Idiosyncratic volatility and security returns: evidence from Germany and United Kingdom

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Abstract

Purpose – Malkiel and Xu state that idiosyncratic volatility is highly correlated with size and that it plays a powerful role in explaining expected returns. The purpose of this paper is to ask whether idiosyncratic volatility is useful in explaining the variation in expected returns; and whether the findings can be explained by the turn of the year effect.

Design/methodology/design – Monthly stock returns and market values of all listed firms in Germany and UK covering the period 1991-2001 from Datastream are used as the basis of the evaluation.

Findings – The paper finds that the three-factor model provides a better description of expected returns than the Capital Asset Pricing Model (CAPM). That is, it is found that firm size and idiosyncratic volatility are related to security returns. In addition, it is noted that the findings are robust throughout the sample period

Originality/value – The paper shows that the CAPM beta alone is not sufficient to explain the variation in stock returns.

Keywords Stock returns, Market value, Capital asset pricing model, Germany, United Kingdom

Paper type Research paper

1. Introduction

Why has the rate of return on equities been higher than the rate of return on risk free assets? The question first posed by Mehra and Prescott (1985) has been termed the "equity premium puzzle." One simple answer to this challenging question is that equities are more riskier than bonds and thus investors require a premium for taking this additional risk. In the context of the Capital Asset Pricing Model (CAPM) high beta stocks generate superior returns since there is a linear relationship between the stock's beta and the expected return. However, recent tests show that the cross-section of average stock returns shows little or no relation to the market betas of the CAPM.

The results indicate that variables such as firm size[1], leverage, firm's book value of equity to its market value, and more recently idiosyncratic volatility adequately

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explain the cross-section of average stock returns better than the beta of a stock. In an important paper Malkiel and Xu (1997) confirm the controversial finding of Fama and French (1992) (FF) that beta does not appear as an explanatory variable when attempting to model the annual returns on US stocks from 1963 through 1990.

They find that portfolios of smaller firms produce risk-adjusted rates of return that are greater than the returns from portfolios of larger firms. Interestingly, they report that idiosyncratic volatility is highly correlated with firm size and that it plays an important role in explaining expected returns. That is, they observe that portfolios of smaller companies have higher idiosyncratic volatility and thus these portfolios post significantly higher average returns suggesting that asset returns are influenced by factors that are not related to economic conditions. Finance theory states that through the process of diversification "idiosyncratic factors" can be cancelled out and thus asset returns are only influenced by systematic factors. In this article, we investigate this argument by providing out of sample evidence from two European stock markets – Germany and UK.

We specifically ask:

- Is idiosyncratic volatility needed to explain the variation in average stock returns? and
- How are firm size and idiosyncratic volatility related to security returns?

We ask these two questions since recent research suggests that firm size is strongly related to idiosyncratic volatility (Malkiel and Xu, 1997). Malkiel and Xu (1997) report that portfolios of smaller stocks tend to have larger idiosyncratic volatility than portfolios of larger stocks. More importantly, they show that idiosyncratic volatility is highly correlated with firm size and that it plays a powerful role in explaining the cross-section of expected returns. Malkiel and Xu (2000) report that idiosyncratic volatility affects returns even after controlling for firm size and book-to-market equity effects. They state that idiosyncratic volatility will affect asset returns when not every investor is able to hold the market portfolio. Campbell *et al.* (2001) find a noticeable increase in firm level volatility relative to the market volatility. Their results indicate that firm specific volatility is the largest component of the total volatility of an average firm. Xu and Malkiel (2003) report that volatility is associated with the level of institutional ownership as well as a positive relationship between idiosyncratic volatility and expected earnings growth. Drew and Veeraraghavan (2002) show that small and high idiosyncratic volatility stocks generate superior returns in Hong Kong, India, Malaysia and Philippines. Their findings support Malkiel and Xu (1997, 2000) who document that idiosyncratic risk is useful in explaining the cross-section of expected returns.

Interestingly, Drew *et al.* (2003) find that small and low idiosyncratic volatility firms generate superior returns than big and high idiosyncratic volatility firms for equities listed in Shanghai Stock Exchange. They propose a behavioral explanation in that they forward irrational investor behavior as a possible explanation in the spirit of Thaler (1999), Daniel and Titman (1999) and Hirshleifer (2001). They conclude that Chinese investors are quasi-rational investors in the sense of Thaler (1999).

Hamao *et al.* (2002) state that the role of idiosyncratic risk in asset pricing has largely been ignored since standard finance theory argues that only systematic risk should be priced in the market. In a similar vein, Xu and Malkiel (2003) observe that the behavior of idiosyncratic volatility has received far less attention in the finance literature. This is because standard finance theory argues that idiosyncratic volatility can be eliminated in a well-diversified portfolio. Barber and Odean (2000) and Benartzi and Thaler (2001) report that both individual investors' portfolios and mutual fund portfolios' are undiversified. Goyal and Santa-Clara (2003) argue that the lack of diversification suggests that the relevant measure of risk for many investors may be the total risk. It is important to note that little, if any, has been published on whether idiosyncratic volatility can explain the cross section of expected stock returns.

In light of these discussions we investigate whether idiosyncratic volatility can serve as a useful proxy for systematic risk and whether it helps explain the variation in average stock returns for equities listed in German and UK markets. The rest of the paper is organized as follows. Section 2 describes the data and methodology employed in this paper. Section 3 presents our findings while Section 4 presents concluding comments.

2. Data and methodology

2.1 Data and the model

We obtain monthly stock returns and market values of all listed firms in Germany and UK covering the period 1991-2001 from Datastream. The relationship between stock returns, overall market factor, size (ME), and idiosyncratic volatility is investigated by employing the following model.

$$R_{pt} - R_{ft} = a_{pt} + b_p(R_{mt} - R_{ft}) + s_p \mathrm{SMB}_t + h_p \mathrm{HIVMLIV}_t + \varepsilon_{pt} \quad (1)$$

where, R_{pt} is the average return of a portfolio (S/L, S/M, S/H; B/L, B/M and B/H)[2]. R_{ft} is the risk-free rate[3] observed at the beginning of each month. Market, is long the market portfolio and short the risk free asset; SMB (small minus big), is long small capitalization stocks and short large capitalization stocks; HIVMLIV (High Idiosyncratic Volatility minus Low Idiosyncratic Volatility), is long high idiosyncratic volatility stocks and short low idiosyncratic volatility stocks.

2.2 Methodology

In this paper we follow the mimicking portfolio approach of Fama and French (1996) in constructing portfolios on firm size and idiosyncratic volatility. We follow this approach since Malkiel and Xu (1997, 2000), Xu and Malkiel (2001), Drew and Veeraraghavan (2002) and Drew *et al.* (2003) suggest that idiosyncratic volatility may be relevant for asset pricing and that it may serve as a useful proxy for systematic risk.

2.2.1 Size portfolios. At the end of December of each year t stocks are assigned to two portfolios of size (small or big) based on whether their December market equity (ME) (defined as the product of the closing price times number of shares outstanding) is above or below the median ME. We form portfolios as of December of each year since most firms in Germany have December as fiscal year end. For firms listed in UK size portfolios are constructed at the end of March of each year since most firms have March as fiscal year end.

2.2.2 Idiosyncratic volatility portfolios. In an independent sort the same stocks are allocated to three idiosyncratic volatility portfolios (low, medium, and high) based on the breakpoints for the bottom 33.33 percent and top 66.67 percent. We first compute the variance of returns for each stock in the sample. We define the variance of returns as the total risk of a stock. We then estimate the beta for each stock by using the covariance/variance approach. We define systematic risk as the beta of a stock multiplied by the variance of the index. Note that we require the previous 24 months of average returns to calculate the variance or beta of the stock. Stocks that do not have 24 months of continuous returns are excluded from the sample. Similarly, we use the previous 24 months of market returns to calculate the variance of the index. We define idiosyncratic volatility as the difference between total risk and the systematic risk of a stock.

2.2.3 Six intersection and three zero investment portfolios. We form six intersection and three zero investment portfolios. The six intersection portfolios formed are (S/L, S/M, and S/H; B/L, B/M, and B/H). The three zero investment portfolios are RMRFT, SMB and HIVMLIV. We define the three zero investment portfolios RMRFT, SMB, and HIVMLIV as follows: RMRFT is long the overall market portfolio and short the risk free asset. SMB is the difference each month between the average of the returns of the three small stock portfolios (S/L, S/M, and S/H) and the average of the returns of the three big portfolios (B/L, B/M, and B/H). HIVMLIV is the difference between the average of the returns of the two high idiosyncratic volatility portfolios (S/H, B/H) and the average of the returns on the two low idiosyncratic volatility portfolios (S/L, B/L).

3. Results

3.1 Performance of the intersection and zero cost portfolios

3.1.1 Germany. Table I, reports the average numbers of firms in each portfolio for the sample period. B/L portfolio has an average of 42 firms followed by the S/M portfolio with an average of 24 firms. The S/L and B/M portfolios have an average of 19 and 18 firms, respectively. The least number of firms are in S/H and B/H portfolios with an average of 11 and 4, respectively. Our first research question is to investigate whether a multifactor asset-pricing model explains the cross-section of average stock returns. Specifically, this study is interested in whether an overall market factor, firm size and idiosyncratic volatility can explain the cross-sectional pattern of stock returns. The mean monthly returns and the regression parameters are reported in Table II.

Table II, Panel A, shows the summary statistics while Panel B shows the regression coefficients of the three-factor model. Our results show that all six portfolios generate positive returns with the S/H portfolio generating the highest return of 1.61 percent per month. The overall performance of the six portfolios is graphically shown in Figure 1. Our findings also show that the overall market factor generates a return of 0.52 percent per month while the other two mimic portfolios, SMB and HIVMLIV generate a return of 0.17 percent per month and 0.87 percent per month, respectively. Since, the mimic

Year	S/L	S/M	S/H	B/L	B/M	B/H	Total
1993	16	21	9	37	12	7	102
1994	14	24	10	42	12	2	104
1995	16	23	9	45	8	4	105
1996	16	20	15	44	10	3	108
1997	14	22	16	43	13	5	113
1998	22	19	12	44	16	4	117
1999	22	26	5	42	23	3	121
2000	22	31	5	40	30	4	132
2001	29	26	15	40	38	7	155
Average	19	24	11	42	18	4	117

Table I.
Sample characteristics – Germany number of companies in portfolios formed on size and idiosyncratic volatility 1993-2001

Table II.
Summary statistics and multifactor regressions for portfolios formed on size and idiosyncratic volatility – Germany 1993-2001

Summary statistics Idiosyncratic volatility portfolios Size	Low	Medium	High	Low	Medium	High
Panel A: summary statistics						
	Means			Standard deviations		
Small	0.46	0.83	1.61	3.94	4.45	4.92
Big	0.52	0.76	1.10	4.38	3.73	8.38
Regression coefficients						
Panel B: $R_{pt} - R_{ft} = a_{pt} + b_p(R_{mt} - R_{ft}) + s_p SMB_t + h_p HIVMLIV_t + \varepsilon_{it}$						
	a			$t(a)$		
Small	0.000	0.003	0.002	0.353	1.106	1.352
Big	0.002	0.004	0.000	1.028	1.898	0.076
	b			$t(b)$		
Small	0.541	0.587	0.680	11.626	11.205	17.803
Big	0.708	0.531	0.569	18.377	12.250	10.172
	s			$t(s)$		
Small	0.311	0.454	1.349	4.751	6.161	25.111
Big	0.103	−0.052	−0.935	1.899	−0.856	−11.874
	h			$t(h)$		
Small	0.037	0.145	0.853	0.712	2.458	19.807
Big	−0.097	0.047	1.086	−2.239	0.957	17.213
	R^2			$s(e)$		
Small	0.65	0.68	0.91	2.57	2.89	2.11
Big	0.76	0.69	0.86	2.13	2.39	3.09
	DW					
Small	1.96	1.96	1.99			
Big	1.92	1.93	1.98			

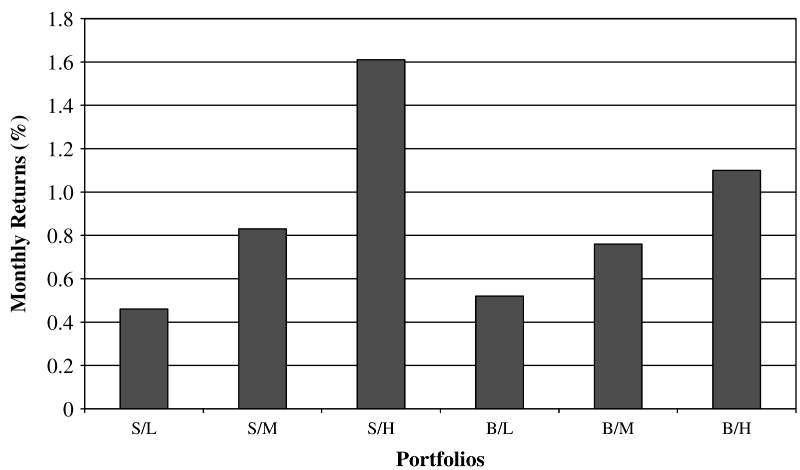

Figure 1.
Mean monthly returns Germany

portfolios for size and idiosyncratic volatility generate superior returns, we argue that this is a compensation for risk not captured by the CAPM. That is, we advance a risk-based explanation and suggest that small and high idiosyncratic volatility firms are riskier than big and low idiosyncratic volatility firms.

Panel B, shows, that the intercept, is statistically insignificant and close to zero for all six portfolios. The findings also show that the *b* coefficient is positive and highly significant for the six portfolios. The *s* coefficient increases monotonically and is positive and highly significant for the three small stock portfolios. As far as three big portfolios are concerned the *s* coefficient is positive for B/L but negative for B/M and B/H portfolios.

Note that our findings are consistent with that of Fama and French (1996) who argue that small firms load positively on SMB while big firms load negatively on SMB. The *h* coefficient increases monotonically for all six portfolios and is highly significant at the 1 percent level for S/H and B/H portfolios. The other portfolios display low levels of statistical significance. We do not find any evidence of autocorrelation since the d-statistic is close to two for all six portfolios. Similarly, the test for multicollinearity shows no evidence of multicollinearity between the independent variables.

3.1.2 United Kingdom. Table III, reports the average number of firms in each portfolio for the sample period. The B/L portfolio has the largest number of firms with an average of 242, followed closely by the S/H portfolio with an average of 230 firms. The S/M portfolio contains an average of 151 firms while B/M contains an average of 179 firms. The S/L and B/H portfolios have an average of 82 and 90 firms, respectively. In Table IV we report the summary statistics and regression coefficients of our multifactor model. Panel A, shows, the summary statistics while Panel B shows the regression coefficients.

Our results show that with the exception of two portfolios all other portfolios generate positive returns. Our results also show that the B/H portfolio generates the highest return of 3.36 percent per month while the S/H portfolio generates a return of 1.16 percent per month. Our findings for UK differ in this respect with that of Germany where we found that the small and high idiosyncratic volatility portfolios generate the highest returns.

The overall performance of the six portfolios is graphically shown in Figure 2. Our findings also show that the overall market factor generates a mean monthly return of 0.32 percent per month while the mimic portfolio for size and idiosyncratic volatility generate a return of −1.46 percent per month and 1.96 percent per month, respectively. Thus, in the case of UK we document a big firm effect. Note that in Germany we found a small firm effect. However, it is to be noted that in both the markets investigated in this paper we document an idiosyncratic volatility effect. That is, portfolios with high idiosyncratic volatility firms generate higher returns than portfolios with low idiosyncratic volatility firms.

Year	S/L	S/M	S/H	B/L	B/M	B/H	Total
1993	41	130	204	204	117	40	736
1994	36	128	207	214	125	41	751
1995	39	113	215	218	149	41	775
1996	40	134	209	241	152	71	847
1997	68	148	215	239	164	93	927
1998	101	144	242	246	208	102	1,043
1999	138	178	241	248	213	137	1,155
2000	140	198	252	273	224	149	1,236
2001	134	187	285	295	257	133	1,291
Average	82	151	230	242	179	90	973

Table III. Sample characteristics – UK number of companies in portfolios formed on size and idiosyncratic volatility 1993-2001

Summary statistics						
Idiosyncratic volatility portfolios						
Size	Low	Medium	High	Low	Medium	High
Panel A: summary statistics						
	Means			Standard deviations		
Small	−0.18	−0.01	1.16	2.02	3.07	6.91
Big	0.79	0.18	3.36	4.09	3.40	8.89
Regression coefficients						
Panel B: $R_{pt} - R_{ft} = a_{pt} + b_p(R_{mt} - R_{ft}) + s_p SMB_t + h_p HIVMLIV_t + \varepsilon_{it}$						
	a			$t(a)$		
Small	−0.002	−0.004	0.001	−1.444	−1.464	0.385
Big	−0.000	−0.001	0.004	−0.171	−0.299	2.200
	b			$t(b)$		
Small	0.306	0.391	0.549	5.949	5.331	7.196
Big	0.525	0.440	0.281	8.459	5.976	5.378
	s			$t(s)$		
Small	0.106	0.101	0.714	1.129	0.754	5.129
Big	−0.452	−0.565	−1.063	−3.989	−3.495	−11.148
	h			$t(h)$		
Small	0.089	0.225	0.975	3.479	6.161	25.612
Big	0.004	0.167	1.118	0.123	3.793	42.925
	R^2			$s(e)$		
Small	0.72	0.65	0.88	2.63	2.32	2.41
Big	0.67	0.69	0.96	1.96	2.39	1.65
	DW					
Small	1.99	1.98	1.96			
Big	1.97	2.07	1.96			

Table IV.
Summary statistics and multifactor regressions for portfolios formed on size and idiosyncratic volatility – UK 1993-2001

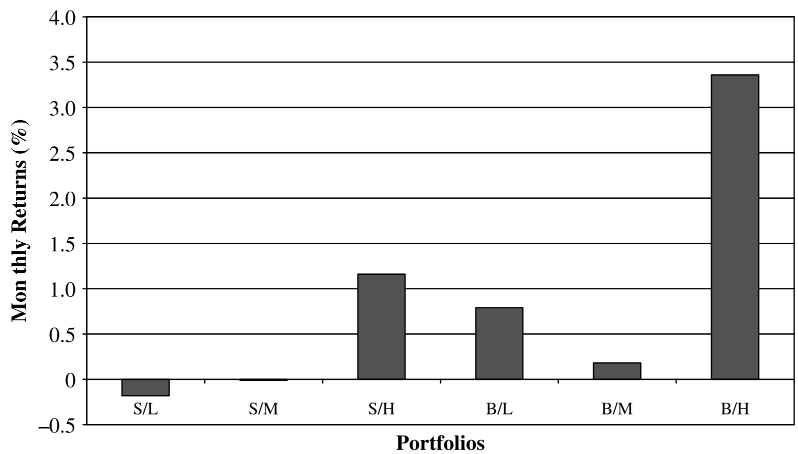

Figure 2.
Mean monthly returns UK

In Table IV, Panel B, we report the coefficients of our multifactor model. Our findings show that the intercept, a coefficient, is indistinguishable from zero for all six portfolios. The b coefficient is positive and statistically significant for all portfolios. The s coefficient is positive for the three small stock portfolios and statistically significant only for S/H portfolio, while the big stock portfolios show negative coefficients with statistical significance. The *h* coefficient increases monotonically for all six portfolios and is highly significant at the 1 percent level for five out of six portfolios. As far as the diagnostics are concerned we find no evidence of autocorrelation or multicollinearity in our sample.

3.2 Results from turn of the year effect

3.2.1 Germany. Prior research on the behaviour of stock prices documents a strong seasonality effect occurring in the month of January, especially for small size stocks. This effect has been described as the January effect. Research also shows that monthly seasonality is linked to the size of the firm. Therefore, a natural extension to the size effect is to examine whether it displays monthly seasonality. Thus, we ask whether multifactor models findings can be explained by the turn of the year effect. In this model we add a dummy variable that takes the value "1" for the month of January and "0" for remaining months. Our model takes the following form:

$$R_{pt} - R_{ft} = a_{pt} + b_p(R_{mt} - R_{ft}) + s_p\text{SMB}_t + h_p\text{HIVMLIV}_t + \gamma_p\text{DJAN}_t + \varepsilon_t$$

Table V, shows the regression coefficients for the multifactor model. Our findings do not reveal any evidence of the turn of the year effect for Germany since the coefficient for the January dummy is not statistically significant for any of the six portfolios. Thus, we reject the claim that the multifactor findings can be explained by seasonality effect.

Table V. Tests for turn of the year effect – Germany

Idiosyncratic volatility portfolios Size	Low	Medium	High	Low	Medium	High
$R_{pt} - R_{ft} = a_{pt} + b_p(R_{mt} - R_{ft}) + s_p\text{SMB}_t + h_p\text{HIVMLIV}_t + \gamma_p\,\text{Jan}_t + \varepsilon_{it}$						
	a			*t*(*a*)		
Small	0.001	0.003	0.002	0.377	1.214	1.293
Big	0.002	0.004	0.000	1.018	1.940	0.130
	b			*t*(*b*)		
Small	0.542	0.589	0.680	11.538	11.172	17.650
Big	0.708	0.532	0.570	18.230	12.195	10.103
	s			*t*(*s*)		
Small	0.309	0.446	1.349	4.613	5.919	24.518
Big	0.102	−0.057	−0.938	1.830	−0.923	−11.636
	h			*t*(*h*)		
Small	0.037	0.146	0.853	0.711	2.461	19.707
Big	−0.097	0.047	1.087	−2.225	0.963	17.133
	γ			$t(\gamma)$		
Small	−0.001	−0.005	−0.000	−0.138	−0.551	0.853
Big	−0.000	−0.003	−0.002	−0.129	−0.448	−0.200
	R^2			*s*(*e*)		
Small	0.57	0.59	0.91	2.58	2.90	2.12
Big	0.76	0.59	0.86	2.14	2.40	3.10
	DW					
Small	1.97	1.95	1.98			
Big	2.05	1.94	2.02			

3.2.2 United Kingdom. In the case of UK we test for both January and April effects. In this model January dummy is represented by γ while April dummy is represented by θ. Our time-series model takes the following form:

$$R_{pt} - R_{ft} = a_{pt} + b_p(R_{mt} - R_{ft}) + s_p SMB_t + h_p HIVMLIV_t + \gamma_p DJAN_t + \theta_p DAPRIL_t + \varepsilon_{pt}$$

Once again (Table VI), our findings reveal no evidence of the turn of the year effect since the January and April dummy are statistically insignificant for all six portfolios. Thus, we argue that the multifactor model is robust throughout the sample period. We also do not find any evidence of autocorrelation or multicollinearity in our sample.

3.3 Factors of risk and risk premia

3.3.1 Germany. Our findings show that the market portfolio generates positive risk premia for all six portfolios. We find that the (B/L) portfolio generates the highest risk premia of 0.36 percent per month (t-statistic = 18.377). We also report that idiosyncratic volatility is highly correlated with firm size. Once again, we find that the (S/H) portfolio generates the highest size premium of 0.22 percent per month (t-statistic = 25.111) while the (B/H) portfolio generates the highest idiosyncratic volatility premia of 0.94 percent per month (t-statistic = 17.213). We also observe that the premia associated with idiosyncratic volatility increases monotonically for the

Idiosyncratic volatility portfolios						
Size	Low	Medium	High	Low	Medium	High
$R_{pt} - R_{ft} = a_{pt} + b_p(R_{mt} - R_{ft}) + s_p SMB_t + h_p HIVMLIV_t + \gamma_p Jan_t + \theta_p Feb_t + \varepsilon_{it}$						
	a			$t(a)$		
Small	−0.002	−0.003	0.000	−0.950	−1.243	0.113
Big	−0.000	−0.001	−0.003	−0.331	−0.365	−1.524
	b			$t(b)$		
Small	0.312	0.396	0.557	5.969	5.274	7.194
Big	0.530	0.450	0.284	8.389	4.986	5.406
	s			$t(s)$		
Small	0.100	0.100	0.731	1.063	0.738	5.216
Big	−0.442	−0.552	−1.075	−3.862	−3.383	11.310
	h			$t(h)$		
Small	0.087	0.225	0.981	3.361	6.047	25.538
Big	0.007	0.172	1.114	0.237	3.837	42.744
	γ			$t(\gamma)$		
Small	−0.004	−0.001	0.011	−0.801	−0.119	1.283
Big	0.006	0.008	−0.009	0.946	0.778	−1.551
	θ			$t(\theta)$		
Small	−0.006	−0.0047	−0.000	−1.080	−0.461	−0.072
Big	0.006	0.008	−0.009	0.946	0.778	−1.551
	R^2			$s(e)$		
Small	0.67	0.69	0.88	1.63	2.34	2.42
Big	0.64	0.66	0.92	1.97	2.82	1.64
	DW					
Small	1.99	1.98	1.97			
Big	1.98	2.07	1.96			

Table VI.
Tests for turn of the year effect (January and April) – UK

three small and big stock portfolios. As, small and high idiosyncratic volatility firms generate higher risk premia we argue that these factors are compensation for the risk missed by the CAPM. Once again our findings are consistent with that of Malkiel and Xu (1997, 2000). Our results are shown in Figure 3.

3.3.2 United Kingdom. Our findings reveal that the market factor generates positive risk premia for all six portfolios. As with Germany we find that the (S/H) portfolio generates the highest risk premia of 0.17 percent per month (t-statistic = 7.196). Interestingly, our findings for UK are different from that of Germany in that we document a big firm effect in UK. This is because we find that the three small stock portfolios generate negative risk premia while the three big stock portfolios generate positive risk premia. We observe that the (B/H) portfolio generates the highest size premia of 1.55 percent per month (t-statistic = 11.148). As far as idiosyncratic volatility premia is concerned we see a monotonic increase for all six portfolios. We find that the (B/H) portfolio generates the highest premia of 2.19 percent per month (t-statistic = 42.925) followed by the (S/H) portfolio of 1.91 percent per month (t-statistic = 25.612). The findings in this respect are consistent with that of Germany. We suggest that if investors are willing to take additional risks they should invest in firms with such characteristics. We summarize these results in Figure 4.

4. Conclusions

The CAPM states that expected returns on securities are a positive linear function of their market betas. However, Malkiel and Xu (1997, 2000) contradict the CAPM by observing that idiosyncratic volatility is priced in the market and hence related to stock returns. In this paper we investigate the explanatory power of a multifactor model with idiosyncratic volatility ask:

- whether idiosyncratic volatility is correlated with firm size; and
- whether such a model is useful in explaining the variation in stock returns.

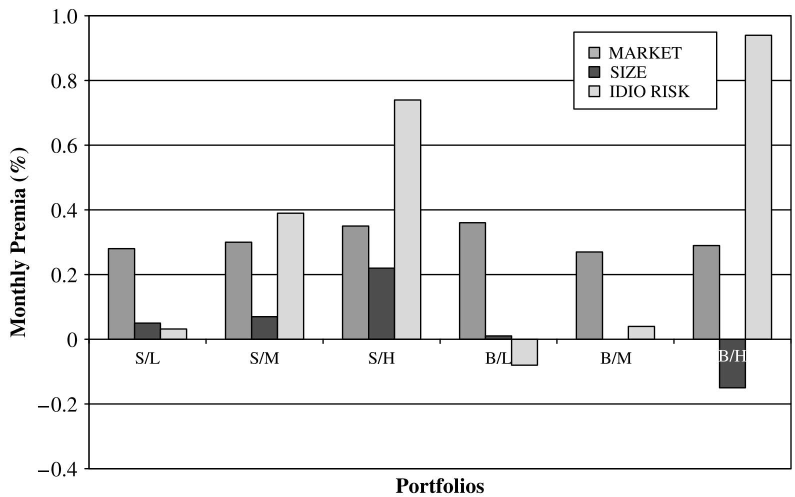

Figure 3. Market, size and idiosyncratic volatility premia Germany

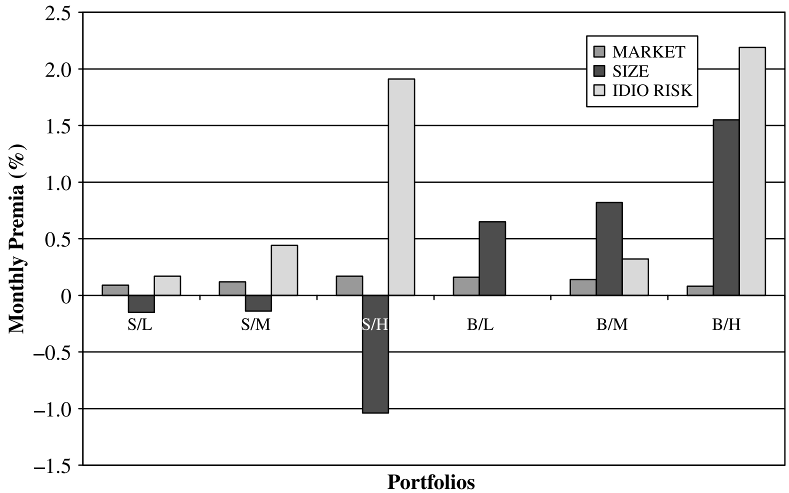

Figure 4.
Market, size and idiosyncratic volatility premia UK

Our findings suggest that idiosyncratic volatility is highly correlated with firm size and that it is useful in explaining expected stock returns. In Tables VII and VIII we present the premia generated by market, firm size and idiosyncratic volatility for Germany and UK. We find that small firms generate higher returns because they have high idiosyncratic volatility. Thus, we argue that idiosyncratic volatility is correlated with firm size. Interestingly, for UK we find that big firms have higher idiosyncratic volatility and thus those portfolios generate superior returns. Hence, we advance the

Table VII.
Market, size and idiosyncratic volatility Premia – Germany

Portfolio	Market premium (percent)	Size premium (percent)	Idiosyncratic volatility premium (percent)
S/L	0.28 (11.626)	0.05 (4.751)	0.032 (0.712)
S/M	0.30 (11.205)	0.07 (6.161)	0.39 (2.458)
S/H	0.35 (17.803)	0.22 (25.111)	0.74 (19.807)
B/L	0.36 (18.377)	0.01 (1.899)	−0.08 (−2.239)
B/M	0.27 (12.250)	−0.00 (−0.856)	0.04 (0.957)
B/H	0.29 (10.172)	−0.15 (−11.874)	0.94 (17.213)

Table VIII.
market, size and idiosyncratic volatility Premia – UK

Portfolio	Market premium (percent)	Size premium (percent)	Idiosyncratic volatility premium (percent)
S/L	0.09 (5.949)	−0.15 (1.129)	0.17 (3.479)
S/M	0.12 (5.331)	−0.15 (0.754)	0.44 (6.161)
S/H	0.17 (7.196)	−1.04 (5.129)	1.91 (25.612)
B/L	0.16 (8.459)	0.65 (−3.989)	0.01 (0.123)
B/M	0.14 (4.976)	0.82 (−3.495)	0.33 (3.793)
B/H	0.08 (5.378)	1.55 (−11.148)	2.19 (42.925)

argument that investors who invest in stocks with these characteristics tend to take greater risk and thus higher risk premia are compensation for these risks. As far as the seasonality issue is concerned we do not find any evidence of our results being explained by the turn of the year effect. Our findings are consistent with Malkiel and Xu (1997, 2000) who find that idiosyncratic volatility is useful in explaining cross-sectional expected returns. They also observe that idiosyncratic volatility is related to the size of the firm in that small firms have high idiosyncratic volatility thus providing an alternative explanation to the Fama and French (1992) conclusions. Thus, we demonstrate that idiosyncratic volatility plays an important role in empirical asset pricing. In closing, we argue that the CAPM beta alone is not sufficient to describe the variation in average equity returns.

Notes

1. Banz (1981) and Reinganum (1981) show that risk-adjusted stock returns are a monotonically decreasing function of firm size. Banz (1981) shows that going long in a portfolio of small firms and going short in a portfolio of big firms generates excess returns of approximately 20 percent per year. Schultz (1983) shows that investors can earn risk-adjusted returns after transaction costs by holding small firms for short periods. Also, see, Schwert (1983), Fama and French (1993, 1996, 1998), Chelley-Steeley and Steeley (1996), Fletcher (1997), Priestley (1997), Heston *et al.* (1999), Charitou *et al.* (2001), Dimson and Marsh (2001), Beltratti and Massimo (2002) and Dissanaike (2002).
2. S/L Portfolio = Small firms with low idiosyncratic volatility
   S/M Portfolio = Small firms with medium idiosyncratic volatility
   S/H Portfolio = Small firms with high idiosyncratic volatility
   B/L Portfolio = Big firms with low idiosyncratic volatility
   B/M Portfolio = Big firms with medium idiosyncratic volatility
   B/H Portfolio = Big firms with high idiosyncratic volatility.
3. We use the Germany Benchmark bond 10-year yield for Germany and the 1-month interbank rate for UK as risk-free rate of return.

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