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Style Investment and Interest Rate Cycles in Switzerland

1. Introduction

A style portfolio is a form of market segmentation and defines a group of shares having similar characteristics. Prices of these shares tend to move in a parallel way. Anomalies are premiums which cannot be explained by traditional financial models. Style investment is a systematic investment process depending on market segmentation. The goal of style investment is to exploit market anomalies. Normally, style investment is based on characteristics of firms such as market capitalization, price to book, price earnings ratio or others. The basic assumption is that style cycles and macroeconomic factors are related closely. Therefore, successful style investment depends on both suitable firm characteristics and macroeconomic factors.[1]

We distinguish between relative and absolute anomalies. Absolute or temporary anomalies are the month-of-the-year effect, the turn-of-the-year effect, the biweekly effect or the day-of-the-week effect. While relative anomalies could be explained by a misspecification of the CAPM absolute anomalies cannot. Absolute anomalies are phenomena that can be measured with time series tests. Very often absolute and relative anomalies are overlapping. For example, the January effect overlaps with the small cap effect. This research is focusing on relative anomalies.

In an efficient market a free lunch does not exist. Therefore, it is not possible to reach higher returns by riding on a style. Advocates of the efficient market hypothesis call style effects anomalies. ELTON/GRUBER (1995, 424) stated five possible explanations for the relationship between returns and firm characteristics:

1. The observed relationship is not real. BLACK (1993) called this phenomenon data mining: „This means that most so called „anomalies" don't seem anomalous to me at all. They seem like nuggets from a gold mine, found by one of the thousands of miners all over the world."
2. The firm characteristics serve as a proxy for an omitted risk variable. Once this variable is taken into account the relationship between firm characteristics and excess returns disappears.
3. The CAPM is a reasonable model but has been misestimated, causing apparent large returns when none exist. For example, betas are systematically underestimated for small firms.
4. Transaction costs eliminate the profitability of any trading rules designed to exploit a style phenomenon.
5. Markets may simply be inefficient.

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This work is focusing on three styles. The characteristic variables are price to book, dividend yield and market capitalization. The price to book is used as a proxy for the value/growth style. The price earnings ratio is not considered as it is incorporated in combination of price to book and market capitalization.[2]
In section two an overview is given of three different styles. The construction of the style portfolios is defined in section three. Section four shortly describes the interest rate cycles in Switzerland. Section five and six show the results of the analysis of the links between interest rates and style portfolios. Section seven gives a brief summary of the results and a short conclusion for asset management.

2. Styles

A style describes the relationship between one or several firm characteristics and the expected return of this firm. Studies show that characteristics such as market capitalization, price to book, price earnings or dividend yield can justify a risk premium.[3] The construction of style portfolios is based on a ranking principle of the characteristic variable. Share with similar characteristics are combined in a portfolio. Different styles are very often strongly correlated because of the close related style variables. For example, a high price to book is associated with a low dividend yield.
The value/growth style is defined by a price related ratio as price to book or price earnings. BASU (1977) or CAPAUL/ROWLEY/SHARPE (1993) showed that value stocks in the long run outperform growth stocks. The value/growth effect even exists when the returns are risk adjusted. There is no theoretical explanation for the outperformance of value. An intuitive argument is that investors tend to overestimate the growth of companies. Because of the overestimation of the growth of a company the stock is priced too high. However, in the long run growth reduces to a sustainable level and the relative overestimation of growth stocks disappears. The value philosophy assumes that the market consensus understates the value firms. The market corrects the underestimation in the long run.[4]
The dividend yield has a long tradition as a forecast variable for stock returns.[5] The dividend yield is a rough proxy variable for the expected return. As interest rates move, the discount rate in a dividend discount model changes as well. Stocks with a long duration tend to outperform when interest rates decrease. In this case, higher returns are expected for stocks with a high price earnings ratio and a low dividend yield. Vice versa, stocks with a short equity duration, a low price earnings ratio and a high dividend yield have higher expected returns when interest rates increase. The dividend policy is influenced by different aspects such as taxes, optimal capital structure, signaling and others. Dividends contain a lot of information which has nothing to do with the value of a firm. All of the undesired information is called „noise". Therefore, the dividend yield is a noisy variable.
The most known style effect is the size effect. Empirical studies show that portfolios representing small caps outperform large caps even when the portfolios are adjusted for risk.[6] Different hypothesis try to explain the small cap effect. ROLL (1981) and REINGANUM (1981) argued that the estimated betas for small caps are biased because of the low trading volume. CHAN/CHEN (1991) argue that small caps bear higher risk because of a lower production efficiency and a higher leverage. CHAN/CHEN called small caps „marginal companies" which face bigger problems in economic difficult times. Therefore, the capitalization is a proxy variable for the fundamental risk of a firm. Small caps are less liquid and bear higher transaction costs such as trading and research costs. ROLL (1981) and BLUME/STAMBAUGH (1983) showed that when considering liquidity and transaction costs, the small cap effect reduces substantially.

3. Style portfolios

The data bank used in creating style portfolios are stocks from the Morgan Stanley Capital International (MSCI) universe for Switzerland. First a standard share is created for each company meaning that bearer, registered and other types of shares are put together according to their respective capitalization. For the standard shares ratios such as price to book, price earnings and dividend yield are recalculated. The MSCI universe is reduced by this procedure to 59 standard shares. Afterwards, the standard shares are ranked in a descending order according to price to book, dividend yield and size respectively. The ranked universe is grouped in five equal weighted portfolios for each ranking criteria. The equal weights reduce the dominance of big caps within a portfolio. The procedure is repeated for each year i.e. the portfolios are reshuffled once a year in January. Finally five portfolios for each criteria, starting in January 1977 ending in November 1995, representing 227 observations are calculated. The monthly return of a portfolio is the total return which is the relative price change plus one twelfth of the dividend yield.[7]

Table 1 to 3 give a statistical summary of the style portfolios. A portfolio contains between 4 and 11 shares, in average 8 shares. Because of the low number of shares the portfolios are certainly insufficiently diversified until the mid eighties. However most of the standard shares are based on two or even three different types of shares. The construction of such standard shares produces as well a diversification effect because premiums are smoothed out. All portfolios have a negative skewness and therefore their distributions are skewed to the left. The high figures for the kurtosis indicate a leptocurtic distribution. The universe is an equally weighted portfolio of all shares. The figures of the portfolio Universe are only approximately equal to the average of the style portfolios. The difference is caused by stocks which are dropped or added to the MSCI universe during the year. The portfolios are reshuffled at the beginning of the next year.

The results given in Table 1 support the existence of a value/growth effect especially between the so called „marginal portfolios"[8] with the highest and the lowest price to book ratios. Although the portfolio PBV20 has the highest return, it has as well the lowest systematic risk as measured by the

Table 1: Style portfolios price to book January 1977 to November 1995

	PBV20	PBV40	PBV60	PBV80	PBV100	Universe
Return	12.36%	8.77%	9.35%	9.79%	7.75%	9.72%
Risk	17.00%	17.02%	16.03%	15.04%	17.36%	15.03%
t-value	3.163	2.242	2.538	2.831	1.941	2.811
Sharpe ratio	0.454	0.242	0.294	0.342	0.179	0.337
Beta (Universe)	0.774	0.809	0.856	0.917	0.802	1.000
Beta (MSCI)	0.692	0.764	0.793	0.906	0.783	0.946
Price to book	0.64	1.09	1.38	1.85	2.85	1.40
Dividend yield	2.34%	3.07%	2.78%	2.45%	2.11%	2.49%
Capitalization in %	9.93%	15.15%	19.30%	22.82%	32.80%	100.00%

Return: average annual return, risk: annual standard deviation, Beta (Universe): market beta with universe as market portfolio, Beta (MSCI): market beta with MSCI as market portfolio.
PBV: price to book portfolios; PBV20: price to Book portfolio with lowest price to book; PBV100: price to book portfolio with highest price to book; Universe: all Swiss stocks covered by MSCI

Table 2: Style portfolios dividend yield January 1977 to November 1995

	DY20	DY40	DY60	DY80	DY100	Universe
Return	10.85%	7.59%	10.07%	9.30%	9.81%	9.72%
Risk	19.64%	16.55%	16.32%	15.63%	14.63%	15.03%
t-value	2.401	1.996	2.684	2.588	2.915	2.811
Sharpe ratio	0.316	0.178	0.332	0.298	0.353	0.337
Beta (Universe)	0.680	0.840	0.862	0.888	0.925	1.000
Beta (MSCI)	0.597	0.837	0.844	0.827	0.878	0.946
Price to book	1.49	1.50	1.55	1.35	1.19	1.40
Dividend yield	1.12%	1.99%	2.45%	2.98%	3.97%	2.49%
Capitalization in %	14.51%	27.45%	22.01%	20.59%	16.44%	100.00%

Return: average annual return, risk: annual standard deviation, Beta (Universe): market beta with universe as market portfolio, Beta (MSCI): market beta with MSCI as market portfolio
DY: dividend yield portfolios; DY20: dividend yield portfolio with lowest dividend yield; DY100: dividend yield portfolio with highest dividend yield; Universe: all Swiss stocks covered by MSCI

beta. In Switzerland large caps tend to have higher price to book ratios. Obviously the value/growth effect and the size effect are correlated. The observed correlation between value/growth and size has strengthen since January 1989. Obviously this observation is a characteristic of the Swiss equity market. The dominant shares in the last few years like Sandoz, Roche, Nestlé and ABB are both large caps as well as growth stocks.

In Table 2, the statistics of the dividend yield portfolios are summarized. No clear relationship between the portfolios and the expected return can be identified. The exception is the portfolio

Table 3: Style portfolios Size January 1977 to November 1995

	SIZE20	SIZE40	SIZE60	SIZE80	SIZE100	Universe
Return	10.71%	9.16%	8.76%	8.22%	11.01%	9.72%
Risk	17.02%	16.57%	17.16%	15.68%	16.58%	15.03%
t-value	2.735	2.404	2.220	2.280	2.887	2.811
Sharpe ratio	0.356	0.272	0.240	0.228	0.383	0.337
Beta (Universe)	0.736	0.829	0.816	0.901	0.806	1.000
Beta (MSCI)	0.600	0.740	0.736	0.873	0.909	0.946
Price to book	0.99	1.13	1.20	1.59	1.43	1.40
Dividend yield	2.35%	2.65%	2.42%	2.47%	2.52%	2.49%
Capitalization in %	1.83%	3.54%	6.16%	12.59%	75.88%	100.00%

Return: average annual return, risk: annual standard deviation, Beta (Universe): market beta with universe as market portfolio, Beta (MSCI): market beta with MSCI as market portfolio
SIZE: size portfolios; SIZE20: size portfolio with smallest capitalization; SIZE100: size portfolio with biggest capitalization; Universe: all Swiss stocks covered by MSCI

DY20 which contains „marginal firms". Nevertheless, there seems to be a link between the risk and the dividend yield. The total risk measured as a standard deviation decreases with higher dividend yields. On the contrary the systematic risk declines with lower dividend yields indicating that the specific risk has to increase stronger than the total risk with lower dividend yields. This contradicts the results of KEIM (1985) who concluded that for the US market the systematic risk declines when dividend payments increase. The higher specific risk for firms paying low or no dividends is obvious. CHAN/CHEN (1991) describe these companies as marginal firms which are run inefficiently, have a high leverage and cash flow problems. These firms are specially sensitive to macroeconomic changes. As BERNSTEIN (1995, 36) argues, investors prefer high dividend yields to uncertain future capital gains in a risk aversion environment – for example during a recession. Regarding the size portfolios, the portfolio SIZE100 seems not to fit into the small cap effect. This observation is a characteristic of the Swiss equity market in the last few years. After the crash in October 1987 the Swiss equity market has been driven more or less by a few large cap stocks.[9] Again, relationship between the value/growth effect and the size effect can be observed. Size seems to be as well an indicator for the general risk. However the relation between risk and size is not as obvious as the relation between risk and dividend yield.

4. Interest rate cycles of Switzerland

Figure 1 shows the Swiss government long term bond yields. The government bond time series are

Figure 1: Interest rates cycles

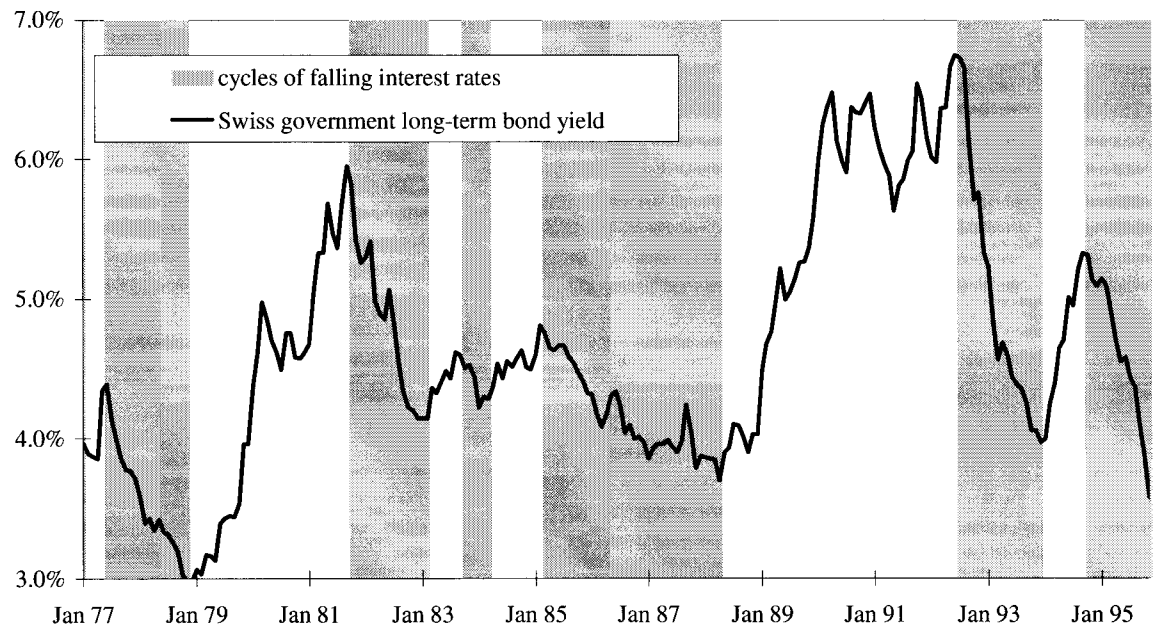
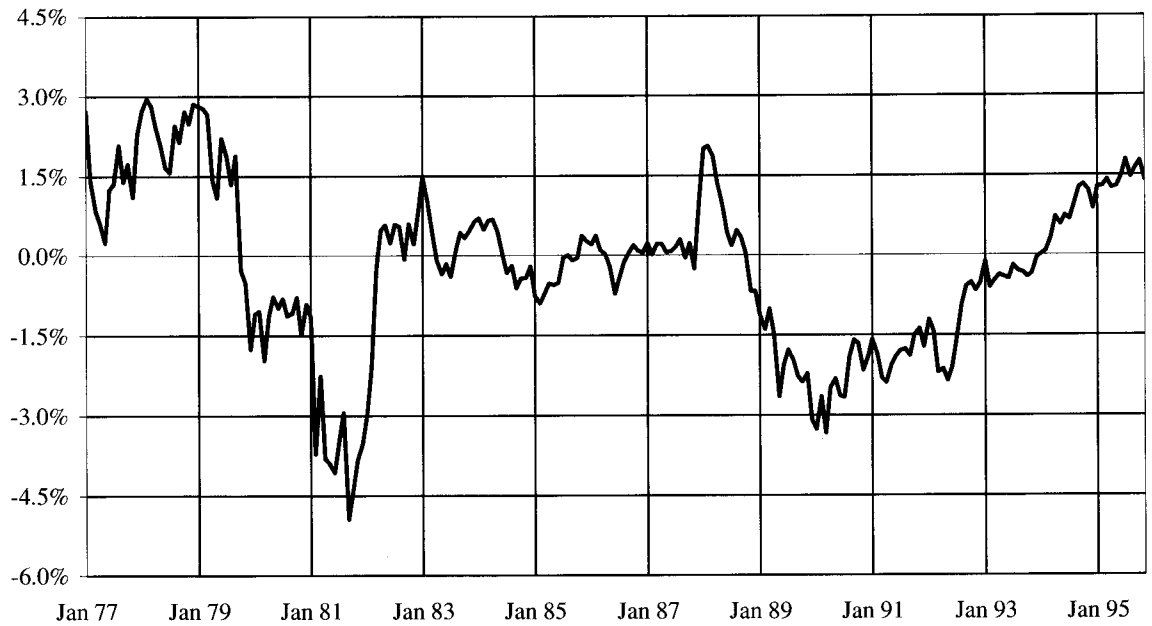


Figure 2: Term structure Switzerland



separated in sub-periods of falling and rising interest rates. A period of falling or rising interest rates is defined as a fall or rise of rates which continues longer than six months. From January 1977 to November 1995 there were six cycles of falling and five cycles of rising rates. Overall 112 observations belong to cycles of falling rates and 115 observation to cycles of rising rates.

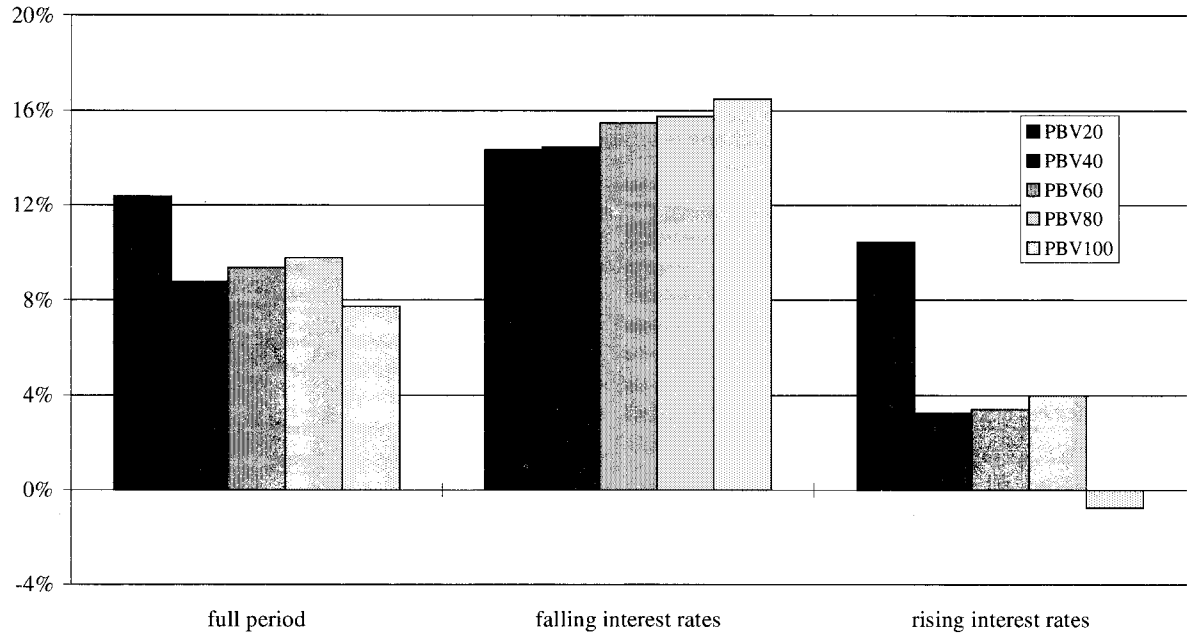
The term structure is defined as difference between the Swiss government long term yield rates and the Swiss franc euromoney rates, 3 months. The Swiss term structure is shown in Figure 2. There have been four major phases of the term structure since January 1977. From January 1977 to January 1982 the term structure declined. During the second phase from January 1982 to September 1987 the term structure was stable. From October 1987 to January 1990 the term structure declined and finally since February 1990 the term structure has been increasing.

5. Interest rate cycles and style portfolios

In the subsequent analysis transaction costs and other expenses are neglected. The average annual returns of the style portfolios show that changes of the interest rate level do not only affects the absolute return. More surprising is that the relative return of the style portfolios tends to invert during a cycles of falling interest rates. The figures 3 to 5 show the average annual return of the style portfolios during different interest rates cycles. The average annual return for all style portfolios during periods of falling interest rates is much higher than during periods of rising interest rates.

Figure 3 shows that for Switzerland, over the full period, a value/growth effect exists. The portfolio PBV20 with the lowest price to book ratio has an average annual return of more than 4% higher than the portfolio PBV100 with the highest price to book ratio. Even more interesting is that an in-

Figure 3: Style portfolios price to book and interest rate cycles



PBV: price to book portfolios;
PBV20: price to Book portfolio with lowest price to book;
PBV100: price to book portfolio with highest price to book

version of the value/growth effect can be observed during periods of falling interest rates. During cycles of rising interest rates, the value/growth effect is positiv. Especially the portfolio with the lowest price to book ratio outperforms all the other portfolios. During phases of falling interest rates, the growth portfolios outperform the value portfolios.

Regarding the dividend yield portfolios, there seems to be no relationship between the dividend yield and the average return of a style portfolio. However, during cycles of falling interest rates portfolios with a higher dividend yield had a higher average annual return excluding the portfolio DY20. In periods of rising interest rates in general, the portfolios with a lower dividend yield exhibit higher returns. Of special interest is the risk of dividend yield portfolios. The higher the dividend yield of a portfolio, the lower the total risk measured by the standard deviation. The relation between risk and the dividend yield is obvious and remains stable for falling and rising interest rates. As mentioned above, the dividend yield is an indicator of the risk of a company going bankrupt. Firms not paying dividends are defined as „marginal firms". Therefore the portfolio DY20 which contains all the marginal firms has the highest risk. A variable like the dividend yield could be very useful in the management of a portfolio for controlling the risk.

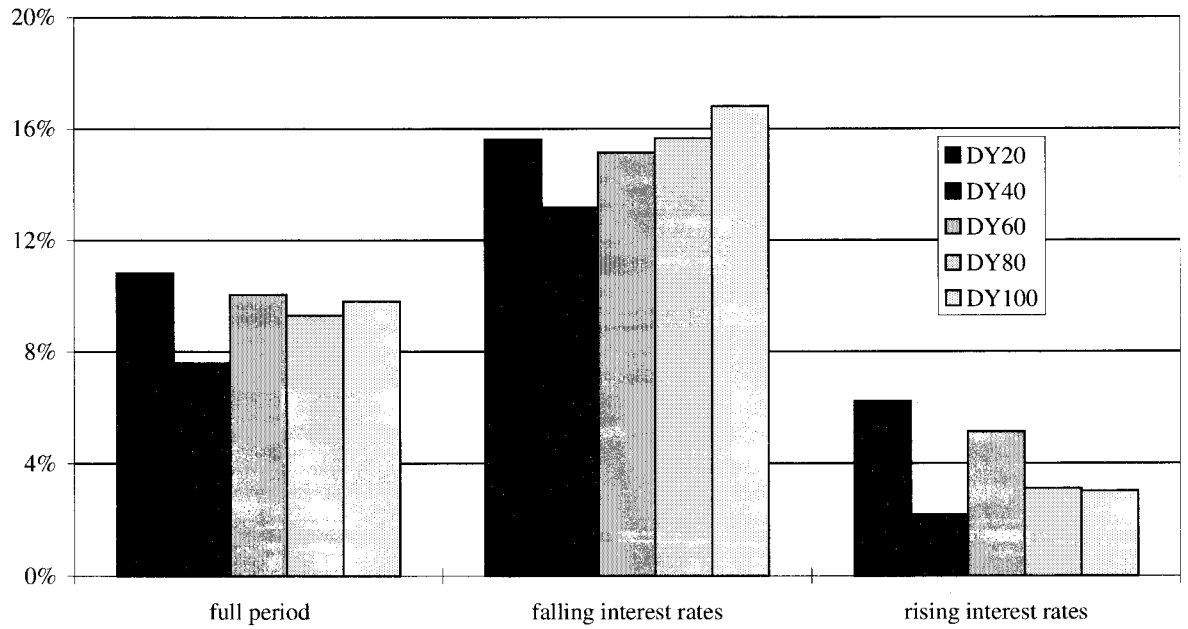
Figure 5 shows the size effect. For the full period, there exists a size effect in Switzerland. But, this effect excludes the big caps in the portfolio SIZE100. Once more, there seems to be an inver-

sion of the classical size effect. However, this time there exists a big cap effect during periods of rising rates. During cycles of falling interest rates, small caps outperformed. The outperformance of big caps is contradictory to our expectations. It is essential to know that the Swiss equity market has been driven more or less by big caps since November 1988, the opening of registered securities of Nestlé for foreigners. This event stands for the start of a general opening of the Swiss market to foreigners.

The inversion of the style effects happens even if the total risk measured by a standard deviation is taken into consideration. Normally, the specific risk measured as a beta remains relative stable meaning that the risks of the portfolios within a style move in parallel. However, the performance of the portfolios changes significantly. Consequently, the fluctuation of the expected returns reflect changes of the risk aversion. The risk aversion of an investor is closely related to the expectations of an economy and the earnings prospects of the firms. An economic recovery means rising earnings leading to a lower risk aversion. A recession and falling earnings increase the risk aversion. Given optimistic expectations investors are willing to invest in riskier and cyclical market segments. Pessimistic expectations lead investors to demand for less risky investments. This change of risk aversio is accentuated by the „marginal portfolios".

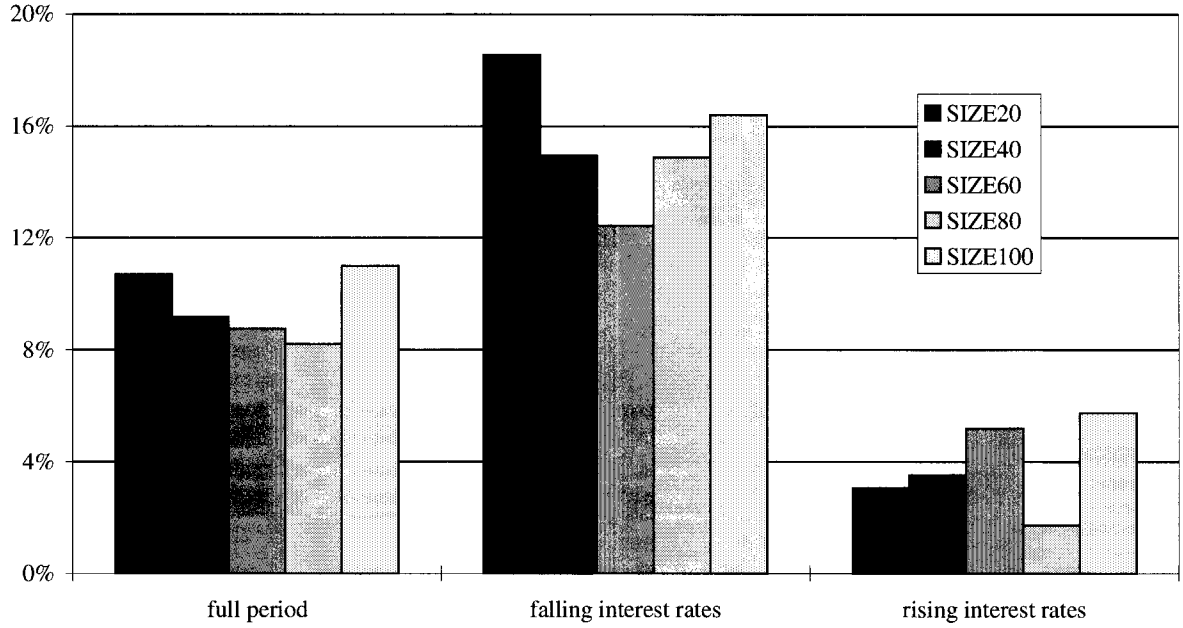
The portfolios show that the returns relative to a market average change significantly during interest rate cycles. However, the relative risk of a portfolio to the market changes only slightly or is stable. The conclusion of this observation is that

Figure 4: Style portfolios dividend yield and interest rates cycles



DY: dividend yield portfolios;
DY20: dividend yield portfolio with lowest dividend yield;
DY100: dividend yield portfolio with highest dividend yield

Figure 5: Style portfolios size and interest rates cycles



SIZE: size portfolios;
SIZE20: size portfolio with smallest capitalization;
SIZE100: size portfolio with biggest capitalization

the risk aversion of investors changes. Therefore style effects are a function of the risk aversion. This study also determines that the risk aversion depends on macroeconomic variables like interest rates or business cycles. Certainly, it is almost impossible to separate the effects of interest rates and business cycles. Especially „marginal portfolios" are very sensitive to business cycles.

6. Interest rate risk and style portfolios

Basically there are two possible reasons for the existence of anomalies. Either the market is not efficient or the capital asset pricing model is misspecified. A multi-factor model is used to find out whether there are economic factors other than the market portfolio. There are two other factors of main interest. First the level of the interest rates which affects the equity duration and respectively the interest rate sensitivity of stocks. Second the term structure which is a useful variable to forecast the growth of an economy.[10] Therefore the term structure is a variable which helps to find out possible relations between styles and business cycles.

The excess return of a style portfolio is defined as a function of three factors:

$$r_{pt} - r_{ft} = \alpha + \beta_m (r_{mt} - r_{ft}) + \beta_B f_{B,t} + \beta_T f_{T,t} + \varepsilon_{pt}.$$

The three factors are the excess return of the market portfolio $r_m - r_{ft}$, the unexpected change of the

Table 4: Correlationmatrix value/growth portfolios

	PBV100	MSCI	BONDU	TERM
PBV20	0.703	0.720	–0.217	0.143
PBV40	0.756	0.801	–0.350	0.212
PBV60	0.779	0.786	–0.312	0.130
PBV80	0.815	0.852	–0.364	0.224
PBV100	1.000	0.851	–0.372	0.194

The data cover the period January 1977 to November 1995. PBV20 to PBV100 are the excess returns of the value/growth portfolios, MSCI is the excess return of the market index, BONDU is the unexpected change of the Swiss bond return and TERM is the term structure. PBV: price to book portfolios, PBV20: price to book portfolio with lowest price to book, PBV100: price to book portfolio with highest price to book

bond yield $f_{B,t}$ and the term structure $f_{T,t}$. The market portfolio r_m is the MSCI index Switzerland, the risk free rate r_f is the Swiss franc euromoney 3 month rate. The unexpected bond yields are the residuals of a autoregressive first-order process AR(1) of the Swiss government long term bond rate. The term structure is the difference between the Swiss government long term bond rate and the Swiss franc euromoney 3 month rate.

The tables 4 to 6 show the correlation between the style portfolios and the three factors. Within each style, the five portfolios are always increasing together. Table 4 demonstrates a clear relation between the value/growth portfolios and the unexpected change of interest rates. The higher the price to book of a portfolio, the more sensitive the portfolio is to interest rate changes. A simple divi dend discount model shows that, generally, stocks with higher growth, and therefore traded at a

Table 5: Correlationmatrix dividend yield portfolios

	DY100	MSCI	BONDU	TERM
DY20	0.685	0.700	–0.196	0.177
DY40	0.775	0.867	–0.357	0.168
DY60	0.774	0.861	–0.340	0.175
DY80	0.793	0.798	–0.321	0.176
DY100	1.000	0.801	–0.377	0.219

The data cover the period January 1977 to November 1995. DY20 to DYB100 are the excess returns of the dividend yield portfolios, MSCI is the excess return of the market index, BONDU is the unexpected change of the Swiss bond return and TERM is the term structure. DY: dividend yield portfolios; DY20: dividend yield portfolio with lowest dividend yield, DY100: dividend yield portfolio with highest dividend yield.

Table 6: Correlationmatrix size portfolios

	SIZE100	MSCI	BONDU	TERM
SIZE20	0.557	0.585	–0.200	0.228
SIZE40	0.739	0.751	–0.296	0.166
SIZE60	0.741	0.772	–0.300	0.180
SIZE80	0.818	0.858	–0.352	0.195
SIZE100	1.000	0.962	–0.393	0.144

The data cover the period January 1977 to November 1995. SIZE20 to SIZE100 are the excess returns of the size portfolios, MSCI is the excess return of the market index, BONDU is the unexpected change of the Swiss bond return and TERM is the term structure. SIZE: size portfolios, SIZE20: size portfolio with smallest capitalization; SIZE100: size portfolio with biggest capitalization.

higher price to book ratio are more sensitive to interest rate changes. There is no clear structure among the dividend yield portfolios and the factors. A higher dividend yield tends to imply a higher sensitivity to interest rates. This result is in line with the general knowledge that the dividend yield is a simple measure for the equity duration.[11] Also it is obvious that the portfolio DY20 is special. There are systematic relations between the size portfolios and all three factors, especially between the size portfolios and the market portfolio and the size portfolios and the unexpected change of interest rates.

The coefficients of the factor model are estimated using HANSEN's (1982) Generalized Method of Moments (GMM). This estimation method allows to avoid usual assumptions of homosketastic and normally distributed error terms. The four instruments are the excess return of the MSCI universe, the change of the Swiss government bond yield, the difference between the government bond yield and the Swiss franc 3 months euromoney rate and the difference between the Swiss franc euromoney rate 3 and 1 months. The five equations within a style are estimated simultaneously. The degrees of freedom are 24. The χ^2 criteria is a goodness of fit test for the model. A large χ^2 statistic indicates that the disturbances are correlated with the instrumental variables. This is evidence of model misspecification.

The results of the estimation are summarized in Table 7. The market betas of the size portfolios increase with the capitalization. The market betas of the dividend yield portfolios decrease with a increase of the dividend yield. This is surprising. Especially the portfolio DY20 should bear the highest specific risk because this portfolio contains all the „marginal firms". There is no obvious relation between the value/growth portfolios and the market betas. Only, one of the coefficients for the interest rate factor is not significant. It is likely that most of the interest rate risk is part of the market risk. Nevertheless, it is quite interesting that the coefficients for the portfolios PBV20, DY20 and SIZE20 are positive, while all other are negative. We defined these portfolios earlier as „marginal portfolios". Generally these marginal portfolios are specially sensitive to interest rate and business cycles.

Table 7: Estimation coefficients of the style portfolios

$$r_{pt} - r_{ft} = \alpha + \beta_m (r_{mt} - r_{ft}) + \beta_B f_{B,t} + \beta_T f_{T,t} + \varepsilon_{pt}$$

	α	β_M	β_B	β_T	adj. R^2	χ^2
PBV20	0.002	**0.877**	2.431	0.206	0.525	7.148
	(0.951)	(14.805)	(1.712)	(1.806)		
PBV40	0.000	**0.866**	–0.895	**0.274**	0.654	
	(0.164)	(19.756)	(0.776)	(2.540)		
PBV60	0.000	**0.836**	–0.786	0.043	0.621	
	(0.318)	(17.322)	(0.578)	(0.404)		
PBV80	0.000	**0.851**	1.426	**0.289**	0.738	
	(0.593)	(23.210)	(1.253)	(3.089)		
PBV100	–0.001	**0.892**	–0.883	0.190	0.732	
	(0.314)	(20.551)	(0.785)	(1.786)		
SIZE20	0.004	**0.662**	2.387	**0.491**	0.369	5.918
	(1.676)	(9.551)	(1.588)	(3.185)		
SIZE40	0.000	**0.838**	0.057	0.177	0.567	
	(0.073)	(17.958)	(0.036)	(1.522)		
SIZE60	0.000	**0.861**	0.380	0.218	0.602	
	(0.026)	(16.828)	(0.258)	(1.804)		
SIZE80	–0.001	**0.862**	–0.060	**0.210**	0.742	
	(0.844)	(20.631)	(0.061)	(2.369)		
SIZE100	0.000	**1.060**	–0.783	0.003	0.928	
	(0.055)	(49.703)	(1.407)	(0.059)		
DY20	0.001	**0.907**	**3.646**	**0.298**	0.505	3.892
	(0.668)	(14.169)	(2.236)	(2.074)		
DY40	–0.001	**0.924**	–0.674	0.110	0.754	
	(0.766)	(21.274)	(0.630)	(1.365)		
DY60	0.001	**0.902**	–0.291	0.121	0.744	
	(1.252)	(21.349)	(0.272)	(1.420)		
DY80	0.000	**0.819**	–0.217	0.159	0.642	
	(0.520)	(18.068)	(0.188)	(1.651)		
DY100	0.001	**0.769**	–1.503	**0.261**	0.657	
	(0.724)	(20.699)	(1.567)	(2.666)		

The estimations are based on monthly data from December 1997 to November 1995.
β_M: beta excess return market portfolio; β_B: beta unexpected changes of Swiss bonds; β_T: beta term structure; χ^2: test of overidentification with 24 degrees of freedom. All estimations are significant on a 1% level. In parenthesis the absolute t-values are given. Bold printed coefficients are significant on a 10% level.
PBV: price to book portfolios, PBV20: price to book portfolio with lowest price to book, PBV100: price to book portfolio with highest price to book, DY: dividend yield portfolios, DY20: dividend yield portfolio with lowest dividend yield, DY100: dividend yield portfolio with highest dividend yield, SIZE: size portfolios, SIZE20: size portfolio with smallest capitalization, SIZE100: size portfolio with biggest capitalization.

7. Conclusion

Style investing enjoys an increasing popularity. Nevertheless, style effects are still often called anomalies. This paper shows, that styles are not necessarily anomalies but are rather caused by the changing risk aversion of investors. Therefore, style effects reflect time-variation of risk premium. Styles are defined by specific characteristics of firms such as market capitalization, price to book, dividend yield or any other ratio. Nevertheless, there is a close relationship between style effects and macroeconomic factors.

The results of this paper show that the returns relative to a market average changes significantly during different interest rate cycles. Relative to a market average the return of style portfolios tends to invert during cycles of falling interest rates. However, the results show also that risk measures are more stable. While returns of style portfolios change substantially, the risk of a style portfolio compared relative to the risk of a benchmark changes only slightly. As a result, style portfolios could be very helpful to control the risk of investments.

The conclusion of this observation is that the risk aversion of investors changes. Therefore style effects are a function of the risk aversion. The risk aversion depends on macroeconomic variables like interest rates or business cycles. Certainly, it is almost impossible to separate the effects of interest rates and business cycles. Especially „marginal portfolios" are very sensitive to business cycles.

For asset management, styles are of interest for various reasons. Styles explain exposures and risks of a portfolio. The performance of a portfolio is often mainly driven by a style – conscious or unconscious. Finally, style approaches enjoy increasing popularity. A number of studies shows that style approaches outperform the market in the long term. This paper demonstrates that style effects are cyclical and correlated to business and interest cycles. Therefore, style effects are not stationary phenomena. The results of this paper strengthen the thesis that an active style investment can be beneficial. Of course, the exploitation of style effects requires the knowledge and the understanding of styles and their cyclical behavior.

Anhang

Table A1: Style portfolios and interest rate cycles

		PBV20	PBV40	PBV60	PBV80	PBV100
Jan 77–Nov 95	return	12.36%	8.77%	9.35%	9.79%	7.75%
# 227	risk	17.00%	17.02%	16.03%	15.04%	17.36%
	t-value	10.96	7.76	8.79	9.81	6.72
	market beta	0.692	0.764	0.793	0.906	0.783
Falling rates	return	14.35%	14.45%	15.48%	15.74%	16.48%
# 112	risk	18.27%	18.90%	17.53%	16.93%	19.41%
	t-value	8.31	8.09	9.35	9.84	8.99
	market beta	0.658	0.715	0.714	0.826	0.736
Rising rates	return	10.42%	3.23%	3.38%	3.99%	–0.75%
# 115	risk	15.72%	14.86%	14.28%	12.78%	14.78%
	t-value	7.11	2.33	2.54	3.35	–0.55
	market beta	0.734	0.841	0.910	1.049	0.877
		DY20	DY40	DY60	DY80	DY100
Jan 77–Nov 95	return	10.85%	7.59%	10.07%	9.30%	9.81%
# 227	risk	19.64%	16.55%	16.32%	15.63%	14.63%
	t-value	8.32	6.91	9.30	8.97	10.10
	market beta	0.597	0.837	0.844	0.827	0.878
Falling rates	return	15.60%	13.17%	15.14%	15.65%	16.78%
# 112	risk	22.41%	17.56%	18.17%	17.10%	16.50%
	t-value	7.37	7.94	8.82	9.69	10.76
	market beta	0.529	0.813	0.796	0.780	0.791
Rising rates	return	6.22%	2.16%	5.14%	3.12%	3.02%
# 115	risk	16.50%	15.42%	14.22%	13.90%	12.31%
	t-value	4.04	1.50	3.87	2.41	2.63
	market beta	0.714	0.869	0.919	0.901	1.044
		SIZE20	SIZE40	SIZE60	SIZE80	SIZE100
Jan 77–Nov 95	return	10.71%	9.16%	8.76%	8.22%	11.01%
# 227	risk	17.02%	16.57%	17.16%	15.68%	16.58%
	t-value	9.48	8.33	7.69	7.90	10.00
	market beta	0.600	0.740	0.736	0.873	0.909
Falling rates	return	18.55%	14.95%	12.43%	14.89%	16.41%
# 112	risk	19.18%	19.28%	19.04%	16.98%	17.15%
	t-value	10.23	8.21	6.91	9.28	10.13
	market beta	0.511	0.658	0.699	0.836	0.918
Rising rates	return	3.07%	3.53%	5.18%	1.72%	5.74%
# 115	risk	14.36%	13.32%	15.12%	14.12%	15.94%
	t-value	2.29	2.84	3.68	1.31	3.86
	market beta	0.756	0.906	0.789	0.932	0.900

Return: average annual return, risk: annual standard deviation; PBV: price to book portfolios; PBV20: price to Book portfolio with lowest price to book; PBV100: price to book portfolio with highest price to book; DY: dividend yield portfolios; DY20: dividend yield portfolio with lowest dividend yield; DY100: dividend yield portfolio with highest dividend yield; SIZE: size portfolios; SIZE20: size portfolio with smallest capitalization; SIZE100: size portfolio with biggest capitalization

Footnotes

[1] BANZ/HAWAWINI (1987) DIMSON (1987), BERNSTEIN (1995).
[2] REINGANUM (1981), FAMA/FRENCH (1992).
[3] BANZ (1981), KEIM (1985), FAMA/FRENCH (1992).
[4] FAMA/FRENCH (1992), CAPAUL/ROWLEY SHARPE (1993) or BERNSTEIN (1995, p. 16).
[5] ROZEFF (1984), SHILLER (1981), KEIM (1985), FAMA/FRENCH (1988b) and (1992), BERNSTEIN (1995).
[6] BANZ (1981), REINGANUM (1981), CHAN/CHEN/HSIEH (1985), OERTMANN (1994), STAUB (1996).
[7] The method is used by Morgan Stanley Capital International.
[8] Portfolios which represent firms in sprecial situations or which behave different to the peer portfolios are defined as marginal portfolios. In this paper the portfolios PBV20, DY20 and SIZE20 are called marginal portfolios.
[9] This phenomenon has been observed as well by other authors. For example see STAUB (1996).
[10] HARVEY (1988 and 1993), ESTRELLA/HARDOUVELIS (1991).
[11] BERNSTEIN (1995, p 120 ff.).

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