | 0.66 | 0.81 | 0.64 |
| p-value | 0.75 | 0.41 | 0.27 | 0.13 | 0.05 | 0.00 |
| Std Dev | 0.06 | 0.05 | 0.05 | 0.05 | 0.05 | 0.02 |
| ***sp2*** | | | | | | |
| Mean | 0.38 | 0.61 | 0.83 | 0.85 | 0.99 | 0.62 |
| p-value | 0.40 | 0.15 | 0.04 | 0.04 | 0.01 | 0.00 |
| Std Dev | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.01 |
| ***sp3*** | | | | | | |
| Mean | -0.01 | 0.25 | 0.53 | 0.54 | 0.74 | 0.75 |
| p-value | 0.99 | 0.63 | 0.24 | 0.25 | 0.11 | 0.00 |
| Std Dev | 0.06 | 0.06 | 0.05 | 0.05 | 0.05 | 0.02 |
| ***sp4*** | | | | | | |
| Mean | 0.49 | 0.52 | 0.79 | 0.88 | 1.04 | 0.55 |
| p-value | 0.33 | 0.25 | 0.08 | 0.04 | 0.01 | 0.00 |
| Std Dev | 0.06 | 0.05 | 0.05 | 0.05 | 0.05 | 0.02 |
| ***Value*** | | | | | | |
| Mean | 0.61 | 0.96 | 1.06 | 1.14 | 1.33 | 0.72 |
| p-value | 0.21 | 0.06 | 0.04 | 0.01 | 0.00 | 0.00 |
| Std Dev | 0.05 | 0.06 | 0.06 | 0.05 | 0.05 | 0.03 |
| ***V-G*** | | | | | | |
| Mean | 0.45 | 0.58 | 0.58 | 0.47 | 0.53 | 1.17 |
| p-value | 0.24 | 0.10 | 0.11 | 0.14 | 0.12 | 0.00 |
| Std Dev | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.04 |

***Panel B: Sales-to-Price and Magnitude of Analysts' EPS Forecast Revisions***

| | | | *FREV* | | | |
|---|---|---|---|---|---|---|
| **12-month** | ***Low*** | ***q2*** | ***q3*** | ***q4*** | ***High*** | ***H - L*** |
| ***Growth*** | | | | | | |
| Mean | 0.31 | 0.44 | 0.57 | 0.48 | 0.65 | 0.34 |
| p-value | 0.54 | 0.35 | 0.24 | 0.29 | 0.10 | 0.05 |
| Std Dev | 0.06 | 0.05 | 0.06 | 0.05 | 0.05 | 0.02 |
| ***sp2*** | | | | | | |
| Mean | 0.61 | 0.51 | 0.76 | 0.73 | 0.97 | 0.35 |
| p-value | 0.19 | 0.24 | 0.09 | 0.07 | 0.01 | 0.11 |
| Std Dev | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.02 |
| ***sp3*** | | | | | | |
| Mean | 0.32 | 0.28 | 0.47 | 0.45 | 0.81 | 0.50 |
| p-value | 0.57 | 0.58 | 0.33 | 0.35 | 0.06 | 0.05 |
| Std Dev | 0.06 | 0.06 | 0.05 | 0.05 | 0.05 | 0.02 |
| ***sp4*** | | | | | | |
| Mean | 0.53 | 0.68 | 0.88 | 0.81 | 0.84 | 0.31 |
| p-value | 0.30 | 0.15 | 0.05 | 0.06 | 0.05 | 0.07 |
| Std Dev | 0.06 | 0.06 | 0.05 | 0.05 | 0.05 | 0.02 |
| ***Value*** | | | | | | |
| Mean | 0.91 | 0.86 | 1.01 | 0.88 | 1.10 | 0.19 |
| p-value | 0.07 | 0.12 | 0.05 | 0.05 | 0.01 | 0.27 |
| Std Dev | 0.06 | 0.06 | 0.06 | 0.05 | 0.05 | 0.02 |
| ***V-G*** | | | | | | |
| Mean | 0.60 | 0.41 | 0.44 | 0.40 | 0.45 | 0.79 |
| p-value | 0.10 | 0.24 | 0.25 | 0.26 | 0.14 | 0.03 |
| Std Dev | 0.03 | 0.03 | 0.04 | 0.03 | 0.03 | 0.03 |

# Table VIII

## Returns to Value Investing split by Agreement and Dispersion of Analysts' EPS Forecast Revisions

The table summarises the main results obtained from the split of the value strategies by earnings momentum. the latter constituted by the frequency and dispersion of analyst's EPS forecast revisions. The total number of months in the sample is 185. Each month from January 1989, all stocks included in the GMO London files are sorted based on their Sales-to-Price and the top (bottom) 30% is considered. These portfolios are subsequently decomposed with either frequency (*Agreement*) or dispersion (*Dispersion*) of the forecast revisions. Therefore, the 5 consecutive cheap to expensive portfolios are overlapped with the 5 consecutive high to low *Agree* and low to high *Dispersion*, giving raise to a total of 25 portfolios. The portfolios are then held over the next *K* months equal to 12 and the equally-weighted and raw returns are calculated and documented in the following table. We also report the *Newey-West* p-value corrected for the *autocorrelation* and *heteroskedasticity*, and the standard deviation of the performances of either every portfolio or the long - short returns.

***Panel A: Value Stocks Split by Agreement and Dispersion of Forecasts***

| **Value** | | | ***Agreement*** | | | |
|---|---|---|---|---|---|---|
| **12-month** | ***High*** | ***q2*** | ***q3*** | ***q4*** | ***Low*** | ***L - H*** |
| ***Agree1*** | | | | | | |
| Mean | 0.61 | 0.76 | 0.63 | 0.42 | 0.81 | 0.20 |
| p-value | 0.32 | 0.15 | 0.19 | 0.38 | 0.06 | 0.57 |
| Std Dev | 0.07 | 0.06 | 0.06 | 0.05 | 0.05 | 0.04 |
| ***Agree2*** | | | | | | |
| Mean | 0.72 | 0.67 | 0.93 | 0.44 | 0.63 | -0.09 |
| p-value | 0.20 | 0.20 | 0.05 | 0.30 | 0.13 | 0.79 |
| Std Dev | 0.06 | 0.06 | 0.06 | 0.05 | 0.05 | 0.04 |
| ***Agree3*** | | | | | | |
| Mean | 0.80 | 1.02 | 1.08 | 0.84 | 1.16 | 0.36 |
| p-value | 0.24 | 0.06 | 0.04 | 0.05 | 0.01 | 0.40 |
| Std Dev | 0.07 | 0.06 | 0.06 | 0.05 | 0.05 | 0.05 |
| ***Agree4*** | | | | | | |
| Mean | 0.87 | 1.10 | 1.12 | 1.37 | 0.92 | 0.05 |
| p-value | 0.16 | 0.03 | 0.02 | 0.00 | 0.02 | 0.89 |
| Std Dev | 0.07 | 0.05 | 0.05 | 0.06 | 0.04 | 0.04 |
| ***Agree5*** | | | | | | |
| Mean | 1.25 | 1.02 | 1.25 | 1.34 | 1.26 | 0.01 |
| p-value | 0.02 | 0.02 | 0.00 | 0.00 | 0.00 | 0.97 |
| Std Dev | 0.06 | 0.05 | 0.05 | 0.05 | 0.04 | 0.04 |
| ***q5-q1*** | | | | | | |
| Mean | 0.64 | 0.26 | 0.62 | 0.93 | 0.45 | 0.65 |
| p-value | 0.01 | 0.20 | 0.01 | 0.00 | 0.02 | 0.05 |
| Std Dev | 0.03 | 0.03 | 0.03 | 0.03 | 0.02 | 0.04 |

***Panel B: Growth Stocks Split by Agreement and Dispersion of Forecasts***

| **Growth** | | | ***Forecast Dispersion*** | | | |
|---|---|---|---|---|---|---|
| **12-month** | ***High*** | ***q2*** | ***q3*** | ***q4*** | ***Low*** | ***L - H*** |
| ***FREV1*** | | | | | | |
| Mean | 0.08 | 0.24 | 0.21 | 0.52 | 0.70 | 0.62 |
| p-value | 0.88 | 0.64 | 0.66 | 0.26 | 0.17 | 0.03 |
| Std Dev | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.04 |
| ***FREV2*** | | | | | | |
| Mean | 0.18 | 0.49 | 0.53 | 0.63 | 1.02 | 0.84 |
| p-value | 0.72 | 0.25 | 0.24 | 0.15 | 0.03 | 0.00 |
| Std Dev | 0.06 | 0.05 | 0.05 | 0.05 | 0.05 | 0.03 |
| ***FREV3*** | | | | | | |
| Mean | 0.17 | 0.59 | 0.51 | 0.75 | 1.14 | 0.98 |
| p-value | 0.73 | 0.13 | 0.22 | 0.07 | 0.02 | 0.00 |
| Std Dev | 0.06 | 0.05 | 0.05 | 0.05 | 0.05 | 0.04 |
| ***FREV4*** | | | | | | |
| Mean | 0.45 | 0.59 | 0.82 | 0.78 | 1.35 | 0.90 |
| p-value | 0.36 | 0.12 | 0.04 | 0.07 | 0.00 | 0.00 |
| Std Dev | 0.06 | 0.05 | 0.05 | 0.05 | 0.05 | 0.03 |
| ***FREV5*** | | | | | | |
| Mean | 0.54 | 0.73 | 0.83 | 1.01 | 1.53 | 0.99 |
| p-value | 0.28 | 0.05 | 0.03 | 0.01 | 0.00 | 0.00 |
| Std Dev | 0.06 | 0.05 | 0.05 | 0.05 | 0.05 | 0.03 |
| ***q5-q1*** | | | | | | |
| Mean | 0.46 | 0.49 | 0.61 | 0.50 | 0.83 | 1.44 |
| p-value | 0.04 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 |
| Std Dev | 0.02 | 0.03 | 0.02 | 0.02 | 0.02 | 0.04 |

# Table IX
# Returns for Countries/Regions for Value Stocks Split by Price Momentum and Acceleration

The table summarises the main results obtained from the split of the value strategies by earnings momentum, the latter constituted by the frequency and dispersion of analyst's EPS forecast revisions. The total number of months in the sample is 185. Each month from January 1989, all stocks included in the GMO London files are sorted based on their Sales-to-Price and the top 30% is considered. These portfolios are subsequently decomposed by the intersection of price momentum and price acceleration, both spit into thirds and so giving rise to a total of 6 portfolios. The portfolios are then held over the next 12 months and the equally-weighted and raw returns are calculated and reported for six of these portfolios in the following table. We also report the *Newey-West* p-value corrected for the *autocorrelation* and *heteroskedasticity*, and the standard deviation of the performances of either every portfolio or the long - short returns.

***Value Stocks (Top 30%)***

| **UK** | *Acceleration Index* | | | | **Italy** | *Acceleration Index* | | | |
|---|---|---|---|---|---|---|---|---|---|
| *Price Momentum* | ***Low*** | ***Mid*** | ***High*** | ***H - L*** | *Price Momentum* | ***Low*** | ***Mid*** | ***High*** | ***H - L*** |
| ***Losers*** | | | | | ***Losers*** | | | | |
| Mean | 1.41 | 1.34 | 1.67 | 0.26 | Mean | 0.34 | -0.02 | -0.53 | -0.88 |
| p-value | 0.02 | 0.03 | 0.03 | 0.35 | p-value | 0.60 | 0.97 | 0.46 | 0.03 |
| Std Dev | 0.06 | 0.06 | 0.08 | 0.03 | Std Dev | 0.08 | 0.08 | 0.09 | 0.05 |
| ***Winners*** | | | | | ***Winners*** | | | | |
| Mean | 1.59 | 1.65 | 1.83 | 0.25 | Mean | 0.68 | 0.85 | 0.61 | -0.07 |
| p-value | 0.00 | 0.00 | 0.00 | 0.09 | p-value | 0.26 | 0.14 | 0.29 | 0.80 |
| Std Dev | 0.05 | 0.04 | 0.05 | 0.02 | Std Dev | 0.07 | 0.07 | 0.07 | 0.03 |
| ***W - L*** | | | | | ***W - L*** | | | | |
| Mean | 0.18 | 0.31 | 0.16 | 0.42 | Mean | 0.33 | 0.87 | 1.14 | 0.26 |
| p-value | 0.46 | 0.27 | 0.67 | 0.11 | p-value | 0.31 | 0.00 | 0.01 | 0.62 |
| Std Dev | 0.03 | 0.03 | 0.04 | 0.03 | Std Dev | 0.04 | 0.04 | 0.06 | 0.04 |
| **France** | ***Low*** | ***Mid*** | ***High*** | ***H - L*** | **Scandinavia** | ***Low*** | ***Mid*** | ***High*** | ***H - L*** |
| ***Losers*** | | | | | ***Losers*** | | | | |
| Mean | 0.93 | 0.85 | 0.75 | -0.19 | Mean | 0.78 | 1.09 | 0.78 | 0.00 |
| p-value | 0.07 | 0.10 | 0.36 | 0.73 | p-value | 0.19 | 0.06 | 0.34 | 1.00 |
| Std Dev | 0.06 | 0.06 | 0.09 | 0.06 | Std Dev | 0.06 | 0.06 | 0.08 | 0.06 |
| ***Winners*** | | | | | ***Winners*** | | | | |
| Mean | 1.27 | 1.28 | 1.62 | 0.35 | Mean | 1.77 | 1.51 | 1.89 | 0.12 |
| p-value | 0.00 | 0.00 | 0.00 | 0.24 | p-value | 0.00 | 0.00 | 0.00 | 0.72 |
| Std Dev | 0.05 | 0.04 | 0.05 | 0.03 | Std Dev | 0.05 | 0.05 | 0.05 | 0.04 |
| ***W - L*** | | | | | ***W - L*** | | | | |
| Mean | 0.33 | 0.43 | 0.87 | 0.69 | Mean | 0.99 | 0.42 | 1.11 | 1.11 |
| p-value | 0.16 | 0.05 | 0.11 | 0.04 | p-value | 0.01 | 0.12 | 0.05 | 0.00 |
| Std Dev | 0.04 | 0.03 | 0.06 | 0.04 | Std Dev | 0.05 | 0.03 | 0.07 | 0.04 |
| **Germany** | ***Low*** | ***Mid*** | ***High*** | ***H - L*** | **Others** | ***Low*** | ***Mid*** | ***High*** | ***H - L*** |
| ***Losers*** | | | | | ***Losers*** | | | | |
| Mean | -0.08 | -0.02 | -0.85 | -0.77 | Mean | 0.38 | 0.40 | -0.01 | -0.39 |
| p-value | 0.89 | 0.97 | 0.19 | 0.03 | p-value | 0.45 | 0.42 | 0.99 | 0.30 |
| Std Dev | 0.06 | 0.05 | 0.07 | 0.04 | Std Dev | 0.06 | 0.06 | 0.07 | 0.05 |
| ***Winners*** | | | | | ***Winners*** | | | | |
| Mean | 0.48 | 0.76 | 0.60 | 0.12 | Mean | 1.09 | 1.27 | 1.73 | 0.64 |
| p-value | 0.24 | 0.03 | 0.09 | 0.52 | p-value | 0.00 | 0.00 | 0.00 | 0.10 |
| Std Dev | 0.04 | 0.04 | 0.04 | 0.02 | Std Dev | 0.05 | 0.04 | 0.05 | 0.03 |
| ***W - L*** | | | | | ***W - L*** | | | | |
| Mean | 0.55 | 0.78 | 1.45 | 0.67 | Mean | 0.71 | 0.87 | 1.74 | 1.35 |
| p-value | 0.17 | 0.02 | 0.00 | 0.06 | p-value | 0.01 | 0.01 | 0.00 | 0.01 |
| Std Dev | 0.04 | 0.03 | 0.05 | 0.04 | Std Dev | 0.03 | 0.04 | 0.06 | 0.04 |

# Table X
## Returns by Countries/Regions for Growth Stocks Split by Price Momentum and Acceleration

The table summarises the main results obtained from the split of the value strategies by earnings momentum, the latter constituted by the frequency and dispersion of analyst's EPS forecast revisions. The total number of months in the sample is 185. Each month from January 1989, all stocks included in the GMO London files are sorted based on their Sales-to-Price and the bottom 30% is considered. These portfolios are subsequently decomposed by the intersection of price momentum and price acceleration, both spit into thirds and so giving rise to a total of 6 portfolios. The portfolios are then held over the next 12 months and the equally-weighted and raw returns are calculated and reported for six of these portfolios in the following table. We also report the *Newey-West* p-value corrected for the *autocorrelation* and *heteroskedasticity*, and the standard deviation of the performances of either every portfolio or the long - short returns.

| **UK** | *Acceleration Index* | | | |
|---|---|---|---|---|
| *Price Momentum* | ***Low*** | ***Mid*** | ***High*** | ***H - L*** |
| ***Losers*** | | | | |
| Mean | 0.40 | 0.40 | 0.48 | 0.08 |
| p-value | 0.57 | 0.52 | 0.53 | 0.81 |
| Std Dev | 0.07 | 0.06 | 0.08 | 0.03 |
| ***Winners*** | | | | |
| Mean | 1.15 | 1.41 | 1.75 | 0.60 |
| p-value | 0.09 | 0.01 | 0.01 | 0.00 |
| Std Dev | 0.06 | 0.05 | 0.06 | 0.02 |
| ***W - L*** | | | | |
| Mean | 0.75 | 1.01 | 1.27 | 1.35 |
| p-value | 0.01 | 0.00 | 0.00 | 0.00 |
| Std Dev | 0.03 | 0.03 | 0.05 | 0.04 |

| **France** | ***Low*** | ***Mid*** | ***High*** | ***H - L*** |
|---|---|---|---|---|
| ***Losers*** | | | | |
| Mean | 0.27 | 0.56 | 0.37 | 0.10 |
| p-value | 0.69 | 0.29 | 0.59 | 0.75 |
| Std Dev | 0.07 | 0.06 | 0.07 | 0.05 |
| ***Winners*** | | | | |
| Mean | 0.88 | 1.33 | 1.41 | 0.53 |
| p-value | 0.14 | 0.01 | 0.01 | 0.01 |
| Std Dev | 0.07 | 0.06 | 0.06 | 0.03 |
| ***W - L*** | | | | |
| Mean | 0.61 | 0.77 | 1.04 | 1.14 |
| p-value | 0.04 | 0.01 | 0.01 | 0.00 |
| Std Dev | 0.05 | 0.04 | 0.05 | 0.05 |

| **Germany** | ***Low*** | ***Mid*** | ***High*** | ***H - L*** |
|---|---|---|---|---|
| ***Losers*** | | | | |
| Mean | -0.88 | -0.79 | -1.05 | -0.17 |
| p-value | 0.23 | 0.28 | 0.18 | 0.67 |
| Std Dev | 0.08 | 0.07 | 0.09 | 0.05 |
| ***Winners*** | | | | |
| Mean | 0.00 | 0.48 | 0.51 | 0.50 |
| p-value | 0.99 | 0.17 | 0.33 | 0.02 |
| Std Dev | 0.06 | 0.04 | 0.05 | 0.03 |
| ***W - L*** | | | | |
| Mean | 0.88 | 1.27 | 1.56 | 1.39 |
| p-value | 0.01 | 0.02 | 0.00 | 0.00 |
| Std Dev | 0.04 | 0.06 | 0.07 | 0.05 |

| **Italy** | *Acceleration Index* | | | |
|---|---|---|---|---|
| *Price Momentum* | ***Low*** | ***Mid*** | ***High*** | ***H - L*** |
| ***Losers*** | | | | |
| Mean | 0.01 | 0.23 | 0.17 | 0.05 |
| p-value | 0.99 | 0.71 | 0.33 | 0.16 |
| Std Dev | 0.09 | 0.08 | 0.10 | 0.05 |
| ***Winners*** | | | | |
| Mean | 0.66 | 0.68 | 0.63 | -0.04 |
| p-value | 0.26 | 0.20 | 0.32 | 0.90 |
| Std Dev | 0.08 | 0.07 | 0.08 | 0.03 |
| ***W - L*** | | | | |
| Mean | 0.66 | 0.45 | 0.51 | 0.62 |
| p-value | 0.09 | 0.25 | 0.95 | 0.08 |
| Std Dev | 0.05 | 0.04 | 0.07 | 0.05 |

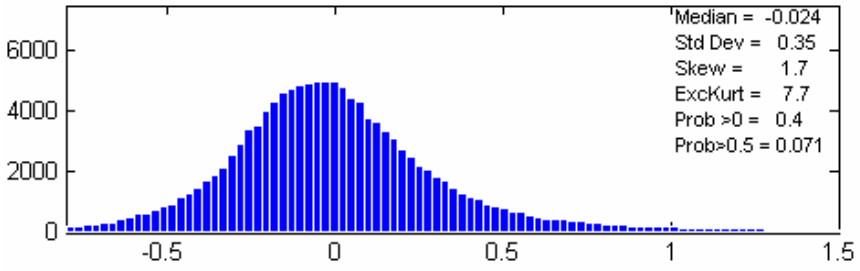
| **Scandinavia** | ***Low*** | ***Mid*** | ***High*** | ***H - L*** |
|---|---|---|---|---|
| ***Losers*** | | | | |
| Mean | -0.15 | 0.36 | -0.47 | -0.31 |
| p-value | 0.81 | 0.48 | 0.51 | 0.57 |
| Std Dev | 0.07 | 0.05 | 0.07 | 0.05 |
| ***Winners*** | | | | |
| Mean | 0.76 | 1.29 | 1.69 | 0.93 |
| p-value | 0.18 | 0.00 | 0.00 | 0.00 |
| Std Dev | 0.06 | 0.05 | 0.06 | 0.02 |
| ***W - L*** | | | | |
| Mean | 0.91 | 0.93 | 2.15 | 1.84 |
| p-value | 0.01 | 0.00 | 0.00 | 0.00 |
| Std Dev | 0.04 | 0.03 | 0.05 | 0.04 |

| **Others** | ***Low*** | ***Mid*** | ***High*** | ***H - L*** |
|---|---|---|---|---|
| ***Losers*** | | | | |
| Mean | 0.17 | 0.26 | 0.02 | -0.16 |
| p-value | 0.70 | 0.51 | 0.98 | 0.66 |
| Std Dev | 0.05 | 0.04 | 0.06 | 0.04 |
| ***Winners*** | | | | |
| Mean | 1.00 | 1.15 | 1.20 | 0.20 |
| p-value | 0.01 | 0.00 | 0.00 | 0.41 |
| Std Dev | 0.04 | 0.04 | 0.04 | 0.03 |
| ***W - L*** | | | | |
| Mean | 0.83 | 0.89 | 1.18 | 1.03 |
| p-value | 0.00 | 0.00 | 0.01 | 0.00 |
| Std Dev | 0.03 | 0.02 | 0.05 | 0.04 |

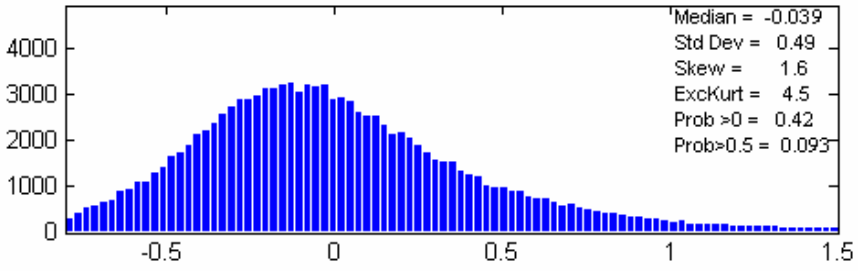
# Figure I
# Distribution of Excess Returns to Value Investing based on Sales-to-Price

The figure shows the distributions of the excess returns (over the benchmark constructed on the entire universe) obtained from the application of a single value criterion represented by Sales-to-Price. Each month from January 1989, all stocks included in the GMO London files are sorted based on their Sales-to-Price and divided in quintiles. The graphs illustrate only the performance of the top 20% of these stocks in terms of equally-weighted and absolute excess returns over holding periods equal to 6, 12, 24, and 36 months. We also report the main statistics as well as the improvement in the upside potentials from the extension of the investment horizon.

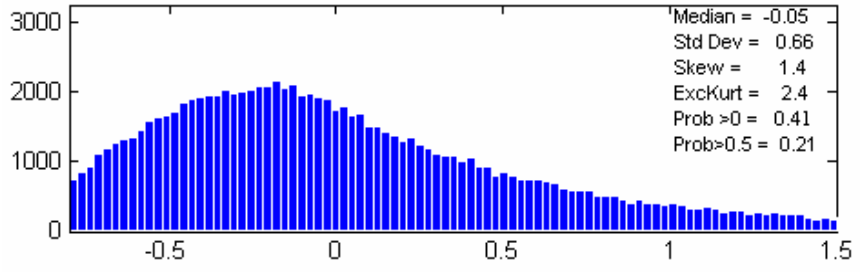
***Graph 1: Distribution of Value Excess Returns over 6 months.***



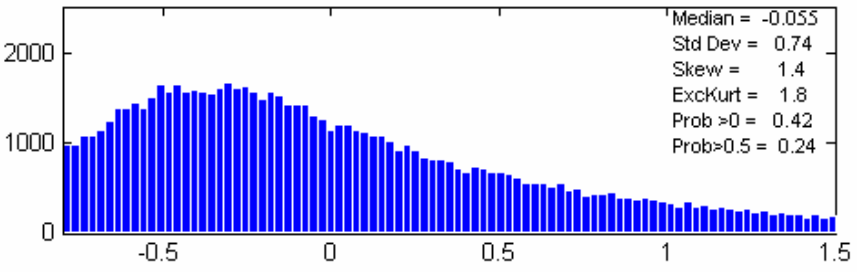

***Graph 2: Distribution of Value Excess Returns over 12 months***




***Graph 3: Distribution of Value Excess Returns over 24 months.***



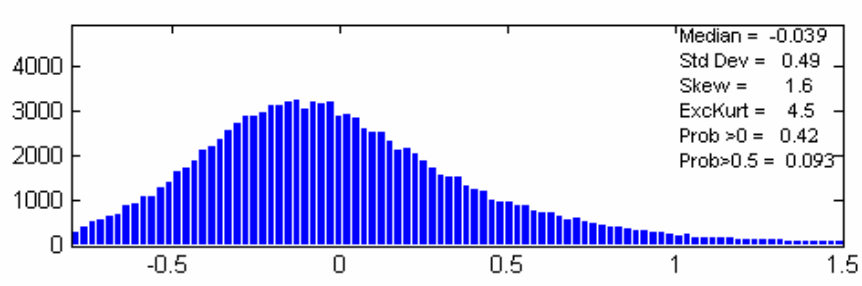

***Graph 4: Distribution of Value Excess Returns over 36 months***



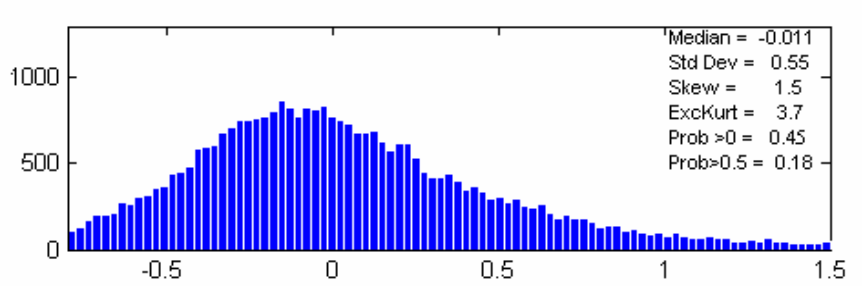
# Figure II
## Enhancement of Excess Returns to Value Investing when Combined with Momentum Strategies

The figure shows the distributions of the excess returns (over the benchmark constructed on the entire universe) obtained from the application of a value criterion represented by Sales-to-Price (*graph 1*) and subsequently intersected with different momentum indicators: the 6-month Price Momentum alone (*graph 2*), the Agreement which measures the frequency of analysts' earnings forecast revisions (*graph 3*) or the combination of price momentum and price acceleration (*graph 4*) along the Momentum Life Cycle. Each month from January 1989, all stocks included in the GMO London files are sorted based on their market-based indicator (SP) and divided in quintiles. In the case of a multi-criteria approach (*graphs 2, 3, and 4*), those stocks falling into the highest quintile by SP are then intersected with the momentum criteria, and their equally-weighted and absolute excess returns are documented over a holding period equal to 12 months. We also report the main statistics of the distributions.

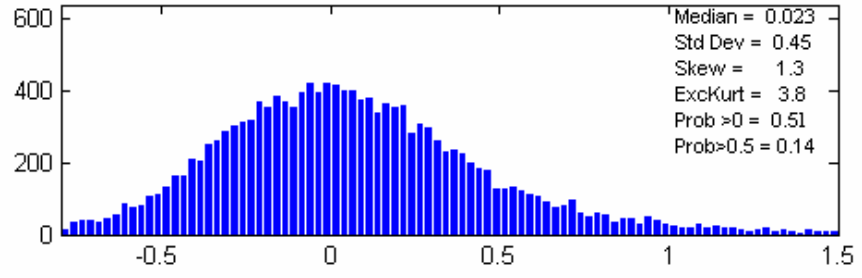
***Graph 1: Distribution of Value returns (Sales-to-Price).***




***Graph 2: Distribution of Value stock with winning characteristics***




***Graph 3: Distribution of Value-Winners with High Agreement***




***Graph 4: Distribution of Value-Winners with High Acceleration***