Capturing the Value Premium in the U.K. 1955-2001

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Abstract

Using a new dataset of accounting information merged with share price data we find a strong value premium in the U.K. for the period 1955-2001. It exists among small-caps as well as among large-caps. However, there are challenges for small-cap managers wishing to capture these higher expected returns. We show that rebalancing-induced portfolio turnover for indexed small-value strategies can be substantial. Coupled with the relative illiquidity of the U.K. market for small-value stocks, this calls for strategies that sacrifice tracking accuracy in favor of reduced trading needs and lower trading costs.

Return premia for value stocks have been documented around the world (Capaul, Rowley, and Sharpe 1993, Fama and French 1998). Unfortunately, data availability constraints have limited these studies on markets outside the U.S. to samples of relatively large stocks and recent time periods. In this study we analyze the U.K. evidence and address some of these problems. Our investigation uses a new dataset of accounting information that covers virtually all U.K. firms ever listed on the London Stock Exchange (LSE) going back to the 1950s. It enables us to look at value effects across the whole population of stocks listed on the LSE from 1955-2001. Our focus is on book-to-market as a measure of value, but we also provide some information on the role of dividend yields.

Of course, premia found in historical returns are only hypothetical. The implementation of strategies to capture the value premium is potentially costly, particularly within the small-cap segment. Stocks migrating in and out of the small-value universe, dividends, and delistings all give rise to trading needs, even for a passive manager. We analyze this rebalancing-induced portfolio turnover for a simple small-value strategy. We then show that trading costs are an important determinant of performance due to the relative illiquidity of the small-value segment in the U.K. Our results highlight that the implementation of small-cap and value strategies outside of the U.S. requires particular attention to trading costs.

Data and Methodology

The source of share price and listing information is the London Share Price Database (LSPD) maintained at London Business School[1]. The master index of this database covers all listed stocks in the U.K. market from 1955. It also includes all non-surviving companies and is therefore free of survivor bias. We select stocks officially listed on the

[1] For more detailed information on the LSPD see Dimson and Marsh (1986).

London Stock Exchange[2], and we exclude foreign companies. Investment trusts (closed-end funds) are also excluded. We obtain listing information, monthly returns, and monthly market values from the LSPD.

We link the LSPD with accounting information from the database described in Nagel (2001). It combines data from three different sources. The first source is Datastream, which starts to cover U.K. firms in the late 1960s. This data source has been used by Levis and Liodakis (1999) and Leledakis and Davidson (2001), but its coverage prior to the 1980s is limited. For the period 1953 to 1976 Datastream is supplemented with information from the Cambridge/DTI database[3], which covers U.K. manufacturing firms. For the remaining firms not on Cambridge/DTI or Datastream, balance sheets are handcollected 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 of the total. As a result we have accounting data for virtually all listed firms since 1953 and survivor bias is eliminated.

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 does not have full coverage. For this period we use the one-in-three random sample provided in the LSPD. This random sample is fully representative. It contains a third of all stocks listed at the start of 1955, and a third of all new listings each year until 1975. Since it includes all non-surviving companies there is no survivor bias in this data.

There are some potentially interesting differences from U.S. data that reflect particular circumstances in the U.K. The number of equities traded on the LSE in 1955 was over 3,500, many more than today. We have accounting data for all, and returns data for a 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

[2] That means, for example, that we do not include stocks traded on the alternative investment market (AIM)
[3] See Meeks and Wheeler (1999).

firms in June 1956, and the sample grows to 4,562 NYSE/AMEX/NASDAQ firms by 1996.

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 closely follows Fama and French (1993), with adjustments where necessary to account for characteristics of 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.

At the end of June each year t we form two size groups based on end of June market value of ordinary shares (ME), and a breakpoint at the 70th percentile of ranked 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). Breakpoints are set at 40th and 60th percentiles, resulting in three groups, low, medium and high. For the six portfolios resulting from intersecting these independent sorts, 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 –100% when the delisting code reported in the LSPD indicates that the stock delisted valueless. In case of a suspension of trading we hold the stock until it is either delisted or resumes trading.

Table 1 presents summary statistics for our set of six portfolios. 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 of the returns on the two high book-to-market ("value") portfolios, minus the average of the returns on the two low book-to-market portfolios.

Our size and book-to-market breakpoints are different from the 50% (ME) and 30%/70% (BE/ME) NYSE-based breakpoints set by Fama and French (1993) for the following

reasons. In the U.K. size and value are negatively correlated. This is evident from the minimum and average number of portfolio constituents in table 1. Large caps are concentrated in the low BE/ME segment. Small caps, in contrast, are concentrated in the high BE/ME class. By choosing less extreme BE/ME breakpoints and a wider range for the small-cap group, we ensure acceptable levels of diversification in these corner portfolios throughout our sample period. As a side effect, the 70% breakpoint for size results in a distribution of aggregate market value across portfolios that is relatively similar to the distribution in Fama and French (1993), where most NASDAQ stocks, which are mostly smaller than the NYSE-based 50% breakpoint, are sorted into the small-cap group. Taken together, our small-cap portfolios cover about 6% of aggregate market capitalization. For comparison, the Hoare Govett Smaller Companies Index (HGSC)—a popular small-cap index in the U.K.—covers the bottom 10% of the aggregate market.[4]

The value-weighted averages of BE/ME ratios in table 1 indicate that our 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 an exception to some extent. Due to the negative correlation between value and size we pointed out above, there are only a few big firms that make it into the high BE/ME group. And those that do tend to have relatively low BE/ME compared to their small-cap counterparts. They also tend to be smaller than their large medium and low BE/ME peers. This explains the low share in aggregate market value of this portfolio and its low average BE/ME ratio.

The Historical Performance Record of Small-Cap and Value

The bottom panels in table 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. Note that the standard

[4] See Dimson and Marsh (2002) for more details on the HGSC.

deviations of the small cap portfolios are likely to be understated due to autocorrelation in portfolio returns. To some extent, this is the consequence of thin trading. We return to this issue below.

Figure 1 compares the cumulative performance of size and book-to-market portfolios to a U.K. value-weighted market index. The market index is the ABN AMRO/LBS Equity Index presented in Dimson and Marsh (2001a), the U.K. counterpart to the Center for 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, with dividends reinvested in the index constituents. The effects of compounding produce a dramatic difference in final values for high BE/ME versus low BE/ME portfolios. Controlling for value, size produces a smaller, but nevertheless still substantial difference in final values.

Figure 2 shows annual returns on the SMB (small minus big) zero-investment portfolio, i.e. the difference in annual returns between the three small and the three big portfolios. The payoff on size has been very variable in the U.K. The time-series patterns documented here for a BE/ME-neutral long-short size strategy are very similar to those reported by Dimson and Marsh (1999) for simple small-cap returns in excess of the market return. The pre-1989 premium on size, and the subsequent reversal documented in their study, as well as the extraordinary rebound in 1999 are similar for the BE/ME-neutral strategies that we investigate here.

The annual performance of HML (high minus low BE/ME) is depicted in **Figure 3**. In contrast to the relatively volatile size premium, the value premium has been surprisingly stable and persistent until the mid-1970s. The 1990s and the first years after the millennium however have seen a highly volatile HML. The four highest absolute returns on the HML factor all occurred in this time period.

The persistent outperformance of value stocks during the first two decades is striking. To some extent, this may just reflect a lucky draw for a value investor, but it also raises some concerns that some look-ahead bias could be involved. We have taken care to rule out the

latter possibility. For example, our portfolio formation mechanism requires that accounting data be at least six months old before we use it. This is meant to ensure that the formation mechanism uses only public information. One might want to question whether this assumption really reflects circumstances in the U.K. during the 1950s and 1960s when financial reporting was slower than today. To check this, we formed our portfolios with the requirement that accounting data be at least 18 months old. The results are almost the same. HML returns for the first two decades are persistently positive as before, and the arithmetic mean annual return for HML over the whole period drops marginally from about 7% to 6.6%. This result is reassuring. It also highlights the fact that the predictive power of BE/ME comes mainly from the denominator. Book values in the numerator are relatively slow moving and their variation over time is less important.

Table 2 reports the average arithmetic mean return on SMB and HML. The positive small-cap and value premia confirm the observations made before. The value premium is notably higher than the small-cap premium. To some extent however, this is also driven by the choice of the small-big cutoff. While there are three BE/ME groups, only two are formed for size. The lower standard deviation of HML reflects the relative stability and persistence of HML that we noted in the bar chart of annual HML returns, Figure 3.

SMB and HML returns are significantly autocorrelated, as shown in the bottom row of Table 2. Thin, and therefore non-synchronous trading can be one of the causes of this autocorrelation, although at monthly frequencies it is unlikely to be a full explanation, even with very thin trading (Lo and MacKinlay 1990). In any case, t-statistics computed with unadjusted standard errors would overstate the statistical significance of the premia. For this reason we use Newey-West (1987) autocorrelation consistent standard errors and allow for autocorrelation up to lag 6. We find that the premium on value is significant at the 1% 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 is evident in Figure 1.

Interestingly, the experience in the U.S. is quite similar. **Table 3** performs the same analysis with SMB and HML returns for the period June 1926 to 2001 for NYSE, AMEX and NASDAQ stocks.[5] The mean premia 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 based on BE/ME-sorted 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 in the U.K. In many other international markets this continues to be the case.

We repeat the portfolio formation procedure described above with dividend yield replacing BE/ME. Each year, 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 two size groups split at the 70th percentile of ranked ME as before. Based on these six portfolios, we then form a factor IMC ("income" minus "capital gains") similar to HML. For the same reason that leads us to exclude firms with negative book values, we exclude non-dividend paying stocks from this analysis. Throughout the period since 1955, non-dividend paying stocks have included many small U.K. firms with value characteristics.

In **Figure 4** we compare annual returns for HML with those from IMC. It is apparent that the patterns are very similar for both factors. The correlation of their annual returns is

[5] We thank Ken French for providing these data.

0.82. This suggests that, in the U.K., IMC also captures much of the cross-sectional variation in returns that is associated with HML. The exclusion of non-dividend paying stocks seems to do the trick of making dividend yield a meaningful measure of value.

The fact that dividend yield does relatively well as a value measure in the U.K. even in recent years may be somewhat surprising. In the U.S., the usefulness of dividend yield for these purposes has declined dramatically with the disappearance of dividend paying firms. Fama and French (2001) find that by the end of the 1990s only about 50% of firms on the NYSE paid dividends. On NASDAQ and AMEX the proportion is much lower. In the U.K., however, the picture is different. Despite some decline since the mid-1980s, about 75% of all listed firms still paid dividends in 2001. In terms of market value they account for 95% of total market capitalization. Hence, cross-sectional sorts on dividend yield are likely to be more informative in the U.K. than in the U.S.

When it comes to average returns however, dividend yield cannot fully measure up to BE/ME. **Table 4**, in comparison with Table 2, shows that the IMC premium is a bit more than half of that on HML. Yet, it is still significant at a level of 5%. The small-cap premium is largely unaffected by whether we use BE/ME or dividend yield as a measure of value.

The close association between HML and IMC returns is a useful fact, even if, on average, dividend yield does not do as well in predicting returns as BE/ME does. For instance, dividend yield may be helpful as a complementary measure of value in individual cases when BE/ME delivers doubtful results. This may be relevant when accounting numbers change dramatically without a fundamental change in the "value" of the company, as can be the case with takeovers that give rise to large goodwill. In such cases dividend yield may provide additional information to guide investment decisions.[6]

[6] Other ratios may be useful as well. Leledakis and Davidson (2001), for example, find that the Sales/Price ratio can provide additional explanatory power beyond BE/ME in the U.K during the 1980-1996 period.

Portfolio Turnover

So far we have focused on documenting historical premia for small-cap and value stocks in the U.K. We now turn to questions concerning the implementation of strategies designed to capture these premia. We analyze these questions in two steps. We look first at trading needs in passive small-value strategies, which arise mainly from recurring portfolio rebalancing. We then analyze the implications of small-cap illiquidity in the U.K.

We focus here on the small-value corner portfolio (small - high BE/ME) and investigate its hypothetical portfolio turnover. The portfolio is rebalanced annually at the end of June. At this point, all those stocks are sold, which grew larger than the size breakpoint, or whose BE/ME declined below the BE/ME breakpoint. Furthermore, proceeds from firms that delisted since the last rebalancing date, for example because they are taken over, need to be reinvested. For simplicity, we assume that proceeds are held in cash until the rebalancing date, at which they are then reinvested according to market-value weights. Further reinvestment needs arise from dividends. Again, we assume that dividends are held in cash until the rebalancing date. **Figure 5a** shows the fraction of total portfolio market capitalization that is realized from sales of stocks that have crossed breakpoints (drop-outs), delistings, and dividends. This fraction is fairly stable over time, and it is surprisingly high. Commonly, around 40% of the portfolio market value is realized and hence needs to be reinvested at each annual rebalancing date. The amount accounted for by delistings has increased over time. At the rebalancing date in 2000 it accounts for about a third of the total volume. With dividend yields declining over time, the share of dividends seeking reinvestment has decreased.

The proceeds thus realized are invested in two ways. First, newly eligible stocks are purchased according to their value-weights. **Figure 5b** further breaks this up into stocks

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Unfortunately, due to the unavailability of sales data before the 1980s, we cannot examine long-run returns

that have been newly listed since the last rebalancing date, and previously existing stocks that have entered the small-value universe. The total fraction of portfolio market capitalization invested in newly eligible stocks is about 30%. Second, when there is a misfit between the fraction of portfolio value realized through sales and other means, and the fraction that is invested in newly eligible stocks, the portfolio weights of all stocks remaining in the portfolio have to be adjusted to equal the value-weights in the newly rebalanced portfolio. **Figure 5c** shows the trading needs arising from this reweighting. It fluctuates quite a lot over time. On average, the fraction of market capitalization going into reweighting is close to 10%.

Despite being a passive strategy with only annual rebalancing, no in- and outflows, and fairly broad definitions of the universe of eligible stocks, the small-value portfolio nevertheless gives rise to considerable trading needs. About 40% of portfolio market capitalization has to be traded per year. In terms of one-way transactions this amounts to 80%. If rebalancing were carried out quarterly or monthly, one-way transactions would probably exceed 100% of portfolio value. In a high trading cost environment, this mechanical trading strategy could easily cut several percentage points off annual performance.

At present, there is no comprehensive small-value index published in the U.K. Nevertheless, the rebalancing mechanism simulated for our small-value portfolio appears realistic for typical benchmarks in the small-cap area. Wilshire Associates and Frank Russell International rebalance their U.S. and non-U.S. size-based indexes annually, as we did in our exercise. Similarly, in the U.K., the HGSC small-cap index follows a once-per-year rebalancing rule. Compared to other indexes, our results may be rather too conservative. The FTSE SmallCap, for example, a competing U.K. small-cap benchmark, is rebalanced based on complex rules, including quarterly reviews and some intra-quarter changes. Dimson and Marsh (2001b) show that this intra-year rebalancing generates much additional portfolio turnover.

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of Sales/Price strategies.

Illiquidity

As portfolio turnover for small-cap value strategies is obviously not negligible, trading costs are an important determinant of achievable returns. In this section we provide some information on the liquidity of the U.K. market for small-cap and value stocks. Of course, we do not have extensive transactions-level data for the entire period under investigation that would allow us to analyze bid-ask spreads, trading volume, and market depth. However, we do have information on trading frequency. At the end of each month, the LSPD provides the number of days since the last transaction in a stock took place. From these we can derive an estimate of daily non-trading probabilities; that is, the probability that a given stock does not trade the next day.[7] These non-trading probabilities illustrate the evolution of liquidity in different U.K. market segments since 1955.

Figure 6 shows annual averages of daily non-trading probabilities for our four corner portfolios. Overall, it is apparent that the probability of non-trading has decreased over time. While big stocks only traded with a probability of about 50% on a given day in the mid-1950s, trading in the most recent period is almost continuous. For small-caps it was

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[7] The non-trading probabilities are computed as follows. For each of our portfolios we calculate value-weighted averages of the number of days since the last trade, which gives us the average duration of non-trading $\bar{k}$. We use the trading process analyzed in Campbell, Lo and MacKinlay (1997 p. 87). A stock trades on a given day with probability 1-π. Furthermore, the variable δ_t takes the value of zero if there is a trade on day t, and one if there is no trade. In this case the duration of non-trading is given by

$$k_t = \sum_{p=1}^{\infty} \prod_{j=1}^{p} \delta_{t-j}$$

and its expected value is

$$E[k_t] = \pi + \pi^2 + \pi^3 + \ldots = \frac{\pi}{1-\pi}$$

Substituting the average duration of non-trading $\bar{k}$ in a portfolio as a point estimate for $E[k_t]$, one can back out an estimate of the average non-trading probability as

$$\hat{\pi} = \frac{\bar{k}}{1+\bar{k}}$$

common in the 1950s not to trade for extended periods of time, sometimes even months for micro caps, which is reflected in daily non-trading probabilities in excess of 90%. Small-cap non-trading probabilities also declined over time, but even in 2001, the probability that a small-value stock (Small-High BE/ME) does not trade on a given day is still around 50%, implying that the average duration of non-trading is about one day. In other words, in value-weighted terms, the average small-value stock currently trades every second day. The equal-weighted average would be still lower.

These findings suggest that even today, the U.K. market for small-value stocks is substantially less liquid than the market for large stocks. Traders who demand immediacy of execution are likely to face substantially higher trading costs. On the other hand, patient investors may find opportunities to earn a premium by supplying liquidity to less patient traders. While trading costs in the U.S. are also substantially higher for small-caps (see Keim and Madhavan 1997), the problem is likely to be more severe in the U.K. For comparison, Campbell, Lo, and MacKinlay (1997) report equal-weighted daily non-trading probabilities for U.S. NYSE and AMEX small-caps over the period 1962 to 1994 that are between 22.5% for the lowest market capitalization decile, and 5.2% for the fourth lowest market capitalization decile. Hence, non-trading probabilities for U.S. small caps over this entire past period were lower than those observed for U.K. small caps in 2001. In other words, even today U.K. small caps are more thinly traded than the average U.S. small-cap stock between 1962 and 1994.

This analysis highlights the fact that strategies designed to capture the value premium in the U.K. require particular attention to trading costs. Pure indexing strategies aimed at minimizing benchmark tracking error call for immediate execution of trading needs arising from inflows and outflows, or from benchmark rebalancing. As a result, investors who follow indexing strategies tend to incur higher trading costs than investors who follow a more patient investment style (Keim and Madhavan 1997). Given the low liquidity of small caps in the U.K., the benefits from sacrificing tracking accuracy in favor of lower trading costs may be higher than in the U.S. Hence, passive small-value managers are likely to benefit from a patient approach to trading. Similarly, active

managers need to incorporate trading costs and possibly slow execution into their assessment of prospective excess returns.

Moreover, measures that help to reduce trading needs in the first place may also be beneficial. More flexible definitions of the targeted universe of small-cap and value stocks can reduce the trading needs that arise from rebalancing. For example, there is a certain probability that stocks which cross breakpoints and leave the target universe may re-enter at later rebalancing dates. Roundtrip transactions of this sort can (partly) be avoided by a more flexible definition of portfolio eligibility. Clever management of the tradeoff between tracking accuracy and trading cost can be a source of substantial competitive advantage for small-value managers. Furthermore, small-value stocks in the U.K. may be more suitable for managers who are less subject to daily in- and outflows and the trading needs they cause.

The results for the U.K. also provide an important lesson for investors wishing to extrapolate from the U.S. experience to other international markets. While value-premia appear to exist around the world (Fama and French 1998, Dimson, Marsh, and Staunton 2002), a successful implementation of value strategies in small-cap segments of these markets requires a particularly skilful approach to trading, as liquidity is likely to be even lower than in the U.K.

Conclusions

Using a new dataset of accounting information merged with share price data we find a strong value premium in the UK for the period 1955-2001. 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. However, managers attempting to capture the value premium in the small-cap segment should pay particular attention to rebalancing-induced portfolio turnover and market illiquidity in small-value stocks. Compared to the U.S., the U.K. market for small-cap stocks is relatively illiquid. Trading costs are therefore an even more crucial determinant of overall performance. This is likely to be the case in other non-U.S. markets as well.

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Table 1
Portfolio Summary Statistics, 1955-2001

BE/ME group	Size group			
	Small	Big	Small	Big
	Percent of aggregate market value		Average of BE/ME ratios	
Low	2.43	55.59	0.57	0.53
Medium	1.22	22.09	1.04	1.03
High	2.07	16.60	2.30	1.74
	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	1.26	1.06	5.14	5.70
Medium	1.52	1.47	4.91	5.65
High	1.74	1.56	4.77	5.84

Table 2

Size and Value Premia in the U.K., 1955-2001

	SMB	HML
Arithmetic monthly mean return	0.15	0.49
Standard deviation	3.40	2.17
AC-consistent t-statistic	0.91	4.13 **
First-order autocorrelation	0.12 **	0.19 **

**significant at the 1% level

Table 3

Size and Value Premia in the U.S., 1926-2001

	SMB	HML
Arithmetic monthly mean return	0.20	0.39
Standard deviation	3.38	3.62
AC-consistent t-statistic	1.73	3.01 **
First-order autocorrelation	0.07	0.18 **

**significant at the 1% level

Table 4

Premia with Dividend Yield as Value Measure

	SMB	IMC
Arithmetic monthly mean return	0.14	0.29
Standard deviation	3.20	2.09
AC-consistent t-statistic	0.96	2.44 *
First-order autocorrelation	0.11 **	0.28 **

*significant at the 5% level

**significant at the 1% level

Figure 1
Cumulative Return from Size and Value Strategies, Jul 1955 - Dec 2001

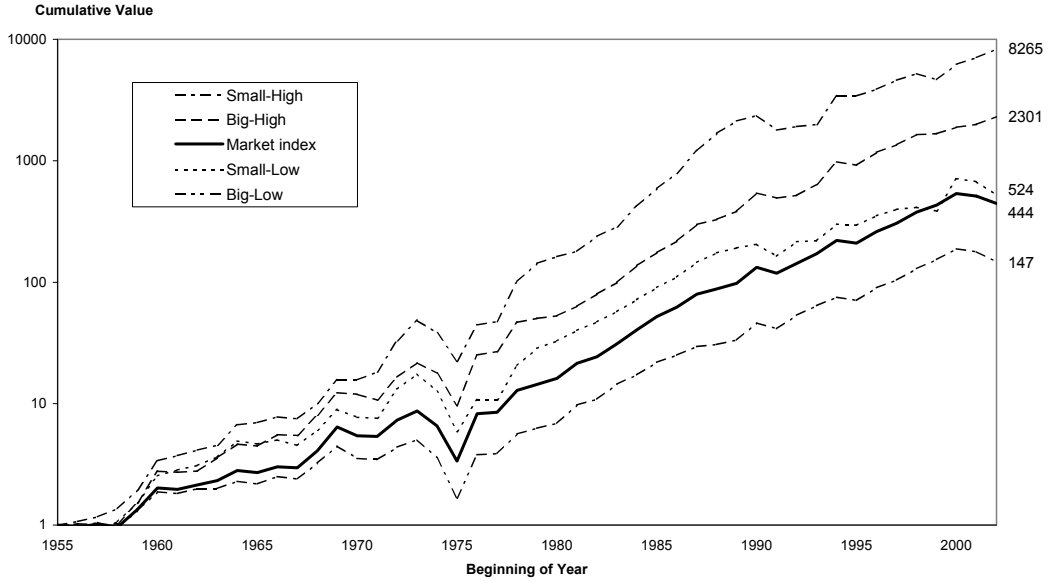

Figure 2
Annual Performance of SMB, 1956 - 2001

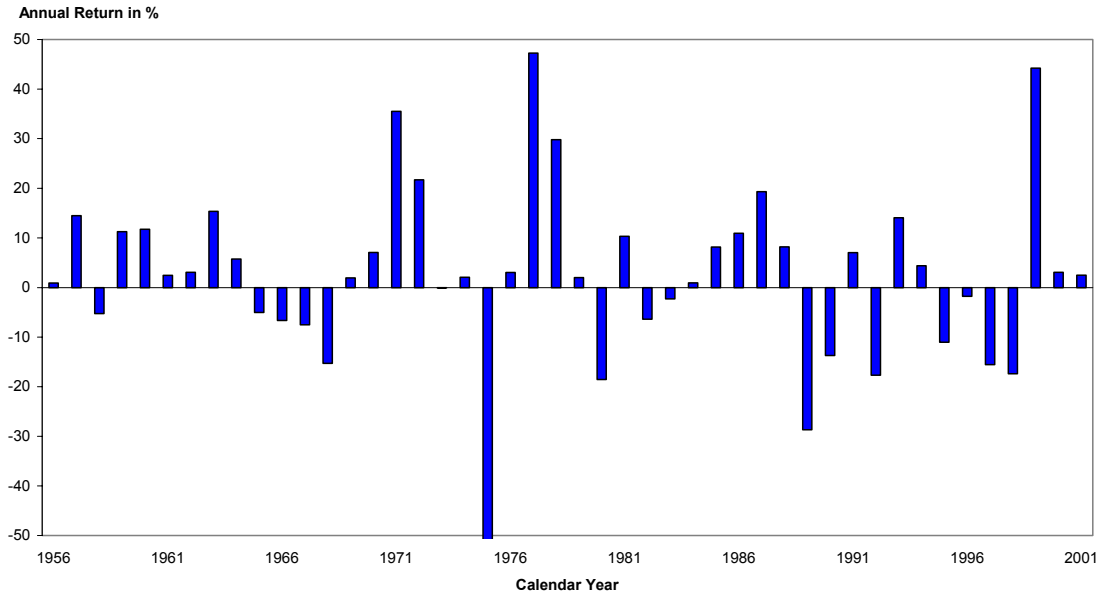

Figure 3
Annual Performance of HML, 1956 - 2001

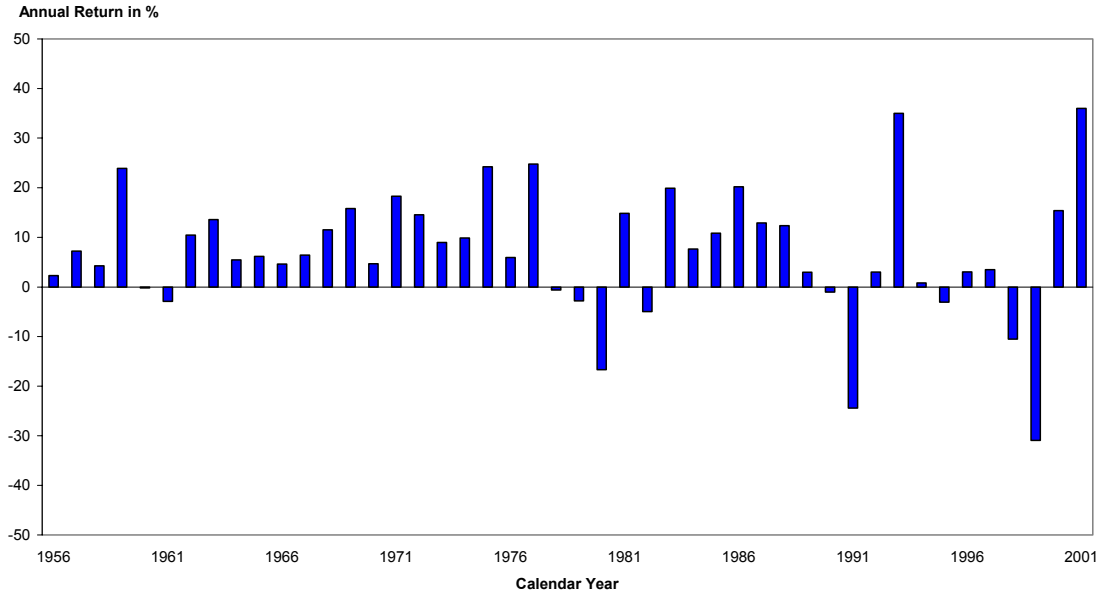

Figure 4
IMC (Dividend Yield) and HML (Book-to-Market)

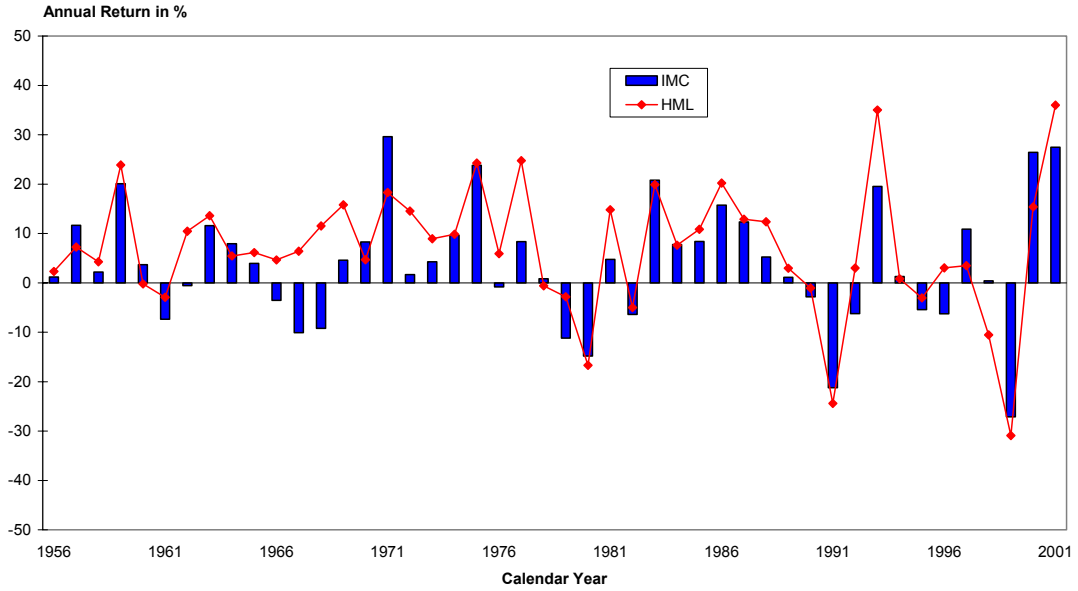

Figure 5a: Portfolio Turnover - Proceeds

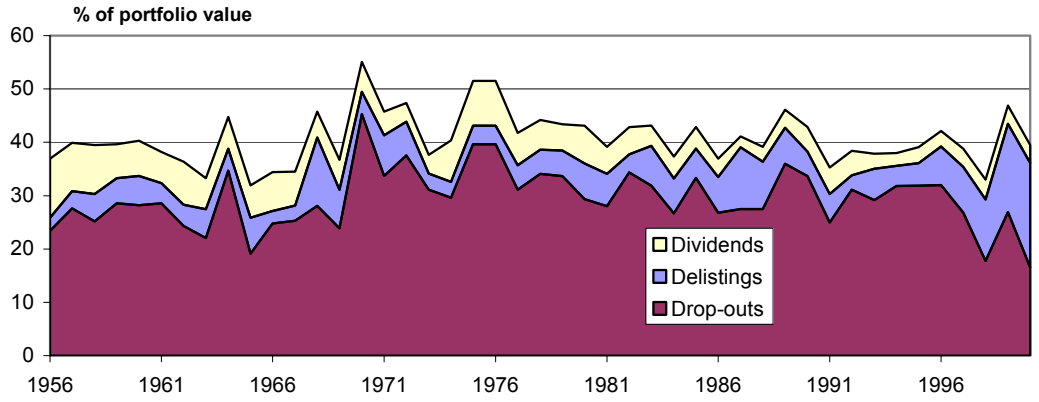

Figure 5b: Portfolio Turnover - Buys

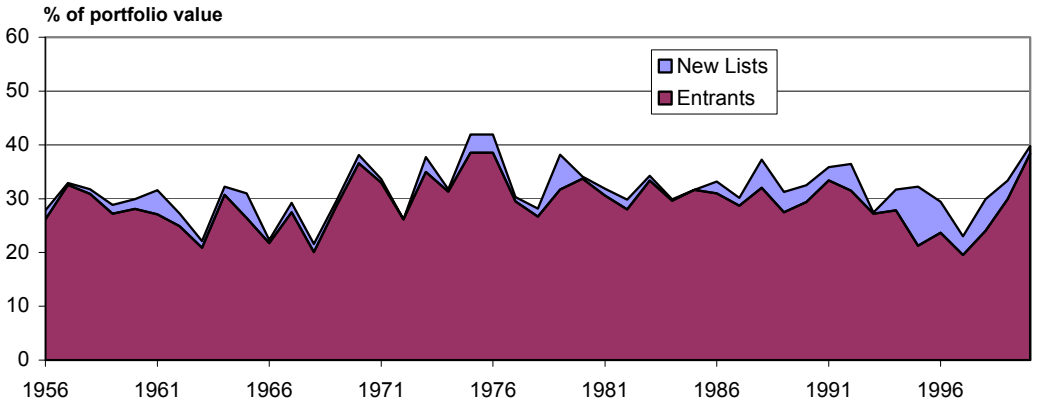

Figure 5c: Portfolio Turnover - Annual Reweighting

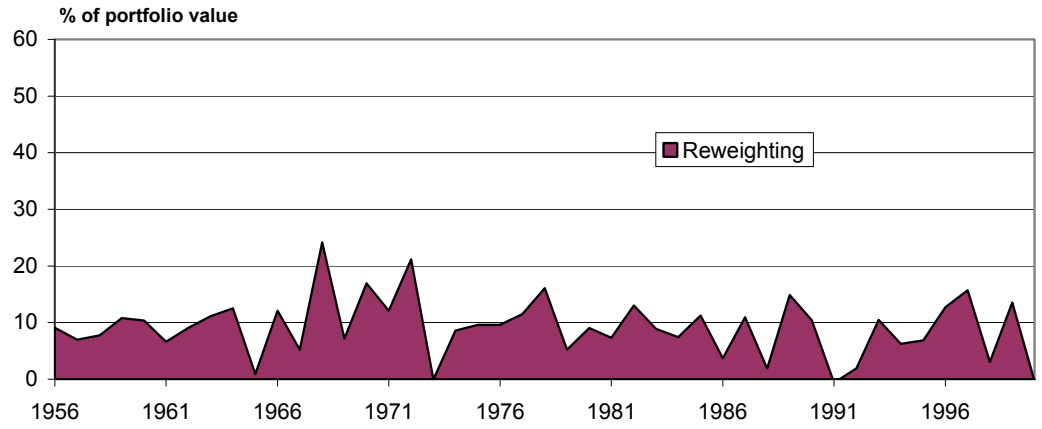

Figure 6: Daily Non-Trading Probabilities