CAN WE BEAT THE DOW ? THE MIRAGE OF GROWTH STRATEGIES

di

Leonardo Becchetti and Giancarlo Marini

Abstract

This paper implements the traditional contrarian strategy literature by testing the significance of value and growth portfolios formed on deviations between observed and discounted cash flow fundamental stock values. Our findings on the 30 stocks of the Dow show that growth portfolios significantly outperform buy and hold strategies on the Index. Arbitrage opportunities, however, disappear when the index is corrected for the survivorship bias. Hence, growth strategies may have been profitable only for those agents capable to pick winners with foresight.

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Introduction

The traditional CAPM model of Sharpe (1964), Linter (1965) and Black (1972), where β is the only significant explanatory variable of cross-sectional variations in stock returns, appears to be rejected by empirical evidence, due to the existence of premia related to size and book to market factors (see, for example, Lakonishok, Schleifer and Vishny, 1994). These cross-sectional anomalies could however be reconciled with the Efficient Market Hypothesis (EMH). Size and book to market premia may disappear by employing the multifactor CAPM (Fama-French, 1992, 1993 and 1996), assuming lead-lag relationships between large and small firm stocks (Lo-MacKinlay, 1990), or allowing for time-varying betas (Ball-Kothari, 1989). The validity of these attempts is questioned on the grounds that return premia on small size and low market to book stocks are too high to be compatible with the EMH. Investment strategies of noise (De Long et al., 1990) , near rational behaviour (Wang, 1993), liquidity or "weak-hearted" traders overreacting to shocks (Lakonishok, Schleifer and Vishny, 1994) must play a significant role in explaining stock price dynamics.

The main contribution of our paper is to propose a new test of the EMH. We devise investment strategies consisting of value and growth stocks ordered on deviations between fundamentals and observed values for the Dow Jones. When fundamentals are calculated according to a two-stage Discounted Cash Flow (DCF) approach, the EMH is rejected, since (short term) growth strategies are shown to systematically beat the Dow30 aggregate index.[1] However, when the DCF is corrected for the selection bias taking into account changes in the Dow components, the EMH appears to be strongly re-established.

The paper is organized as follows. In section 2 we justify our choice of the DCF and the selection of its crucial parameters. In section 3 we build an aggregate fundamental to observed price ratio for the Dow30 aggregate index (not corrected for the selection bias and therefore including the current Dow components) and analyse its relationship with (non corrected) Dow returns and other explanatory variables. The profitability of value and growth portfolio strategies formed on deviations between observed and fundamental stock values is assessed in section 4 In section 5 we correct for the selection bias and re-estimate the fundamental to observed price ratio on the historical Dow30 components. We then evaluate the performance of the new value and growth portfolio strategies and compare it with our previous results. Section 6 concludes the paper.

2. The DCF approach and portfolio selection.

Our DCF approach is based on I/B/E/S forecasts and has the advantage of using current net earnings as the only accounting variable. Accounting and economic literature usually adopt at least three different approaches to calculate the fundamental value of a stock: i) the comparison of balance sheet multiples (EBITDA, EBIT) for firms in the same sector; ii) the residual income method; iii) the discounted cash flow method.

[1] Our results are broadly consistent with empirical evidence of short and medium term return continuation (Jeegadeesh-Titman, 1993; Rouwenhorst, 1998).

The benchmark used for comparison in the first approach may be overvalued or undervalued due to nonhomogeneous information or different trading strategies. The second problem with this method is that industry or sector classifications have become increasingly difficult since firms diversify their activities and develop new products or services (Kaplan-Roeback, 1995).
The problem with the second approach (residual income method) (Lee-Myers- Swaminathan, 1999; Frankel-Lee, 1998), is that the formula for evaluating the fundamental value of a stock uses a balance sheet measure. Lee-Myers- Swaminathan (1999) document the sharp uptrend in the price to book ratio which has risen three times between 1981 and 1996 for the Dow Jones Industrial Average. An interpretation for this result is that accounting methodologies lag behind in adjusting to changes in investors' market value assessments of firms whose share of intangible assets made by human and, more generally, immaterial capital is rising over time. This is the reason why, following Kaplan-Roeback (1995), we prefer to use the DCF approach.

According to the DCF model - and under the assumption that the discounted cash flow to the firm is equal to net earnings[2] -, the "fundamental price-earning" ratio of the stock may in fact be written as:

$$EV/X = \sum_{t=0}^{\infty} \frac{(1+E[g_t])^t}{(1+r_{CAPM})^t} \qquad (1)$$

where *MV* is the firm equity value, *X* is the current cash flow to the firm,[3] $E[g_t]$ is the yearly expected rate of growth of earnings

[2] The traditional DCF approach discounts dividends and not earnings. Many companies have recently started to postpone dividend payments at later stages of their life cycle (Campbell, 2000). In parallel, several authors use earnings rather than dividends to predict stock returns (Olhson, 1995; Fama-French, 1998; Lamont, 1998).
[3] We are assuming in accordance with the literature, that, under perfect information and no transaction costs, the dividend policy does not affect the value of stocks (Miller-Modigliani, 1961).

according to I/B/E/S consensus forecasts,[4] $r_{CAPM} = R_f + bE[R_m]$ is the discount rate adopted by equity investors, R_f represents the risk free rate,
$E[R_m]$ the expected stock market premium, b is exposition to systematic nondiversifiable risk.
To calculate the fundamental value we consider the following "two stage growth" approximation of (1):

$$MVE = X + \sum_{t=1}^{5} \frac{X(1+E[g_U])^t}{(1+r_{CAPM})^t} + \frac{X(1+E[g_U])^6}{(r_{CAPM(TV)} - gn)(1+r_{CAPM})^6} \qquad (2)$$

where MVE is the "two stage growth" equity market value, $E[g_U]$ is the expected yearly rate of growth of earnings according to the Consensus of stock analysts. According to this formula the stock is assumed to exhibit excess growth in a first stage and to behave like the rest of the economy in a second stage. The second stage contribution to MVE is calculated as a terminal value in the second addend of (2) where $r_{CAPM(TV)} = R_f + E[R_m]$ and gn is the perpetual nominal rate of growth of the economy.
The analytical definition of the DCF model imposes crucial choices on five key parameters: the risk free rate, the risk premium, the beta, the length of the first stage growth and the rate of growth of the terminal period.
For the risk free rate we use the yield on the three month US Treasury Bill.[5] For the risk premium we consider that our measure should be between the historical difference in the rates of return of stocks and T-bonds (between 6 and 7 percent) and the

[4] We use 1-year and 2-year ahead average earnings forecasts for the first two years and the long term average earning forecasts from the third to the sixth year.
[5] We choose a short term risk free rate to match its time length with the average time length of portfolio strategies which will be illustrated in sections 4 and 5. Results obtained when adopting a long term risk free rate (yield on the ten year Treasury Bill) are not substantially different from those presented in the paper and are omitted for reasons of space.

current implied premium[6] for US equity markets in the sample period which is around 2 percent. The third critical factor in the "two-stage" DCF formula is the terminal value of the stock. We fix at the sixth year the shift from the high growth period to the stable growth period. Sensitivity analysis on this threshold shows however that our choice is not crucial for the determination of the value of the stock.[7] The positive impact on value of an additional year of high growth is to be traded off with a heavier discount of the terminal value. In the terminal value it is assumed that the stock cannot grow more and cannot be riskier than the rest of the economy. The nominal average rate of growth of the economy *gn* is calculated in a range between 2 and 5 percent which is consistent with values adopted in the literature and $r_{CAPM(TV)} = Rf + E[R_m]$.

Finally, in the choice of beta for our discounting formula we generally have various alternatives in the literature.[8] We alternatively try the estimation of a time varying beta in a five year window of monthly observations and the choice of a unit beta. We are particularly comfortable with the last choice which represents a plausible simplification when working with the 30 stocks of the Dow (Lee-Myers-Swaminathan, 1999).[9]

Before going to portfolio strategies we investigate the properties of the Dow aggregate fundamental to observed price ratio (also defined in the paper as the value price ratio) built as an unweighted average of the value price ratios of each of the

[6] To calculate the current implied premium we use the Gordon-Shapiro (1956) formula in which value is equal to: expected dividends next year/(required return on stocks - expected growth rate).

[7] Results are available from the authors upon request.

[8] There is a vast literature on sophisticated methods for estimating time varying beta. See for example Harvey-Siddique (2000) and Jagannathan-Wang (1996)

[9] The choice is reasonable given the size and representativeness of the Dow components and given several potential biases arising in beta estimates (noise, dependence from time varying leverage and business cycle conditions). The choice is nonetheless confronted with that of an estimated beta in our simulation (see sections 3-5).

current Dow30 components. Our sample period goes from January 1982 where reliable data on earnings' forecasts begin to be available to December 2000.

Tab. 1 describes discounting choices producing a value price ratio nearest to one and therefore an estimated fundamental closest on average to the observed value of the Dow.[10] The formula which combines 8 percent risk premium, 3 percent perpetual growth and a unit beta gives mean monthly fundamental to observed price ratios exactly equal to one.[11]

3. The determinants of the aggregate value price ratio and its relationship with the Dow30

We now test whether our I/B/E/S based DCF formula is biased by the omitted consideration of relevant factors. Among selected regressors we include: i) the standard deviation of analysts consensus on 1-year ahead earning forecasts (*F1SD*)[12]; ii) the number of analysts following the stock and releasing forecasts on 1-year ahead earnings (*F1NE*);[13] iii) one and two period ahead changes in 1-year ahead earning forecasts (respectively *REV1F1*

[10] If eighteen years is a sufficient length for the Dow to be centered around its fundamental value, then the DCF formula yielding an average value price ratio closest to one should be considered as the most accurate estimation of the fundamental.

[11] The division of the sample in two equal subperiods leaves our results virtually unchanged.

[12] We consider this variable as a risk factor which could be added when discounting the fundamental value. Farrelly-Reichenstein (1984) evaluate by questionnaire risk ratings of 209 portfolio managers and find that dispersion of analysts' earning forecasts is to them a better risk proxy than beta. Parkash-Salakta (1999) find a positive relationship between analysts' forecast dispersion and business and financial risk.

[13] We expect this variable to reduce asymmetric information and to increase the reliability and precision of forecasts. The number of recommending brokers is regarded in the literature as nonlinearly and positively related to the speed of adjustment of prices to new information (Brennan-Jegadeesh-Swaminathan, 1993) and as positively related to the accuracy of earnings predictions (Firth-Gift,1999).

and *REV1F2*).[14] These variables should show whether the fundamental to observed price ratio anticipates revisions of forecasts not already incorporated into I/B/E/S numbers; iv) the 1-year ahead to long term earning growth forecasts ratio (*STLGRT*); v) lagged values of levels and differences in the value-price ratio.
Results from GMM estimates show the presence of both mean reversion and persistence effects. Changes in the price-value ratio are in fact positively affected by the two period lagged and negatively affected by the one period price value ratio, while the one period lagged dependent variable is also negative and significant (Table 2). The positive and significant impact of the *F1NE* variable supports the hypothesis that a higher number of forecasts is expected to increase the expected accuracy of the mean forecast (Firth-Gift,1999).
We also regress Dow returns on our value to price ratio and on a set of control variables. We find again evidence of mean reversion and persistence as one (two) period lags of the price value ratio are negatively (positively) correlated with the dependent variable (Table 3).

4. The performance of fundamental growth and value portfolio strategies

Our findings on the *current Dow30* value price ratio appear to support the hypothesis that the two conflicting phenomena of persistence and mean reversion occur. To assess their relative relevance we simulate returns from three portfolio strategies: investing on growth stocks (the ten Dow30 stocks with the highest value price ratio), average stocks and value stocks (the ten Dow30 stocks with the lowest value price ratio). Our results surprisingly show that growth strategies dominate not only value, but also buy and hold strategies on the Dow. When the DCF

[14] More formally REV1F1 $=E_{t+1}[F1]-E_t[F1]$ and REV2F1 $=E_{t+2}[F1]-E_{t+1}[F1]$ where F1 is the 1-year ahead mean estimate of earning growth and t is the month in which the forecast is formed.

fundamental is evaluated using 8 percent risk premium, unit beta and 3 percent nominal rate of growth in the terminal period, the mean monthly return of the portfolio strategy based on buying every month growth stocks (the ten Dow30 stocks whose observed to fundamental price ratio is higher) and selling them after one month is around 2.6 percent against 1.6 percent of the buy and hold strategy on the *current Dow30* and 0.8 percent of the strategy based on buying value stocks (stocks whose observed to fundamental price ratio is lower) (Table 4). A growth strategy buying growth stocks ranked according to their value price ratio at time t and selling the portfolio at time t+2 (two month growth portfolio strategy) also yields MMRs higher than the buy and hold portfolio (2.69 percent). Selecting growth stocks at month t, buying them at month t+1 and selling at t+2 (we call it *lagged 1-month strategy*) is also profitable : MMRs are quite high (2.9 percent)

We have performed robustness checks discounting future expected cash flows with a 6 percent risk premium and with betas estimated over the past five year monthly returns. Results are basically confirmed (2.58 and 2.69 percent MMRs from 1-month and lagged 1-month growth strategies compared to 0.85 and 0.67 percent from 1-month and lagged 1–month value strategies).

Parametric and non parametric tests on the significance of the difference between MMRs from different strategies show that one month, lagged 1-month and two month growth strategies are significantly more profitable in mean than value and buy and hold strategies on the Dow (Table 5a). This result proves to be robust to changes in the DCF parameters as well (Table 5b).

There is no significant decline over time of the relative profitability of growth portfolios even when we split the sample into two equal subperiods. [15] (Table 4).

The persistence of premia from growth portfolios is confirmed also under standard CAPM estimates and two factor CAPM

[15] These results are omitted for reasons of space and are available from the authors upon request.

estimates showing that risk adjusted intercepts of growth portfolios are still positive and significant (Table 6). Hence, these portfolios yield excess returns persisting even after risk adjustment

5. The correction for the selection bias

The analysis carried out so far would seem to indicate a clear violation of the EMH. We now investigate whether our evaluation of the fundamental has correctly considered possible selection effects.

The history of the Dow30 reveals that many of its current components were not present at the beginning of our estimation period. One third of the components in 1982 (the beginning of I/B/E/S data and of our sample) has been replaced by new entries. These substitutions reflect a significant change in the industry composition of the Dow30 with an increased weight of the high-tech with respect to traditional industries (Hewlett-Packard replaces Texaco in 1996, while Intel and Microsoft replace respectively Goodyear and Dow Chemical, in 1998). Other newcomers, affiliated to more traditional industries (JP Morgan, Citigroup, Wal Mart, Caterpillar and Home Depot) are sector winners.

1982 Dow Components	Current Dow30 components
Alcoa	Alcoa
AT&T	AT&T
American Express	American Express
Boeing	Boeing
Navistar	Caterpillar (from 1990)
CBS	Citigroup (from 1998)
Coca-Cola	Coca-Cola
Disney	Disney
Du Pont	Du Pont
Exxon	Exxon
General Electric	General Electric
General Motors	General Motors
Texaco	Hewlett-Packard (from 1996)
Sears Roebruck	Home Depot (from 1998)
Honeywell	Honeywell
Good Year	Intel (from 1998)

IBM	IBM
International Paper	International Paper
Primerica	JP Morgan (from 1990)
Betkehel Steel	Johnson & Johnson (from 1996)
Mc Donald	Mc Donald
Merck	Merck
Dow Chemical	Microsoft (from 1998)
Minnesota	Minnesota
MNG	MNG
Philip Morris	Philip Morris
Procter & Gamble	Procter & Gamble
SBC Communication	SBC Communication
Chevron	United Technology (from 1998)
Venator	Wal Mart (from 1996)

Our previous results on the performance of growth and value portfolios appear to be strongly influenced by the selection bias. Some of the stocks entering the index at a later date (Microsoft, Wal Mart and Johnson and Johnson) clearly belong to growth portfolios (see Table A1 in the Appendix). If these stocks realised significant capital gains before entering the Dow then their contribution to the success of the growth portfolios must have been substantial.

We therefore constructed our aggregate Dow30 value price ratio on the basis of the historical Dow30 components and repeated our simulation with value and growth portfolios. Our findings show that growth portfolios still yield MMRs which are higher than MMRs from corresponding value and buy and hold strategies (Table 7). MMRs, though, are lower than before. Adjusted DCF 1-month growth strategies yield 2.2 percent against 2.6 percent of the corresponding simple DCF strategies (Table 4). In addition, they do not outperform buy and hold strategies in the overall period, in the two equal subperiods and with risk adjusted CAPM estimates (Tables 8-9).

More importantly, the EMH is re-eastablished when we re-estimate the models presented in Tables 2 and 3 with the Dow30 index corrected for the survivorship bias. Any form of persistence now disappears and the change in the price value ratio does not present empirically observed regularities (Tables 10-11).

Conclusions

The no arbitrage condition is violated in the short run when net present value is proxied by the discounted cash flow fundamental. One month and two month growth strategies (selection every month of the ten stocks with the highest price value ratio in the previous period) yield significantly higher mean monthly returns than both value and buy and hold strategies on the Dow index. These results are confirmed under parametric and non parametric diagnostics and persist when returns are adjusted for risk.

The violation of the EMH is however only apparent. When we adjust the DCF fundamental for the selection bias, to capture the effect of changes in Dow components, growth portfolios no longer outperform value and buy and hold portfolios and the aggregate residual from the estimation of the fundamental has no predictive power on future returns.

Arbitrage opportunities from growth strategies may thus have existed only for those traders capable to anticipate losers which were going to exit and winners which were going to enter the Dow. Our results suggest that "growth strategies" can beat passive strategies only if portfolio managers have the ability of picking winners with sufficient foresight.

Table 1. Average monthly value of the aggregate *current Dow 30* value-price ratio (January 1982 - December 2000)

		RISK PREMIUM		
	NOMINAL RATE OF GROWTH IN THE TERMINAL VALUE	*6 percent*	*7 percent*	*8 percent*
VARIABLE BETA	*2 percent*	1.522	1.398	1.295
	3 percent	1.723	1.561	1.429
	4 percent	2.065	1.820	1.635
	5 percent	2.785	2.202	1.979
UNIT BETA	*2 percent*	1.170	1.057	0.963
	3 percent	1.257	1.122	1.015
	4 percent	1.367	1.273	1.077
	5 percent	1.516	1.309	1.155

Table 2. The determinants of the aggregate DCF observed to fundamental price earning ratio (current Dow30 constituents)

BETA ESTIMATED ON PREVIOUS 3 YEAR MMR									
DEPENDENT VARIABLE: AGGREGATE 1-MONTH CHANGE IN THE DCF OBSERVED TO FUNDAMENTAL PRICE EARNING RATIO (CURRENT DOW30 CONSTITUENTS)									
RISK PREMIUM	*6 percent*			*7 percent*			*8 percent*		
NOMINAL RATE OF GROWTH IN THE TERMINAL VALUE	*2 percent*	*3 percent*	*4 percent*	*2 percent*	*3 percent*	*4 percent*	*2 percent*	*3 percent*	*4 percent*
C	-0.072	-0.095	-0.122	-0.071	-0.091	-0.105	-0.069	-0.086	0.608
	[-0.50]	[-0.62]	[-0.65]	[-0.50]	[2.25]	[-0.59]	[-0.48]	[-0.58]	[2.25]
GAP(-1)	-0.157	-0.129	-0.075	-0.176	-0.151	-0.111	-0.195	-0.173	0.533
	[-3.78]	[-3.65]	[-2.86]	[-3.88]	[-3.83]	[-3.55]	[-3.96]	[-3.97]	[5.86]
GAP(-2)	0.112	0.096	0.053	0.128	0.114	0.085	0.144	0.133	-0.474
	[2.80]	[2.80]	[2.05]	[2.93]	[2.99]	[2.79]	[3.05]	[3.16]	[-5.03]
DGAP(-1)	-0.430	-0.405	-0.317	-0.437	-0.418	-0.361	-0.443	-0.428	0.527
	[-5.71]	[-5.39]	[-4.27]	[-5.80]	[-5.55]	[-4.85]	[-5.87]	[-5.68]	[3.13]
REV1F1(-1)	-0.001	-0.001	-0.002	-0.001	-0.001	-0.002	-0.001	-0.001	-0.006
	[-0.64]	[-0.74]	[-1.22]	[-0.58]	[-0.64]	[-0.95]	[-0.53]	[-0.57]	[-3.59]
F1NE	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	-0.003
	[2.08]	[2.06]	[2.25]	[2.04]	[2.01]	[2.09]	[2.00]	[1.96]	[-2.50]
R-squared	0.196	0.185	0.144	0.200	0.192	0.168	0.203	0.198	0.302
BETA=1									
DEPENDENT VARIABLE: AGGREGATE 1-MONTH CHANGE IN THE DCF OBSERVED TO FUNDAMENTAL PRICE EARNING RATIO (CURRENT DOW30 CONSTITUENTS)									
RISK PREMIUM	*6 percent*			*7 percent*			*8 percent*		
NOMINAL RATE OF GROWTH IN THE TERMINAL VALUE	*2 percent*	*3 percent*	*4 percent*	*2 percent*	*3 percent*	*4 percent*	*2 percent*	*3 percent*	*4 percent*
C	0.029	0.021	0.011	0.037	0.031	0.018	0.044	0.039	0.032
	[0.20]	[0.14]	[0.07]	[0.25]	[0.20]	[0.12]	[0.30]	[0.26]	[0.21]
GAP(-1)	-0.214	-0.197	-0.175	-0.239	-0.224	-0.191	-0.262	-0.249	-0.233
	[-3.71]	[-3.68]	[-3.62	[-3.71]	[-3.71]	[-3.66]	[-3.70]	[-3.71]	[-3.71]
GAP(-2)	0.105	0.094	0.084	0.121	0.110	0.092	0.137	0.127	0.115
	[1.92]	[1.87]	[1.83]	[1.99]	[1.93]	[1.86]	[2.05]	[2.00]	[1.94]
ΔGAP(-1)	-0.443	-0.439	-0.431	-0.446	-0.444	-0.436	-0.447	-0.446	-0.444
	[-6.07]	[-6.01]	[-5.90]	[-6.10]	[-6.07]	[-5.96]	[-6.13]	[-6.11]	[-6.08]
REV1F1(-1)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
	[-0.91]	[-0.92]	[-0.95]	[-0.90]	[-0.91]	[-0.93]	[-0.90]	[-0.90]	[-0.91]
F1NE	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
	[2.73]	[2.73]	[2.70]	[2.71]	[2.72]	[2.71]	[2.68]	[2.71]	[2.72]
R-squared	0.201	0.198	0.194	0.202	0.201	0.197	0.203	0.203	0.202

T-stats are reported in square brackets. Variable legend. *Dependent variable*. GAP:(E/P)* - (E/P) or fundamental earning price ratio to observed earning price ratio. *Regressors*. ΔGAP: first difference of the GAP variable; REV1F1=E_{t+1}[F1]-E_t[F1] where F1 is the 1-year ahead mean estimate of earning growth; F1NE: number of estimates for the 1-year ahead mean earning growth; F1SD: standard deviation of estimates for the 1-year ahead mean earning growth.

Table 3 The effect of the aggregate DCF observed to fundamental price earning ratio (current Dow30 constituents) on Dow 30 returns

BETA ESTIMATED ON PREVIOUS 3 YEAR MMR									
DEPENDENT VARIABLE: 1-MONTH DOW30 RETURN									
RISK PREMIUM	*6 percent*			*7 percent*			*8 percent*		
NOMINAL RATE OF GROWTH IN THE TERMINAL VALUE	*2 percent*	*3 percent*	*4 percent*	*2 percent*	*3 percent*	*4 percent*	*2 percent*	*3 percent*	*4 percent*
C	0.017 [0.42]	0.017 [0.42]	0.018 [0.43]	0.017 [0.41]	0.017 [0.41]	0.018 [0.42]	0.017 [0.40]	0.017 [0.41]	0.021 [0.50]
GAP(-1)	-0.030 [-2.53]	-0.024 [-2.41]	-0.012 [-1.71]	-0.033 [-2.56]	-0.027 [-2.46]	-0.017 [-2.05]	-0.036 [-2.60]	-0.030 [-2.50]	0.050 [2.13]
GAP(-2)	0.035 [3.14]	0.026 [2.84]	0.012 [1.88]	0.040 [3.26]	0.031 [3.01]	0.019 [2.40]	0.044 [3.35]	0.036 [3.14]	-0.047 [-1.96]
ΔGAP(-1)	-0.033 [-1.77]	-0.030 [-1.65]	-0.019 [-1.16]	-0.032 [-1.76]	-0.030 [-1.65]	-0.021 [-1.26]	-0.032 [-1.75]	-0.030 [-1.64]	0.130 [3.03]
F1NE	0.0004 [0.59]	0.0005 [0.81]	0.0006 [1.15]	0.0003 [0.50]	0.0004 [0.67]	0.0005 [0.93]	0.0003 [0.44]	0.0003 [0.56]	0.0004 [0.81]
F1SD	-0.126 [-0.86]	-0.125 [-0.84]	-0.129 [-0.85]	-0.128 [-0.88]	-0.124 [-0.85]	-0.123 [-0.82]	-0.130 [-0.90]	-0.125 [-0.85]	-0.127 [-0.87]
STLGRT	0.039 [1.66]	0.037 [1.56]	0.029 [1.23]	0.039 [1.68]	0.037 [1.59]	0.031 [1.34]	0.040 [1.71]	0.038 [1.61]	0.019 [0.87]
R-squared	0.053	0.045	0.024	0.056	0.049	0.033	0.059	0.052	0.073
BETA ESTIMATED ON PREVIOUS 3 YEAR MMR									
DEPENDENT VARIABLE: 1-MONTH DOW30 RETURN									
RISK PREMIUM	*6 percent*			*7 percent*			*8 percent*		
NOMINAL RATE OF GROWTH IN THE TERMINAL VALUE	*2 percent*	*3 percent*	*4 percent*	*2 percent*	*3 percent*	*4 percent*	*2 percent*	*3 percent*	*4 percent*
C	0.017 [0.42]	0.017 [0.43]	0.018 [0.43]	0.017 [0.42]	0.017 [0.42]	0.017 [0.43]	0.016 [0.42]	0.017 [0.42]	0.017 [0.42]
GAP(-1)	-0.046 [-2.81]	-0.042 [-2.74]	-0.037 [-2.67]	-0.053 [-2.91]	-0.049 [-2.83]	-0.041 [-2.72]	-0.061 [-3.00]	-0.056 [-2.93]	-0.051 [-2.85]
GAP(-2)	0.053 [3.43]	0.047 [3.30]	0.040 [3.14]	0.062 [3.55]	0.056 [3.45]	0.045 [3.24]	0.070 [3.65]	0.065 [3.57]	0.059 [3.47]
ΔGAP(-1)	-0.040 [-2.10]	-0.039 [-2.09]	-0.039 [-2.07]	-0.040 [-2.13]	-0.040 [-2.11]	-0.039 [-2.09]	-0.041 [-2.15]	-0.040 [-2.13]	-0.040 [-2.11]
F1NE	0.0003 [0.52]	0.0004 [0.57]	0.0004 [0.66]	0.0003 [0.51]	0.0003 [0.52]	0.0004 [0.61]	0.0003 [0.51]	0.0003 [0.51]	0.0003 [0.52]
F1SD	-0.126 [-0.86]	-0.121 [-0.83]	-0.116 [-0.80]	-0.130 [-0.89]	-0.126 [-0.87]	-0.119 [-0.82]	-0.134 [-0.92]	-0.131 [-0.90]	-0.127 [-0.87]
STLGRT	0.040 [1.77]	0.039 [1.73]	0.038 [1.68]	0.041 [1.82]	0.040 [1.78]	0.039 [1.71]	0.042 [1.85]	0.041 [1.82]	0.041 [1.79]
R-squared	0.065	0.062	0.058	0.068	0.065	0.060	0.071	0.068	0.066

T-stats are reported in square brackets. *Variable legend*. GAP:(E/P)* - (E/P) or fundamental earning price ratio to observed earning price ratio (current Dow30 constituents). *Regressors*. ΔGAP: first difference of the GAP variable; F1NE: number of estimates for the 1-year ahead mean earning growth; F1NE: number of estimates for the 1-year ahead mean earning growth; F1SD: standard deviation of estimates for the 1-year ahead mean earning growth; STLGRT: mean 1-year ahead to mean long term forecasted earning growth.

Table 4. Relative performance of value and growth DCF strategies on Dow stocks

	Growth portfolio	Average portfolio	Value portfolio	Buy and hold on DOW 30	Buy and hold on DOW 65	Growth portfolio	Average portfolio	Value portfolio	Buy and hold on DOW 30	Buy and hold on DOW 65
	Mean monthly returns					Mean monthly returns				
	Risk premium 6percent, nominal growth in the terminal period 3percent, variable beta					Risk premium 8percent, nominal growth in the terminal period 3percent, unit beta				
1 month	2.580	1.300	0.850			2.611	1.389	0.796		
				1.600	1.040				1.600	1.040
Lagged 1 month	2.697	1.498	0.667			2.910	1.383	0.620		
2 months	2.630	1.390	0.760			2.669	1.466	0.670		
6 months	2.050	1.440	1.270			2.057	1.360	1.320		
12 months	1.905	1.470	1.340			1.847	1.389	1.534		
	Monthly returns variance					Monthly returns variance				
	Risk premium 6percent, nominal growth in the terminal period 3percent, variable beta					Risk premium 8percent, nominal growth in the terminal period 3percent, unit beta				
1 month	0.0026	0.0024	0.0025			0.0024	0.0022	0.0031		
Lagged 1 month	0.0026	0.0025	0.0024			0.0024	0.0022	0.0032		
2 months	0.0026	0.0024	0.0024	0.0022	0.0017	0.0024	0.0023	0.0031	0.0022	0.0017
6 months	0.0028	0.0026	0.0022			0.0026	0.0021	0.0031		
12 months	0.0029	0.0022	0.0024			0.0026	0.0022	0.0029		
	Monthly returns skewness					Monthly returns skewness				
	Risk premium 6percent, nominal growth in the terminal period 3percent, variable beta					Risk premium 8percent, nominal growth in the terminal period 3percent, unit beta				
1 month	-0.377	-0.655	-0.582			-0.272	-0.542	-0.565		
Lagged 1 month	-0.455	-0.579	-0.477			-0.279	-0.576	-0.504		
2 months	-0.377	-0.568	-0.675	-0.560	-0.774	-0.198	-0.562	-0.572	-0.560	-0.774
6 months	-0.440	-0.820	-0.089			-0.241	-0.489	-0.357		
12 months	-0.609	-0.557	-0.197			-0.334	-0.394	-0.446		

Legend for all strategies except lagged 1 month: portfolios are formed the first day of month t on values that the ranking variable (value to price ratio) assumes in the last day of the month t-1 and held until the end of month t (1 month strategy), t+1 (two month strategy), t+6 (6 month strategy). New portfolios are formed only at the end of each holding period. *Lagged 1 month:* portfolios are formed the first day of month t+1 on values that the ranking variable (value to price ratio) assumes in the last day of the month t-1 and held until the end of month t+1.

Table 5a. Significance of the difference in unconditional mean monthly returns of different portfolio strategies

RISK PREMIUM 6PERCENT, NOMINAL GROWTH IN THE TERMINAL PERIOD 3PERCENT, VARIABLE BETA				
INTERVAL BETWEEN TWO SUBSEQUENT PORTFOLIO RECOMPOSITIONS IN GROWTH AND VALUE STRATEGIES	PORTFOLIO STRATEGIES	T-STAT	Nonparametric test	
			z	Prob > |z|
Lagged 1 month	VALUE PORTFOLIOS	4.319	4.556	0.00001
1 month		3.649	3.816	0.0001
2 months	VERSUS	4.037	4.193	0.00001
6 months		1.839	2.326	0.0200
1 year	GROWTH PORFOLIOS	1.234	1.561	0.1184
Lagged 1 month	DJ65 VERSUS GROWTH	-3.774	-4.013	0.0000
	DJ65 VERSUS VALUE	0.889	1.087	0.2769
1 month	DJ65 VERSUS GROWTH	-3.529	-3.758	0.0002
	DJ65 VERSUS VALUE	0.447	0.463	0.6436
2 months	DJ65 VERSUS GROWTH	-3.518	-3.782	0.0002
	DJ65 VERSUS VALUE	0.848	0.845	0.3981
6 months	DJ65 VERSUS GROWTH	-2.324	-2.738	0.0062
	DJ65 VERSUS VALUE	-0.412	0.157	0.8752
1 year	DJ65 VERSUS GROWTH	-2.002	-2.325	0.0201
	DJ65 VERSUS VALUE	-0.720	0.671	0.5023
Lagged 1 month	DJ30 VERSUS GROWTH	-2.386	-2.571	0.0102
	DJ30 VERSUS VALUE	2.081	2.451	0.0142
1 month	DJ30 VERSUS GROWTH	-2.145	-2.293	0.0218
	DJ30 VERSUS VALUE	1.644	1.861	0.0627
2 months	DJ30 VERSUS GROWTH	-2.141	-2.342	0.0192
	DJ30 VERSUS VALUE	2.040	2.200	0.0278
6 months	DJ30 VERSUS GROWTH	-1.025	-1.311	0.1900
	DJ30 VERSUS VALUE	0.870	1.200	0.2303
1 year	DJ30 VERSUS GROWTH	-0.733	-0.934	0.3504
	DJ30 VERSUS VALUE	0.553	0.702	0.4826

For the definition of portfolio strategies see legend at Table 4

The non parametric test is based on the Mann-Withney U-statistics computed as follows: $U = N_1 N_2 + \frac{N_1(N_1+1)}{2} - R_1$ and $U = N_1 N_2 + \frac{N_2(N_2+1)}{2} - R_2$ where N_1 is the number of observations in the first sample, N_2 is the number of observations in the second sample, R_1 is the sum of ranks in the first sample, R_2 is the sum of ranks in the second sample. The test is based on the lowest of the U values.

Table 5b Significance of the difference in unconditional mean monthly returns of different portfolio strategies

RISK PREMIUM 8 PERCENT, NOMINAL GROWTH IN THE TERMINAL PERIOD 3PERCENT, BETA=1				
INTERVAL BETWEEN TWO SUBSEQUENT PORTFOLIO RECOMPOSITIONS IN GROWTH AND VALUE STRATEGIES	PORTFOLIO STRATEGIES	T-STAT	Nonparametric test	
			z	Prob > |z|
Lagged 1 month	VALUE PORTFOLIOS	4.630	4.778	0.00001
1 month		3.692	3.664	0.0002
2 months	VERSUS	4.083	4.068	0.0002
6 months		1.469	1.795	0.0727
1 year	GROWTH PORFOLIOS	0.638	0.837	0.4026
Lagged 1 month	DJ65 VERSUS GROWTH	-4.364	-4.557	0.00001
	DJ65 VERSUS VALUE	0.922	1.009	0.3129
1 month	DJ65 VERSUS GROWTH	-3.661	-3.723	0.0002
	DJ65 VERSUS VALUE	0.546	0.412	0.6800
2 months	DJ65 VERSUS GROWTH	-3.798	-3.895	0.0001
	DJ65 VERSUS VALUE	0.823	0.794	0.4270
6 months	DJ65 VERSUS GROWTH	2.570	2.570	0.0100
	DJ65 VERSUS VALUE	-0.591	0.490	0.6240
1 year	DJ65 VERSUS GROWTH	-1.842	-2.048	0.0400
	DJ65 VERSUS VALUE	-1.073	-1.055	0.2900
Lagged 1 month	DJ30 VERSUS GROWTH	-2.912	-2.968	0.0030
	DJ30 VERSUS VALUE	2.029	2.225	0.0261
1 month	DJ30 VERSUS GROWTH	-2.245	-2.219	0.0260
	DJ30 VERSUS VALUE	1.677	1.736	0.0820
2 months	DJ30 VERSUS GROWTH	-2.375	-2.411	0.0159
	DJ30 VERSUS VALUE	1.947	0.794	0.4270
6 months	DJ30 VERSUS GROWTH	-0.988	-1.114	0.2650
	DJ30 VERSUS VALUE	0.588	0.820	0.4120
1 year	DJ30 VERSUS GROWTH	-0.536	-0.626	0.5310
	DJ30 VERSUS VALUE	0.145	0.338	0.7357

For the definition of portfolio strategies see legend at Table 4

The non parametric test is based on the Mann-Withney U-statistics computed as follows: $U = N_1 N_2 + \frac{N_1(N_1+1)}{2} - R_1$ and $U = N_1 N_2 + \frac{N_2(N_2+1)}{2} - R_2$ where N_1 is the number of observations in the first sample, N_2 is the number of observations in the second sample, R_1 is the sum of ranks in the first sample, R_2 is the sum of ranks in the second sample. The test is based on the lowest of the U values.

Table 6 Risk adjustment of returns from growth and value DCF strategies with CAPM (GMM estimates)

	RISK PREMIUM 6PERCENT, NOMINAL GROWTH IN THE TERMINAL PERIOD 3PERCENT, VARIABLE BETA RM: MEAN MONTHLY RETURNS ON DATASTREAM WORLD INDEX							
STRATEGY HOLDING PERIOD	1 MONTH		2 MONTHS		6 MONTHS		1 YEAR	
STRATEGY	GROWTH	VALUE	GROWTH	VALUE	GROWTH	VALUE	GROWTH	VALUE
C	0.010	-0.010	0.009	-0.011	0.004	-0.006	0.002	-0.003
	[3.10]	[-2.29]	[2.71]	[-2.79]	[1.13]	[-1.65]	[0.49]	[-0.77]
R_m-R_f	0.861	0.765	0.848	0.783	0.815	0.834	0.771	0.826
	[7.90]	[5.41]	[7.20]	[5.95]	[7.18]	[8.84]	[5.94]	[6.14]
$(R_m\text{-}R_f)^2$	-0.059	-0.668	-0.007	-0.509	-0.364	0.074	-0.660	-0.236
	[-0.06]	[-0.57]	[-0.01]	[-0.45]	[-0.41]	[0.10]	[-0.57]	[-0.24]
Rsquared	0.553	0.527	0.526	0.544	0.521	0.552	0.505	0.565
	RISK PREMIUM 8 PERCENT, NOMINAL GROWTH IN THE TERMINAL PERIOD 3PERCENT, BETA=1 RM: MEAN MONTHLY RETURNS ON DATASTREAM WORLD INDEX							
STRATEGY HOLDING PERIOD	1 MONTH		2 MONTHS		6 MONTHS		1 YEAR	
STRATEGY	GROWTH	VALUE	GROWTH	VALUE	GROWTH	VALUE	GROWTH	VALUE
C	0.008	-0.007	0.008	-0.008	0.006	-0.002	0.002	0.0001
	[1.78]	[-1.60]	[1.88]	[-1.86]	[1.38]	[-0.31]	[0.63]	[0.01]
R_m-R_f	0.854	0.784	0.860	0.776	0.960	0.818	0.903	0.791
	[6.06]	[5.39]	[5.89]	[5.59]	[7.07]	[5.61]	[6.66]	[5.20]
$(R_m\text{-}R_f)^2$	0.332	-1.024	0.473	-1.140	0.760	-0.786	0.369	-0.953
	[0.29]	[-0.91]	[0.39]	[-1.07]	[0.72]	[-0.69]	[0.33]	[-0.80]
Rsquared	0.522	0.517	0.511	0.530	0.556	0.513	0.561	0.526

The table reports coefficients and t-tests of the following 3-CAPM regression :

$$R_{PK} - R_f = a + b(R_m - R_f) + g(R_m - R_f)^2 + e$$

where R_{pk} is the monthly return of portfolio p (p=1,..,11) formed on factor k, R_f is the monthly return of the 3-month UK average deposit interest rate for the same period, R_m is the monthly return of the sample market portfolio Equations are estimated with a GMM (Generalised Method of Moments) approach with Heteroskedasticity and Autocorrelation Consistent Covariance Matrix. The Bartlett's functional form of the kernel is used to weight the covariances in calculating the weighting matrix. Newey and West's (1994) automatic bandwidth procedure is adopted to determine weights inside kernels for autocovariances. The same regressors are used as instruments.

* The coefficient is significantly different from zero at 95%. ** The coefficient is significantly different from zero at 99%.

Dependent variable legend:

For portfolio strategies see legend at Table 4

Table 7. Relative performance of value and growth strategies on the historical Dow30 components

	GROWTH PORTFOLIO	AVERAGE PORTFOLIO	VALUE PORTFOLIO	BUY AND HOLD ON DOW 30	BUY AND HOLD ON DOW 65
	RISK PREMIUM 8PERCENT, NOMINAL GROWTH IN THE TERMINAL PERIOD 3PERCENT, UNIT BETA				
	MEAN MONTHLY RETURNS				
1 month	2.25	1.32	0.12		
1 month interv.	1.36	1.16	0.40		
2 months	2.13	1.25	0.36	1.600	1.040
6 months	1.84	1.24	0.78		
12 months	1.85	1.13	0.92		

	GROWTH PORTFOLIO	AVERAGE PORTFOLIO	VALUE PORTFOLIO	BUY AND HOLD ON DOW 30	BUY AND HOLD ON DOW 65
	RISK PREMIUM 8PERCENT, NOMINAL GROWTH IN THE TERMINAL PERIOD 3PERCENT, UNIT BETA				
	VARIANCE OF MONTHLY RETURNS				
1 month	0.020	0.002	0.003		
				0.0022	0.0017
1 month interv.	0.002	0.002	0.003		
2 months	0.020	0.002	0.003		
6 months	0.020	0.002	0.003		
12 months	0.020	0.002	0.003		

	GROWTH PORTFOLIO	AVERAGE PORTFOLIO	VALUE PORTFOLIO	BUY AND HOLD ON DOW 30	BUY AND HOLD ON DOW 65
	RISK PREMIUM 8PERCENT, NOMINAL GROWTH IN THE TERMINAL PERIOD 3PERCENT, UNIT BETA				
	SKEWNESS OF MONTHLY RETURNS				
1 month	0.165	-0.849	-1.120		
1 month interv.	-0.429	-0.914	-0.814	-0.56	-0.774
2 months	-0.221	-0.922	-1.074		
6 months	0.096	-0.819	-0.762		
12 months	0.070	-0.816	-0.846		

Table 8. Significance of the difference in unconditional mean monthly returns of different portfolio strategies on the historical Dow30 components

RISK PREMIUM 8 PERCENT, NOMINAL GROWTH IN THE TERMINAL PERIOD 3 PERCENT, BETA=1				
INTERVAL BETWEEN TWO SUBSEQUENT PORTFOLIO RECOMPOSITIONS IN GROWTH AND VALUE STRATEGIES	PORTFOLIO STRATEGIES	T-STAT	Nonparametric test	
			z	Prob > |z|
1 month (1month interv.)	GROWTH PORFOLIOS	2.116	2.146	0.0319
1 month		2.006	2.261	0.0238
2 months	VERSUS	1.818	2.053	0.0400
6 months		1.119	0.647	0.5178
1 year	VALUE PORTFOLIOS	0.940	0.279	0.7800
1 month (1month interv.)	DJ65 VERSUS GROWTH	-0.753	0.724	0.4694
	DJ65 VERSUS VALUE	1.456	-1.537	0.1242
1 month	DJ65 VERSUS GROWTH	-1.133	0.289	0.7724
	DJ65 VERSUS VALUE	1.985	-1.976	0.0482
2 months	DJ65 VERSUS GROWTH	-1.103	0.401	0.6885
	DJ65 VERSUS VALUE	1.631	-1.694	0.0902
6 months	DJ65 VERSUS GROWTH	-0.801	-0.342	0.7325
	DJ65 VERSUS VALUE	0.756	-0.996	0.3190
1 year	DJ65 VERSUS GROWTH	-0.789	-0.340	0.7335
	DJ65 VERSUS VALUE	0.382	-0.630	0.5284
1 month (1month interv.)	DJ30 VERSUS GROWTH	-0.213	1.054	0.2919
	DJ30 VERSUS VALUE	1.539	-1.225	0.2205
1 month	DJ30 VERSUS GROWTH	-0.902	0.635	0.5252
	DJ30 VERSUS VALUE	1.977	-1.689	0.0913
2 months	DJ30 VERSUS GROWTH	-0.873	0.739	0.4598
	DJ30 VERSUS VALUE	1.685	-1.402	0.1608
6 months	DJ30 VERSUS GROWTH	-0.588	-0.016	0.9875
	DJ30 VERSUS VALUE	0.958	-0.731	0.4650
1 year	DJ30 VERSUS GROWTH	-0.575	-0.012	0.9904
	DJ30 VERSUS VALUE	0.652	-0.342	0.7325

Table 9. Risk adjustment of returns from growth and value DCF strategies with CAPM (GMM estimates) (historical Dow30)

RM: MEAN MONTHLY RETURNS ON DATASTREAM WORLD INDEX								
STRATEGY HOLDING PERIOD	1 MONTH		2 MONTHS		6 MONTHS		1 YEAR	
STRATEGY	GROWTH	VALUE	GROWTH	VALUE	GROWTH	VALUE	GROWTH	VALUE
C	-0.013	-0.016	-0.014	-0.014	-0.014	-0.010	-0.015	-0.011
	[-3.89]	[-3.78]	[-4.19]	[-3.38]	[-4.07]	[-2.11]	[-4.55]	[-2.33]
R_m-R_f	0.687	0.696	0.692	0.696	0.728	0.735	0.712	0.666
	[6.98]	[4.34]	[7.35]	[4.37]	[6.92]	[4.40]	[7.72]	[3.94]
$(R_m-R_f)^2$	-0.019	-1.569	0.118	-1.668	0.028	-1.236	-0.015	-1.443
	[-0.03]	[-1.09]	[0.20]	[-1.17]	[0.04]	[-0.89]	[-0.02]	[-1.03]
Rsquared	0.478	0.523	0.475	0.532	0.462	0.529	0.456	0.527

The table reports coefficients and t-tests (in square brackets) of the following 3-CAPM regression :

$$R_{DCF} - R_f = a + b(R_m - R_f) + g(R_m - R_f)^2 + e$$

where R_{DCF} is the monthly return of the DCF portfolio, R_f is the monthly return of the 3-month US T-bill for the same period, R_m is the monthly return of the sample market portfolio Equations are estimated with a GMM (Generalised Method of Moments) approach with Heteroskedasticity and Autocorrelation Consistent Covariance Matrix. The Bartlett's functional form of the kernel is used to weight the covariances in calculating the weighting matrix. Newey and West's (1994) automatic bandwidth procedure is adopted to determine weights inside kernels for autocovariances. The same regressors are used as instruments.

For the definition of the different portfolio strategies see legend at Table 4

Table 10. The determinants of the aggregate DCF observed to fundamental price earning ratio (historical Dow30 constituents)

BETA ESTIMATED ON PREVIOUS 3 YEAR MMR									
DEPENDENT VARIABLE: AGGREGATE 1-MONTH CHANGE IN THE DCF OBSERVED TO FUNDAMENTAL EARNING TO PRICE RATIO (HISTORICAL DOW30 CONSTITUENTS)									
RISK PREMIUM	*6 percent*			*7 percent*			*8 percent*		
NOMINAL RATE OF GROWTH IN THE TERMINAL VALUE	*2 percent*	*3 percent*	*4 percent*	*2 percent*	*3 percent*	*4 percent*	*2 percent*	*3 percent*	*4 percent*
C	-0.072	-0.095	-0.122	-0.071	-0.091	-0.105	-0.069	-0.086	0.608
	[-0.50]	[-0.62]	[-0.65]	[-0.50]	[2.25]	[-0.59]	[-0.48]	[-0.58]	[2.25]
GAP(-1)	-0.019	0.015	-0.033	0.013	-0.082	0.006	-0.792	-0.025	-0.082
	[-0.70]	[0.18]	[-0.50]	[0.26]	[-0.65]	[0.02]	[-2.17]	[-0.27]	[-0.81]
GAP(-2)	-0.048	0.019	0.021	-0.176	-0.042	-0.042	-0.528	0.001	0.063
	[-1.82]	[0.23]	[0.33]	[-3.57]	[-0.33]	[-0.19]	[-1.43]	[0.01]	[0.62]
ΔGAP(-1)	-0.112	-0.029	-0.016	0.226	-0.068	-0.016	0.010	-0.003	-0.033
	[-1.68]	[-0.43]	[-0.24]	[3.52]	[-1.01]	[-0.24]	[0.15]	[-0.04]	[-0.49]
REV1F1(-1)	-0.0001	-0.0007	-0.0045	0.0001	-0.0010	-0.0050	0.0009	0.0008	-0.0005
	[-0.07]	[-0.12]	[-0.26]	[0.07]	[-0.12]	[-0.21]	[0.06]	[0.07]	[-0.08]
F1NE	0.005	0.006	0.008	0.007	0.022	0.020	0.052	0.004	0.007
	[1.98]	[0.62]	[0.35]	[2.28]	[1.57]	[0.57]	[1.62]	[0.23]	[0.62]
R-squared	0.029	0.001	0.002	0.114	0.006	0.000	0.032	0.0003	0.006
BETA=1									
DEPENDENT VARIABLE: AGGREGATE 1-MONTH CHANGE IN THE DCF OBSERVED TO FUNDAMENTAL EARNING TO PRICE RATIO (HISTORICAL DOW30 CONSTITUENTS)									
RISK PREMIUM	*6 percent*			*7 percent*			*8 percent*		
NOMINAL RATE OF GROWTH IN THE TERMINAL VALUE	*2 percent*	*3 percent*	*4 percent*	*2 percent*	*3 percent*	*4 percent*	*2 percent*	*3 percent*	*4 percent*
C	0.029	0.021	0.011	0.037	0.031	0.018	0.044	0.039	0.032
	[0.20]	[0.14]	[0.07]	[0.25]	[0.20]	[0.12]	[0.30]	[0.26]	[0.21]
GAP(-1)	-0.205	-0.189	-0.169	-0.228	-0.214	-0.198	-0.249	-0.237	-0.223
	[-3.42]	[-3.40]	[-3.34]	[-3.41]	[-3.42]	[-3.40]	[-3.38]	[-3.40]	[-3.41]
GAP(-2)	0.075	0.066	0.057	0.088	0.079	0.069	0.102	0.093	0.083
	[1.31]	[1.25]	[1.20]	[1.39]	[1.33]	[1.26]	[1.46]	[1.40]	[1.34]
ΔGAP(-1)	-0.444	-0.441	-0.435	-0.446	-0.445	-0.442	-0.447	-0.447	-0.445
	[-6.79]	[-6.74]	[-6.64]	[-6.82]	[-6.79]	[-6.75]	[-6.83]	[-6.84]	[-6.80]
REV1F1(-1)	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001
	[-0.43]	[-0.43]	[-0.43]	[-0.43]	[-0.43]	[-0.43]	[-0.43]	[-0.43]	[-0.43]
F1NE	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
	[3.06]	[3.06]	[3.01]	[3.05]	[3.06]	[3.06]	[3.03]	[3.05]	[3.06]
R-squared	0.180	0.177	0.173	0.181	0.180	0.178	0.181	0.182	0.180

T-stats are reported in square brackets. Variable legend. *Dependent variable*. GAP = (E/P)* - (E/P) or fundamental earning price ratio to observed earning price ratio. *Regressors*. ΔGAP: first difference of the GAP variable; $REV1F1=E_{t+1}[F1]-E_t[F1]$ where F1 is the 1-year ahead mean estimate of earning growth, F1NE: number of estimates for the 1-year ahead mean earning growth

Table 11. The effect of the aggregate DCF observed to fundamental price earning ratio (historical Dow30 constituents) on Dow 30 returns

BETA ESTIMATED ON PREVIOUS 3 YEAR MMR									
DEPENDENT VARIABLE: 1-MONTH DOW30 RETURN									
RISK PREMIUM	*6 percent*			*7 percent*			*8 percent*		
NOMINAL RATE OF GROWTH IN THE TERMINAL VALUE	*2 percent*	*3 percent*	*4 percent*	*2 percent*	*3 percent*	*4 percent*	*2 percent*	*3 percent*	*4 percent*
C	0.017	0.017	0.018	0.017	0.017	0.018	0.017	0.017	0.021
	[0.42]	[0.42]	[0.43]	[0.41]	[0.41]	[0.42]	[0.40]	[0.41]	[0.50]
GAP(-1)	0.002	0.001	0.0005	0.003	0.002	0.0003	0.001	-0.0005	-0.002
	[0.77]	[0.81]	[1.37]	[0.80]	[1.10]	[0.34]	[0.38]	[-0.63]	[-1.48]
GAP(-2)	0.000	0.001	0.0002	0.001	0.001	0.00002	-0.0003	0.0004	0.001
	[-0.17]	[0.49]	[0.55]	[0.13]	[0.62]	[0.003]	[-0.13]	[0.61]	[0.34]
ΔGAP(-1)	-0.008	0.003	-0.0001	-0.008	-0.0002	0.0001	0.0001	0.001	0.002
	[-1.29]	[2.34]	[-0.19]	[-1.46]	[-0.27]	[0.38]	[0.29]	[1.50]	[1.94]
F1NE	0.0002	0.0001	0.0002	0.0001	0.0001	0.0003	0.0002	0.0003	0.0004
	[0.82]	[0.86]	[1.62]	[0.21]	[0.78]	[1.72]	[1.22]	[1.90]	[1.96]
F1SD	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
	[0.94]	[1.02]	[0.99]	[0.93]	[0.92]	[0.98]	[0.97]	[1.00]	[1.06]
STLGRT	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
	[1.03]	[1.01]	[1.14]	[1.01]	[0.96]	[1.00]	[0.96]	[1.00]	[1.02]
R-squared	0.017	0.034	0.018	0.019	0.015	0.008	0.008	0.020	0.034

BETA ESTIMATED ON PREVIOUS 3 YEAR MMR									
DEPENDENT VARIABLE: 1-MONTH DOW30 RETURN									
RISK PREMIUM	*6 percent*			*7 percent*			*8 percent*		
NOMINAL RATE OF GROWTH IN THE TERMINAL VALUE	*2 percent*	*3 percent*	*4 percent*	*2 percent*	*3 percent*	*4 percent*	*2 percent*	*3 percent*	*4 percent*
C	0.017	0.017	0.018	0.017	0.017	0.017	0.016	0.017	0.017
	[0.42]	[0.43]	[0.43]	[0.42]	[0.42]	[0.43]	[0.42]	[0.42]	[0.42]
GAP(-1)	-0.030	-0.027	-0.023	-0.035	-0.031	-0.028	-0.040	-0.037	-0.033
	[-1.77]	[-1.74]	[-1.72]	[-1.83]	[-1.79]	[-1.75]	[-1.90]	[-1.87]	[-1.80]
GAP(-2)	0.041	0.036	0.031	0.048	0.044	0.038	0.055	0.051	0.046
	[2.59]	[2.50]	[2.37]	[2.68]	[2.61]	[2.51]	[2.75]	[2.70]	[2.62]
ΔGAP(-1)	-0.042	-0.042	-0.041	-0.043	-0.042	-0.042	-0.043	-0.042	-0.043
	[-2.34]	[-2.33]	[-2.34]	[-2.36]	[-2.35]	[-2.34]	[-2.39]	[-2.34]	[-2.35]
F1NE	-0.0002	-0.0001	-0.0001	-0.0002	-0.0002	-0.0001	-0.0002	-0.0002	-0.0002
	[-0.28]	[-0.21]	[-0.10]	[-0.31]	[-0.28]	[-0.22]	[-0.32]	[-0.30]	[-0.28]
F1SD	0.001	0.001	0.002	0.0004	0.001	0.001	0.0002	0.0005	0.001
	[0.17]	[0.28]	[0.43]	[0.10]	[0.17]	[0.27]	[0.05]	[0.10]	[0.16]
STLGRT	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003
	[1.68]	[1.66]	[1.63]	[1.71]	[1.69]	[1.66]	[1.74]	[1.71]	[1.69]
R-squared	0.053	0.051	0.049	0.055	0.054	0.052	0.057	0.055	0.054

T-stats are reported in square brackets. *Variable legend*. GAP = (E/P)* - (E/P) or fundamental earning price ratio to observed earning price ratio. (current Dow30 constituents); *Regressors*. ΔGAP: first difference of the GAP variable REV1F1=E_{t+1}[F1]-E_t[F1] where F1 is the 1-year ahead mean estimate of earning growth; REV2F1: E_{t+2}[F1]-E_{t+1}[F1]; F1NE: number of estimates for the 1-year ahead mean earning growth; F1NE: number of estimates for the 1-year ahead mean earning growth; F1SD: standard deviation of estimates for the 1-year ahead mean earning growth; STLGRT: mean 1-year ahead to mean long term forecasted earning growth.

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Appendix (not to be published and available upon request)

Table A.1 Relative performance of non overlapping value and growth DCF strategies on Dow stocks in sample subperiods (1982-1991; 1992-2000)

RISK PREMIUM 6 PERCENT, NOMINAL GROWTH IN THE TERMINAL PERIOD 3 PERCENT, VARIABLE BETA								
			LAGGED 1 MONTH				LAGGED 1 MONTH	
1 month	*GROWTH PORTFOLIOS*	MI	2.623	2.888	*VALUE PORTFOLIOS*	mI	0.710	0.603
		MII	2.495	2.506		mII	0.998	0.732
		varI	0.003	0.003		varI	0.003	0.003
		varII	0.002	0.002		varII	0.002	0.002
2 months		mI	2.755			mI	0.566	
		mII	2.414			mII	0.803	
		varI	0.003			varI	0.003	
		varII	0.002			varII	0.002	
6 months		mI	2.219			mI	1.074	
		mII	1.941			mII	1.365	
		varI	0.003			varI	0.002	
		varII	0.002			varII	0.002	
1 year		mI	2.161			mI	1.192	
		mII	1.734			mII	1.518	
		varI	0.004			varI	0.003	
		varII	0.002			varII	0.002	
DOW JONES 65		mI	1.095					
		mII	1.000					
		varI	0.002					
		varII	0.001					
DOW JONES 30		mI	0.017					
		mII	0.016					
		varI	0.003					
		varII	0.002					

Legend: m1 mean monthly return from the corresponding portfolio strategy for the period 1982-1991; mII mean monthly return from the corresponding portfolio strategy for the period 1992-2000; var1 variance of monthly returns from the corresponding portfolio strategy for the period 1982-1991; varII variance of monthly returns from the corresponding portfolio strategy for the period 1992-2000;
For portfolio strategies see legend at Table 4

Table A.2 Relative performance of non overlapping value and growth DCF strategies on Dow stocks in sample subperiods (1982-1991; 1992-2000)

RISK PREMIUM 8 PERCENT, NOMINAL GROWTH IN THE TERMINAL PERIOD 3 PERCENT, BETA=1								
				LAGGED 1 MONTH				LAGGED 1 MONTH
1 month	*GROWHT PORTFOLIOS*	mI	2.793	3.154	*VALUE PORTFOLIOS*	mI	0.640	0.365
		mII	2.428	2.665		mII	0.952	0.875
		varI	0.308	0.321		varI	0.346	0.338
		varII	0.176	0.162		varII	0.276	0.297
2 months		mI	2.939			mI	0.532	
		mII	2.399			mII	0.808	
		varI	0.313			varI	0.327	
		varII	0.170			varII	0.286	
6 months		mI	2.388			mI	1.035	
		mII	1.725			mII	1.605	
		varI	0.298			varI	0.322	
		varII	0.228			varII	0.300	
1 year		mI	2.260			mI	1.114	
		mII	1.434			mII	1.954	
		varI	0.311			varI	0.314	
		varII	0.199			varII	0.274	
DOW JONES 65		mI	1.095					
		mll	1.000					
		varl	0.220					
		varll	0.130					
DOW JONES 30		mI	1.655					
		mII	1.551					
		varI	0.281					
		varII	0.158					

Legend: m1 mean monthly return from the corresponding portfolio strategy for the period 1982-1991; mII mean monthly return from the corresponding portfolio strategy for the period 1992-2000; var1 variance of monthly returns from the corresponding portfolio strategy for the period 1982-1991; varII variance of monthly returns from the corresponding portfolio strategy for the period 1992-2000;
For portfolio strategies see legend at Table 4

Table A.3 Significance of the difference in unconditional mean monthly returns of different portfolio strategies in sample subperiods

RISK PREMIUM 6PERCENT, NOMINAL GROWTH IN THE TERMINAL PERIOD 3PERCENT, VARIABLE BETA							
			LAGGED 1 MONTH				LAGGED 1 MONTH
GROWTH VERSUS VALUE	1month-I subperiod	3.705	4.408				
	1month-II subperiod	3.496	4.247				
	2month-I subperiod	4.261					
	2month-II subperiod	3.792					
	6month-I subperiod	2.281					
	6month-II subperiod	1.330					
	1year-I subperiod	1.853					
	1year-II subperiod	0.497					
DOW JONES 65 VERSUS VALUE PORTFOLIOS	1month-I subperiod	-3.134	-3.654	DOW JONES 65 VERSUS VALUE PORTFOLIOS	1month-I subperiod	0.817	1.047
	1month-II subperiod	-3.973	-3.989		1month-II subperiod	0.006	0.701
	2month-I subperiod	-3.395			2month-I subperiod	1.133	
	2month-II subperiod	-3.724			2month-II subperiod	0.508	
	6month-I subperiod	-2.283			6month-I subperiod	0.046	
	6month-II subperiod	-2.399			6month-II subperiod	- 0.952	
	1year-I subperiod	-2.123			1year-I subperiod	- 0.208	
	1year-II subperiod	-1.874			1year-II subperiod	- 1.338	
DOW JONES 30 VERSUS VALUE PORTFOLIOS	1month-I subperiod	-1.884	-2.386	DOW JONES 30 VERSUS VALUE PORTFOLIOS	1month-I subperiod	1.894	2.113
	1month-II subperiod	-2.407	-2.427		1month-II subperiod	1.351	2.060
	2month-I subperiod	-2.136			2month-I subperiod	2.201	
	2month-II subperiod	-2.181			2month-II subperiod	1.856	
	6month-I subperiod	-1.089			6month-I subperiod	1.212	
	6month-II subperiod	-0.957			6month-II subperiod	0.465	
	1year-I subperiod	-0.959			1year-I subperiod	0.942	
	1year-II subperiod	-0.450			1year-II subperiod	0.083	

For portfolio strategies see legend at Table 4

Table A.4 Significance of the difference in unconditional mean monthly returns of different portfolio strategies in sample subperiods

RISK PREMIUM 8 PERCENT, NOMINAL GROWTH IN THE TERMINAL PERIOD 3PERCENT, BETA=1							
			LAGGED 1 MONTH				LAGGED 1 MONTH
GROWTH VERSUS VALUE	1month-I subperiod	4.754	5.189				
	1month-II subperiod	3.313	3.991				
	2month-I subperiod	6.087					
	2month-II subperiod	3.552					
	6month-I subperiod	2.826					
	6month-II subperiod	0.250					
	1year-I subperiod	2.395					
	1year-II subperiod	-1.140					
DOW JONES 65 VERSUS GROWTH PORTFOLIOS	1month-I subperiod	-3.973	-4.226	DOW JONES 65 VERSUS VALUE PORTFOLIOS	1month-I subperiod	0.980	1.476
	1month-II subperiod	-3.887	-4.658		1month-II subperiod	0.113	0.289
	2month-I subperiod	-4.148			2month-I subperiod	1.443	
	2month-II subperiod	-3.850			2month-II subperiod	0.449	
	6month-I subperiod	-3.009			6month-I subperiod	0.123	
	6month-II subperiod	-1.825			6month-II subperiod	-1.393	
	1year-I subperiod	-2.713			1year-I subperiod	-0.038	
	1year-II subperiod	-1.140			1year-II subperiod	-2.267	
DOW JONES 30 VERSUS GROWTH PORTFOLIOS	1month-I subperiod	-2.490	-2.919	DOW JONES 30 VERSUS VALUE PORTFOLIOS	1month-I subperiod	2.062	2.476
	1month-II subperiod	-2.285	-2.977		1month-II subperiod	1.376	1.514
	2month-I subperiod	-2.713			2month-I subperiod	2.656	
	2month-II subperiod	-2.232			2month-II subperiod	1.684	
	6month-I subperiod	-1.596			6month-I subperiod	1.205	
	6month-II subperiod	-0.422			6month-II subperiod	-0.120	
	1year-I subperiod	-1.319			1year-I subperiod	1.052	
	1year-II subperiod	0.295			1year-II subperiod	-0.926	

For portfolio strategies see legend at Table 4

Table A.5 Relative performance of non overlapping value and growth sophisticated DCF strategies on hystorical Dow30 components in sample subperiods (1982-1991; 1992-2000)

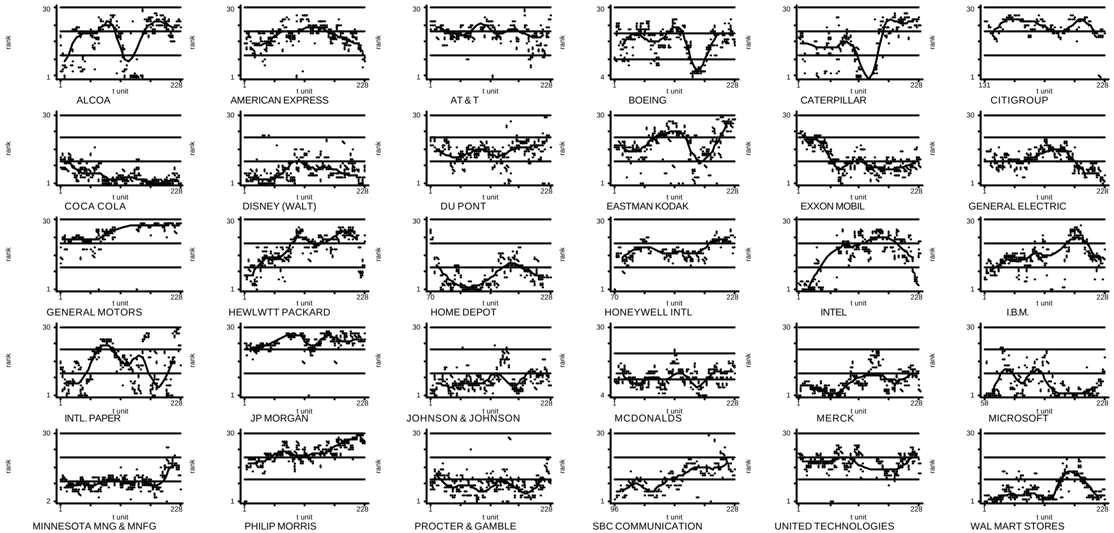
RISK PREMIUM 8 PERCENT, NOMINAL GROWTH IN THE TERMINAL PERIOD 3PERCENT, BETA=1								
1 month	*GROWHT PORTFOLIOS*	mI	0.030	0.012	*VALUE PORTFOLIOS*	mI	0.001	0.004
		mII	0.014	0.015		mII	0.002	0.003
		VarI	0.038596	0.00181		varI	0.003635	0.003636
		VarII	0.001487	0.001349		varII	0.002521	0.002599
2 months		MI	0.030			mI	0.004	
		MII	0.013			mII	0.002	
		VarI	0.038522			varI	0.003711	
		varII	0.001474			varII	0.002553	
6 months		mI	0.028			mI	0.007	
		mII	0.009			mII	0.007	
		varI	0.038601			varI	0.003535	
		varII	0.002302			varII	0.002522	
1 year		mI	0.028			mI	0.008	
		mII	0.009			mII	0.009	
		varI	0.038647			varI	0.003185	
		varII	0.002137			varII	0.002234	
DOW JONES 65	mI	0.010952						
	mII	0.010001						
	varI	0.002205						
	varII	0.001297						
DOW JONES 30	mI	0.016546						
	mII	0.015512						
	varI	0.002807						
	varII	0.001577						

Legend: m1 mean monthly return from the corresponding portfolio strategy for the period 1982-1991; mII mean monthly return from the corresponding portfolio strategy for the period 1992-2000; var1 variance of monthly returns from the corresponding portfolio strategy for the period 1982-1991; varII variance of monthly returns from the corresponding portfolio strategy for the period 1992-2000;

Table A.6 Significance of the difference in unconditional mean monthly returns of different portfolio strategies on hystorical Dow30 components in sample subperiods

RISK PREMIUM 8 PERCENT, NOMINAL GROWTH IN THE TERMINAL PERIOD 3PERCENT, BETA=1							
GROWTH VERSUS VALUE	1month-I subperiod	2.130	1.583				
	1month-II subperiod	2.710	2.748				
	2month-I subperiod	1.911					
	2month-II subperiod	2.521					
	6month-I subperiod	1.529					
	6month-II subperiod	0.421					
	1year-I subperiod	1.409					
	1year-II subperiod	-0.038					
DOW JONES 65 VERSUS GROWTH PORTFOLIOS	1month-I subperiod	-1.391	-0.296	DOW JONES 65 VERSUS VALUE PORTFOLIOS	1month-I subperiod	2.053	1.283
	1month-II subperiod	-0.640	-1.321		1month-II subperiod	1.930	1.677
	2month-I subperiod	-1.409			2month-I subperiod	1.409	
	2month-II subperiod	-0.436			2month-II subperiod	1.935	
	6month-I subperiod	-1.280			6month-I subperiod	0.728	
	6month-II subperiod	0.510			6month-II subperiod	0.924	
	1year-I subperiod	-1.241			1year-I subperiod	0.507	
	1year-II subperiod	0.464			1year-II subperiod	0.421	
DOW JONES 30 VERSUS GROWTH PORTFOLIOS	1month-I subperiod	-0.965	0.967	DOW JONES 30 VERSUS VALUE PORTFOLIOS	1month-I subperiod	3.007	2.274
	1month-II subperiod	0.695	0.282		1month-II subperiod	2.975	2.908
	2month-I subperiod	-0.983			2month-I subperiod	2.388	
	2month-II subperiod	0.887			2month-II subperiod	2.977	
	6month-I subperiod	-0.856			6month-I subperiod	1.753	
	6month-II subperiod	1.661			6month-II subperiod	2.027	
	1year-I subperiod	-0.817			1year-I subperiod	1.572	
	1year-II subperiod	1.636			1year-II subperiod	1.585	

Fig. A1. The allocation of individual Dow30 components in growth, value and intermediate portfolios during the sample period (lower band: value portfolio; intermediate band: intermediate portfolio; upper band: growth portfolio)


ALCOA
AMERICAN EXPRESS
AT & T
BOEING
CATERPILLAR
CITIGROUP
COCA COLA
DISNEY (WALT)
DU PONT
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EXXON MOBIL
GENERAL ELECTRIC
GENERAL MOTORS
HEWLWTT PACKARD
HOME DEPOT
HONEYWELL INTL
INTEL
I.B.M.
INTL. PAPER
JP MORGAN
JOHNSON & JOHNSON
MCDONALDS
MERCK
MICROSOFT
MINNESOTA MNG & MNFG
PHILIP MORRIS
PROCTER & GAMBLE
SBC COMMUNICATION
UNITED TECHNOLOGIES
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