Value versus Growth in the UK Stock Market, 1955 to 2000

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Introduction

We perform a historical analysis of value versus growth in the UK stock market. Our analysis employs a new data set of balance sheets for all listed UK firms back to 1953. It enables us to look at value effects across the whole population of stocks listed on the London Stock Exchange from 1955-2000. Our data set is free of survivorship bias and covers more than thousand firms already at the start of the sample period. This is the first non-U.S. study of the value effect that uses a data set that is comparable, with respect to survivorship issues even better, than the benchmark U.S. CRSP[1]/COMPUSTAT database.

While there have been studies of the value effect outside of the US, for example Capaul, Rowley, and Sharpe (1993) and Fama and French (1998), these studies have used data sets with relatively short time frame and limited to large cap stocks. In contrast, our data allows to examine the value effect in the UK also within the small-cap universe and over a long time period.

Data

In studies of the historical performance of investment strategies data mining and survivorship biases are serious issues, as argued in Lo and MacKinlay (1990) and Kothari, Shanken, and Sloan (1995). The latter study specifically questioned the abnormal performance of high book-to-market stocks that had been documented in Fama and French (1992). They argue that the way the U.S. COMPUSTAT database is updated excludes some underperforming firms with hindsight. Our analysis tackles both of these issues. We investigate returns for value and growth strategies on a new data set for the U.K. that, except for some subsets covering the later decades, has not been previously used for this purpose, which alleviates data mining concerns. Furthermore, by obtaining

[1] CRSP stands for the Center for Research in Security Prices at the University of Chicago.

book values for all firms ever listed on the LSE during 1953-2000 we avoid introducing a survivorship bias.

The source of share price and listing information is the London Share Price Database (LSPD) maintained at London Business School[2]. The master index of this database covers all listed stocks in the UK market from 1955. It also includes all non-surviving companies and is therefore free of survivorship bias. We only select stocks officially listed on the London Stock Exchange[3] and we exclude foreign companies. Investment trusts (closed-end funds) are also excluded. We obtain listing information, monthly returns, and monthly market values, as well as a T-Bill series from the LSPD.

We link the LSPD with accounting information from three different sources. Datastream starts to cover U.K. firms in the late 1960s. It provides very good coverage since the early 1980s. For the period 1953 to 1976 we supplement Datastream with information from the Cambridge/DTI database[4], which covers U.K. manufacturing firms. For the remaining firms not on Cambridge/DTI or Datastream we handcollect balance sheets from the official Stock Exchange Yearbooks. In total this amounts to about 100,000 firm years of accounting data, with each data source covering about a third. As a result we have accounting data for virtually all listed firms since 1953 and survivorship bias is absent.[5]

We compute monthly returns and market capitalizations from share prices, dividends, and capital changes in the LSPD files. For the twenty-year period starting in 1955 the LSPD however currently does not have full coverage, and we use the one-in-three random sample provided in the LSPD. This random sample is fully representative and includes non-surviving companies as well as new issues.

As a result we get a large database of linked share price and accounting information that is free of survivorship bias. It is therefore not subject to the critique that has been

[2] For more detailed information on the LSPD see Dimson and Marsh (1986).
[3] That means for example that we do not include stocks traded on the alternative investment market (AIM)
[4] See Meeks, G., Wheeler, J. (1999).
[5] See Nagel (2001) for more information on this data.

addressed to studies using the U.S. COMPUSTAT data. In addition, there are some potentially interesting differences to U.S. data that arise from particular circumstances in the U.K. First, the number of equities traded on the LSE in 1955 was more than 3,500, almost three times as many as today. We have accounting and returns data for third of them (the LSPD random sample). In the U.S. the opposite pattern prevailed. The Davis, Fama, and French (2000) COMPUSTAT/Moody's data set, which is the most extensive one available for the U.S., provides accounting information for 834 NYSE firms in June 1956, and the sample grows to 4,562 NYSE/AMEX/NASDAQ firms by 1996.

Portfolios

In order to investigate value effects controlling for size we form portfolios based on independent sorts on book-to-market and market capitalization. The portfolio formation mechanism follows closely Fama and French (1993), with adjustments to account for peculiarities in the U.K. data. We define book value of equity (BE) as ordinary share capital plus reserves plus deferred and future taxation. We exclude firms with negative book values.

End of June each year t we form size groups based on end of June market value of ordinary shares (ME). We form book-to-market groups based on the ratio of book value of the fiscal year ending in year t-1 and the market capitalization of ordinary shares at the end of December year t-1 (BE/ME). By intersecting the independent ME and BE/ME sorts we form size and book-to-market portfolios. For the portfolios resulting from the intersection we calculate value-weighted monthly returns during a 12 month buy-and-hold period. The proceeds from a stock that delists during the holding period are distributed among the other stocks in the portfolio according to their value-weights. We adjust the delisting returns to zero when the delisting code reported in the LSPD suggests that the stock delisted valueless. In case of a suspension of trading we hold the stock until it is either delisted or resumes trading.

Exhibit 1 presents summary statistics for a set of six portfolios, based on a size breakpoint at 70% of ranked ME, resulting in two groups, small and large. Book-to-market breakpoints are set at 40% and 60% percentiles, resulting in three groups, low, medium and high. These are the portfolios that allow us to calculate the Fama and French (1993) HML and SMB factors, where SMB is the average return on the three small-cap portfolios minus the average return on the three large-cap portfolios, and HML is the average return on the two high book-to-market portfolios minus the average return on the two low book-to-market portfolios.

These breakpoints are different from those set by Fama and French (1993) for the following reason. In the U.K. size and value are negatively correlated. This is evident from the minimum and average number of portfolio constituents in exhibit 1. In relative terms within size groups there are many more stocks in the small-high group than there are in the big-high group. Therefore, an intersection of independent sorts on size and value results in relatively few stocks in the small-growth and big-value portfolios. By choosing to put more stocks into the small-cap group we ensure acceptable levels of diversification in each of the small-cap portfolios.

As a side effect the 70% breakpoint for size also results in a distribution of shares in aggregate market value across portfolios that is relatively similar to the one in Fama and French (1993), where the much smaller NASDAQ stocks are sorted into quintiles with NYSE-based breakpoints. Taken together the three smallest of our groups also correspond roughly to the universe of the Hoare Govett Smaller Companies Index (HGSC), which covers the bottom 10% of aggregate market capitalization.[6]

The value-weighted averages of BE/ME ratios in Exhibit 1 also indicate that the independent sorts largely achieve their purpose, namely to create variation of size holding book-to-market constant and vice versa. Only the big-high portfolio is to some extent an exception. Due to the negative correlation between value and size we highlighted above there are only few big firms that make it into the high BE/ME group. And those that do

[6] Dimson and Marsh (2001) provides more details on the HGSC

tend to have relatively low BE/ME within this group, and they also tend to be smaller than their large medium and low BE/ME counterparts. This explains the low share in aggregate market value of this portfolio and its low average BE/ME ratio.

The Historical Performance Record of Size and Value

The bottom panels in Exhibit 1 present monthly arithmetic average returns for these six portfolios. It is evident that there is a size premium independent of the value premium, and also a value premium independent of the size premium. It is noteworthy that the standard deviations of the small cap portfolios are likely to be understated due to thin trading[7]. Trading was often very thin for many small companies in the first decades of our sample. As a result the returns on the small cap portfolio are autocorrelated. Simple standard deviations as reported in Exhibit 1 therefore understate the true variation in portfolio returns. We return to this issue below.

Exhibit 2 compares the cumulative performance of size and book-to-market portfolios to the ABN AMRO/LBS Equity Index. The latter is a value-weighted index of all listed stocks on the London Stock Exchange, the counterpart to the Center of Research in Security Prices (CRSP) value-weighted index in the U.S. The graph tracks the value of a hypothetical investment of £1 at the beginning of July 1955. The effects of compounding produce a dramatic difference in final values for value versus growth portfolios. However, when compounded size also accounts for large differences in final values.

Exhibit 3 shows annual returns on the SMB zero-investment portfolio, i.e. the average difference in annual returns between the small and big portfolios. This figure shows that the payoff on size has been very variable in the U.K. The time-series patterns documented here for a long-short size strategy that is BE/ME neutral are very similar to those reported by Dimson and Marsh (1998) for simple small-cap returns in excess of the market. The pre-1989 premium on size, and the subsequent reversal they had documented, as well the extraordinary rebound in 1999 are therefore given also for BE/ME neutral size strategies.

The annual performance of HML is depicted in Exhibit 4. In contrast to the relatively volatile size premium the value premium has been remarkably stable and persistent until the mid-1970's.

Long-term Premiums

Exhibit 5 reports the average arithmetic mean return on SMB and HML. The positive small-cap and value premiums confirm the observations made before. The value premium is furthermore notably higher than the small-cap premium. The higher standard deviation of SMB corresponds to the apparent relative stability and persistence of HML that we noted in the bar chart of annual HML returns Exhibit 4.

In order to judge the significance of the average SMB and HML returns we compute t-statistics. It is important to note the autocorrelation in SMB, and especially HML returns that is reported for the first three lags in the bottom rows of Exhibit 5. Thin trading is likely to be one of the major causes of this autocorrelation. It seems particularly a problem for HML. Due to this autocorrelation t-statistics computed with unadjusted standard errors would overstate the significance of the premiums. For this reason we use Newey-West (1987) autocorrelation consistent standard errors to compute t-statistics[8]. As a result we find that the premium on value is significant at the 99% level, whereas the small-cap premium is insignificant at conventional significance levels. This is due to a lower mean coupled with a higher variation in factor returns than for HML. However, it is important to note that despite its statistical insignificance the small-cap premium gives rise to economically important differences in long-run performance as evident in Exhibit 2.

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[7] See Dimson (1979) and Lo and MacKinlay (1990) for an analysis of thin trading problems.
[8] In computing Newey-West (1987) standard errors we allow for autocorrelation up to lag 6.

Interestingly, the experience in the U.S. is quite similar. Exhibit 6 performs the same analysis with SMB and HML returns for the period June 1926 to 2001 for NYSE, AMEX and NASDAQ stocks.[9] The mean premiums are somewhat lower for HML and higher for SMB. The zero-investment portfolio returns are also autocorrelated, albeit not as strongly as they are in the U.K.

Dividend Yield and Book-to-Market

Given our new data set of book values for U.K. companies it is interesting to compare the results of BE/ME based portfolios to the results obtained by sorting on dividend yield instead. For long-run historical analyses going back as far as 1955 dividend yield has up to now been the only widely available measure of value.

We repeat the portfolio formation described above with dividend yield replacing BE/ME. Each year end of June we rank all stocks in our sample by ME and dividend yield as of end of June. Dividend yield is defined as the sum of dividends on a stock over the preceding 12 months, divided by ME. We form three groups along the dividend yield dimension with 40%, 60% breakpoints and intersect with the same two size groups split at the 70% percentile of ranked ME. Based on these six portfolios we then form dividend yield HML. For the same reason that lead us to exclude firms with negative book values, we exclude non-dividend paying stocks from this analysis. Firms with low dividends predominantly tend to have growth characteristics. However, firms that do not pay dividends at all tend to be value stocks rather than growth stocks, except may be in the most recent past.

In Exhibit 7 we compare annual returns for BE/ME-HML (the bars are the same as those in Exhibit 4) with those from HML that is based on dividend yield. It is apparent that the

[9] We thank Kenneth French for providing the data. For details on US SMB and HML factors see Fama and French (1993).

patterns are very similar for both definitions of HML. The correlation of annual returns on both factors is 0.82. Surprisingly, even in the 1990s we still observe a very close relationship between returns on these two HML factors. This suggests that at least in the U.K. dividend yield also captures much of the cross-sectional variation in returns that is associated with BE/ME – HML. Obviously, the advent of share repurchases in the U.K. in recent years and a general tendency to pay lower dividend has not impaired the ability of dividend yield to capture return differentials between stocks. The exclusion of non-dividend paying stocks seems to do the trick of maintaining dividend yield as a meaningful measure of value.

When it comes to average returns however, dividend yield cannot fully measure up to BE/ME. Exhibit 8 shows that the dividend yield HML premium is a bit more than half of that on BE/ME. Yet, it is still significant at a significance level of 95%. The small-cap premium is largely unaffected by whether we use BE/ME or dividend yield as a measure of value.

However, the finding of such a close association between dividend yield based and BE/ME based HML returns may have profound implications for designing value strategies even if on average dividend does not do as well in predicting returns as BE/ME does. Dividend yield for example may be a very useful measure of value in individual cases when BE/ME delivers doubtful results. This may be relevant when accounting numbers when accounting numbers change dramatically without a fundamental change in the "value" of the company, as can be the case with mergers and takeovers. In such cases dividend yield may provide additional information to guide investment decisions.

Conclusions

Using a new data set of accounting information merged with share price data we find a strong value premium in the UK for the period 1955-2000. The value premium exists within the small-cap as well as the large-cap universe. We also find that dividend yield as a measure of value produces strikingly similar results. The time-series of return spreads between portfolios sorted according to dividend yields closely matches the results obtained from sorts on book-to-market.

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Exhibit 1
Portfolio Summary Statistics, 1955-2000

BE/ME group	Size group: Small	Big	Small	Big
	Percent of aggregate market value		Average of BE/ME ratios	
Low	2.45	55.15	0.57	0.53
Medium	1.23	22.23	1.05	1.04
High	2.09	16.84	2.32	1.75
	Minimum number of firms		Average of number of firms	
Low	145	87	258	202
Medium	87	34	157	72
High	188	30	383	72
	Average monthly return		Standard deviation	
Low	1.31	1.09	4.94	5.70
Medium	1.52	1.49	4.84	5.67
High	1.73	1.59	4.66	5.87

Exhibit 2
Cumulative Return from Size and Value Strategies, Jul 1955 - Dec 2000

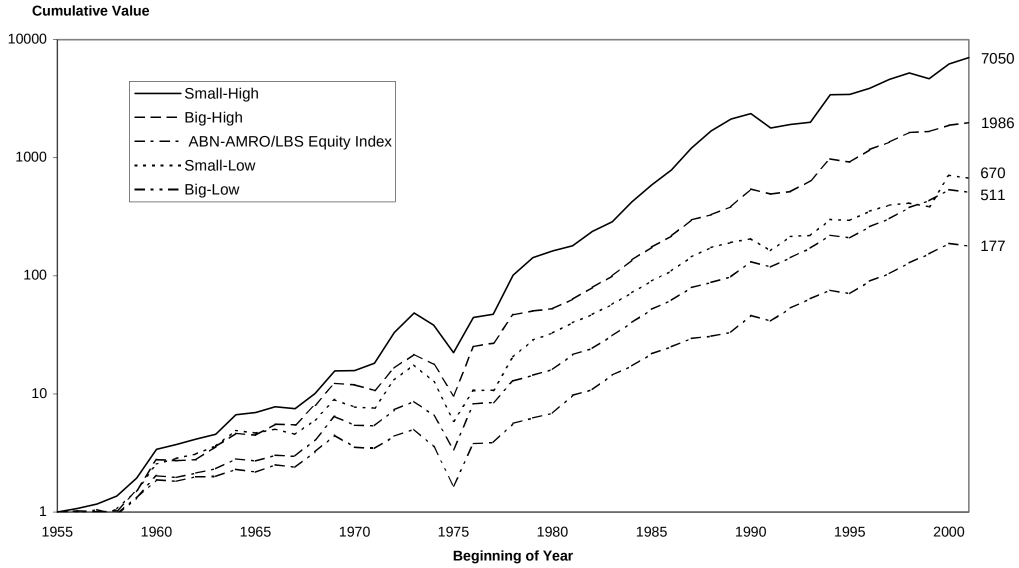

Exhibit 3
Annual Performance of SMB, 1956 - 2000

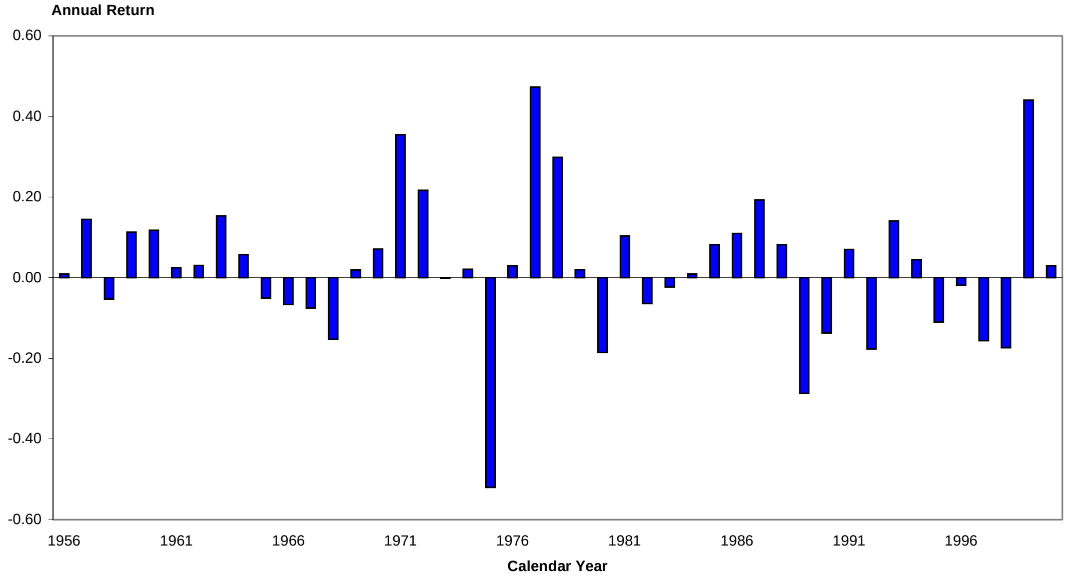

Exhibit 4
Annual Performance of HML, 1956 - 2000

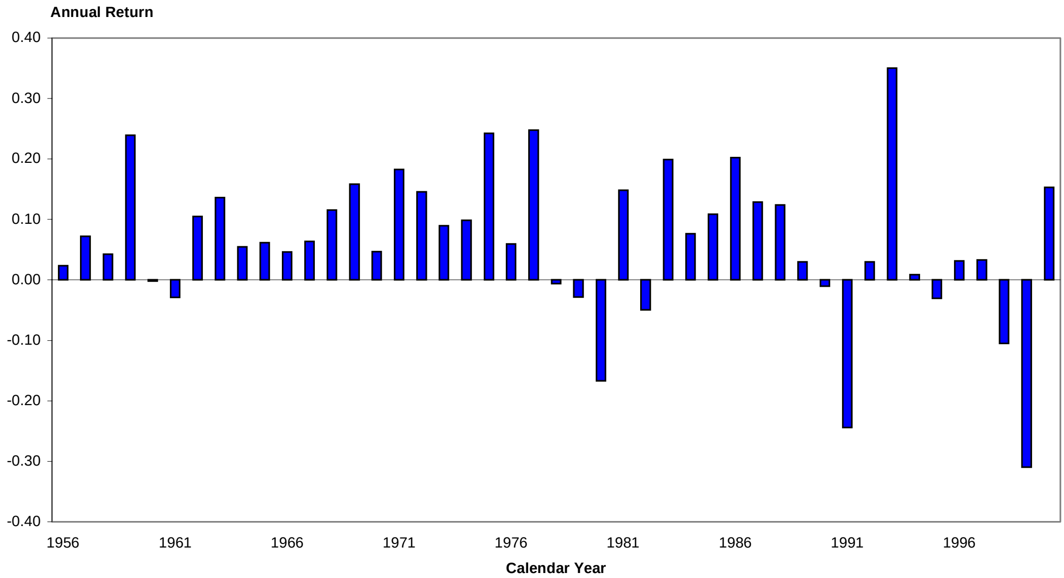

Exhibit 5

Size and value premia in the UK, 1955-2000

	SMB	HML
Arithmetic Monthly Mean Return	0.141	0.440
Standard deviation	3.386	2.116
AC-consistent t-statistic	0.86	3.90 **
First-order Autocorrelation	0.128**	0.186**
Second-order Autocorrelation	-0.001	0.154**
Third-order Autocorrelation	0.047	0.024

**significant at the 99% level

Exhibit 6

Average Monthly Size and value premia, 1927-2000

	SMB	HML
Arithmetic Monthly Mean Return	0.196	0.336
Standard deviation	3.372	3.541
AC-consistent t-statistic	1.66	2.69**
First-order Autocorrelation	0.081	0.193**
Second-order Autocorrelation	0.039	-0.023
Third-order Autocorrelation	-0.045	-0.055

**significant at the 99% level

Exhibit 7
Dividend Yield - HML and Book-to-Market - HML

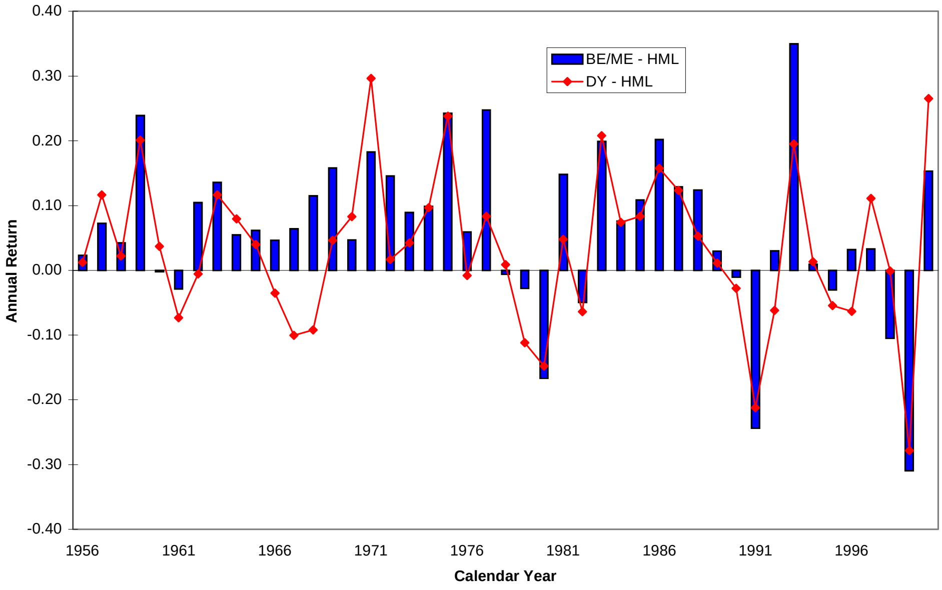

Exhibit 8
Premia with Dividend Yield as Value Measure

	SMB	HML
Arithmetic Monthly Mean Return	0.154	0.240
AC-consistent t-statistic	0.85	2.17 *

*significant at the 95% level