Sentiment and Financial Health Indicators for Value and Growth Stocks: The European Experience

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Abstract: Although it is well documented that value stocks outperform growth stocks over a market cycle, it is now recognised that the majority of value (and growth) stocks underperform the market over holding periods of 12 months and beyond. This reflects that traditional valuation metrics might tell us whether a stock is potentially cheap or expensive but little about when or if it will experience a market correction. Two indicators have come to the fore in recent years that provide useful insights in a number of contexts as to the likely performance of stocks: sentiment/momentum and accounting fundamentals/financial health. We examine the impact of both of these indicators, both in isolation and combination, on value and growth stocks and find that (i) the are effective in introducing a timing element into the selection of both value and growth stocks, (ii) the sentiment indicator completely dominates the financial health indicator when trying to identify the better value stocks, and (iii) both indictors contribute to the identification of the good and bad growth stocks. The size of the investment profits that potentially can be generated using the two indicators in combination with value and growth stocks questions of the efficiency of the European equity markets. We conclude that our findings are consistent with the pricing cycle for a stock proposed by Lee and Swaminathan (2000) and the under- and over-reaction in pricing inherent in models proposed by Barberis et al (1998) and Hong and Stein (1999).

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Although there is ample evidence that portfolios composed of value stocks outperform diversified stock indices and the existence of a value premium, recent evidence has highlighted both that the majority of individual stocks in these portfolios underperform and the extent to which one has to be patient to extract added value from these portfolios. The other side of the value premium is the underperforming growth portfolios which is at least partially attributable to the fact that typically even a higher percentage of stocks included in these portfolios underperform the market than is the case for value stocks[1]. The focus of this paper is on evaluating, within a European setting, two approaches for enhancing the performance of both value and growth investment strategies. We believe that the evidence that we present will only have implications for market efficiency but also provide useful insights into the process by which equities are priced.

One of the problems with so-called value stocks is that they can remain "cheap" for an extended period of time and so the valuation metrics used to identify value stocks often would lead one to invest in these stocks much too early. A particular method we employ to address this problem is to refrain from investing in a value stock until the market sentiment has significantly improved. A second problem with value stocks is that there relatively low valuation can be a reflection of their parlous financial health about which the simple valuation metrics used to identify value tells us nothing. The way we address this problem is to calculate a financial strength score for each stock on the presumption that stocks that are cheap but have poor financial prospects should be avoided as they have a low probability of experiencing a market recovery. Finally we look at the combined impact of the application of both a sentiment and financial health indicator for identifying which are the better value stocks and, in particular, to determine the extent to which these two indicators are additive..

The problem with growth stocks is that by definition they are relatively expensive and so any loss of confidence in the market is likely to lead to a significant price correction. Skinner and Sloan (2001) and Kim (2002) have demonstrated the "torpedo" effect on a firm's stock price of failing to meet the market's earnings expectations, especially for those stocks that have a relatively long history of either meeting or beating these expectations. However, it is also true that there are a number (albeit a minority) of growth stocks that continue to beat the optimistic

[1] We acknowledge that the definition for growth stocks that we and others use is better described as "non-value" as it refers to stocks with high values for ratios such as price-to-earnings, market-to book and price-to-sales

growth expectations as reflected in their high valuations. Therefore, the possibility remains to construct a portfolio composed of these better performing[2]. We propose that the same sentiment and financial strength indicators that we use to identify "good" value stocks can also be used to identify the "good" growth stocks and so we will extend our analysis to examine their impact on the performance growth stocks.

The structure that we follow in this paper is to provide a synopsis of the background literature in Section I. We proceed in Section II to outline our data and the research method that we employ. We set out and discuss our findings in Section III and provide a summary of our findings in Section IV.

Section 1: Background literature

The genesis of value investing dates back over 70 years to the publication of the text *Security Analysis* authored by Graham and Dodd (1934). Although this text and the teaching of its authors soon became the inspiration for some of the most famous investors of all time (e.g. Warren Buffett, John Templeton, and Jeremy Grantham), the bulk of the interest from the academic community has been restricted to the last 15 years (Fama and French, 1992, Lakonishok et al, 1994)[3]. The existence of a value premium is now well accepted with attention more recently being directed to explaining what gives rise to this phenomenon[4].

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 Capital Asset Pricing Model. 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 these first two proposals attempt to reconcile the empirical evidence with the Efficient Markets Hypothesis, a third 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 process of valuing firms. There is no evidence of imminent closure of this debate as to the explanation for the value premium and it is not the primary focus of this paper. However, the insights that our study provides as to the price behaviour of a stock over its life cycle is likely to be more consistent with judgmental mistakes by investors providing the best explanation.

[2] One important distinction between value and growth stocks is that the some value stocks will disappear rather than experience a market recovery whereas all growth stocks will eventually experience a downturn.
[3] The most obvious exception being Basu (1977) who provided evidence to support that stocks with low-price-to-earnings outperform while those with high price-to-earnings underperform.
[4] See Fama and French (1992, 1995, 1998)), Capaul et al. (1993), Lakonishok et al (1994), Chan and Lakonishok (2004). Bird and Casavecchia (2005a).

All the analysis of value strategies were initially conducted at the portfolio level and it has only been in more recent years that we have been made aware of the fact that the typical value stocks actually underperform the market over all reasonable holding periods. Piotroski (2000) found that less than 43% of US stocks outperformed the index over a 12 month holding period while Bird and Casavecchia (2005a) found the equivalent figure for European stocks to be 42%. Findings such as these highlighted a major deficiency in the normal valuation metrics such as earnings-to-price, book-to-market and sales-to-price used to identify value stocks. Although these valuation multiples might provide a logical basis for identifying stocks that are candidates for a reversion in recent poor market performance, they tell us little or nothing about when this reversion is likely to occur, if indeed at all. A similar problem also applies with growth stocks where high valuation multiples might reflect that the market has high expectation with respect to their future performance but does not deny the possibility that many stocks will actually live up to these expectations.

In order to address the problem associated with investing in value stocks, one would like to delay the acquisition of an apparent cheap stock until closer to the time when it will enjoy a reversion in its performance. Therefore, one obvious way of enhancing a value investment strategy is to overlay the value stocks with screens aimed at delaying the purchase of value stocks until they are near their turning point. Recent studies suggest two indicators that might be used to introduce such a timing element into forming value portfolios:

- Bird and Whitaker (2004) demonstrated that the added value attributable to each of value and momentum investing are basically uncorrelated so the use of these two techniques in combination leads to improved investment performance. Bird and Casavecchia (2005) provided an explanation for this by indicating how value and momentum signals could be used in combination to better pinpoint where a stock is situated in its pricing life cycle. In particular they demonstrated that a pickup in momentum for a value stock provides a good early warning sign of a sustained improvement in the stock's fundamental and market performance. Of course, strong sentiment as reflected by high price momentum is synonymous with a growth stock and so any fall off in sentiment may well reflect that the stock is at, or more probably beyond, the peak of its pricing life cycle.
- Piotroski (2000, 2005) demonstrated that a solid improvement in a firm's financial situation as indicated by a score derived from several financial ratios provides an indication of those stocks that were must likely to enjoy an imminent recovery. Scott at

al (2003) provided evidence to suggest that such a market turnaround is typically a response to a turnaround in its earnings news. Both Piotroski and Scott et al found that the market is slow to react to the information in accounting earnings and other accounting numbers which explains why this publicly available information might be useful for providing additional insights as to the likely medium-term performance of value stocks. We have already stressed that meeting the market's expectations particularly with respect to earnings is critical for a growth stocks. Hence it is not surprising that Mohanram (2005) found that similar fundamental variables to those used by Piotroski (2000) could be used to differentiate between "good" and "bad" growth. Indeed, we would suggest that the state of a company's financial health of a company will prove to more important for growth stocks than value stocks as there are only low expectations regarding financial health of value stocks and the reaction to any improvement in their financial health is slow.

The overriding focus of this study is to evaluate these two approaches to enhancing value portfolios in the context of the European markets from 1989 to 2004. We first consider the enhancement potential of each of these means independently and report of the improved performance at first the portfolio and then the individual stock level. We then examine how a combination of momentum and accounting fundamentals impact on the performance of value portfolios and value stocks with a special interest in determining whether they are additive or offsetting.

Section 2: Data and Method

The Data

The original sample consists of almost 8000 firms from fifteen European countries: France, Italy, The Netherlands, Germany, Spain, United Kingdom, Belgium, Portugal, Ireland, Austria, Greece, Norway, Sweden, Denmark, and Finland. The analysis was conducted over more than fifteen years, from 1989 to 2004. We obtained the accounting data from the Worldscope database and the return data from GMO UK[5]. In order to avoid any exchange rate effects, all of the data are expressed in local currencies. Consistent with previous studies, we excluded from our sample all stocks belonging to the financial sector, and those with a negative book value or priced at less than one pound (or the equivalent in other currencies) a procedure that also

[5] The authors would like to thank GMO UK for providing all the necessary data on European stocks.

permits to reduce possible problems related to the inclusion in our portfolios of small and illiquid stocks). We end up with approximately 1,650 stocks in our sample each year.

The Methodology

We have used sales-to-price as the valuation metric throughout this study to differentiate between value and growth stocks as we have previously found that it provides the best separation for European stocks[6]. We rank the stocks at the end of August each year based on these valuation metrics and use these rankings to form equally-weighted portfolios whose performance we then measure over holding periods from one month to 36 months[7]. In most cases the returns reported for these portfolios are excess returns where the benchmark is the return on an equally weighted portfolio of all the stocks included in our sample each month. .

We then examine the impact of applying a sentiment screen to both the value and growth stocks. We use price momentum measured over the previous six months as our measure of market sentiment as we have previously found that this simple measure provides a good basis for separating out the good and bad value stocks. Our sample of stocks are ranked on the basis of their six-month price momentum each month and then the top 40%, and bottom 40%, by these rankings are used to further separate our value and growth stocks into "good" and "bad". We then calculate the excess returns for these good and bad value and growth portfolios over holding periods extending from one to 36 months.,

We also develop a financial health indicator and then test the ability of this indicator to distinguish between the better- and worse-performing value and growth stocks. The starting point in developing this indicator was to choose 24 accounting variables which have previously been found to be useful in distinguishing between stocks on the basis of their future market performance[8]. Each year we build a model based on these 24 accounting variables to predict the probability that the reported earnings per share (EPS) for the next financial year will be greater the current year's EPS. We then use this probability as the measure of each stock's financial strength.

The two steps in arriving at this score are set out below[9]:

1. *Principal component analysis* (hereafter PCA)*;*
2. *Construct a Probit regression model to provide the financial strength score*

[6] We also obtained very similar findings when we conducted the analysis using book-to-market.
[7] We from portfolios in August to allow sufficient time for the accounting information that we use in our analysis to be publicly released.
[8] These variables are set out in Table 1 in Appendix A.
[9] The various steps in the analysis and the financial ratios used in the analysis are discussed in more detail in Appendix A.

After constructing the financial ratios, we first applied the PCA to the previous year fundamental variables in order to construct a number of composite variables that best explain the variation in EPS across firms during this period. These composite variables were then used as the explanatory variables in a model designed to forecast the probability of a particular stock increasing its EPS in the subsequent year. Finally, these forecasted probabilities provided our measure of the stock's financial health and are used to assign stocks to quintiles with *Pr1* being those stocks with the lowest indicated financial health and *Pr5* being those stocks with the highest indicated financial health. We examined the impact of splitting the value and growth stocks up in accordance with their financial health rankings in order to judge their efficacy over various holding periods.

Finally we considered the ability of the combined use of our market sentiment and our financial strength indicators to distinguish between the good and bad value and growth stocks. We first identified the value and growth stocks and then separated then out using both indicators and examined the performance of the resulting portfolios over various holding periods. On one hand, it might be expected that the two indicators would be picking up the same phenomenon as earnings is the major influence on momentum. However, there is a timing difference in the two indicators that we use in that price momentum relates to the past while the financial health indicator although based on currently available accounting data relates to a future event (i.e. the next reported earnings announcement. This timing difference suggests that both might have an influence even thought they maybe closely related.

Section 3: The Results

The first step in our analysis was to rank the universe of stocks at the end of August each year based on their sales-to-price ratio and then to split the stocks into quintiles to form five equally weighted portfolios which were then held over a range of holding periods extending from one month to 36 months. We calculate the average excess return over each of these holding periods against our benchmark portfolio which is an equally weighted portfolio of all of the stocks in our universe. In Table 1 we report these excess returns on both the value and the growth portfolios held over three, six, 12, 24 and 36 months.

The results for the average excess returns and the p values for these returns as presented in Table 1 confirm the findings from previous studies that value portfolios clearly outperform

growth portfolios[10]. However they also highlight that there can be a substantial waiting before any outperformance is realised and significantly longer periods before the value premium becomes relatively large. Our results also confirm previous findings that the outperformance of value over growth extends least three years.

Table 1

Excess Returns for Value and Growth Portfolios

Each August from 1991 to 2003, all available stocks are sorted based on their Sales-to-Price with those in the top 20% being assigned to the value portfolio and those in the bottom 20% being assigned to the growth portfolio. The accumulated excess returns attributable to these equally-weighted portfolios are calculated over several holding periods extending from three months to 36 months. The average of these accumulated excess returns is reported in this Table. We also report the Newey-West p-value corrected for the *autocorrelation* and *heteroskedasticity* to test the significance of the reported excess returns.

Holding period	3 months	6 months	12 months	24 months	36 months
Value	-0.4% (0.08)	0.1% (0.06)	2.1% (0.10)	7.9% (0.00)	14.2% (0.01)
Growth	1.2% (0.13)	0.9% (0.06)	-0.7% (0.00)	-7.1% (0.05)	-12.0% (0.04)
V - G	-1.7% (0.07)	-0.8% (0.06)	2.8% (0.03)	15.1% (0.00)	26.2% (0.13)

In order to further evaluate the performance of the value and growth portfolios, we next turned to consider the behaviour of the individual stocks included in these portfolios. Consistent with the findings of previous studies mentioned earlier, we found that only 44% of value stocks outperformed the market over a 12 month holding period. The equivalent figure for growth stocks was slightly less at 43%. These relatively low percentages are consistent with one having to be patient in order to realise any significant outperformance from value portfolios (Rousseau and van Rensburg, 2004), and to have excellent stock picking skills in order to realise outperformance from pursuing a growth strategy. The percentages also serve as a warning that the valuation metrics used to identify the value stocks provides little insight into when, or indeed if, a value stock will enjoy a pickup in their performance. In other words, these metrics only provide very noisy insights into what stocks are indeed underpriced and overpriced.

[10] It should be noted that the excess returns reported are the average accumulated excess returns over each particular holding period (i.e the returns for the three months holding period are the average accumulated excess returns over those three months while those for 26 months are e the average accumulated excess returns over these 36 months. If the excess return was 5% over a three month holding period and 5% over a 12 month holding period, this would indicate that the excess returns over month four to 12 was basically zero.

The obvious implication to draw from the above findings is that there are many value and growth stocks in which one would wish to avoid investing. This suggests that one way to enhance the performance of a value (and growth) portfolio is to identify some of these underperforming stocks with the intention of excluding them from one's portfolio. The prime focus of this paper is to determine whether one might be able to identify (some of) these "bad" value and growth stocks. The successful achievement of this objective would not only provide a means for enhancing the performance of value and growth portfolios but also throw additional light on the pricing behaviour of individual stocks and so the level or efficiency within equity markets around the world.

The two forms of enhancement that we evaluate for both value and growth stocks are a market sentiment indicator and a financial heath indicator.

Market Sentiment (Momentum) Indicator

The momentum life cycle for a stocks as proposed by Lee and Swaminathan (2000) suggests that the price of a stocks oscillates between being under- and over-valued. Pricing behaviour of this kind is what one might expect given the empirical evidence that suggests that stock prices both under- and over-react to the release of information[11]. The Lee and Swaninathan paper and Bird and Casavecchai (2005b) have identified a number of factors (e.g. price momentum, trading volume, and valuation levels) that provide useful insights as to where a particular stock is placed in its momentum life cycle. Bird and Whitaker (2004) have previously demonstrated that the combination of a value indicator with a series of price momentum and/or earnings momentum measures can provide a good indication of the future return behaviour of a stock. We report in Table 2 the excess returns for the following four portfolios: value (top 20% by valuation metric) and growth (bottom 20% by valuation metric) separated into winners (top 40% by price momentum measured over the previous six months) and losers (bottom 40% by price momentum measured over the previous six months).

[11] Barberis et al.(1998) and Hong and Stein (1999) are two papers that have attempted to provide an explanation for this pricing phenomenon.

Table 2

Excess Returns for Value and Growth Portfolios Screened by Momentum

Each August from 1991 to 2003, all available stocks are sorted based on their sales-to-price with those in the top 20% being designated as value stocks and those in the bottom 20% being designated as growth stocks. The same stocks area also sorted by their price momentum over the previous six months with the top 40% being designated as winners and the bottom 40% being designated as losers. Portfolios are then constructed of value winners and losers and growth winners and losers. The accumulated excess returns attributable to these equally-weighted portfolios are calculated over several holding periods extending from three months to 36 months. The average of these accumulated excess returns is reported in this Table. We also report the Newey-West p-value corrected for the *autocorrelation* and *heteroskedasticity* to test the significance of the reported excess returns.

	3 months	6 months	12 months	24 months	36 months
Value winners (VW)	5.8% (0.03)	7.0% (0.00)	9.1% (0.07)	14.5% (0.03)	23.2% (0.09)
Value	**-0.4%** **(0.08)**	**0.1%** **(0.06)**	**2.1%** **(0.15)**	**7.9%** **(0.00)**	**14.2%** **(0.01)**
Value losers (VL)	-4.5% (0.24)	-4.7% (0.19)	-3.1% (0.01)	2.3% (0.12)	8.2% (0.13)
VW - VL	10.3% (0.00)	11.8% (0.03)	12.2% (0.08)	12.2% (0.01)	15.1% (0.51)
Growth winners (GW)	5.5% (0.04)	7.1% (0.04)	7.0% (0.06)	2.1% (0.01)	-4.7% (0.04)
Growth	**1.2%** **(0.13)**	**0.9%** **(0.06)**	**-0.7%** **(0.00)**	**-7.1%** **(0.05)**	**-12.0%** **(0.04)**
Growth losers (GL)	-5.7% (0.01)	-8.3% (0.03)	-10.3% (0.15)	-15.9% (0.08)	-13.6% (0.03)
GL - GW	11.2% (0.00)	15.5% (0.03)	17.3% (0.08)	18.0% (0.01)	8.9% (0.10)

The findings reported in Table 2 clearly indicate that a substantial improvement in performance has been realised by applying the momentum indicator to both the value and the growth portfolios. In the case of the value portfolios, the differential performance between portfolios consisting of value winners and the unscreened value portfolios peaks at around 9% pa after 12 months with no additional added value being realised over the subsequent 24 months. However as the added value from unscreened value also picks up after the first 12 months, the value portfolios enhanced by momentum realise a fairly consistent 7% pa over holding periods extending out to 36 months. Most importantly, the findings indicate that the use of the momentum indicator has made a significant contribution to solving the problem of prematurely investing in value stocks as the modification to the value portfolios by the momentum screen results in the construction of portfolios that immediately generate market outperformance.

For growth portfolios, the application of a momentum screen has resulted in the construction of portfolios that have outperformed the market by about 7% over a 12 month holding period even though the unscreened growth portfolios slightly underperformed the market over this period. However, the continuing weakening performance of the growth portfolios over longer holding periods and the fact that the enhancement fails to provide any additional added value beyond 12 months means that this outperformance cannot be sustained and so is largely dissipated over 24 months and turns negative after 36 months. These findings reflect that an eventual market correction for growth stocks is inevitable but that one can generate significant outperformance in the shorter term by identifying those growth stocks which are able to maintain their upward momentum for periods of around 12 months.

The momentum indicator provides very impressive insights into those value and growth stocks that are important to avoid. The portfolio composed of the value losers underperforms an unscreened value portfolio by around 5% over a 12 month holding period with again no additional value being realised over longer periods. The added value realised by screening losing stocks out of the growth portfolios is an even more impressive, peaking at around 10% after 12 months and then fairly rapidly dissipating. This decline reflects a combination of (i) the rapid price decline in the price of growth stocks once market sentiments turns against them (the "torpedo" effect), and (ii) the fact that eventually all growth stocks will lose the confidence of the market. Overall, we conclude that sentiment, and particularly negative sentiment, is a very important indicator for the future performance of growth stocks.

The results that we discuss above of the performance of value and growth portfolios modified by a sentiment/momentum indicator display the following behaviour which is clearly consistent with the momentum life cycle:

(i) the cheap stocks that are at the bottom of their cycle trend up for an extended period once they have experienced their turning point, and

(ii) the upward potential of the expensive stocks is limited and they typically fall fairly rapidly from their peak price.

Financial Health Indicator

Commencing with Ou and Penman (1989), a number of studies have identified that accounting measures can be used to identify the better performing stocks. Beneish et al (2001) confirmed this in the context of extreme performing stocks, Piotroski (2000) in the context of value stocks and Mohanram (2005) in the context of growth stocks. In this study we derive an indicator based on 24 variables derived from fundamental accounting data which we use to build a model each year to predict the probability of each stock realising an increase in its earnings per share (EPS) in the subsequent year.

We propose this measure of the probability of an increase in EPS as our measure of financial health which ties back to the momentum life cycle with both Soffer and Walther (1999) and Scott et al (2003) demonstrating that it is earnings that is the driver of the turning points in a stock's pricing cycle[12]. As at the end of August each year we rank the stocks on the basis of these probability estimates (Pr) and form five equally weighted portfolios based on these rankings. The excess returns realised by these five portfolios over holding periods ranging from three months to 36 months are reported Table 3. These excess returns confirm our expectations that there is a positive relationship between a firm's financial health and its market performance, which leads us to expect that these financial health ranking might provide a good basis to differentiate between stocks in a number of contexts. In Table 4 we report the excess returns on portfolios consisting of value and growth stocks that are in a strong financial state (top 40% by Pr designated Pr45) and in a poor financial state (bottom 40% by Pr designated Pr12).

The evidence presented in Table 4 confirms our expectations that a company's financial health can be used to differentiate between both good and bad value stocks, and good and bad growth stocks. With respect to value portfolios, those with strong financial health tend to outperform the unscreened value portfolios by around 1% pa extending out 36 months while those with poor financial health tends to underperform by a slightly greater amount over the same period. From this one might conclude that the fundamental variables can be used to make a reasonable enhancement to value portfolios although much less than that which could be achieved using the momentum indicator.

[12] A detailed explanation of the calculation of these probabilities is contained in the Appendix.

Table 3

Excess Returns for Portfolios Sorted by their Financial Health

Each August from 1991 to 2003, all available stocks are sorted based on their financial health score and five quintile portfolios are formed with Pr1 being the one with the poorest financial health and Pr5 is the one with the strongest financial health. The accumulated excess returns attributable to these five equally-weighted portfolios are calculated over several holding periods extending from three months to 36 months. The average of these accumulated excess returns is reported in this Table. We also report the Newey-West p-value corrected for the *autocorrelation* and *heteroskedasticity* to test the significance of the reported excess returns.

	3 months	6 months	12 months	24 months	36 months
Weak (Pr1)	-1.0% (0.06)	-1.9% (0.18)	-2.6% (0.06)	-1.5% (0.11)	-1.4% (0.00)
Pr2	-0.1% (0.06)	-0.3% (0.02)	-1.0% (0.03)	0.1% (0.16)	0.6% (0.13)
Pr3	0.1% (0.32)	0.2% (0.25)	0.4% (0.15)	1.8% (0.12)	2.5% (0.05)
Pr4	0.4% (0.15)	0.9% (0.22)	2.3% (0.10)	3.6% (0.05)	3.4% (0.15)
Strong (Pr5)	0.6% (0.13)	1.2% (0.16)	1.8% (0.04)	2.8% (0.17)	3.7% (0.209)
Pr5 – Pr1	1.5% (0.08)	3.1% (0.04)	4.4% (0.00)	4.2% (0.06)	5.0% (0.03)

Table 4

Excess Returns for Value and Growth Portfolios Screened by Financial Health

Each August from 1991 to 2003, all available stocks are sorted based on their sales-to-price with those in the top 20% being designated as value stocks and those in the bottom 20% being designated as growth stocks. The same stocks area also sorted by their financial health score with the top 40% (Pr45) being designated as having good financial health and the bottom 40% (Pr12) being designated as having poor financial health. Four portfolios are then constructed consisting of valuePr45 stocks, valuePr12, growthPr45 and growthPr12 stocks. The accumulated excess returns attributable to these equally-weighted portfolios are calculated over several holding periods extending from three months to 36 months. The average of these accumulated excess returns is reported in this Table. We also report the Newey-West p-value corrected for the *autocorrelation* and *heteroskedasticity* to test the significance of the reported excess returns.

	3 months	6 months	12 months	24 months	36 months
Value Pr45 (VPr45)	-0.1% (0.06)	1.0% (0.08)	3.2% (0.05)	9.3% (0.06)	16.7% (0.03)
Value	**-0.4%** **(0.08)**	**0.1%** **(0.06)**	**2.1%** **(0.15)**	**7.9%** **(0.00)**	**14.2%** **(0.01)**
Value Pr12 (VPr12)	-0.8% (0.12)	-0.9% (0.04)	0.4% (0.04)	6.9% (0.04)	10.9% (0.03)
VPr45 – VPr12	0.8% (0.11)	1.8% (0.12)	2.8% (0.00)	2.4% (0.02)	5.8% (0.27)
Growth Pr45 (GPr45)	2.0% (0.11)	2.6% (0.01)	3.6% (0.09)	-1.3% (0.02)	-6.7% (0.05)
Growth	**1.2%** **(0.13)**	**0.9%** **(0.06)**	**-0.7%** **(0.00)**	**-7.1%** **(0.05)**	**-12.0%** **(0.04)**
Growth Pr12 (GPr1)	0.1% (0.15)	-1.1% (0.03)	-3.7% (0.10)	-9.0% (0.09)	-10.1% (0.10)
GPr45 – GPr12	1.9% (0.05)	3.7% (0.08)	7.3% (0.07)	7.7% (0.11)	3.3% (0.19)

The added value that can be realised by using financial health to differentiate between growth stocks is much greater than what we have seen to be the case for value stocks. In terms of identifying poor performing growth stocks, the financial health indicator provides an added value of 3% over the first 12 months although this subsequently dissipates. However, even greater benefits come from identifying the better performing growth stocks as it proves that growth stocks with good financial strength outperform unscreened growth stocks by in excess of 3%pa over holding periods up to 24 months. We have previously quoted evidence to suggest that high valuation of growth stocks is likely to have been driven by an extended period of high earnings growth and that a fall off in market performance is likely to be the consequence of a turnaround of this growth in earnings. Our results confirm the importance for growth stocks of maintaining the perception that earnings will be maintained in the future.

Market Sentiment and Financial Health Indicators Combined

We have seen that when employed independently both the sentiment indicator and the financial health indicator are successful in differentiating between the good and bad value and growth stocks. We are interested in whether they are largely seen as providing the same information and so combining them will lead to little or no improvement as the findings of Chordia and Shivakumar (2005) might suggest or whether they independently introduce information and so their impact will in effect be aggregated. One important consideration is that there is a timing difference with respect to our indicators as our financial health indicator is reflecting something that has yet to occur (i.e. future earnings) while the momentum indicator is reflecting something that has already happened (i.e. returns over the past six months). The impact of each indicator really depends upon the speed of adjustment of prices and our findings might provide some insights into this.

We define a good stock as one that rates fairly highly in terms of both market sentiment and financial health which means that the stocks must rank in the top 40% for both indicators. Similarly we define a bad stock as one that rates poorly in terms of both market sentiment and financial health which means that the stock must rank in the bottom 40% under each indicator. Applying these definitions of good and bad, we construct a good and bad portfolio for both value and growth stocks in August of each year and the excess returns associated with each of these four portfolios are reported in Table 5 for holding periods extending from three months to 36 months.

Table 5

Excess Returns for Value and Growth Portfolios Screened by Both Momentum and Financial Health

Each August from 1991 to 2003, all available stocks are sorted based on their sales-to-price with those in the top 20% being designated as value stocks and those in the bottom 20% being designated as growth stocks. The same stocks area also sorted by (i) their price momentum over the previous six months with the top 40% being designated as winners and the bottom 40% being designated as losers and (ii) their financial health score with the top 40% (Pr45) being designated as having good financial health and the bottom 40% (Pr12) being designated as having poor financial health. Four portfolios are then constructed: "Good" value which are value stocks that are also winners and Pr45; "Bad" value which value stocks that are both losers and Pr12; "Good" growth which are growth stocks that are winners and also Pr45; "Bad" growth that are growth stocks that are losers and Pr12. The accumulated excess returns attributable to these equally-weighted portfolios are calculated over several holding periods extending from three months to 36 months. The average of these accumulated excess returns is reported in this Table. We also report the Newey-West p-value corrected for the *autocorrelation* and *heteroskedasticity* to test the significance of the reported excess returns.

	3 months	6 months	12 months	24 months	36 months
"Good" Value	6.2% (0.03)	8.0% (0.04)	11.1% (0.05)	18.5% (0.04)	37.3% (0.03)
Value	**-0.4%** **(0.08)**	**0.1%** **(0.06)**	**2.1%** **(0.15)**	**7.9%** **(0.00)**	**14.2%** **(0.01)**
"Bad" Value	-5.9% (0.09)	-6.6% (0.14)	-2.8% (0.13)	8.2% (0.08)	11.8% (0.13)
Good Value – Bad Value	12.2% (0.01)	14.6% (0.08)	13.9% (0.06)	10.3% (0.13)	25.5% (0.12)
"Good " Growth	6.6% (0.10)	9.4% (0.04)	11.9% (0.05)	6.4% (0.01)	-0.5% (0.15)
Growth	**1.2%** **(0.13)**	**0.9%** **(0.06)**	**-0.7%** **(0.00)**	**-7.1%** **(0.05)**	**-12.0%** **(0.04)**
"Bad" Growth	-7.0% (0.04)	-10.7% (0.06)	-13.5% (0.11)	-20.5% (0.01)	-14.7% (0.02)
Good Growth – Bad Growth	13.6% (0.08)	20.1% (0.12)	25.5% (0.07)	27.0% (0.02)	14.2% (0.03)

Given the success of the two individual indicators, the fact that the combined indicator yields portfolios that deliver significant added value should come as no surprise. For value stocks, the good portfolio outperforms the unscreened portfolio by around 9% over the first 12 months and then continues to outperformance but at a slightly lower rate over the subsequent 24 months. The bad value portfolios underperform by a lesser amount: 5% over a 12 month holding period with no underperformance in subsequent months. This reflects that the indicators are delaying entry into value stocks where a turnaround in market performance is not imminent but that progressively more and more of the current bad value stocks do turnaround resulting in the longer term benefits from these signals being dissipated.

The added value from the use of the combined indicators brings is greater for growth stocks than it is for value stocks. The good growth portfolios realise an outperformance of in excess of 12% going out 12 months (compared to 9% for value stocks) but then minimal outperformance beyond this date. As a consequence, we are able to produce a growth portfolio that performs equally as well as the best value portfolio over holding periods of up to 12 months. Similarly with the bad growth stocks, they underperform unscreened growth by in excess of 12% for the first 12 months (compared to 5% for value stocks) but this underperformance slowly dissipates over the next 24 months.

Given the success of the enhancements for both the value and growth portfolios, a strategy of going long the good value stocks and short the good growth stocks continues to produce excellent results for holding periods at least of up to 36 months, delivering around 25% in the first year but then in excess of 11% in the second year and around 10% in the third year. The equivalent figures for long unscreened value versus short unscreened growth would be about 3% in the first year, almost 12% in the second year and around 10% in the third year. This emphasises once again that all of the added value from the enhancements come in the first 12 months which might be expected there main purpose of introducing a timing element into the decision process.

The question we ask is whether the two indicators in combination provide insights into future portfolio performance beyond that which can be obtained from an individual indicator? From our previous analysis, it is clear that the momentum indicator is more effective than the financial health indicator in differentiating between good and bad stocks so the question we specifically address here is whether the addition of the financial health indicator results in an improvement in portfolio performance beyond that which would be realised using the momentum indicator alone. Our findings suggest that the addition of the financial health indicator results in an annualised improvement in performance of around 2% over holding periods of up to 24 months in all cases, other than for bad value (i.e. good value, good growth and bad growth all improve). It is not surprising that a poor financial health indicator (as indicated by a low expectation that next year's EPS will exceed the current year's EPS) is not a particularly bad signal for a value stock experiencing poor investor sentiment as in the majority of cases this will just be indicating a continuation of the poor financial performance that it has been experiencing for an extended period which is already (overly) reflected in its price.

We have already seen that in the majority of cases the use of the two indicators supplement each other when they are both giving a consistent signal. In Table 6 we provide the excess

returns generated by the value and growth portfolios over a 12 month holding period where the signals from the two indicators are both in concordance and in conflict.

Table 6

Excess returns for Value and Growth Portfolios with Consistent and Conflicting Signals for Momentum and Financial Health

Each August from 1991 to 2003, all available stocks are sorted based on their sales-to-price with those in the top 20% being designated as value stocks and those in the bottom 20% being designated as growth stocks. The same stocks area also sorted by (i) their price momentum over the previous six months with the top 40% being designated as winners and the bottom 40% being designated as losers and (ii) their financial health score with the top 40% (Pr45) being designated as having good financial health and the bottom 40% (Pr12) being designated as having poor financial health. Eight portfolios are then constructed: Four value portfolios and four growth portfolio, both with all combinations of momentum and financial health. The accumulated excess returns attributable to these equally-weighted portfolios are calculated over a 12 month holding period. The average of these accumulated excess returns is reported in this Table.

Value: 12 month holding period		
	Pr45 (top 40%)	Pr12 (Bot. 40%)
Winners (top 40%)	+9.0%	+7.3%
Losers (bot. 40%)	-3.9%	-4.9%
Growth: 12 month holding period		
	Pr45 (Top 40%)	Pr12. (Bot. 40%)
Winners (top 40%)	+12.7%	+3.2%
Losers (bot. 40%)	-6.9%	-12.9%

The information contained in Table 8 clearly confirms that (i) the two indicators complement each other and (ii) that the momentum indictor has a larger impact than does the financial health indicator. However, what is also clear is that the financial health indicator has a much stronger influence with respect to growth stocks that it does with respect to value stocks. This can be seen from the fact that the excess returns for value winners and value losers only differ to a small amount (1% to 2%) depending on whether they have a good or poor financial health score. However, the equivalent differences for growth stocks are much greater with the difference being 9.5% for growth winners and 6.0% for growth losers. Again this finding is not surprising as it reflect the concern of investors for the large potential losses to be realised from investing in those growth stocks whose fundamentals erode (i.e. torpedo stocks). As a consequence any sign of a turnaround in fundamental performance has a significant impact on the company's stock price even if that stock is still currently enjoying positive momentum.

Excess Return Distributions

To date we have concentrated our attention at the portfolio level but our concern has been to enhance portfolio performance by avoiding the poorer performing stocks that would otherwise be included in the value and growth portfolios. Therefore, we would like to gain more information of the improvements at the stock level associated with the use of the momentum

and financial strength indicators. In order to gain these insights we have prepared excess return distributions for stocks included in the following four value portfolios and four growth portfolios:

- Value (see Figure 1):
    - Top 20% by valuation multiple
    - Top 20% by valuation multiple ***and*** top 40% by momentum indicator
    - Top 20% by valuation multiple ***and*** top 40% by financial health indicator
    - Top 20% by valuation multiple ***and*** top 40% by both the momentum and financial health indicators
- Growth See Figure 2):
    - Bottom 20% by valuation multiple
    - Bottom 20% by valuation multiple ***and*** top 40% by momentum indicator
    - Bottom 20% by valuation multiple ***and*** top 40% by financial health indicator
    - Bottom 20% by valuation multiple ***and*** top 40% by both the momentum and financial health indicators

As previous writers have found the medium return for value stocks underperforms the market, the distribution of returns is significantly positively skewed and there is a disproportionate amount of the added value generated from a relatively small number of stocks. We can see from Figure 1 that only 44% of value stocks outperform the market over a 12 month holding period. The introduction of a financial health requirement for value stocks both increases the proportion of stocks outperforming from 44% to 47% and also those outperforming by more than 50% from 9% to 11%. The introduction of a sentiment/momentum requirement resulted in a larger increase in the proportion of stocks outperforming from 44% to 50% while the extreme outperformers increased from 9% to 12%. In the case of value stocks, the combined introduction of the financial health and momentum indicators produced the same distributional parameters as was the case with the momentum indicator alone which is consistent with our previous finding that the financial health indicator added little in the way of incremental performance for value portfolios when used in combination with the momentum indicator.

The proportion of growth stocks outperforming the market over a 12 month holding period is 43% but the introduction of the financial health indicator increases this proportion to 46% and that of the extreme performing growth stocks slightly from 6.7% to 7.4%. The application of the momentum indicator to screen out growth stocks increases the proportion outperforming from 43% to 48% and the proportion of extreme performers from 6.7% to 8.8%. A significant increase in performance at the stocks level is realised when both indicators are applied to screen out growth stocks with the proportion outperforming the market increasing to 52% and

the proportion of extreme performers increasing to 11%. These results are consistent with our previous findings with respect to growth stocks and confirm that financial health is much more important to the on-going performance of growth stocks than is the case for value stocks.

Figure 1
Distributions of Excess Returns of Stocks Included in Various Value Portfolios

The excess return is calculated over a 12 month holding period for each stock included in the four value portfolios (where value is the top 20% by sales-to-price) The following figures are plot of these distributions of excess returns. We also report several statistics and return characteristics relating to these distributions.

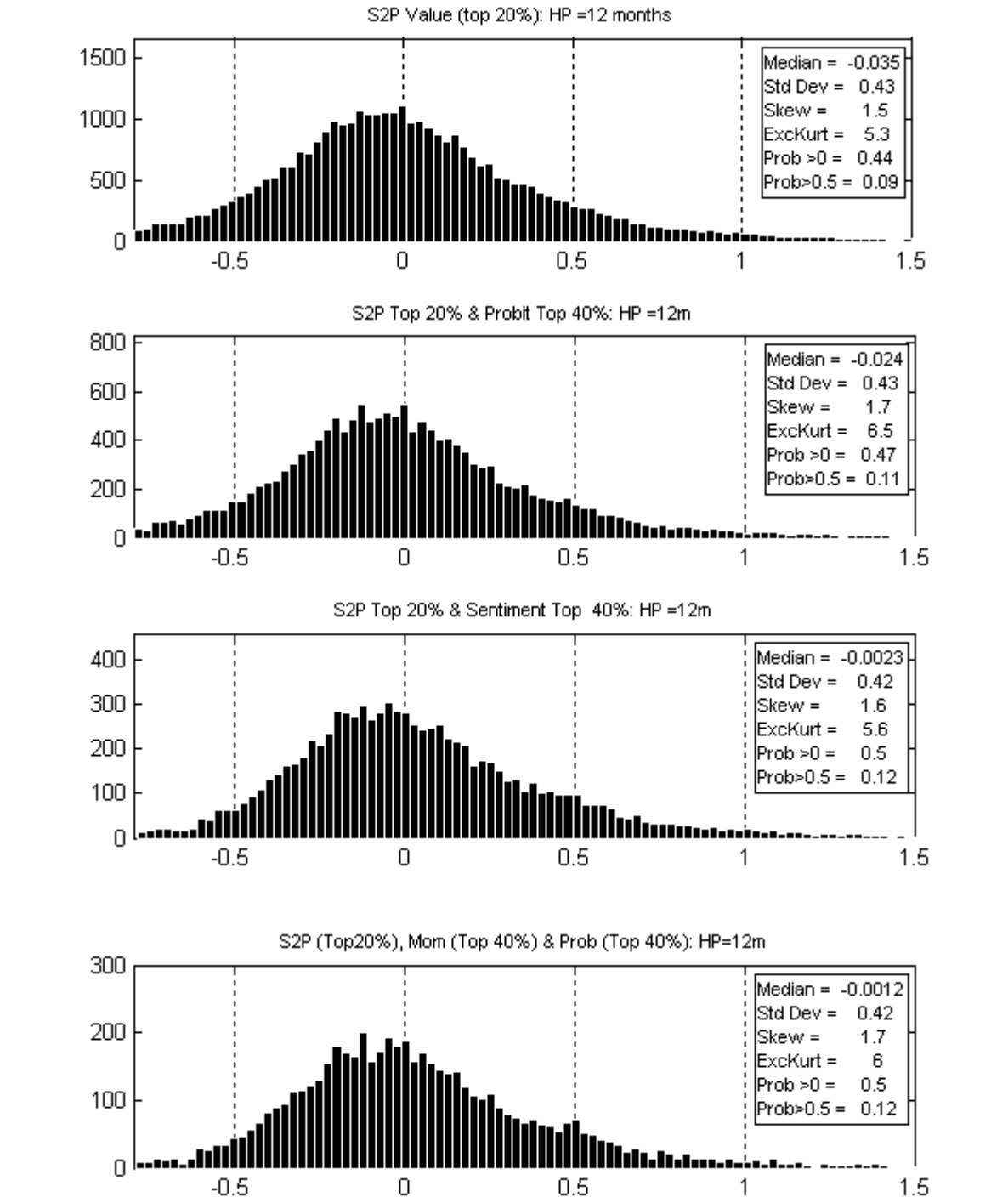

Figure 2
Distributions of Excess Returns of Stocks Included in Various Growth Portfolios

The excess return is calculated over a 12 month holding period for each stock included in the four value portfolios (where value is the bottom 20% by sales-to-price) The following figures are plot of these distributions of excess returns. We also report several statistics and return characteristics relating to these distributions.

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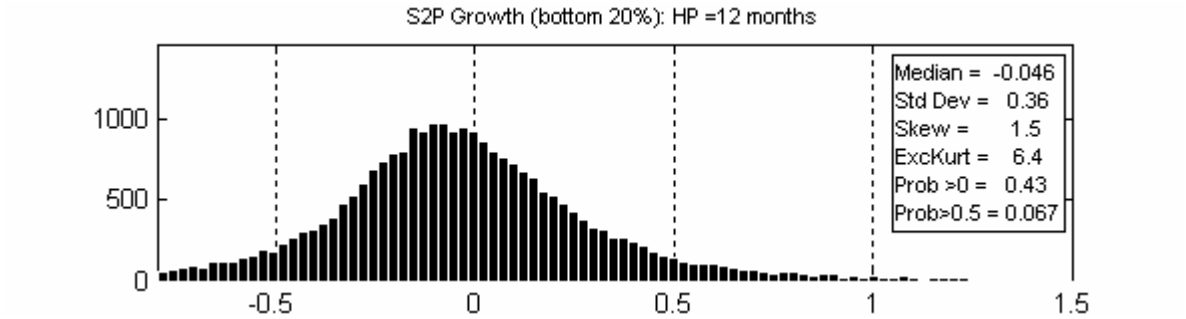

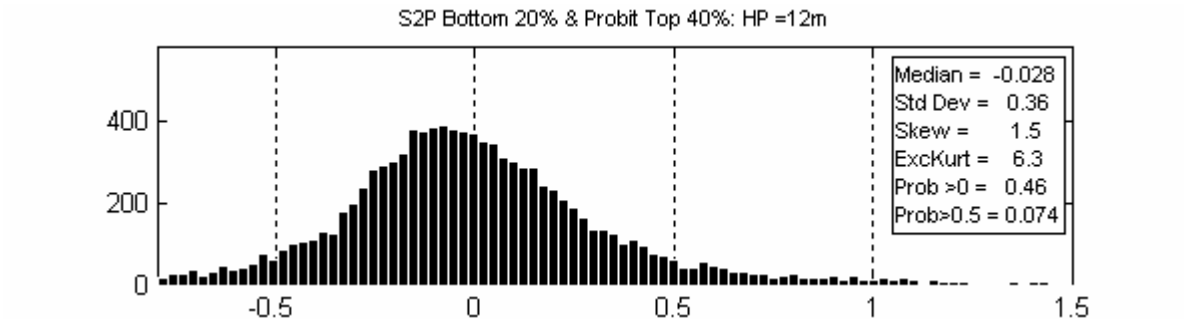

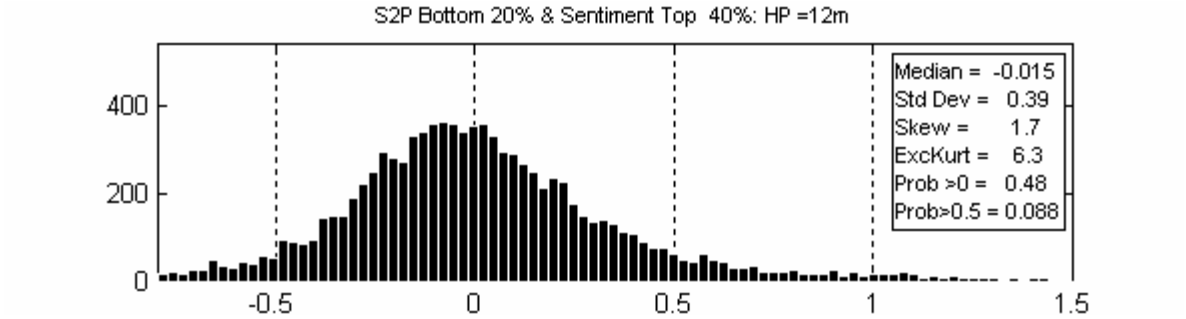

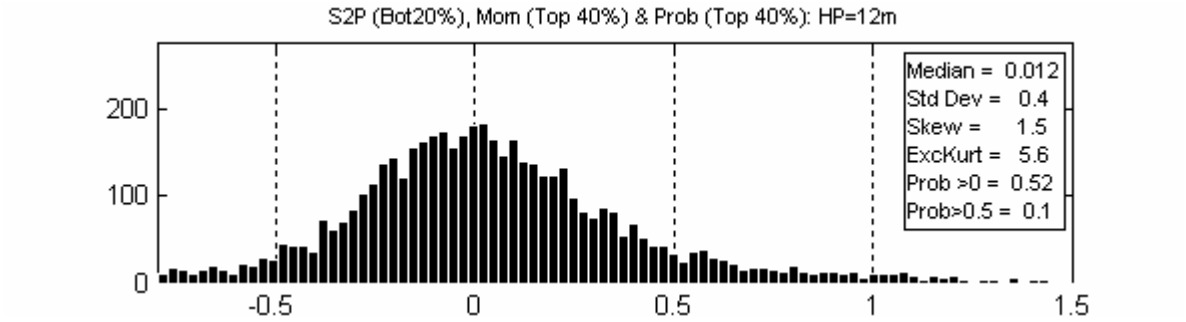

Section 4: Summary Comments

We have demonstrated in this paper that many of the problems associated with identifying value stocks and growth stocks can be overcome by the application of a sentiment/momentum indicator and a financial health indicator. Specifically with respect to value stocks, the main problem is to identify more precisely when (and if) a particular stocks will experience a market turnaround. Sentiment proves to be effective for timing the acquisition of these stocks by delaying entry until a market turnaround is more likely to be imminent. The problem with growth stocks is that they are already "expensive" and so subject to a turnaround, the timing of which the traditional valuation metrics provide little or no insights. The sentiment and financial health indicators in combination prove very useful in identifying those growth stocks most likely to outperform over the next 12 months. Indeed, it proves that over holding periods of up to 12 months, we are able to extract higher added value from a "good" growth portfolio that we are from a "good" value portfolio.

The most obvious implication for our findings is for market efficiency across the major European markets. The added value that we have identified is so large to be unlikely to be explained by transaction costs, especially when recognition is given to the fact that we only have annual rebalancing. An alternative explanation is t that the differing performance across portfolios is explained by "risk" but our analysis suggests that the better performing portfolios actually have the lower total risk (volatility). We conclude that our findings are very much consistent with the momentum life cycle proposed by Lee and Swaminathan (2000) and the behavioural-based models developed by Barbaris et al (1998) and Hong and Stein(1999) which suggest that stocks initially underreact to information, trend and eventually become overly "cheap" or "expensive". Obviously the pricing of all stocks do not behave in such a fashion but what we have established using the three metrics employed in this study is that sufficient stocks behave in this way to generate large and consistent investment returns.

There are a number of obvious extensions of this study which might enrich our knowledge of the pricing behaviour of stocks through time. One possible extension would be to examine in more detail the sentiment and financial health indicators used in this study and other possible derivations of these indicators in order to gain a better understanding of how and why they are driving stock valuations. A second is to examine whether there are differences in the pricing

behaviour of stocks at the country and region level within Europe as a first step to seeking explanations for any differences identified which should in turn increase our understanding of pricing behaviour more generally. Another extension would be to apply our analysis at the country and region level with the main objective being to identify, and then seek explanations for, differing findings to identify differences in behaviour which may well provide Europe to see if they behave differently. A final extension that we plan to pursue is to evaluate the pattern of pricing behaviour of stocks within a country/region with reference to the economic cycle within that country/region with the view of identifying the impact (if any) that macroeconomic factors have on this pricing behaviour.

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Appendix A

The Calculation of the Financial Health Score

We use 24 variables calculated using accounting data to derive an estimate of the probability that the firm's EPS will be greater next year than it was this year. The accounting variables are listed in Table A1 while below we outline the three following steps in our derivation of the financial health score:

- Principal Component Analysis
- Construct a Probit regression model to provide the financial strength score

Table A1

Fundamental Accounting Variables Used in the Analysis

Signals	*Ratio*	*Variable*	*Measurement*
Profitability			
1)	RoE	Return on Equity	$\frac{NetIncome_t^{*}}{Tass^{**}_{t-1} - Tliab^{**}_{t-1}}$
2)	Δ(ROE)	Δ (1)	$\frac{RoE_t - RoE_{t-1}}{RoE_{t-1}}$
3)	RoA	Return on Assets	$\frac{NetIncome_t}{Tass_{t-1}}$
4)	Δ(ROA)	Δ (3)	$\frac{RoA_t - RoA_{t-1}}{RoA_{t-1}}$
5)	CFO	Cash Flow from Op.	$\frac{OperatingCashFlow_t}{Avg\_Tass_t}$
6)	Δ(CFO)	Δ (5)	$\frac{CFO_t - CFO_{t-1}}{CFO_{t-1}}$
7)	Accr	Accruals	$\frac{CFO_t - OperIncome_t}{Avg\_Tass_t}$
8)	Δ(ACCR)	Δ (7)	$Accruals_t - Accruals_{t-1}$
9)	SG	Sales Growth	$\frac{Sales_t - Sales_{t-1}}{Sales_{t-1}}$
Signals	***Ratio***	***Variable***	***Measurement***
Financial Strength			
10)	CR	Current Ratio	$\frac{CurrAssets_t}{CurrLiabs_t}$
11)	Δ(CR)	Δ (10)	$CurrRatio_t - CurrRatio_{t-1}$
12)	LEV	Leverage	$\frac{LTDebt_t}{Avg\_Tass_t}$
13)	Δ(LEV)	Δ (12)	$Leverage_t - Leverage_{t-1}$
Signals	***Ratio***	***Variable***	***Measurement***
Operating Efficiency			
14)	MG	Margin	$\frac{Sales_t - COGS_t}{Sales_{t-1}}$
15)	Δ(MG)	Δ (15)	$Margin_t - Margin_{t-1}$
16)	CTASS	Capex-to-Total Assets	$\frac{CapitalExpdt_t}{Tass_{t-1}}$
17)	Δ(CTASS)	Δ (18)	$CTass_t - CTass_{t-1}$
18)	ATO	Asset Turnover	$\frac{Sales_t}{Tass_{t-1}}$
19)	Δ(ATO)	Δ (16)	$ATO_t - ATO_{t-1}$
20)	Δ(ITO)	Δ Inventory Turnover	$\Delta\left(\frac{Inventories}{Tass}\right)_{t-1,t}$
21)	Δ(RTO)	Δ Receivable Turnover	$\Delta\left(\frac{Receiv}{Sales}\right)$
22)	Δ(PTO)	Δ Payables Turnover	$\Delta\left(\frac{Payables}{Tliabs}\right)$
23)	Δ(R)	Δ Receivables	$Receiv_t - Receiv_{t-1}$
24)	Δ(R/TASS)	Δ Receivables/Total Assets	$\Delta\left(\frac{Receivables}{Tass}\right)_{t-1,t}$

* *Net Income Before Extraordinary Items: Pre-tax Income - Income taxes*
** *Tass and Tliabs: Total Assets and Total Liabilities*
a. *Avg_Tass: Change in Total Asset*
b. *Capex: Capital Expenditures*
c. *COGS: Cost of Goods Sold*

Principal Component Analysis.

The aim of the PCA is to reduce a large number (m) of predictors (X) to a parsimonious number (n) of principal components (PCs) whilst retaining as much as possible of the variation in the m initial predictors. The reason for using the PCs in our analysis is deal with the potentially problem caused by the fact that there are many instances of high correlations between the accounting variables used to forecast the direction of future earnings The central idea of the principal component is to reduce the dimensionality of a data set consisting of a large number of correlated variables by extrapolating the latent factors behind them. This task is achieved by translating the original financial ratios into a new set of uncorrelated predictors, the PCs, which are ordered in terms of those that explain the largest portion of the variation in the original variables.

We used the correlation-matrix method in the construction of the PCs because the variables are not expressed in common units of measurement. This allows us to work with standardized variates, which are all dimensionless and can be easily combined to give rise to the PC scores. Another advantage of using the correlation matrix is that it will be relatively easy to determine which of the orthogonal PCs (eigenvectors) must be retained for the next steps of our procedure. The criterion we used to select the PCs is the *Kaiser's rule* (Kaiser, 1960) based on the value of the eigenvalues (variance) of the PCs. The idea behind the rule is that if all elements of X (predictors) are independent, then the PCs are the same as the original variables, and all have unit variances in the case of a correlation matrix. Thus, any PC with variance less than one contains less information than one of the original variables (X) and so should be retained. Hence, the eigenvectors to select in each year are only those with an eigenvalue greater than or equal to one. On average approximately nine PC's are included each year with a minimum of six and a maximum of 12.

Construct a Probit regression model to provide the financial strength score

Having determined the PCs to be retained each year, we proceeded to the construction of a probability indicator. Our assumption is that the (positive or negative) variation in the EPS can be used to predict the next year returns across all firms. Therefore, we split the change in EPS in two groups according to whether it was positive or negative. Consequently, the next year variation in the EPS is transformed in a dummy variable, which enters the probit model as a dichotomous dependent variable. The retained predictors instead, constitute the independent variables in each period. Hence, the probit regression is formulated in the following way:

$$y_{i,t}^{*} = \beta_0 + \sum_{j=1}^{\max} \beta_j x_{i,j,t-1} + u_i \qquad 25$$

(1)

Where $y^*_{i,t}$ is the (theoretically) unobservable (positive or negative) change in EPS. What we observe is the dummy realisation y_i of $y^*_{i,t}$, defined as,

$$y_{i,t} = \begin{cases} 1 & \text{if } y_{i,t}^* > 0 \\ 0 & \text{otherwise} \end{cases}$$

Therefore, the yearly specification of the probit regression is as follows:

$$\Pr_i = \Pr ob(y_i = 1) = \Pr ob\left[u_i > -\left(\beta_0 + \sum_{j=1}^{\max} \beta_j x_{i,j}\right)\right] = 1 - F\left[-\left(\beta_0 + \sum_{j=1}^{\max} \beta_j x_{i,j}\right)\right]$$

The probit model is then reestimated each year and the simulated probability of a positive or negative variation in the EPS over the following 12 months is saved. In Figure A1 we illustrate an example of a yearly realisation of the probit model and the regression fit in terms of likelihood and probability of correct/incorrect forecast for the same year for the model.

Figure A1