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The Performance of Value and Momentum Investment Portfolios: Recent Experience in the Major European Markets

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Introduction

Over the last 25 years there have been numerous studies that have identified various market anomalies, many of which have given rise to a new quantitative investment strategy. This paper concentrates on the two most prolific of these strategies: value investing and momentum

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investing, whose performance is evaluated in the major European markets over the interesting period from January 1990 to June 2002. The first decade of the sample period was characterised by a consistently rising market, with the European markets rising on average by 12.5 per cent per annum but this period was followed by a rapid (still on-going) market correction, with the European markets falling on average by 12 per cent per annum over the first two and a half years of the new millennium.[1]

In the first section of this paper the authors briefly outline the history of the two investment techniques under evaluation and the past evidence with respect to their performance. They then proceed to provide a broad outline of the methods and data employed in this study. Thereafter the authors outline the findings which verify the on-going success of a number of alternative implementations of these two strategies. The paper concludes with some summary comments.

Existing evidence on value and momentum investing

As indicated above, the focus of this paper is to evaluate the recent performance of value and momentum investing in the major European markets. Before turning to the empirical findings, the authors survey in this section the nature and performance record of both of these two approaches to investing.

Value investing

The foundations of value investing date back to Graham and Dodd (1934) who suggested that analysts extrapolate past earnings growth too far out into the future and by so doing drive the price of the stock of the better performing firms to too high a level. The Graham and Dodd hypothesis is that firms who have experienced and who are currently experiencing high earnings growth are unlikely to be able to sustain it over extended time periods. When the earnings growth of such a firm reverts back towards some industry/economy-wide mean, it will fall well short of the unrealistic expectations that have been built into current prices and give rise to a downward correction in its stock price. A similar story also applies to a firm that has been performing poorly, whose share price has been driven down too far and which subsequently mean-reverts when the fundamentals of the firm begin to pick up.

A number of valuation multiples have been used to provide insights into possible mispricings due to these unrealistic expectations. For example, a high (low) price-to-earnings or market-to-book multiple is

taken as indicative that the firm's stock is expensive (cheap). Value (or contrarian) investment strategies have been developed using such multiples where stocks are ranked in accordance to their multiple values and the investment portfolio is tilted towards the cheaper stocks and away from the expensive stocks. Although such strategies have been in use since the writings of Graham and Dodd, it is only in the last 25 years that academics have devoted time to both measuring and providing explanations for their apparent success. Basu (1977) evaluated earnings-to-price as the value criterion; Rosenberg *et al.* (1985) investigated price-to-book; Chan *et al.* (1991) studied cash flow-to-price, while Lakonishok *et al.* (1994), Dreman and Berry (1995) and Bernard *et al.* (1997) all evaluated several value criteria.

A consistent finding in these papers has been that value investing is a profitable investment strategy not only in the USA but also in most of the other major markets (Arshanapalli *et al.*, 1998; Rouwenhorst, 1999). The debate then goes as to whether the excess returns associated with a value strategy represent a market anomaly (Lakonishok *et al.*, 1994) or whether they simply represent a premium for taking on extra investment risk (Fama and French, 1993). A third possible explanation is that the value premium is simply a reward for taking on the greater business risk associated with holding a disproportionate amount of out-of-favour stocks in one's portfolio. According to this third explanation, the greater return to value investment would be an equilibrium (permanent) outcome although still appearing an anomaly within the narrowly defined objective function assumed in classical economic models.

Irrespective of the source of the extra returns from value investing, they seem to exist and persist across almost all of the major world markets. Not surprisingly, this outcome has attracted an increasing number of investment managers to integrate this form of investing into their process. One particular downside to value investing that has been identified in recent studies is that the majority (typically around 55 per cent) of the so-called cheap stocks do not outperform the market (Bird and Gerlach, 2003), the reason being that the multiples used to identify value stocks are by their nature very crude. For example, the market may expect a firm that has been experiencing poor earnings performance for several years to continue to do so for many more years, and this will cause the firm to have a low (say) price-to-earnings multiple. Of course, if the earnings do revert upwards in the immediate future the market will revise the firm's stock price upwards and the low price-to-earnings multiple would have been reflective of a cheap stock. On the other hand, the market might have been right in its expectations and the firm's profitability may never improve and so it does not prove

to be cheap. Indeed, the firm's fundamentals might even worsen and so investing in this firm on the basis of its price-to-earnings multiple would prove a very bad investment.

Momentum investing

Momentum investing basically involves investing on the basis of a past trend with many investment managers including some component of this form of investment in their process. Momentum investing comes in various guises and in this study we evaluate two of the most common: price momentum and earnings momentum.

Price momentum

Price momentum investing represents the simplest outworking of the technical analysts' motto that the trend is your friend. The suggestion being that recent trends in returns will be maintained into the future and so an investment approach that favours stocks that have realised high returns in recent times will outperform the market. The usual justification for such a strategy being that the performance of both markets and individual stocks is largely driven by market sentiment which itself follows trends.

Empirical tests of whether stocks prices move randomly or follow some predictable patterns date back over 100 years.[2] The early tests largely concentrated on the correlation between relatively short-term price movements and found limited evidence of mean-reversion (see Elton *et al.*, 2003: 411). In more recent times DeBondt and Thaler (1985, 1987) found that price movements overreact over extended time periods and subsequently mean-revert; the implication being that the best performing stocks over the last three to five years will tend to realise poor subsequent performance. This behaviour is similar to that previously discussed with respect to value investing, and it may well be that such investment opportunities are better identified using valuation multiples rather than some measure of long-term market performance.

Although the findings discussed above suggest that there is some mean-reversion in both short-term and long-term price movements, the majority of the interest in recent years has been in the continuance of medium-term price movements. It is the work in this area that has given rise to what has become known as (price) momentum investing. Jegadeesh and Titman (1993) when evaluating US stocks found that the relative return on stocks over a 3–12 months period is highly

correlated with their relative returns over the previous 3–12 months. Many authors subsequently confirmed these findings with perhaps the most comprehensive being Jegadeesh and Titman's update of their original study (Jegadeesh and Titman, 2001). The evidence on price momentum is not limited to the USA. The most extensive international studies were conducted by Rouwenhorst (1998), who found that price momentum strategies also performed well in other developed markets and also many of the emerging markets.

The strength of the findings with respect to price momentum provided the impetus for a number of authors to try and provide an explanation for the empirical findings, with investment risk being the most obvious candidate. A consistent finding, however, was that applying the traditional risk controls (CAPM, Fama–French three factor model) actually increases momentum returns (Grundy and Martin, 2001; Chopra *et al.*, 1992; Jegadeesh and Titman, 2001; and Rouwenhorst, 1998). Other attempts to attribute momentum to illiquidity, data snooping and the like have also failed to meet with much success. Indeed, the outperformance of simple price momentum strategies remains so much a mystery that Fama has identified this as the one outstanding anomaly in market behaviour (Fama, 1998). The authors propose that a most likely explanation for the continued success of momentum trading is that it is a consequence of information signals being correlated over time (good news is more likely to follow good news) and the fact the market tends to underreact to new information (see Kadiyala and Rau, 2001, and Soffer and Walther, 2000). Such conditions create the environment for extended trends in price movement, especially in a positive direction, at a time when management is actively manipulating information flows (see, for example, Richardson *et al.*, 2000).

Earnings momentum

As indicated above, a likely contributing factor to price momentum is the fact that information signals are correlated over time (ie good news is more likely to be followed by more good news). Reported earnings is a prime suspect as the major source of information to which prices react. As a consequence, a number of writers have studied the market reaction to several forms of earnings momentum. A very early study in this area was conducted by Ball and Brown (1968), who evaluated the share price reaction to a change in a firm's earnings from one reporting period to the next and found that such changes did result in a consistent movement in share price. Evidence of a post announcement earnings drift

has also been found, which suggests that investment strategies based on earnings momentum would be rewarded.

From evaluating the price response to earnings announcements, writers then turned to undertaking similar analyses and obtained similar findings using the earnings forecasts undertaken by equity analysts as the information source. These forecasts not only have the advantage of occurring earlier in the information cycle, but also are updated more frequently than reported earnings and so are more in tune with an investment strategy that is rebalanced on a monthly basis. It is for these reasons that the two earnings momentum criteria that we apply in this study for rankings stocks and forming portfolios are both based on the analysts' earnings forecasts, ie:

– Agreement measures the direction of changes in analysts' earnings forecasts over a short time period. It was first studied by Givoly and Lakonishok (1979) and is commonly used by a number of managers as part of their investment process;
– Forecast revisions measure the change in the magnitude of the analysts' earnings forecasts over a short time period. It has been evaluated by a number of writers including Chan *et al.* (1996) and is also used by a number of managers as part of their process.

Data and method

The data

In the following section the authors report on the performance of both value and price momentum investing when applied in several European countries: France, Germany, Italy, The Netherlands, Spain, Switzerland and the UK. The analysis was conducted over the period from January 1990 to June 2002, using accounting data obtained from the Worldscope database, return data provided by GMO Woolley and data on analyst's earnings forecasts provided by I/B/E/S. The only companies excluded from the sample were financial sector stocks and stocks with a negative book value. The average number of companies included in the database for each country is reported in Table 6.1.1.

Forming portfolios

Under both value and momentum investing, the stocks are ranked on the basis of some criterion with these rankings then being used as the

Table 6.1.1 Sample size by country

	Average	Maximum	Minimum
United Kingdom	1,081	1,274	730
France	376	454	376
Germany	332	515	230
Italy	129	147	108
Switzerland	127	162	108
Netherlands	97	115	75
Spain	78	99	57
Combined	2,219	2,533	1,641

basis for forming investment portfolios. The four criteria used by the authors are:

– Book-to-market (bm)
– Dividend yield (divvy)
– Earnings yield (epsy)
– Sales-to-price (sales price)

The first of these measures is a stock measure based on valuations while the other three relate current price to some flow measure that captures some activity of the firm. In each case, the lowest ranked stocks are the most expensive stocks and the highest ranked stocks are the cheapest stocks.

Two different measures of price momentum were also used to form the portfolios:

– 6-month price momentum (pmS)
– 12-month price momentum (pmL)

These two options were chosen as previous studies have shown that the best results from forming price momentum portfolios are obtained when the classification period for ranking stocks lies somewhere between 6 and 12 months. With price momentum, the bottom ranked stocks are those that have realised the lowest return over the measurement period (often referred to as the 'losers'), while the top ranked stocks are those that have realised the highest return (referred to as the 'winners'). The expectation being that the winners will continue to outperform the losers over the next several months.

Finally, two measures of earnings momentum were used, each based on analysts' earnings forecasts:

– Agreement (agree)
– Forecast revisions (fcr)

Agreement is measured by the quantity of analyst earnings revisions over a 2-month period – upward revisions minus downward revisions divided by the total number of revisions. A forecast revision is measured by the percentage change in the consensus analysts' earnings forecast over a two-month period.[3] Although both measures are based on analysts' forecasts, the former picks up on the fact that analysts tend to herd when making these revisions and so provides a measure of the strength of the signal relating to this herding behaviour while the second measure picks up on the magnitude of the signal. In the case of both criteria, stocks that have high rankings are expected to do much better than those with low rankings.

The procedure that the authors follow is to rank stocks at the beginning of each month based on each of the eight criteria outlined above. For example, each stock within each country (say France) is ranked on the basis of its book-to-market. Assume that there are 100 stocks with five portfolios to be formed. Then the 20 stocks with the lowest book-to-market values are included in the quintile one (most expensive) portfolio, the next 20 stocks ranked by book-to-market in the quintile two portfolio and so on. The resulting portfolios are (partially) rebalanced monthly and assumed to be held over holding periods that vary from 1 month to 48 months. With a 1-month holding period, the portfolios are totally rebalanced each month but with (say) a 12-month holding period, effectively one-twelfth of the portfolio is rebalanced each month, which means selling the stocks acquired 12 months ago and replacing them with the currently preferred stocks.

Besides following the procedure described above to build portfolios within countries, the authors also pool all of the stocks and build a combined portfolio incorporating all the available stocks from the seven markets. When all the stocks are then ranked in accordance with the procedures described above, there will be a tendency for the portfolios to reflect the relative valuations across the seven markets. For example, if French stocks are relatively cheap when measured by book-to-market, then they are likely to have a disproportionate weighting in the cheap portfolio that will be reflected in the returns on that portfolio. In order

to minimise the impact of any country bias on the combined portfolios, the authors also form these portfolios on a country-corrected basis. The country-corrected value for the particular criterion being used (eg book-to-market) is calculated for each stock in each country by deducting the average value for the criterion across all the stocks in the country from the actual value for that criterion for each stock. For example, country-corrected book-to-market for all French stocks in a particular month is determined by deducting the average book-to-market for all French stocks for that month from each stock's book-to-market. Each stock is ranked across all countries in accordance with these country-corrected values. The portfolio formed from following this approach is described as a country-corrected portfolio and the returns, country-corrected returns.

Determining the returns on the portfolios

The end objective is to measure the performance of the portfolios formed following one of the approaches described above. The authors calculate several returns, each of which is described below:[4]

1. Equally weighted return – these are returns on equally weighting each stock within each portfolio.
2. Market weighted returns – these are the returns obtained by weighting each stock in each portfolio on the basis for its contribution to the market capitalisation of the portfolio.
3. Size-adjusted equally weighted returns – in this case each stock is equally weighted within each portfolio but the returns used to calculate the portfolio returns are not the actual stock returns for each month, but rather the size-adjusted returns obtained by subtracting the return of the portfolio composed of stocks that fall in the same size-decile portfolio from the stock's actual return. (See La Porta *et al.*, 1997, for a detailed discussion of the calculation of size-adjusted returns.)
4. Size-adjusted market weighted returns – each stock is held in each portfolio in proportion to its market capitalisation with portfolio returns being calculated using the size-adjusted returns that are calculated using the method described above.

As well as calculating the monthly returns for each portfolio, the authors also calculate a *p*-value as a test of the significance of these returns. These *p*-values are calculated using the Newey–West measure of variance that corrects for serial correlation (Newey and West, 1987).

Finally, the authors collect the following characteristics for each portfolio:

– The portfolio's average book-to-market value as a measure of its valuation level
– The portfolio's six-month price momentum as a measure of its recent market performance
– The relative trading volume of the stocks in the portfolio over the previous month as a measure of its liquidity
– The decile ranking of the market capitalisation of the stocks in the portfolio

The findings

The authors begin their analysis of how value and momentum strategies performed over the sample period by examining the performance of the four value criteria across the combined sample of the stocks in the seven countries and then evaluating the value criteria at the individual country level. Attention is then turned to conducting the same analysis applying both the two price momentum and two earnings momentum criteria.

Individual value strategies across all markets

Table 6.1.2 shows the absolute returns realised by applying the four value criteria to the pooled sample of stocks drawn from all seven markets. The immediate impression that one gains from reviewing this table is that some of the value criteria have been a lot more successful than others in separating what prove to be the cheap from the expensive stocks. Those criteria that disappoint are dividend yield and the earnings yield while sales-to-price and particularly book-to-market work well. Indeed, the authors would suggest that sales-to-price and book-to-market are purer measures of value as they are more difficult to manipulate than the other criteria. Hence the authors will concentrate on sales-to-price and book-to-market as the value criteria throughout the remainder of the discussions.

The evidence suggests that sorting stocks by book-to-market adds value over periods of up to three years, which is consistent with previous experience for US stocks (see Lakonishok *et al.*, 1994). For example, the first quintile portfolio composed of expensive stocks returns 0.61 per cent per month over a three-year holding period with there being

Table 6.1.2 Equally weighted returns (per cent per month) across value port-folios created using four criteria and with differing holding periods (combined markets, January 1990 to June 2002)

Panel 1: Sorting by book-to-market

Holding period	bm1	bm2	bm3	bm4	bm5	bm5 – bm1
1 month	0.633	0.589	0.553	0.592	1.175	0.542
	0.291	0.154	0.112	0.108	0.01	0.277
3 months	0.529	0.562	0.624	0.722	1.334	0.805
	0.366	0.165	0.071	0.045	0.006	0.121
6 months	0.427	0.578	0.646	0.792	1.542	1.115
	0.456	0.134	0.052	0.02	0.005	0.058
9 months	0.532	0.756	0.844	0.997	1.88	1.348
	0.353	0.047	0.01	0.003	0.002	0.031
12 months	0.507	0.773	0.894	1.059	2.002	1.495
	0.375	0.041	0.006	0.001	0.001	0.021
24 months	0.546	0.762	0.887	1.202	2.077	1.531
	0.333	0.05	0.009	0.001	0.001	0.013
36 months	0.614	0.825	0.956	1.309	2.206	1.591
	0.265	0.032	0.004	0	0.001	0.013
48 months	0.443	0.684	0.746	1.119	1.7	1.257
	0.417	0.078	0.023	0.004	0.004	0.02

Panel 2: Sorting by dividend yield

Holding period	divy1	divy2	divy3	divy4	divy5	divy5 – divy1
1 month	0.531	0.727	0.777	0.76	0.771	0.241
	0.402	0.041	0.038	0.047	0.137	0.555
3 months	0.7	0.791	0.834	0.713	0.755	0.055
	0.297	0.024	0.023	0.056	0.13	0.907
6 months	0.883	0.806	0.849	0.696	0.776	–0.107
	0.239	0.014	0.015	0.054	0.105	0.859
9 months	1.135	1.002	1.074	0.872	0.954	–0.181
	0.156	0.002	0.002	0.017	0.041	0.788
12 months	1.229	1.047	1.138	0.897	0.953	–0.275
	0.141	0.001	0.001	0.016	0.037	0.702
24 months	1.081	1.009	1.162	1.167	1.042	–0.04
	0.169	0.004	0.001	0.005	0.017	0.953
36 months	1.009	1.054	1.247	1.472	1.098	0.089
	0.157	0.002	0	0.004	0.011	0.882
48 months	0.73	0.821	0.989	1.264	0.891	0.161
	0.305	0.018	0.003	0.013	0.03	0.791

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Table 6.1.2 Continued

Panel 3: Sorting by earnings yield

Holding period	epsy1	epsy2	epsy3	epsy4	epsy5	epsy5 – epsy1
1 month	0.369	0.705	0.697	0.838	0.959	0.59
	0.571	0.08	0.04	0.018	0.023	0.112
3 months	0.543	0.709	0.746	0.874	0.923	0.38
	0.419	0.071	0.025	0.013	0.024	0.374
6 months	0.773	0.681	0.742	0.9	0.915	0.142
	0.287	0.071	0.02	0.006	0.02	0.793
9 months	1.109	0.811	0.92	1.101	1.096	−0.013
	0.147	0.03	0.004	0.001	0.005	0.983
12 months	1.256	0.835	0.96	1.133	1.08	−0.176
	0.112	0.024	0.002	0	0.006	0.78
24 months	1.535	0.847	0.937	1.093	1.117	−0.418
	0.076	0.025	0.006	0.001	0.006	0.567
36 months	1.566	0.908	0.965	1.123	1.336	−0.23
	0.039	0.015	0.004	0	0.002	0.644
48 months	1.215	0.709	0.738	0.852	1.188	−0.027
	0.078	0.059	0.034	0.006	0.01	0.947

Panel 4: Sorting by sales-to-price

Holding period	sales price1	sales price2	sales price3	sales price4	sales price5	sales price5 – sales price1
1 month	0.479	0.689	0.8	0.742	0.869	0.391
	0.363	0.054	0.028	0.069	0.072	0.149
3 months	0.491	0.737	0.809	0.791	0.98	0.49
	0.341	0.037	0.025	0.046	0.047	0.083
6 months	0.498	0.725	0.796	0.824	1.182	0.683
	0.313	0.031	0.02	0.03	0.033	0.069
9 months	0.706	0.899	0.967	1.051	1.429	0.723
	0.15	0.007	0.004	0.005	0.016	0.096
12 months	0.769	0.94	1.004	1.092	1.473	0.705
	0.117	0.005	0.003	0.003	0.018	0.135
24 months	0.817	0.928	0.983	1.131	1.677	0.86
	0.106	0.009	0.006	0.004	0.018	0.132
36 months	0.964	0.972	1.022	1.167	1.857	0.892
	0.054	0.006	0.003	0.001	0.019	0.183
48 months	0.801	0.757	0.756	0.874	1.6	0.799
	0.11	0.035	0.028	0.012	0.038	0.216

Notes: The first line in each cell is the monthly returns while the second line reports the *p*-value calculated using the Newey-West measure of variance corrected for serial correlation. For example, the top left hand cell in Panel 1 shows that the first quintile of book-to-market realised a monthly return of 0.633 per cent with a *p*-value of 0.291.

a smooth transition in returns across the other quintile portfolios with the fifth quintile portfolio composed of cheap stocks returning 2.20 per cent over the same holding period. For all holding periods in excess of 9 months, the difference between the returns on the cheap and expensive portfolios is highly significant. The sorting of stocks by sales-to-price produces portfolios whose returns are equally regular and long-lived as are those for the book-to-market portfolios, even though they suggest a value strategy which is slightly less profitable.

In order to gain greater insights into the reasons why these two criteria might give rise to a profitable value strategy the authors examined several characteristics of the resulting portfolios and these are reported in Table 6.1.3. The characteristics of both sets of portfolios are quite distinctive – the cheap book-to-market portfolios comprised relatively small and cheap (by book-to-market) stocks that have experienced poor recent market performance and a relatively low trading volume; the cheap sales-to-price portfolios comprised stocks that have experienced poor recent market performance on a relatively low trading volume but which are, on average, neither small nor cheap.

Table 6.1.3 Characteristics of book-to-market and sales-to-price portfolios (combined markets, January 1990 to June 2002)

Book-to-market

Portfolio	Book-to-market	6-month price momentum (per cent per month)	Volume (proportion of total)	Size (decile rank)
bm1	0.0933	2.3887	0.2126	6.8255
bm2	0.2409	1.3565	0.2155	6.745
bm3	0.4143	0.7897	0.2548	6
bm4	0.6957	0.3507	0.212	4.9664
bm5	1.4211	−0.8508	0.105	2.9765

Book-to-market

Portfolio	Book-to-market	6-month price momentum (per cent per month)	Volume (proportion of total)	Size (decile rank)
sales price1	0.2928	1.4622	0.2672	6.2181
sales price2	0.3486	1.2984	0.3712	6.1409
sales price3	0.5005	0.8808	0.2527	5.1007
sales price4	0.5646	0.3246	0.0545	4.2383
sales price5	0.4382	0.0385	0.0544	5.3188

The characteristics presented in Table 6.1.3 would suggest the possibility that, especially in the case of the book-to-market portfolios, size and illiquidity considerations might mitigate against being able to extract much of the potential added value highlighted in Table 6.1.2. In order to throw more light on this possibility, we also report the performance of each of the portfolios first measured on a market weighted basis (Table 6.1.4) and then on a market-weighted and size-adjusted basis (Table 6.1.5). The overall effect of market weighting the stocks within the portfolio is to lower the impact of the smaller stocks on portfolio returns. Therefore, it is not surprising to find from an examination of Table 6.1.4 that the spread in the returns across the various portfolios is lower than they were when returns were calculated for equally weighted portfolios. The introduction of size-adjusted returns as reported in Table 6.1.5 does not, however, result in any further erosion of the outperformance of the cheaper stocks, with the spread between the returns on the cheap and expensive portfolios remaining at around 7 per cent per annum over a 36-month holding period in the case of book-to-market portfolios and almost 5 per cent per annum in the case of sales-to-price portfolios. The optimal holding period for the value portfolios would appear to be somewhere between 24 months and 36 months, over which time the spread between the returns on the cheap and expensive portfolios has maximum statistical significance.

The final issue to examine when investigating the application of value investing across the whole population of stocks is whether the way in which the rankings from the various countries have been combined introduces country positions that impact on the performance of the portfolios. In order to gain insights into this possibility, the authors produce country-corrected portfolios following the procedure described in the previous section, and report the returns on these country-corrected portfolios in Table 6.1.6. The effect of correcting for country bias results in a slight erosion in the performance of the portfolios, especially in the case of those formed using sales-to-price over the longer holding periods. It does seem, however, that the vast majority of the potential added value from implementing a value strategy during this period would have been due to stock selection rather than country bets.

The conclusion the authors draw from the discussion to date is that a value strategy based on either book-to-market or sales-to-price performed well if executed over the major European markets during the period from January 1990 to June 2002. This is a particularly interesting period as it contains a 10-year period when there was a boom in stock prices followed by a 2+ year correction period. Indeed, an analysis of

Table 6.1.4 Market-weighted returns (per cent per month) for book-to-market and sales-to-price portfolios (combined markets, January 1990 to May 2002)

Panel 1: Sorting by book-to-market

Holding period	bm1	bm2	bm3	bm4	bm5	bm5 – bm1
1 month	0.657	0.865	0.877	0.822	1.129	0.471
	0.117	0.01	0.005	0.029	0.009	0.329
3 months	0.639	0.812	0.857	0.865	1.103	0.464
	0.111	0.012	0.005	0.013	0.011	0.318
6 months	0.629	0.812	0.865	0.838	1.115	0.486
	0.1	0.008	0.002	0.014	0.007	0.259
9 months	0.805	1.008	1.046	1.017	1.345	0.54
	0.038	0.001	0	0.002	0	0.191
12 months	0.768	1.006	1.029	1.032	1.328	0.559
	0.05	0.001	0	0.002	0	0.153
24 months	0.724	0.947	1.04	1.041	1.379	0.654
	0.073	0.004	0	0.002	0	0.054
36 months	0.738	0.898	1.008	1.044	1.352	0.614
	0.061	0.008	0.001	0.002	0	0.055
48 months	0.67	0.774	0.865	0.899	1.137	0.467
	0.093	0.029	0.004	0.011	0.001	0.136

Panel 2: Sorting by sales-to-price

Holding period	sales price1	sales price2	sales price3	sales price4	sales price5	sales price5 – sales price1
1 month	0.546	0.765	0.917	0.944	1.109	0.564
	0.193	0.009	0.005	0.009	0.005	0.014
3 months	0.554	0.803	0.906	0.97	1.015	0.461
	0.174	0.007	0.004	0.004	0.008	0.057
6 months	0.534	0.754	0.786	1	1.034	0.5
	0.179	0.009	0.011	0.002	0.004	0.037
9 months	0.725	0.94	0.948	1.201	1.2	0.475
	0.074	0.001	0.002	0	0.001	0.047
12 months	0.737	0.947	0.904	1.178	1.153	0.416
	0.074	0.001	0.003	0	0.001	0.073
24 months	0.668	0.9	0.934	1.149	1.151	0.483
	0.128	0.002	0.005	0.001	0.002	0.036
36 months	0.756	0.834	0.908	1.043	1.16	0.404
	0.079	0.006	0.004	0.002	0.002	0.07
48 months	0.695	0.73	0.751	0.87	0.991	0.296
	0.11	0.024	0.02	0.012	0.01	0.198

Table 6.1.5 Market-weighted and size-adjusted returns (per cent per month) for book-to-market and sales-to-price portfolios (combined markets, January 1990 to June 2002)

Panel 1: Sorting by book-to-market

Holding period	bm1	bm2	bm3	bm4	bm5	bm5 – bm1
1 month	−0.028	0.18	0.188	0.151	0.442	0.47
	0.887	0.157	0.372	0.491	0.19	0.329
3 months	−0.016	0.158	0.197	0.215	0.45	0.466
	0.935	0.239	0.316	0.291	0.155	0.316
6 months	0.013	0.195	0.245	0.226	0.49	0.477
	0.942	0.14	0.203	0.245	0.1	0.272
9 months	0.008	0.21	0.245	0.219	0.54	0.531
	0.964	0.109	0.2	0.273	0.055	0.2
12 months	−0.009	0.225	0.246	0.252	0.534	0.543
	0.962	0.079	0.192	0.214	0.045	0.169
24 months	−0.081	0.137	0.228	0.232	0.551	0.632
	0.664	0.228	0.173	0.246	0.016	0.067
36 months	−0.102	0.052	0.16	0.198	0.478	0.58
	0.573	0.621	0.307	0.324	0.034	0.076
48 months	−0.028	0.07	0.158	0.196	0.411	0.44
	0.872	0.468	0.268	0.331	0.055	0.171

Panel 2: Sorting by sales-to-price

Holding period	sales price1	sales price2	Sales price3	sales price4	sales price5	sales price5 – sales price1
1 month	−0.135	0.08	0.238	0.263	0.427	0.562
	0.505	0.688	0.084	0.038	0.009	0.015
3 months	−0.092	0.145	0.255	0.317	0.364	0.455
	0.662	0.426	0.062	0.008	0.037	0.062
6 months	−0.074	0.134	0.171	0.387	0.42	0.495
	0.729	0.435	0.192	0.001	0.015	0.041
9 months	−0.063	0.14	0.153	0.406	0.402	0.466
	0.775	0.411	0.268	0.001	0.013	0.052
12 months	−0.034	0.165	0.125	0.401	0.374	0.409
	0.876	0.339	0.373	0.002	0.016	0.08
24 months	−0.135	0.091	0.126	0.339	0.341	0.476
	0.546	0.584	0.366	0.01	0.023	0.04
36 months	−0.089	−0.009	0.064	0.193	0.316	0.405
	0.684	0.953	0.676	0.135	0.026	0.071
48 months	−0.006	0.027	0.049	0.164	0.289	0.295
	0.977	0.841	0.753	0.216	0.04	0.201

Table 6.1.6 Market-weighted returns (per cent per month) for country-corrected book-to-market and sales-to-price portfolios (combined markets, January 1990 to June 2002)

Panel 1: Sorting by country-corrected book-to-market

Holding period	bm1	bm2	bm3	bm4	bm5	bm5 – bm1
1 month	0.803	0.771	0.743	0.836	1.163	0.36
	0.056	0.027	0.017	0.016	0.006	0.411
3 months	0.86	0.708	0.72	0.844	1.169	0.308
	0.035	0.033	0.015	0.01	0.003	0.466
6 months	0.805	0.682	0.725	0.901	1.181	0.375
	0.043	0.033	0.01	0.003	0.001	0.341
9 months	0.957	0.865	0.942	1.112	1.426	0.468
	0.016	0.007	0.001	0	0	0.213
12 months	0.928	0.867	0.925	1.116	1.423	0.495
	0.02	0.007	0.001	0	0	0.172
24 months	0.82	0.844	1.003	1.101	1.439	0.619
	0.052	0.012	0.001	0.001	0	0.069
36 months	0.805	0.796	1.002	1.102	1.398	0.593
	0.06	0.019	0.001	0.001	0	0.099
48 months	0.798	0.642	0.843	0.923	1.172	0.374
	0.072	0.061	0.005	0.006	0	0.297

Panel 2: Sorting by country-corrected sales-to-price

Holding period	sales price1	sales price2	sales price3	sales price4	sales price5	sales price5 – sales price1
1 month	0.748	0.87	0.578	0.902	1.473	0.725
	0.04	0.027	0.085	0.007	0	0.001
3 months	0.72	0.872	0.603	0.965	1.407	0.686
	0.038	0.021	0.071	0.003	0	0.001
6 months	0.798	0.846	0.586	0.846	1.36	0.563
	0.015	0.019	0.079	0.006	0	0.003
9 months	0.98	1.047	0.736	1.055	1.57	0.59
	0.002	0.004	0.027	0.001	0	0.002
12 months	0.953	1.064	0.685	1.085	1.503	0.55
	0.003	0.004	0.041	0	0	0.003
24 months	1.005	0.967	0.614	1.125	1.334	0.329
	0.003	0.011	0.09	0.001	0.001	0.059
36 months	1.014	0.975	0.564	1.122	1.2	0.185
	0.002	0.011	0.119	0	0.002	0.254
48 months	0.866	0.881	0.469	0.943	1.025	0.159
	0.011	0.023	0.208	0.005	0.01	0.316

the returns on the value portfolios confirm the authors' expectations that the value strategy struggled during the former period but strongly came into its own during the correction period. The other finding that is worth noting is that the authors have confirmed that despite the outperformance of value portfolios during this period, the majority of cheap (top quinitile) stocks underperform the market. Applying a one-year holding period the authors found that on average only 46 per cent of their value stocks as ranked by book-to-market, outperformed the market – which is consistent with previous evidence on this same issue for other markets (Bird and Gerlach, 2003).

Value strategies across each European market

The authors conducted the same analysis at the individual country level as was conducted at the combined level, and found in general that value investing performed well in each country. It should be noted, however, that the sample size for some of the countries, such as Italy, the Netherlands, Spain and Switzerland, is likely to mitigate against the possibility of finding significant results in countries. The findings for each country are reported in Table 6.1.7, where stocks are sorted by book-to-market with the returns being in local currency and calculated for equally weighted portfolios. The book-to-market criterion produces a positive spread between the returns on the cheap and expensive port-folios varying from around 5 per cent per annum for Spanish and Swiss markets to as much as 25 per cent per annum for the UK market. The strongest results in terms of statistical significance were in the larger markets (UK, France and Germany) plus Italy. In each country there is a fairly smooth transition in returns across the quintile portfolios, with a differentiation in the return between the bottom and top quintile. The overall findings provide confirmation that the outperformance previously seen at the combined level was mainly due to stocks selection within the seven markets.

The stocks have very similar characteristics across the seven countries – with the cheap portfolios on average being composed of stocks that are relatively small and illiquid with poor recent market performance (ie 6-month price momentum). The performance of the book-to-market strategy for the seven countries where portfolios are formed on a market capitalisation basis are reported in Table 6.1.8. These results, which correct to a certain extent for the small-cap bias and, to a lesser extent, for the lower liquidity, indicate that performance remains strong in both the UK and France but has significantly eroded in Germany. In

Table 6.1.7 Equally weighted returns (per cent per month) for book-to-market portfolios (individual markets, January 1990 to June 2002)

Holding period	bm1	bm2	bm3	bm4	bm5	bm5 – bm1
Panel 1: German stocks sorted by book-to-market						
12 months	−0.376	0.019	0.198	0.213	0.28	0.656
	0.532	0.96	0.524	0.49	0.501	0.226
24 months	−0.59	0.07	0.313	0.357	0.421	1.011
	0.302	0.854	0.304	0.235	0.267	0.019
36 months	−0.508	0.134	0.382	0.461	0.481	0.989
	0.339	0.713	0.198	0.135	0.189	0.01
Panel 2: French stocks sorted by book-to-market						
12 months	0.867	1.124	1.25	1.315	2.716	1.849
	0.259	0.02	0.003	0.001	0	0.022
24 months	1.101	1.194	1.304	1.667	2.697	1.596
	0.131	0.014	0.003	0.001	0	0.019
36 months	1.279	1.369	1.486	2.04	2.76	1.482
	0.073	0.007	0.001	0.001	0	0.015
Panel 3: Italian stocks sorted by book-to-market						
12 months	0.808	1.003	0.945	1.903	1.733	0.925
	0.229	0.084	0.129	0.019	0.021	0.062
24 months	0.996	1.076	1.141	1.984	1.72	0.724
	0.137	0.09	0.084	0.009	0.022	0.065
36 months	1.241	1.368	1.473	2.198	1.939	0.698
	0.066	0.034	0.023	0.002	0.01	0.053
Panel 4: Netherlands stocks sorted by book-to-market						
12 months	0.987	1.073	1.079	1.074	1.538	0.551
	0.076	0.018	0.007	0.011	0.011	0.274
24 months	0.994	1.022	1.243	1.229	1.518	0.525
	0.088	0.039	0.004	0.004	0.011	0.253
36 months	1.048	1.3	1.401	1.325	1.778	0.73
	0.076	0.007	0.001	0.003	0.004	0.131
Panel 5: Spanish stocks by book-to-market						
12 months	1.105	1.406	1.623	1.511	1.532	0.428
	0.082	0.013	0.002	0.008	0.007	0.181
24 months	1.297	1.5	1.666	1.429	1.576	0.28
	0.049	0.01	0.003	0.013	0.009	0.383
36 months	1.748	1.836	2.054	1.746	2.244	0.496
	0.005	0	0	0.001	0.001	0.365

(*continued*)

Table 6.1.7 Continued

Holding period	bm1	bm2	bm3	bm4	bm5	bm5 – bm1
Panel 6: Swiss stocks by book-to-market						
12 months	0.99	0.967	0.945	1.187	1.199	0.209
	0.065	0.054	0.073	0.022	0.015	0.52
24 months	1.013	1.012	1.04	1.254	1.413	0.4
	0.068	0.052	0.057	0.029	0.005	0.177
36 months	1.136	1.177	1.164	1.417	1.537	0.402
	0.043	0.027	0.034	0.014	0.002	0.158
Panel 7: United Kingdom stocks by book-to-market						
12 months	0.674	0.842	0.995	1.081	2.3	1.626
	0.332	0.08	0.012	0.006	0.025	0.095
24 months	0.555	0.726	0.943	1.215	2.293	1.738
	0.431	0.136	0.024	0.009	0.021	0.057
36 months	0.579	0.745	0.947	1.258	2.481	1.902
	0.407	0.113	0.015	0.005	0.029	0.068

Table 6.1.8 Market-weighted returns (per cent per month) for book-to-market portfolios (individual markets, January 1990 to June 2002)

Holding period	bm1	bm2	bm3	bm4	bm5	bm5 – bm1
Panel 1: German stocks sorted by book-to-market						
12 months	0.381	0.741	0.821	0.952	0.735	0.354
	0.553	0.103	0.019	0.018	0.065	0.517
24 months	0.529	0.699	0.963	0.947	0.911	0.383
	0.416	0.122	0.012	0.018	0.026	0.466
36 months	0.805	0.891	1.103	1.141	1.066	0.262
	0.189	0.033	0.002	0.003	0.01	0.594
Panel 2: French stocks sorted by book-to-market						
12 months	1.074	1.194	1.113	1.063	1.745	0.671
	0.031	0.007	0.013	0.021	0.002	0.111
24 months	1.066	1.207	1.269	1.047	1.717	0.651
	0.043	0.013	0.003	0.038	0.002	0.081
36 months	1.051	1.383	1.34	1.313	1.854	0.804
	0.054	0.008	0.001	0.02	0.001	0.011
Panel 3: Italian stocks sorted by book-to-market						
12 months	0.993	1.641	1.318	1.193	1.192	0.198
	0.183	0.014	0.04	0.072	0.136	0.721
24 months	1.195	1.76	1.447	1.269	1.289	0.094
	0.098	0.017	0.033	0.067	0.123	0.858
36 months	1.426	1.888	1.719	1.551	1.647	0.221
	0.049	0.009	0.011	0.021	0.043	0.676

Table 6.1.8 Continued

Holding period	bm1	bm2	bm3	bm4	bm5	bm5 – bm1
Panel 4: Netherlands stocks sorted by book-to-market						
12 months	0.711	1.312	1.394	1.462	0.789	0.077
	0.315	0	0.001	0.003	0.215	0.9
24 months	0.943	1.262	1.382	1.438	0.874	−0.069
	0.16	0.001	0.001	0.002	0.148	0.894
36 months	0.942	1.456	1.521	1.446	1.256	0.314
	0.157	0	0.001	0.006	0.03	0.534
Panel 5: Spanish stocks by book-to-market						
12 months	0.936	1.432	1.607	1.697	1.769	0.833
	0.135	0.002	0.001	0.004	0.007	0.111
24 months	1.218	1.262	1.537	1.676	1.663	0.445
	0.063	0.012	0.002	0.003	0.014	0.388
36 months	1.588	1.511	1.706	1.885	1.879	0.291
	0.012	0.001	0	0	0.004	0.573
Panel 6: Swiss stocks by book-to-market						
12 months	0.962	1.407	1.393	1.542	1.418	0.456
	0.022	0	0.005	0.003	0.01	0.3
24 months	0.818	1.488	1.281	1.608	1.499	0.681
	0.065	0	0.007	0.007	0.009	0.126
36 months	0.797	1.463	1.269	1.709	1.48	0.683
	0.074	0.001	0.012	0.007	0.012	0.1
Panel 7: United Kingdom stocks by book-to-market						
12 months	0.711	0.768	0.874	0.972	1.405	0.694
	0.092	0.01	0.006	0.009	0.001	0.149
24 months	0.476	0.661	0.953	0.972	1.443	0.967
	0.293	0.041	0.004	0.011	0	0.037
36 months	0.446	0.491	0.955	0.898	1.403	0.957
	0.338	0.144	0.003	0.016	0	0.044

the smaller markets, the success of the value strategies has if anything strengthened in both Spain and Switzerland, but has been severely eroded in both Italy and the Netherlands with the portfolios being formed using market value weights.

In general, the previous favourable finding with respect to the performance of value investing across a combination of the major European market during our sample period transcends to the individual countries, although it suffers somewhat from the smaller sample size in some markets. There is a similar trend across the various markets with respect to the success rate at the individual stock level – 46 per cent of all cheap (top quintile) outperform their market over a 12-month holding period

in France, Switzerland and the UK, while this figure is slightly higher (47 per cent) in the other four markets, confirming at the country level that value strategies outperform despite the fact that the majority of cheap value stocks underperform.

Price momentum strategies across all markets

Momentum is the second form of investment strategy evaluated in this paper. In this sub-section the authors consider price momentum where stocks are ranked and portfolios formed on the basis of a stock's returns over a prior period. In this study 6-month and 12-month periods have been chosen as the prior periods, on the basis that they incorporate the range over which other authors have found strong continuation in market returns.

Table 6.1.9 shows the returns on the portfolios formed applying these two momentum criteria. Highlighting the immediacy of this strategy, the performance tends to be very good, realising sizable and significant added value over holding periods of 3 months or less. The 6-month strategy continues to maintain good performance for holding periods of up to 9 months, with the past winners (top quintile) outperforming the losers (bottom quintile) by in excess of 7 per cent over this holding period. In the case of the 12-month strategy, the optimum holding period is less than 6 months with the outperformance of past winners over past losers being around 4 per cent over a 6-month holding period. In both cases the short-term added value quickly reverses itself and becomes negative over periods beyond 24 months for the 6-month strategy and beyond 12 months for the 12-months strategy.

The characteristics of the price momentum portfolios are reported in Table 6.1.10. The typical winning (top quintile) portfolio is composed of stocks which are expensive, of above average size and very heavily traded. In contrast, the losing portfolio (bottom quintile) is composed of cheap stocks, which are relatively small and have been experiencing low turnover. As most of the potential added value is with the winning stocks, there seems little reason to be concerned with potential problems in implementing the strategy in terms of being able to acquire the desired stocks. The market weighted returns will, however, still be of interest, because other writers have found that correcting for any size bias actually increases the performance. These market-weighted returns, as reported in Table 6.1.11, indicate that the potential performance of a price momentum strategy is slightly lower in the case of market weighted portfolios (compared to equally weighted portfolios) over holding periods of up to 3 months but much greater for holding periods

Table 6.1.9 Equally weighted returns (per cent per month) across momentum portfolios created using 6- and 12-month price momentum (combined markets, January 1990 to June 2002)

Panel 1: Sorting by 6-month price momentum

Holding period	pmS1	pmS2	pmS3	pmS4	pmS5	pmS5 – pmS1
1 month	0.209	0.239	0.563	0.884	1.599	1.39
	0.754	0.542	0.077	0.005	0.002	0.014
3 months	0.317	0.319	0.698	0.896	1.509	1.192
	0.643	0.41	0.029	0.004	0.001	0.032
6 months	0.536	0.365	0.754	0.919	1.392	0.856
	0.472	0.326	0.014	0.001	0.001	0.162
9 months	0.743	0.677	0.952	1.097	1.503	0.761
	0.281	0.079	0.002	0	0	0.148
12 months	0.979	0.738	1.002	1.092	1.403	0.424
	0.171	0.044	0.001	0	0.001	0.441
24 months	1.325	0.962	1.064	1.024	1.105	−0.219
	0.059	0.011	0.001	0.001	0.012	0.655
36 months	1.571	1.077	1.168	1.034	1.044	−0.528
	0.022	0.003	0	0.001	0.014	0.244
48 months	1.285	0.854	0.922	0.835	0.817	−0.468
	0.061	0.018	0.006	0.01	0.056	0.298

Panel 2: Sorting by 12-month price momentum

Holding period	pmL1	pmL2	pmL3	pmL4	pmL5	pmL5 – pmL1
1 month	0.146	0.157	0.53	1.038	1.668	1.522
	0.82	0.676	0.088	0.001	0.001	0.003
3 months	0.387	0.292	0.608	0.99	1.547	1.16
	0.559	0.444	0.051	0.001	0.001	0.029
6 months	0.725	0.391	0.654	0.946	1.367	0.642
	0.323	0.281	0.026	0.001	0.002	0.302
9 months	1.182	0.678	0.863	1.051	1.363	0.181
	0.12	0.055	0.003	0	0.002	0.779
12 months	1.416	0.79	0.925	1.042	1.206	−0.21
	0.068	0.019	0.001	0	0.007	0.749
24 months	1.586	1.064	1.028	0.995	0.938	−0.647
	0.027	0.003	0.001	0.002	0.039	0.217
36 months	1.893	1.158	1.108	1.013	0.876	−1.017
	0.017	0.001	0	0.001	0.043	0.095
48 months	1.536	0.909	0.872	0.83	0.695	−0.84
	0.018	0.004	0.001	0.004	0.043	0.092

Table 6.1.10   Characteristics of price momentum portfolios (combined markets, January 1990 to June 2002)

6-months price momentum

Portfolio	Book-to-market	6-month price momentum (per cent per month)	Trading volume (proportion of total)	Size (decile rank)
pmS1	0.6174	−5.768	0.1696	3.9698
pmS2	0.4536	−1.3652	0.1253	5.3826
pmS3	0.4192	0.6272	0.1327	5.8993
pmS4	0.3742	2.6466	0.2235	6.2852
pmS5	0.3212	7.783	0.3489	5.9966

12-months price momentum

Portfolio	Book-to-market	6-month price momentum (per cent per month)	Trading volume (proportion of total)	Size (decile rank)
pmL1	0.7043	−3.9803	0.177	3.6544
pmL2	0.4865	−0.732	0.1092	5.2215
pmL3	0.4304	0.697	0.1292	5.9732
pmL4	0.3702	2.1305	0.2252	6.4396
pmL5	0.279	5.7852	0.3594	6.3624

beyond 3 months. For example the returns of the losing portfolio under a 6-month strategy for a 9-month holding period are now around 1.4 per cent, while that for the winning portfolio is around 12 per cent. Further, this 10 per cent differential is maintained beyond holding periods in excess of 12 months, which highlights that forming market weighted portfolios extends the productive life of a price momentum strategy. The authors would suggest that the findings largely support those of previous writers, that any attempt to control for size biases actually improves the performance of price momentum portfolios. Another point that can be noted from the findings is that the majority of the added value from the market weighted price momentum strategies comes from shorting the losing stocks.

In obtaining the results reported above, the authors simply pooled the stocks. Thus, the portfolio of winners (losers) will be overrepresented with stocks from those markets where the market returns were greatest (smallest). In order to control for any country bias the authors also ranked the stocks across all the markets on a country-corrected basis. The results for the country-corrected portfolios are reported in Table 6.1.12. Again the evidence is a little mixed, with the country-corrected

Table 6.1.11 Market-weighted returns (per cent per month) for price momentum
portfolios (combined markets, January 1990 to June 2002)

Panel 1: Sorting by 6-month price momentum

Holding period	pmS1	pmS2	pmS3	pmS4	pmS5	pmS5 – pmS1
1 month	0.436	0.734	0.895	0.825	0.952	0.517
	0.501	0.075	0.004	0.009	0.021	0.345
3 months	0.115	0.748	0.894	0.865	1.013	0.898
	0.86	0.058	0.002	0.004	0.008	0.083
6 months	−0.067	0.631	0.849	0.94	1.03	1.097
	0.914	0.1	0.003	0.001	0.004	0.025
9 months	0.154	0.754	1.005	1.102	1.259	1.106
	0.794	0.048	0	0	0.001	0.016
12 months	0.279	0.744	1.007	1.055	1.153	0.875
	0.626	0.049	0	0	0.002	0.043
24 months	0.601	0.847	1.003	0.981	0.944	0.343
	0.233	0.018	0.001	0.001	0.019	0.264
36 months	0.762	0.931	0.978	0.906	0.879	0.117
	0.086	0.005	0.001	0.003	0.029	0.578
48 months	0.655	0.779	0.842	0.787	0.764	0.109
	0.143	0.021	0.007	0.014	0.058	0.568

Panel 2: Sorting by 12-month price momentum

Holding period	pmL1	pmL2	pmL3	pmL4	pmL5	pmL5 – pmL1
1 month	0.159	0.514	0.875	0.894	1.029	0.87
	0.812	0.252	0.008	0.002	0.023	0.163
3 months	−0.043	0.512	0.795	0.917	1.053	1.096
	0.947	0.252	0.009	0.001	0.014	0.073
6 months	0.084	0.498	0.761	0.904	1.009	0.925
	0.893	0.248	0.011	0	0.014	0.114
9 months	0.472	0.801	0.949	1.042	1.098	0.626
	0.42	0.052	0.001	0	0.009	0.265
12 months	0.602	0.839	0.97	1.009	0.985	0.384
	0.273	0.032	0.001	0	0.023	0.464
24 months	0.852	0.916	1.033	0.98	0.825	−0.027
	0.064	0.011	0.001	0.001	0.066	0.94
36 months	0.989	1.011	1.015	0.924	0.779	−0.21
	0.016	0.003	0.001	0.002	0.073	0.441
48 months	0.846	0.844	0.83	0.821	0.684	−0.162
	0.041	0.014	0.008	0.008	0.112	0.508

Table 6.1.12 Market-weighted returns (per cent per month) for country-corrected price momentum portfolios (combined markets, January 1990 to June 2002)

Holding period	pmS1	pmS2	pmS3	pmS4	pmS5	pmS5 – pmS1
Panel 1: Sorting by 6-month country corrected price momentum						
1 month	0.176	0.837	0.721	1.004	0.97	0.794
	0.772	0.042	0.024	0.002	0.02	0.119
3 months	0.005	0.713	0.795	0.872	1.14	1.136
	0.994	0.065	0.007	0.003	0.004	0.018
6 months	−0.026	0.662	0.796	0.895	1.112	1.137
	0.964	0.077	0.004	0.001	0.002	0.01
9 months	0.198	0.773	0.961	1.079	1.314	1.115
	0.715	0.034	0.001	0	0	0.01
12 months	0.318	0.759	0.986	1.062	1.169	0.85
	0.548	0.037	0	0	0.002	0.032
24 months	0.667	0.862	0.982	0.991	0.938	0.272
	0.154	0.014	0.001	0.001	0.017	0.283
36 months	0.821	0.897	0.962	0.94	0.866	0.045
	0.046	0.007	0.001	0.002	0.028	0.786
48 months	0.71	0.75	0.825	0.801	0.749	0.04
	0.09	0.025	0.009	0.011	0.056	0.782
Panel 2: Sorting by 12-month country-corrected price momentum						
1 month	0.087	0.393	0.821	0.815	1.229	1.143
	0.892	0.394	0.005	0.006	0.005	0.073
3 months	−0.141	0.416	0.764	0.828	1.26	1.401
	0.825	0.325	0.006	0.003	0.002	0.026
6 months	0.076	0.423	0.753	0.86	1.116	1.04
	0.899	0.302	0.006	0.001	0.005	0.068
9 months	0.492	0.701	0.958	1.019	1.166	0.674
	0.38	0.08	0.001	0	0.004	0.213
12 months	0.601	0.776	0.982	0.986	1.044	0.443
	0.251	0.043	0	0	0.012	0.372
24 months	0.863	0.912	1.028	0.943	0.852	−0.01
	0.049	0.01	0	0.002	0.045	0.974
36 months	0.986	0.972	0.998	0.925	0.788	−0.198
	0.012	0.003	0	0.002	0.057	0.398
48 months	0.863	0.822	0.815	0.791	0.706	−0.157
	0.03	0.015	0.007	0.012	0.088	0.458

portfolios performing slightly better over holding periods of up to 3 months but slightly worse over longer holding periods. The authors' general finding is that removing the country bias has little effect on the performance of the price momentum portfolios, however, suggesting that all the added value is coming from stock selection rather than as a consequence of introducing any country bias.

Price momentum strategies across each European market

The next step in the analysis is to examine the performance of the price momentum strategies on a country-by-country basis. Table 6.1.13 shows the performance of the 6-month strategy over several holding periods based on market weighting the stocks within the portfolios. Consistent with the findings for the combined markets, a combination of 6-month momentum with a 9-month holding period performs very well in all but the French and Spanish markets. In the other five markets, a long-short portfolio of winners and losers would have returned upwards of 9 per cent over a 9-month holding period, but even in the French and Spanish markets there exists some added value potential and a smooth gradation in returns across the quintile portfolios. Indeed, the strength

Table 6.1.13 Market-weighted returns (per cent per month) for 6-month price momentum portfolios (individual markets, January 1990 to June 2002)

Holding period	pmS1	pmS2	pmS3	pmS4	pmS5	pmS5 – pmS1
Panel 1: German stocks sorted by price momentum						
6 months	−0.793	0.26	0.502	0.601	0.819	1.612
	0.272	0.533	0.122	0.022	0.036	0.004
9 months	−0.606	0.435	0.669	0.831	1.028	1.633
	0.371	0.291	0.038	0.001	0.011	0.001
12 months	−0.571	0.47	0.706	0.82	0.913	1.484
	0.392	0.243	0.03	0.002	0.023	0.002
Panel 2: French stocks sorted by price momentum						
6 months	0.566	0.615	0.888	1	0.928	0.363
	0.304	0.133	0.014	0.002	0.022	0.389
9 months	0.851	0.796	1.083	1.188	1.117	0.266
	0.115	0.044	0.001	0	0.007	0.486
12 months	0.899	0.911	1.116	1.149	1.142	0.243
	0.1	0.023	0.001	0	0.007	0.523
Panel 3: Italian stocks sorted by price momentum						
6 months	0.434	0.665	0.8	0.779	1.159	0.724
	0.534	0.261	0.163	0.151	0.101	0.183
9 months	0.616	0.863	1.023	1.081	1.382	0.765
	0.347	0.135	0.081	0.046	0.052	0.119
12 months	0.722	0.995	1.076	1.237	1.368	0.645
	0.259	0.084	0.061	0.027	0.056	0.167

(*continued*)

Table 6.1.13   Continued

Holding period	pmS1	pmS2	pmS3	pmS4	pmS5	pmS5 – pmS1
Panel 4: Netherlands stocks sorted by price momentum						
6 months	0.376	0.695	1.369	1.165	1.186	0.81
	0.568	0.077	0	0	0.006	0.164
9 months	0.447	0.863	1.468	1.364	1.299	0.852
	0.511	0.027	0	0	0.003	0.159
12 months	0.432	0.951	1.46	1.338	1.27	0.838
	0.517	0.012	0	0	0.005	0.158
Panel 5: Spanish stocks by price momentum						
6 months	0.447	0.546	0.773	0.711	0.716	0.269
	0.526	0.324	0.136	0.112	0.152	0.598
9 months	0.794	0.828	0.975	1.168	1.08	0.286
	0.215	0.109	0.039	0.005	0.027	0.522
12 months	0.885	0.893	1.105	1.178	1.073	0.189
	0.146	0.073	0.016	0.004	0.025	0.651
Panel 6: Swiss stocks by price momentum						
6 months	0.757	0.646	0.802	1.302	1.475	0.718
	0.102	0.123	0.031	0.001	0.002	0.135
9 months	0.759	0.765	1.128	1.454	1.617	0.858
	0.097	0.072	0.002	0	0.001	0.053
12 months	0.858	0.836	1.132	1.445	1.477	0.619
	0.051	0.043	0.002	0	0.001	0.112
Panel 7: United Kingdom stocks by price momentum						
6 months	−0.393	0.503	0.794	0.859	1.142	1.535
	0.583	0.245	0.009	0.005	0.001	0.015
9 months	−0.15	0.538	0.856	0.997	1.313	1.462
	0.821	0.208	0.003	0.001	0	0.011
12 months	−0.135	0.467	0.79	0.903	1.141	1.277
	0.835	0.281	0.007	0.002	0.002	0.022

of the finding across the individual markets is consistent with the previous evidence, which confirms that the added value from price momentum is largely attributable to the performance of price momentum within the individual markets.

Earnings momentum strategies across all markets

The authors' two measures of earnings momentum are based upon analysts forecasts: the first being based on the volume of analysts changing

their forecast about a firm's earnings in a particular direction (agreement) over a 2-month period and the second based on the magnitude of the change in the average forecast by the analysts (forecast revision) over a 2-month period. Table 6.1.14 shows the returns from both of these strategies where the portfolios are formed on an equally weighted basis.

Table 6.1.14 Equally weighted returns (per cent per month) for earnings momentum portfolios (combined markets, January 1990 to June 2002)

Panel 1: Sorting by Agreement

Holding period	agree1	agree2	agree3	agree4	agree5	agree5 – agree1
1 month	−0.168	0.383	0.521	0.992	1.302	1.471
	0.708	0.372	0.242	0.014	0.001	0
3 months	0.007	0.483	0.402	1.032	1.164	1.157
	0.987	0.24	0.349	0.011	0.003	0
6 months	0.151	0.539	0.481	0.915	1.032	0.881
	0.724	0.17	0.264	0.018	0.005	0
9 months	0.437	0.757	0.829	1.086	1.148	0.711
	0.295	0.045	0.112	0.004	0.002	0
12 months	0.53	0.784	0.971	1.08	1.136	0.606
	0.197	0.036	0.108	0.004	0.002	0
24 months	0.658	0.853	1.018	0.953	1.027	0.368
	0.123	0.027	0.07	0.014	0.006	0
36 months	0.773	0.927	0.955	1.033	0.986	0.213
	0.051	0.013	0.048	0.005	0.007	0.004
48 months	0.538	0.706	0.665	0.802	0.754	0.216
	0.172	0.052	0.15	0.029	0.041	0.001

Panel 2: Sorting by Forecast Revision

Holding period	fcr1	fcr2	fcr3	fcr4	fcr5	fcr5 – fcr1
1 month	0.13	0.434	0.801	1.046	0.642	0.512
	0.793	0.25	0.027	0.004	0.137	0
3 months	0.226	0.532	0.794	0.945	0.643	0.416
	0.626	0.149	0.024	0.01	0.144	0
6 months	0.271	0.563	0.773	0.9	0.731	0.46
	0.547	0.11	0.024	0.008	0.099	0
9 months	0.617	0.768	1.008	1.072	0.937	0.32
	0.177	0.025	0.004	0.001	0.038	0.001
12 months	0.656	0.801	1.1	1.068	0.983	0.327
	0.139	0.018	0.005	0.001	0.032	0.011
24 months	0.755	0.848	1.007	0.983	0.945	0.19
	0.09	0.019	0.008	0.005	0.041	0.152
36 months	0.857	0.916	0.981	0.986	0.959	0.102
	0.037	0.009	0.006	0.004	0.024	0.313
48 months	0.615	0.666	0.74	0.764	0.719	0.103
	0.123	0.054	0.04	0.028	0.086	0.213

The results for the portfolios formed using agreement (agree) as the criterion proved to be particularly strong, especially for periods of up to 12 months. There is a smooth transition in the returns realised across the quintile portfolios with the difference in the performance between the low and high momentum portfolios being 7.5 per cent per annum and highly significant. The performance of the portfolios based on the magnitude of the forecast revisions (fcr) are much weaker and less consistent across the quintile portfolios although they still give rise to an outperformance of 4 per cent per annum over a 12-month holding period.

Again, the authors tracked the characteristics of the portfolios formed on the two criteria (see Table 6.1.15). In the case of agreement, the stocks that most analysts have been revising upwards prove to be slightly above average in terms of both size and valuation (as measured by book-to-market) with good recent market performance on fairly average volume. The characteristics of the favoured portfolio by forecast revisions are similar but slightly less extreme than those for agreement. Given that the authors found that the size bias in the case of price momentum actually was detrimental to overall performance, they also

Table 6.1.15   Characteristics of earnings momentum portfolios (combined markets, January 1990 to June 2002)

Agreement

Portfolio	Book-to-market	6-month price momentum (per cent per month)	Trading volume (proportion of total)	Size (decile rank)
agree1	0.4635	−0.9404	0.2723	4.9732
agree2	0.3785	0.2401	0.2075	6.7416
agree3	0.3954	0.6218	0.0957	4.2886
agree4	0.409	1.2033	0.1935	4.8893
agree5	0.3216	2.3806	0.231	6.3658

Forecasts revisions

Portfolio	Book-to-market	6-month price momentum (per cent per month)	Trading volume (proportion of total)	Size (decile rank)
mag1	0.4464	−0.3386	0.2507	5.3893
mag2	0.3917	0.3154	0.1283	5.6376
mag3	0.3996	0.8682	0.168	4.9027
mag4	0.3592	1.4107	0.1524	5.6779
mag5	0.3791	1.3008	0.3006	5.7483

investigated the impact on the earnings momentum findings of forming portfolios using market weights. The results are reported in Table 6.1.16. In contrast to the findings for the price momentum portfolios, the separation in the returns for the earnings momentum portfolios are lower where the portfolios are market-weighted, rather than equally

Table 6.1.16 Market-weighted returns (per cent per month) for earnings momentum portfolios (combined markets, January 1990 to June 2002)

Panel 1: Sorting by Agreement

Holding period	agree1	agree2	agree3	agree4	agree5	agree5 – agree1
1 month	0.345	0.611	0.813	1.047	1.202	0.858
	0.41	0.063	0.05	0.002	0	0.004
3 months	0.418	0.717	0.519	0.989	1.098	0.68
	0.288	0.027	0.133	0.004	0	0.012
6 months	0.483	0.739	0.516	0.87	0.981	0.498
	0.209	0.019	0.128	0.005	0.001	0.045
9 months	0.684	0.931	0.664	1.03	1.13	0.446
	0.063	0.004	0.059	0.001	0	0.036
12 months	0.655	0.93	0.574	1.025	1.116	0.461
	0.069	0.004	0.124	0.001	0	0.017
24 months	0.672	0.886	0.583	0.944	1.062	0.39
	0.072	0.01	0.134	0.004	0.001	0.005
36 months	0.692	0.872	0.553	0.907	0.966	0.275
	0.058	0.01	0.138	0.005	0.002	0.013
48 months	0.588	0.75	0.458	0.793	0.823	0.234
	0.109	0.03	0.222	0.02	0.013	0.005

Panel 2: Sorting by Forecast Revision

Holding period	fcr1	fcr2	fcr3	fcr4	fcr5	fcr5 – fcr1
1 month	0.724	0.609	1	1.073	0.808	0.083
	0.068	0.08	0.003	0.001	0.011	0.656
3 months	0.712	0.735	0.862	0.928	0.785	0.073
	0.031	0.027	0.004	0.003	0.021	0.484
6 months	0.693	0.748	0.826	0.898	0.797	0.104
	0.04	0.02	0.004	0.002	0.015	0.094
9 months	0.906	0.938	1.011	1.067	0.957	0.051
	0.006	0.003	0	0	0.003	0.322
12 months	0.858	0.953	0.96	1.039	0.94	0.082
	0.011	0.003	0.001	0	0.003	0.065
24 months	0.86	0.911	0.901	0.983	0.897	0.037
	0.015	0.009	0.003	0.001	0.008	0.327
36 months	0.841	0.884	0.85	0.921	0.861	0.02
	0.016	0.011	0.005	0.003	0.01	0.52
48 months	0.717	0.752	0.749	0.779	0.746	0.029
	0.043	0.036	0.02	0.018	0.03	0.262

weighted. In the case of the agreement portfolios, the added value remains significant but is reduced from 7.5 per cent per annum to 5.7 per cent per annum over a 12-month holding period. In the case of the forecast revision portfolios, however, any potential added value almost entirely disappears.[5] It would appear that the volume of analysts revising their forecasts is much more related to future price movements than is the magnitude of their average revision.

As with the other criteria, when applied across all the countries, it could be that some of the added value is coming from biasing the portfolios towards particular markets rather than from stock selection. In order to evaluate this possibility, the authors also ranked stocks and formed portfolios on a country-corrected basis. Although not reported here, the returns on these portfolios were almost identical to those reported in Table 6.1.14 (equally weighted) and Table 6.1.16 (market weighted), which suggests that almost all the added value was coming from stock selection across the various markets.

Earnings momentum strategies across each European market

The authors evaluated the performance of earnings momentum as measured by agreement at the individual country level, the findings are reported in Table 6.1.17. The markets in which agreement would seem to have worked best as the criterion for forming portfolios are France, Spain, Switzerland and the UK. A long-short portfolio across each of these four markets returns between 6 per cent per annum and 8 per cent per annum over a 12-month holding period, which would appear to be optimum for investment strategies based upon agreement. In the case of the other three markets, an earnings momentum strategy based on agreement would appear to hold out some potential worthy of further consideration, especially when one considers the option of combining an earnings momentum strategy with some other strategy.

Summary and concluding comments

The objective of this paper has been to undertake a thorough evaluation of the performance of value and momentum investment across the major European markets over the period from January 1990 to June 2002, a major motivation being to extend our knowledge of the performance of such strategies across a widening range of markets and over different time periods. Such knowledge enables one to obtain a better

Table 6.1.17 Market-weighted returns (per cent per month) for earnings momentum portfolios (agree) (individual markets, January 1990 to June 2002)

Holding period	agree1	agree2	agree3	agree4	agree5	agree5 – agree1
Panel 1: German stocks sorted by Agreement						
6 months	0.254	0.645	0.084	0.086	0.843	0.59
	0.675	0.139	0.811	0.861	0.064	0.062
12 months	0.555	0.857	0.212	0.115	0.863	0.308
	0.314	0.041	0.554	0.823	0.066	0.254
24 months	0.696	0.903	0.396	0.298	0.803	0.107
	0.19	0.033	0.245	0.573	0.108	0.666
Panel 2: French stocks sorted by agreement						
6 months	0.516	0.811	0.733	1.108	1.297	0.78
	0.368	0.079	0.114	0.016	0.003	0.019
12 months	0.859	1.067	1.078	1.204	1.446	0.586
	0.122	0.024	0.015	0.01	0.001	0.048
24 months	1.034	0.977	1.03	1.112	1.342	0.308
	0.07	0.057	0.021	0.022	0.003	0.159
Panel 3: Italian stocks sorted by agreement						
6 months	0.83	1.064	0.84	1.355	1.192	0.361
	0.176	0.039	0.023	0.011	0.004	0.437
12 months	1.177	1.185	1.036	1.257	1.347	0.17
	0.05	0.027	0.005	0.01	0.002	0.679
24 months	1.116	1.174	1.099	1.131	1.396	0.281
	0.055	0.024	0.01	0.04	0.002	0.315
Panel 4: Netherlands stocks sorted by agreement						
6 months	0.83	1.064	0.84	1.355	1.192	0.361
	0.176	0.039	0.023	0.011	0.004	0.437
12 months	1.177	1.185	1.036	1.257	1.347	0.17
	0.05	0.027	0.005	0.01	0.002	0.679
24 months	1.116	1.174	1.099	1.131	1.396	0.281
	0.055	0.024	0.01	0.04	0.002	0.315
Panel 5: Spanish stocks by agreement						
6 months	0.562	0.925	1.304	1.114	1.265	0.703
	0.403	0.074	0.03	0.055	0.02	0.041
12 months	0.938	1.483	1.413	1.614	1.551	0.613
	0.106	0.004	0.01	0.004	0.004	0.018
24 months	1.243	1.462	1.44	1.525	1.624	0.381
	0.048	0.008	0.013	0.007	0.006	0.097

Table 6.1.17 Continued

Holding period	agree1	agree2	agree3	agree4	agree5	agree5 – agree1
Panel 6: Swiss stocks by agreement						
6 months	0.45	0.65	0.8	0.896	1.289	0.839
	0.398	0.2	0.103	0.108	0.024	0
12 months	0.864	0.953	0.976	1.095	1.335	0.47
	0.116	0.071	0.056	0.046	0.019	0.003
24 months	1.132	1.044	1.078	1.201	1.189	0.057
	0.053	0.062	0.044	0.034	0.041	0.634
Panel 7: United Kingdom stocks by agreement						
6 months	0.427	0.62	0.72	0.658	0.868	0.441
	0.258	0.05	0.077	0.048	0.005	0.056
12 months	0.498	0.726	0.635	0.901	1.011	0.513
	0.16	0.025	0.154	0.003	0.001	0.006
24 months	0.441	0.678	0.494	0.821	0.898	0.457
	0.249	0.055	0.294	0.011	0.004	0.002

understanding of market behaviour and potential anomalies that can in turn give rise to superior investment management strategies.

The authors' general finding is that value and momentum strategies would have performed well over the period studied both if applied across the combination of all markets evaluated and, in most instances, at the individual market level. Of the various criteria used to form value portfolios, both book-to-market and sales-to-price performed well and generated added value when applied over holding periods of up to 36 months. The stocks favoured had a small capitalisation bias which, when controlled, resulted in a reduction in, but far from complete erosion of, the added value associated with these implementations of a value strategy. The momentum strategies also meet with a high level of success, although this was confined to much shorter holding periods. Again there was a small-cap bias in the well performing momentum portfolios, with attempts to control for this bias resulting in even greater added value in the case of price momentum, although it did erode, but far from completely remove, the added value from the earnings momentum portfolios.

Of course most studies raise more questions than they can answer. In the case of this paper, one obvious question stems from the fact that the authors have limited their evaluation of value and momentum to

only ranking stocks and forming portfolios based on a single criterion. A number of writers have found that using multiple criteria to form portfolios can result in even better performance. An obvious extension, then, is to evaluate portfolios composed on multiple criteria (eg two value criteria or a value criterion with a momentum criterion).

A second challenge is to determine how best to tackle the dilemma of all value investors – the fact that the majority of stocks in which they invest underperform the market. This suggests that the combination of some quality measure with the value criteria has the potential of improving the hit rate from value investing which would translate into a significant increase in added value. Finally, there is the complex issue as to why value and momentum strategies continue to add value, especially as they are well known and easy to implement. As suggested earlier, the success of value strategies is possibly easier to understand as it may just be a premium to compensate for the discomfort associated with holding value stocks. Momentum is a bit more difficult to understand as it seems just another outworking of the market under-reacting to new information, which is one aspect of market behaviour for which the authors are still seeking an explanation.

Acknowledgments

Notes

1. These returns are based upon the S&P Europe 350 index measured in British pounds.
2. The first comprehensive work undertaken in this area was by Bachelier (1900).
3. The forecast at each point in time is calculated for a constant 12-month period. For example, if it is 6 months from the end of the next financial year, the 12-month forecast is calculated as one-half the one-year forecast and one-half the two-year forecast.
4. When forming portfolios within one country, the returns on the portfolio are calculated in local currency. Where the portfolios are formed across all seven countries, the returns are all calculated in British pounds.
5. Although not reported here, the findings for the market-weighted size-adjusted portfolios are almost identical as those for the market-weighted portfolios.

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