Contrarian investment strategies using financial ratios

A significant area of finance is concerned with the stock market's overreaction to information. Following the overreaction, eventually price tends towards the fundamental value. This suggests that there is some form of reversion in returns; stocks that have done well in the past will tend not to do well in the future (and vice versa) This, in turn, suggests that a successful trading strategy might be investing in stocks that have performing poorly in the recent past; ie a contrarian strategy.

One of the first to suggest this were DeBondt & Thaler in their key paper "Does the stock market overreact?", Journal of Finance, 1985, 793-805. This strategy requires the investor to calculate past returns in order to identify stocks most likely to do well in the future. A related (but probably simpler) strategy, to identify such stocks would be to see if the current stock price seems to be out of line with the fundamental value. This approach to contrarian investment is investigated by

Lakonishok, Shleifer and Vishny, "Contrarian investment, extrapolation, and risk", Journal of Finance, 1994, 1541-1578.

1. The basic idea and motivation in LSV

The basic idea is taken from Kahneman & Tversky, "Intuitive prediction: biases and corrective procedures", in Kahneman, Slovic & Tversky (eds), *Judgment under uncertainty: heuristics and biases*, Cambridge University Press, England. This suggests that people tend to forecast without a full appreciation of reversion. Their predictions are far too extreme relative to what might reasonably be expected on the basis of previous experience.

For example, if a company is currently doing well, then this performance will be projected in to the future, well beyond what is reasonable on the basis of what we know about:

the ability of other companies to compete away the profits;
the inclination of good managers to find more lucrative jobs elsewhere;
the loyalty of customers.

Another way of looking at this behaviour is that people tend to think that changes (in both directions) are more permanent than they really turn out to be. This behaviour is applied by LSV to investors who are far too optimistic about currently high performing companies.

Using financial ratios, book to market (B/M), cash flow to price (C/P), earnings price (E/P) and growth in sales (GS) they classify companies in to two classes:

- **value stocks**, which seem to be out of favour with the market, and where the market is probably far too pessimistic about future performance; and

- **glamour stocks,** which seem to be favoured by the market, and where the market is probably far too optimistic about future performance.

They show that:

- value stocks outperform glamour stocks over the next five years;

- the results apply to large companies as well as to small companies
- the results apply to most of the years they examined, and therefore risk is unlikely to be the cause the performance differential between the companies
- the value stocks tend to be those that have performed poorly in the past, and so linking their results with those of DeBondt & Thaler.

2. The strategy

The analysis is conducted for companies quoted on either NYSE or AMEX. At the end of April in a particular year, stocks are ranked according to a particular ratio and grouped in to 10 portfolios. Portfolio 1 is made up of companies with the lowest value of the ratio, and Portfolio 10 is made up of companies with the highest value of the ratio. The subsequent performance of each of portfolio is then monitored for the next five years. This process is carried out in each year from 1968 to 1989, thus giving 22 replications of the experiment.

Their Table I reports the return (averaged over the 22 replications) for each of the 10 portfolios over the five year post formation period, for each of the ratios they use {book to market (B/M), cash flow to price (C/P), earnings price (E/P) and growth in sales (GS)}. They show that value stocks generally outperform glamour stocks throughout the five years.

An extract (showing only the most & the least glamorous of portfolios, based on book to market) from their Table I is given below.

Ratio = Book to market (B/M)	**Low B/M**	**High B/M**	**Difference**
	Portfolio1 of 10	Portfolio 10 of 10	10-1
	Most glamorous of stocks	Value stocks, the least glamorous	
$\mathbf{R_1}$ (average return over 1968-89, in the 1st year after portfolio formation)	0.110	0.173	0.063
$\mathbf{R_2}$ (average return over 1968-89, in the 2nd year after portfolio formation)	0.079	0.188	0.109
$\mathbf{R_3}$ (average return over 1968-89, in the 3rd year after portfolio formation)	0.107	0.204	0.097
$\mathbf{R_4}$ (average return over 1968-89, in the 4th year after portfolio formation)	0.081	0.207	0.126
$\mathbf{R_5}$ (average return over 1968-89, in the 5th year after portfolio formation)	0.088	0.215	0.127

The results show clearly that, even the first year after the formation of the portfolios, value stocks outperform the glamour stocks. In the 2nd and following years after the formation of the portfolio, the difference is larger still. These results are replicated for the other ratios LSV use: C/P, E/P and GS.

3. Portfolio formation on the basis of two ratios

In addition, they construct portfolios on the basis of two ratios. Each April, stocks are sorted in to 3 groups according to one ratio. Then, each of these portfolios are further sorted in to 3 group according to the value of the second financial ratio, giving 9 portfolios in all.

An extract (again showing only the most & the least glamorous of portfolios, based on book to market and cashflow to price) from their Table II is shown below.

Ratio = Book to market (B/M)	**Low B/M**	**High B/M**	**Difference**
	Portfolio1 of 3, based on B/M	Portfolio 3 of 3, based on B/M	
Ratio = Cash flow to price (C/P)	**Low C/P**	**High C/P**	
	Portfolio1 of 3 based on C/P, within portfolio 1 for B/M	Portfolio 3 of 3 based on C/P, within portfolio 3 for B/M	
	Most glamorous of stocks	Value stocks, the least glamorous	
R_1 (average return over 1968-89, in the 1st year after portfolio formation)	0.111	0.194	0.083
R_2 (average return over 1968-89, in the 2nd year after portfolio formation)	0.085	0.189	0.104
R_3 (average return over 1968-89, in the 3rd year after portfolio formation)	0.111	0.207	0.096
R_4 (average return over 1968-89, in the 4th year after portfolio formation)	0.101	0.219	0.118
R_5 (average return over 1968-89, in the 5th year after portfolio formation)	0.108	0.209	0.101

The story is much the same as before. The value portfolio outperforms the glamour portfolio in all years after portfolio formation.

4. Are the results driven by the size effect?

Some authors argue that there is a size effect; smaller companies earn larger returns than larger companies. Smaller companies have larger risks of bankruptcy and the market for the shares is less competitive. Therefore an important issue is whether the LSV results are driven by size.

In order to address this possibility, LSV look at the 50% largest (defined by market capitalisation) of stocks in their sample. The results are much the same as before, although slightly less pronounced. An extract (again showing only the most & the least glamorous of portfolios, and based on book to market and cashflow to price) from their Table III is shown below.

Ratio = Book to market (B/M)	**Low B/M**	**High B/M**	**Difference**
	Portfolio1 of 3, based on B/M	Portfolio 3 of 3, based on B/M	
Ratio = Cash flow to price (C/P)	**Low C/P**	**High C/P**	
	Portfolio1 of 3 based on C/P, within portfolio 1 for B/M	Portfolio 3 of 3 based on C/P, within portfolio 3 for B/M	
	Most glamorous of stocks	**Value stocks, the least glamorous**	
AR (average return over 1968-89,and over the five post formation years)	0.109	0.178	0.069

5. Are some ratios more important than others?

LSV use 4 ratios to construct their portfolios: B/M, C/P, E/P and GS. But are they all equally important? In order to address this question, LSV conduct multiple regression analysis with the 4 ratios to explain the 1 year ahead returns. As before, the analysis is conducted each April between 1968 and 1989, and therefore the results are averages across the 22 replications.

An extract from their Table IV is given below. For ease of presentation the constant, which is given in LSV's table, is omitted. LSV amend both the E/P and C/P variables slightly. This is necessary because the monotonic relationship between the ratios and expected growth collapses when negative values are included. When positive, high values will reflect low market expectations of growth; similarly, low values will reflect high market expectations of growth. However, when negative, a lower value does not imply a higher market expectation about growth. For negative values of E/P and C/P the market price probably reflects the breakup value of the company rather than future performance. Two types of correction[1] are made:

- the variables E/P and C/P are replaced with E/P+ and C/P+ respectively, in which negative values are replaced with zero; and

- a dummy constant (DE/P and CE/P) is included when the value is negative, to reflect the belief that the 1 year ahead return will be the same in all cases.

[1]As in Fama & French, The cross section of expected stock returns, Journal of Finance, 1992.

Explaining 1 year ahead returns with financial ratios							
	GS	B/M	Size	E/P+	DE/P	C/P+	DC/P
				= E/P if positive = 0 otherwise	=1 if E/P negative =0 otherwise	= C/P if positive = 0 otherwise	=1 if C/P negative =0 otherwise
Coefficient	-0.04	0.00	-0.00			0.296	-0.036
t statistic	-2.12	0.00	-1.06			4.553	-1.625
Coefficient	-0.05	0.01	-0.00	0.394	-0.03		
t statistic	-2.52	1.03	-1.06	2.008	-1.94		

There are two points to note about their results:

- GS and C/P are the main drivers; and
- B/M and size are not significant, once other variables are included. This is important because Fama-French (for the full reference, see footnote 1) have suggested that equilibrium returns can be described by B/M , E/P and size, and they regard these variables as measures of risk. This leads naturally to the issue of risk which is discussed next.

6. Are contrarian strategies more risky?

Probably the most frequent criticism of studies which claim to identify a market anomaly is that the results are caused by an inadequate treatment of risk. LSV are aware of this and deal with the issue in a separate section.

Recall that the results above are averages over the 22 experiments during 1968 to 1989. In order to address the risk issue, LSV look at the return differential between value and glamour stocks in each year to see how the strategy performs over time. For example it may be that whilst value stocks outperform glamour ones on average, the variation in return may be larger.

Their results are reported in their Table VI, but the main point can be grasped from the extract below.

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Ratio = cash flow to price (C/P) **Excess returns of value over glamour**	Stocks are ranked according to C/P and grouped in to 10 portfolios. Portfolio 1 is made up of companies with the lowest C/P ratio (most glamorous). Portfolio 10 is made up of companies with the highest C/P ratio (value stocks, the least glamorous).	
	1-year-after-formation return on portfolios 9&10 (two least glamorous) less 1-year-after-formation return on portfolios 1&2 (two most glamorous)	
1968	0.022	
1969	0.123	
1970	0.135	
1971	-0.078	
1972	0.155	
1973	0.021	
1974	-0.007	
1975	0.262	
1976	0.174	
1977	0.193	
1978	0.048	
1979	-0.168	
1980	0.039	
1981	0.203	
1982	-0.032	
1983	0.204	
1984	0.192	
1985	0.014	
1986	0.108	
1987	0.093	
1988	0.092	
1989	-0.063	

The results show that in only 5 of the 22 years do glamour stocks outperform value stocks. In 4 cases the differences are small; only in 1979 do glamour stocks outperform value stocks by 16.8%. LSV suggest that the results pose a stiff challenge to any risk based explanation of the results.

7. Are the results caused by excessive optimism & pessimism?

The main motivation for the study is that forecast are made without a full appreciation of reversion. Predictions are far too extreme relative to what might reasonably be expected on the basis of previous experience. LSV find that stocks which seem to be in favour with the market (defined by certain ratios, particularly GS and C/P) perform less well over the next five years than those stocks which appear to be out of favour. However they need also to show that their results are the consequence of investors being too extreme in the predictions.

In another section of their paper, they address this question, and this is illustrated below with an extract from their Table V. They proceed in the same way as with their two variable classification of stocks, using C/P and GS.

Judging by the financial ratios the glamour stocks are very much in favour with the market compared to the value stocks; for example the glamour stocks have a C/P ratio of 0.08 compared with 0.279 for value stocks. Also the glamour stocks out-perform the value stocks in the pre-portfolio formation period; they rise by 139% compared with 22.5% for value stocks[2]. Clearly the market has high expectations of the glamour stocks.

However in the post portfolio formation period, the glamour stocks are relatively disappointing.

> Earnings growth over the next 5 years is much the same for glamour and value stocks (8.9% and 8.6% respectively) .
>
> Although growth in cash flow performance over the 5 years is superior for glamour stocks (11.2% compared with 5.2%), this is largely due to the first year after the glamour/value classification; in years 2 to 5 cash flow performance is much the same (9.5% and 8.8% respectively). More importantly, over the 5 years the performance of the glamour is only approximately double that of value stocks; which is much smaller than is implied by the C/P ratios at the time of the portfolio formation. The prices paid for each $ of current cash flow are 12.5 (1/0.08) and 3.58 (1/.279) respectively; which seems to imply that the cash flow for glamour stocks will grow at more than three times as much (12.5 / 3.58) as that for value stocks. But the reality is that cash flow grows only at double the rate.
>
> Glamour stocks retain their superiority with respect to sales growth over the 5 years (10% compared with 3.7%) but their differential in the pre portfolio formation period (11.2% compared with 1.3%) is not maintained.

[2] This is consistent with other studies of overreaction (for example, DeBondt & Thaler, Journal of Finance, 1985) in which past stock winners become stock losers

Ratio = Cash flow to price	Low C/P	High C/P
	Portfolio1 of 3, based on C/P	Portfolio 3 of 3, based on C/P
Ratio = GS	**High GS**	**Low GS**
	Portfolio 3 of 3 based on GS, within portfolio 1 for C/P	Portfolio 1 of 3 based on GS, within portfolio 3 for C/P
	Most glamorous of stocks	**Value stocks, the least glamorous**
E/P	0.054	0.114
C/P	0.080	0.279
S/P (sales to price)	1.115	5.279
D/P (dividends to price)	0.014	0.039
B/M	0.385	1.414
Size	681	390
Past performance		
$AEG_{-5,0}$ (average growth in earnings in the 5 years prior to portfolio formation)	0.142	0.082
$ACG_{-5,0}$ (average growth in cash flows in the 5 years prior to portfolio formation)	0.210	0.078
$ASG_{-5,0}$ (average growth in sales in the 5 years prior to portfolio formation)	0.112	0.013
$R_{-3,0}$ (cumulative return over the 3 years prior to portfolio formation)	1.390	0.225
Future performance		
$AEG_{0,5}$ (average growth in earnings in the 5 years after portfolio formation)	0.089	0.086
$ACG_{0,5}$ (average growth in cash flows in the 5 years after portfolio formation)	0.112	0.052
$ASG_{0,5}$ (average growth in sales in the 5 years after portfolio formation)	0.100	0.037
$AEG_{2,5}$ (average growth in earnings between 2 & 5 years after portfolio formation)	0.084	0.147
$ACG_{2,5}$ (average growth in cash flows between 2 & 5 years after portfolio formation)	0.095	0.088
$ASG_{2,5}$ (average growth in sales between 2 & 5 years after portfolio formation)	0.082	0.038

8. Further thoughts

The main focus of the paper has been to show that when people invest in stock markets, they behave in much the same way as they behave elsewhere. However, rather than concentrating on how foolish people are, I think it is more interesting to ask why such apparent irrational behaviour might conceivably make sense.

LSV suggest two areas for discussion:

1. why do the differences between value and glamour stocks arise; and
2. why are the differences not arbitraged away?

They mainly focus on the second area and point out (of course, amongst other things) that investors tend to have *very* short time horizons, far too short to take advantage of a contrarian strategy. Before the strategy came good, institutional investors would be out of a job.

My own views for what they are worth are:

On the first area, herding may be able to explain some of investors' actions identified here. When investors are making themselves accountable (even to themselves), the actions of other investors may matter. Making losses on the market is not desirable, but making losses when others are making profits is very very undesirable. Perhaps the relatively poor return on glamour stocks is part of the price investors are willing to pay for being in the same boat as others. Another explanation of herding is that choices by others contain information not available to the individual investors (for example, Bikhchandani, Hirshleifer & Welch, A theory of fads, fashion custom and cultural change as informational cascades, Journal of Political Economy, 1992, 992-1026).

On the second area, it should be noted that the glamour-value results are average results; not only across years (which LSV deal with), but also across stocks in a particular portfolio. In order to hold a value portfolio (when sorting by one ratio), an investor would have to hold a portfolio one tenth of the size of the NYSE and AMEX together! An interesting and important question is then, how few stocks do you have to hold to in order to make the contrarian strategy work?