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WORKING PAPER

Value and size effect: Now you see it, now you don't

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Value and Size Effect: Now You See It, Now You Don't

Abstract

The empirical finding that small stock returns exceed big stock returns (size premium), and that value stock returns exceed growth stock returns (value premium) has been extensively studied in the past. In this paper, we analyse the size premium and value premium for a cross-section of European stocks. The focus in this paper is on the evaluation of the robustness of the findings. We find a large size premium, but we also find that this premium only exists in the cross-section of the whole European market. If small and big stocks are selected relative to the market size of the country, the strategy is no longer profitable. As for the value premium, we find that the strategy is not profitable. When the value and growth portfolios are equally weighted there is a significant premium of about 7% on an annual basis. However, this premium is explained by the size effect. Finally, we observe that accounting for the look-ahead bias matters for the evaluation of returns on investment strategies based on accounting figures.

Keywords: book-to-market, size, value strategy

JEL Classification: G12, G15

Value and Size Effect: Now You See It, Now You Don't

1. Introduction

It is well-known by now that several pre-determined variables can predict stock returns even when traditional risk measures are used to control for risk. Among these pre-determined variables especially market value of equity ('size') (Banz (1981)) and the book-to-market ratio (BM, Rosenberg, Reid, and Lanstein (1985)) have been very popular, both in academics and among practitioners. This is undoubtedly for a large part due to the finding by Fama and French (1992). In this study it is shown that other pre-determined variables, such as the price-earnings ratio and financial leverage that also can predict stock returns in a univariate setting, lose their predictive properties when size and book-to-market are taken into account. Stocks with high BM ratios (*value stocks*) or small capitalisation stocks earn higher average returns than low BM stocks (*growth stocks*) or large caps.

The controversy aroused by these empirical findings concerns their interpretation, but also their empirical soundness. At least four different interpretations have been put forward. First, some authors have argued that the pre-determined variables are proxies for exposures with respect to a systematic risk factor. If this factor is priced, a relationship between the proxy exposure and expected returns fits a rational asset pricing model. Evidence consistent with this interpretation can be found in Fama and French (1993) where common time variation in returns not related to the market return is documented. Fama and French conjecture that this is evidence for omitted risk factors which they try to capture by two factor-mimicking portfolios based on size and BM (in addition to the market factor). In addition, Fama and French (1995) show that there is a BM factor in fundamentals (earnings and sales) and Chan and Chen (1991) indicate that small stocks with a high BM ratio are firms that recently have performed poorly and are vulnerable to financial distress. In addition, Fama and French (1996) indicate that many previously documented asset pricing anomalies disappear using their three factor model.

The second interpretation attributes the return regularities (especially concerning BM) to psychological and institutional effects. Lakonishok, Shleifer, and Vishny (1994) argue that investors erroneously extrapolate past earnings growth too far into the future and therefore

cause stock prices to deviate from their 'fundamental' value (overreaction hypothesis). Eventually, these deviations are corrected causing the empirical regularities documented above. For instance, future earnings of firms that recently performed badly – and are therefore more likely to be relatively small and to have a high BM ratio – are underestimated. When higher than expected earnings are announced, stock prices incur an upward correction (see La Porta, Lakonishok, Shleifer, and Vishny (1997)). A similar reasoning can be made for growth stocks whose expected earnings are overestimated and are therefore bound for a downward correction. Investors pursuing so-called *contrarian strategies* (such as buying high BM stocks) stand to earn a *value premium*. Next to the overreaction hypothesis, it may also be the case that investment holdings are biased in favour of glamorous growth stocks, simply because they are more easily justified towards fund sponsors. Indirect evidence consistent with these views comes from Rozeff and Zaman (1998). If the value premium is a following of mispricing, then insiders, who presumably know the true value of the firms better than outsiders, should be able to earn money using a contrarian strategy. Rozeff and Zaman indeed find that the proportion of buy transactions by insiders is positively related to the BM ratio (among others), as implied by the mispricings view.

A third explanation is advocated by Daniel and Titman (1997). They argue that the common variation of portfolios that share similar BM or size properties is due to the fact that these stocks share common characteristics, such as related business lines, similar industries or same regions. They are therefore more likely to become distressed simultaneously, which leads to high BM ratios (and smaller market capitalisation). When holding such a portfolio of distressed firms, investors earn a higher risk premium – implying a positive ex-post relation between average returns and BM ratios. Daniel and Titman show that firms with similar characteristics (BM and size), but different exposures to the Fama and French (1993) mimicking factor portfolios do not show different returns, thereby casting doubt on the risk story. However, Davis, Fama, and French (2000) increase the power of the test statistics by extending the sample of Fama and French (1992) to include the 1927-1962 period and are able to discard the characteristics model.

As for the credibility of the empirical findings, some authors argue that the empirical relationship between returns and the pre-determined variables is due to methodological issues and data biases, or simply to a statistical fluke. Indeed, most papers have studied US stock returns and use the CRSP files to compute stock returns and COMPUSTAT to derive

ratios based on accounting data, such as the BM ratio. It is well known that both data sources contain biases. For instance, Shumway (1997) indicates that many delisting returns are lacking in the CRSP files. When they are filled in, the size premium is severely affected for NYSE and Amex stocks and it disappears for Nasdaq stocks (Shumway and Warther (1999)). The COMPUSTAT tapes are plagued by survivorship bias and look-ahead bias. Accounting data are added to the database when they are made public, but they are recorded as if they were publicly known at the fiscal year end (in many cases December). Banz and Breen (1986) indicate that it suffices to use end-of- December accounting data not earlier than in March of the next fiscal year to alleviate this look-ahead bias in the COMPUSTAT files, and most if not all studies take this advice at heart by applying a time lag of three to six months when using accounting data. Also, survivorship bias in the COMPUSTAT tapes may be responsible for some of the earlier studies finding relations between ratios using accounting data and stock returns as COMPUSTAT tended to include historical data when it adds surviving firms to its database. Also many firms on CRSP have no entry in the COMPUSTAT tapes. Distressed firms are predominantly present in this group (Kothari, Shanken, and Sloan (1995)). Kothari, et al. (1995) and Breen and Korajczyk (1995) show that when survivorship-free accounting numbers are used, the BM premium is strongly reduced in comparison to the premium found in Fama and French (1992). Besides data problems, the empirical results may be due to data-snooping (see Black (1993); MacKinlay (1995), White (2000)). Some relations are bound to be statistically significant as long as sufficient candidate variables are tried.

To counter these problems it is important to scrutinise the sample of stock returns and the accounting data used. In addition, the data-snooping critique can be responded to by studying out-of-sample data. Davis (1994) and Davis, et al. (2000) study earlier periods than Fama and French (1992) and find similar results. As the latter study ignored financial firms another holdout sample constitutes precisely out of these firms. Barber and Lyon (1997) again find similar results for this sample. Also in the Japanese market (Chan, Hamao, and Lakonishok (1991)) a BM and a size effect are found, although according to Daniel, Titman, and Wei (2001) the data are at odds with the risk story and confirm to the characteristics based explanation. More countries are studied by Fama and French (1998) (developed markets) and Rouwenhorst (1999) (emerging markets). Both papers conclude that the international data also point to the existence of a value premium and a size effect. The

importance of this kind of analysis is straightforward. Lots of asset managers form their portfolios based on well-known anomalies. Suppose they use a top-down analysis. When they assign country weights it is very interesting to see what the marketcap weighted return is on these strategies. When they apply a bottom up approach, the equally weighted return will provide better information. In both cases, it is important to evaluate the robustness of the results. Not only because of academic relevance, but also because portfolio managers or investment houses have different approaches in managing their investment process. We think that an evaluation of both the marketcap weighted returns and the equally weighted returns taking the robustness of the measurement methodology into account provides useful information about the relevance of these investment strategies.

The main conclusions can be summarized as follows: (1) the size premium for the 1974-2000 period for a cross-section of European stocks is 1.45% per month or approximately 19% on an annual basis. Currency risk is of no importance, but if we look at relative size (which means that the stock's size is expressed relative to the average country size instead of the European size) this large premium no longer exists. Hence the size premium is high and significant if stocks are selected on a European basis. (2) The value premium for the same period is 0.16% per month or about 2% per year. The European value premium is not significant and we essentially find that it is explained by the size premium. (3) We find that accounting for the look-ahead bias matters for the evaluation of returns on investment strategies based on accounting figures. Not accounting for the look-ahead bias leads to a significant annual premium of 11% instead of the previously reported 2%.

The organization of the paper is as follows. Section 2 presents a description of the dataset. In section 3, the size and value premia are computed based on the Fama and French (1993) methodology. Section 4 discusses the robustness of the premia found in section 3. Finally, section 5 offers a summary and concluding remarks.

2. Data

The analysis is done on a European scale. For 15 European countries, all stocks from the Datastream local market index in January 2001 are collected. The sample consists of stocks accounting for about 80% of the total market capitalization of each country. This universe of stocks is the focus of the coverage by the typical European institutional investor. Also, the inclusion of really small European stocks could induce false identification of results because these stocks are susceptible to infrequent trading. In order to reduce survivorship bias, we add a sample of "dead" stocks for each country (Fama and French (FF) 1998 only used alive stocks in their international study). Dead stocks are defined as stocks that merged, defaulted or were delisted. Dead stocks prior to January 2001 are selected up to a total market capitalization of 80% of all dead stocks for each country.

The returns are in German mark and are from Datastream (as in FF 1998). The market capitalization (also in German mark) and the ratio book-to-market value of the 2866 stocks are also retrieved from Datastream from January 1973 until December 2000. By dividing the net tangible assets by the market value, the ratio book-to-market equity (BM) is obtained. These net tangible assets are defined as total assets, excluding intangible assets, less total liabilities, minority interest and preferred stocks. The exclusion of the intangible assets allows a better distinction of value and growth stocks. Intangible assets typically consist of research & development, trademarks and patents, two characteristics that are typically high for growth stocks. Thus, including the intangible assets in the book-to-market equity may lead to a false classification of growth stocks as value stocks.

Every stock in the sample belongs to one of the following countries: Austria, Belgium, France, Germany, Denmark, Finland, Ireland, Italy, the Netherlands, Norway, the UK, Switzerland, Spain, Portugal or Sweden. To be able to track the sector representations within our portfolios we also classified the stocks into a limited number of homogeneous sectors (FT classification), namely resources, basic industries, general industries, cyclical consumer goods, non-cyclical consumer goods, cyclical services, non-cyclical services, utilities, financials and information technology.

The total sample consists out of 2866 stocks. Of course, in the early months of the sample, not all 2866 stocks are already listed pushing downwards the number of stocks in the

analysis. In addition, there are some stocks that have a return observation in a certain month but no book-to-market observation in the end of the previous month. These stocks are also discarded from the analysis. Figure 1 shows the evolution of our sample size. The lowest number of stocks in the analysis is 375 stocks in November 1975, while 1766 is the largest number of stocks (observed in August 1999).

[Insert Figure 1 about here]

Table 1 summarizes our sample. To calculate the monthly returns, the annual dividend for a calendar year is spread across all months of the year so that compounding the monthly returns reproduces the annual return (as in FF 1998). This is how Datastream accounts for dividends.

[Insert Table 1 about here]

As has been mentioned before, in our dataset dead stocks are added. Table 2 presents some summary statistics for the stocks in our sample. For each country in the sample the statistics for the dead stocks and the stocks that are still alive are given. In addition, for every sector in the sample the monthly return and standard deviation are also reported.

[Insert Table 2 about here]

3. The value and size premium

3.1 The Fama and French approach

The basic results are obtained by applying the FF (1993) methodology on a dataset of 2866 European stocks. Size decile portfolios are constructed ranking all available stocks at the end of June (of each year t) based on market capitalizations at the end of June. Note that the most important difference with previous papers (especially FF (1998)) is that stocks are ranked cross-sectionally across countries. For each decile portfolio, both the equally weighted (EW) and marketcap weighted (MW) return are calculated for the 12 following months (July year t up to June year $t+1$). Decile 1 is the small stock decile. Figure 2 visually presents the size decile formation procedure.

[Insert Figure 2 about here]

Lewellen (1999) suggests that due to the persistence of BM ratios there is no concern about the ranking date or in other words the look-ahead bias. Nevertheless, we adopt the FF92 procedure for reasons of comparison. It implies that, at the end of December of year $t-1$, ten BM deciles are formed. Decile one contains the lowest BM ratio stocks (growth stocks), while decile ten consists of the highest BM ratio stocks (value stocks). Again, we calculate EW and MW return for July of year t to June of year $t+1$ on a monthly basis. Figure 3 presents the BM decile formation procedure.

[Insert Figure 3 about here]

3.2 Size returns

Table 3 presents the size deciles characteristics. The first row shows the MW portfolio returns. As the size increases, the returns decrease almost monotonically. Small European stocks earn a monthly return of more than 2.6% per month, which is much higher than the 1.2% per month for the largest stocks. This means that despite the fact that in our sample the 20% smallest stocks of each country are excluded, a significant size premium of 1.45% per month, or about 19% on an annual basis, is found. This is finding contrasts with FF (1998). Their data for the US are from the electronic version of the MSCI. They argue that, since MSCI only includes about 80% of a market's invested wealth, this database does not allow meaningful tests for a size effect. Our sample is also based on about 80% of the total market capitalization of each country. However, we find a significant European size premium.

[Insert Table 3 about here]

The second row of table 3 presents the equally weighted returns. Exactly the same pattern is found, although equally weighted returns are somewhat higher. The question is whether smaller stocks are fundamentally riskier than big stocks. A first indication is the standard deviation of the MW returns. This total risk measure is presented in the third row of table 3. Indeed, the returns on the small stock portfolio seem to be more volatile than the largest stock returns. However, this is not a general conclusion. (compare the standard deviation of decile 1 and decile 9). Risk-corrected returns (Sharpe ratios) reveal that the reward-to-risk ratio[1] decreases with increasing market value. When returns are corrected for the market risk, the differences in returns are even more outspoken.

The row denoted β^* presents corrected betas. These βs are computed as the sum of the slopes in the regression of the excess return of the decile portfolio on the current and one month lagged excess market return. In line with Dimson (1979) and FF (1992) these βs are

[1] The calculations are based on the market capitalization weighted returns

used to adjust for nonsynchronous trading. As in FF (1992), the use of β^* produces large increases in the βs of the small stock portfolios and only small changes in the large stock portfolios. Computing risk-adjusted returns based on the sum βs still produces a European size premium of about 15.7% per year.

The SMB premium based on MW returns is 1.45% per month (t-value is 5.73) for 1973 - 2000. The same premium computed based on equally weighted returns amounts to 1.58% per month (t-value is 6.73). FF (1993) report a premium for the United States of 0.76% per month (based on equally weighted returns). Their sample starts in July 1963 and extends through December 1990.

The last row of table 3 shows the average values of the book-to-market equity (ln) of the decile portfolios[2]. As was the case in FF (1992), there is a negative relationship between the average size of the decile portfolios and the average value of the book-to-market equity. The smallest stocks have a substantially higher book-to-market equity ratio than the largest stocks. However, when computing HML and SMB premia this relationship between size and book-to-market equity should be kept in mind as both variables may measure the same effect.

3.3 BM returns

Table 4 presents the characteristics of the BM deciles. The MW decile returns show an increasing return pattern moving from decile 4 (growth stocks) to decile 9 (value stocks). The return on the lowest book-to-market equity stocks is on average 1.39% per month, while the return on the highest book-to-market equity stocks is on average 1.55% per month.

[Insert Table 4 about here]

[2] BM is on average lower in our study than in the FF(1993) study. As explained in section 2, we apply the Datastream ratio for market-to-book value. Net book value is defined as shareholder's equity minus total intangibles. So firms with elevated intangibles will be recognised as growth stocks.

The HML premium computed based on these market capitalization weighted returns is 0.16% per month (about 2% per year) with a t-value of 0.72 (the premium is 0.25% per month in our sample when the FF (1998) sample period from January 1975 until December 1995 is used) and is hence statistically not different from zero.

The EW decile returns are substantially higher. The HML premium increases to 0.58% per month (with a t-value of 3.29). FF (1998) report a HML premium for their international sample[3] based on value-weighted US dollar returns. The premium is 7.68% annually (0.62% per month). This is very close to our HML premium computed based on equally weighted returns. However, when market capitalization weighted returns are used, the HML premium disappears from our European sample. Our sample includes 15 European countries. For comparison, the HML values for the European countries used in FF (1998) are shown in table 5.

[Insert Table 5 about here]

Most of the HML return spreads are small and insignificant. The return spread for Italy is even negative. Hence, it comes as no surprise that, when cross-sectional data are used, no HML premium is found on a European scale. In the 8 overlapping countries of our sample and the sample of FF (1998), only 2 countries seem to have a significant HML premium (France and Belgium). We come back to these results in section 4.2, when studying country influences.

3.4 Two-way sorts: size and BM

The increase in the BM decile returns when using EW returns may indicate that there is a size effect in the HML premium. This conclusion is partially confirmed by the average size of the two extreme BM deciles. The growth stocks have an average size (ln) of 7.96, as opposed to the 6.90 of the value stocks. The Sharpe ratio of the decile portfolios indicate that the reward-to-risk ratio increases with increasing book-to-market equity. However, the effect of rising book-to-market equity on the Sharpe ratio is not as dramatic as was the case

[3] Their international sample includes: the US, Japan, Australia, Hong Kong, Singapore and eight European countries: the UK, France, Germany, Italy, the Netherlands, Belgium, Switzerland and Sweden.

for the size deciles. A correction of the returns for market risk increases the HML risk-adjusted premium since low BM stocks have a β of 1.01, while high BM stocks have a β of 0.88. The conclusions when correcting the portfolio returns for β^* instead of β remain the same.

The previous analysis indicates the existence of a negative relationship between size and book-to-market equity. Here, we evaluate whether the HML premium is in fact a size effect. We form three size portfolios ranking all stocks according to their market value. The small and big size portfolio both comprise 30% of all ranked stocks. Within each size portfolio, BM deciles are formed. Finally, within every size portfolios the HML premium is computed. Table 6 presents the results of this analysis.

First, notice that the figures indicate that the HML premia are now calculated within portfolios of comparable size. Row 7 of table 6 shows the natural logarithm of the average portfolio size.

[Insert Table 6 about here]

One can clearly see the impact of the size effect on the HML premium. An increasing size accompanies a decreasing return on both the growth and value stock portfolio. A computation of the HML premium within the size deciles reveals that the HML effect described in the previous analysis is in fact a size effect. Within the three size portfolios the HML effect disappears. Only in the medium size stocks, there is a positive premium of 0.35%. The subperiod analysis reveals that this premium is entirely due to the first half of the sample (1974-1986). For the 30% smallest stocks, the HML premium is -0.09% per month. For the 40% medium stocks, the HML premium is 0.35% per month, which is higher, but statistically not different from zero. Finally, the HML premium for the 30% largest stocks is -0.02% per month. It should be noted that when the returns for the value and growth portfolios within the small and medium size portfolios are corrected for their β-exposure, a higher HML premium appears(although not significantly different from zero).

In conclusion, there seems to be a significant size premium in the European stock market. Using risk corrected returns pushes the premium upwards. It should be mentioned,

however, that there seems to be a relationship between size and book-to-market equity. Small firms typically have high book-to-market equity, while the opposite is true for large firms. The HML premium is only significant when equally weighted returns are used. This is an indication that the HML premium is dominated by a size effect.

4. Robustness of the results

In the previous sections the SMB and HML premia were reported based on the methodology of FF (1993). Novel in our approach is that the European returns are studied on a cross-section of European countries. Also, value and growth stocks are distinguished by using a net book value, by taking the difference between shareholder's equity and total intangibles.

The fact that a European sample is used in this study could lead to some important differences in comparison with the U.S. First, for most of the period studied, each of the 15 countries in our sample had their own currency. This implies that the returns of stocks quoted in a certain country might contain a currency premium/discount. Therefore, we correct the stock returns for currency risk by using hedged returns.

Second, accounting standards might differ substantially between the countries in our sample. By demeaning the ranking variables we correct for potential differences in accounting rules. Demeaning implies that the size (and book-to-market equity ratio) of individual stocks are corrected for the monthly average size (book-to-market equity) of the country in which they are listed. More specifically, we rule out the country difference in the level of the ranking variables.

4.1 Hedged returns

In section 3 we presented the results for HML and SMB return spreads for the cross-section of European stocks with total returns denominated in German mark (DEM). In this section we correct the stock returns for currency risk by using hedged returns. Every month a forward contract is bought based on the one-month forward exchange rate.

To be able to calculate the one month hedged returns we retrieve the one month forward rates of all the countries in the sample. Due to a lack of data we download the one month forward rates of the local currencies relative to the British pound (GBP). Since all variables in the analysis are expressed in German mark, we converted the one month forward rates in pound to one month forward rates in German mark based on the one month forward rate DEM/GBP. The spot exchange rates of the 15 countries in the analysis are also needed. Here again, we download the spot exchange rates from Datastream from the local currencies to the British pound and converted them to DEM by means of the DEM/GBP spot exchange rate.

To be able to compute hedged returns, we use one-month forward rates for every country in the sample from its own currency to the German Mark and all spot exchange rates The one month forward premium/discount is computed as follows:

$$fp_t^i = \frac{F_t^i - S_t^i}{S_t^i},$$

where F_t^i is the one month forward rate of currency i at time t expressed as domestic currency (DEM) per unit of foreign currency
S_t^i is the spot rate of currency i at time t expressed as domestic currency per unit of foreign currency

It can be shown that the hedged returns can be approximated by (Eun and Resnick ,1988)

$$r_t^{h,i} \approx r_t^i + fp_{t-1}^i,$$

where $r_t^{h,i}$ is the hedged holding period return of stock i over period t
r_t^i is the unhedged holding period return of stock i over period t

Table 7 presents the results. MW return and EW return for the first and tenth decile portfolios are shown as well as the difference in return and the t-value. The results for the decile returns using hedged returns are outlined as well as the previously reported (-FF methodology-) benchmark case.

An important finding is that the currency choice does not explain the return spreads. Over the approximately 25 year period, shifts in exchange rates do not influence the return on an investment strategy based on size and BM. In this paper, we cannot explain the estimated premiums by the fact that there are 15 countries in the sample that have a different currency for most of the studied period.

[Insert Table 7 about here]

4.2 The demeaned ranking variable

In the benchmark case, we classify a stock as small or big, or value or growth, based on its characteristic (size or BM) relative to the average level of the characteristic of the European market. This could imply a possible bias in the results. First, imagine, for example, that most of the small stocks are concentrated in a certain country. This may imply that the SMB premium we find is in fact a country-effect. Second, because of differences in accounting standards across European countries, relative BM might differ. To look into the possible effect of the concentration of certain stock deciles in certain countries or regions and accounting differences, we demeaned the characteristics size and BM. This means that the size and BM of every stock is corrected on a monthly basis for the average size and BM of the home country (Lewellen ,1999). Table 8 shows the results.

[Insert Table 8 about here]

Table 8 shows that the large size premium found in all the previously discussed cases disappears. While in the benchmark case we found an average European size premium of about 1.7%, this premium is no longer statistically different from 0% when using demeaned figures. This tells us that small stocks in the European market earn a premium. However, when the small stocks are selected relative to the total market capitalization of the country in which they are listed, and next, portfolios are formed with these redefined small stocks, this eventual small stock portfolio no longer earns a premium

As important is the result for BM portfolios. Demeaning[4] the BM characteristic and taking possible accounting differences into account does not change the size of the premium. For market capitalization weighted returns, the return spread remains around 15 basis points and remains statistically not different from 0%. For equally weighted portfolios the spread remains around 50 basis points. It implies that relative BM ratios supply the same kind of information as absolute BM ratios. Furthermore, it implies that accounting principle differences play no major role in investment strategies based on these principles[5]. Combined with the finding that the currency denomination does not influence the results about the HML return spread, we feel that a cross-sectional European exercise gives robust information about the HML return spread.

4.3 Additional robustness checks

In the past 20 years, a lot of explanations have been suggested that could explain why a significant return spread is found. Until now, we only covered a few sample problems or irregularities. Therefore, we recalculated the spread and its significance for other important sample problems and methodological issues.

First, we apply a basic method. We use the characteristics at the end of the previous month to form portfolios for which returns are calculated for the next month. This means that we deliberately ignore the issue of lookahead bias to estimate the impact on the results. The important question arising here is whether we should worry about the look-ahead bias or other portfolio formation problems.

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[4] Instead of using these demeaned values, we have also performed normalized demeaning. This means that the ranking variable is transformed in the following way: $MC_{dm} = (MC_{ij} - MC_j) / \sigma_{MC_j}$ where MC_{dm} is the demeaned market capitalization, MC_{ij} is the market capitalization of stock i in country j , MC_j is the average market capitalization of country j and σ_{MCj} is the standard deviation of the market capitalization of country j. The results of this analysis were comparable to the results described above.

[5] Garcia-Ayuso et al. (1998) report that information in accounting multiples across Europe are not caused by a different degree of accounting conservatism. Ashiq and Hwang (2000) report that country characteristics such as financial system and accounting conservatism determining the value relevance of accounting information are very much interrelated across countries.

Second, we recalculate the return spreads excluding the dead stocks from the sample. The issue here is whether excluding dead stocks in the analysis influences the results. Portfolios in this case are constructed based on the FF methodology.
Third, we exclude financial stocks and UK stocks from the analysis, again applying the FF methodology on the remaining sample. We raise the possible problem of differences in the balance sheet structure of financial firms due to leverage, although Barber and Lyon (1997) find similar results for US data for financial and non-financial firms evaluating size and BM. Since UK stocks dominate the sample, the obvious question is whether the European results are influenced by the UK market. This is an important issue for euro zone based managers who may wonder whether our European results apply to the euro zone as well.
In the next two sections, we show the results of these exercises for the size and BM problem separately.

4.3.1 Additional robustness checks for the size effect

Table 9 presents the results for the additional robustness checks for the SMB return spread. The one aspect influencing the results seems to be excluding UK stocks. Without UK stocks, the return on small stocks (decile 1) is 61 basis points lower, explaining the drop of the SMB premium from 1.45% to 0.89%. Looking at the results, UK stocks have a higher return on their small stocks, adding to the argument made before that small stocks have different characteristics in the different countries. However, the premium is still significantly different from zero when the UK stocks are excluded.

[Insert Table 9 about here]

The fact that the other issues do not influence the results is as important. Second, there is only a small survivorship bias. Moreover, the bias found here is not significant. We remark that the survivorship bias here is not the same as the delisting bias as reported in Shumway and Warther (1999). Dead stocks in our sample are both delisted stocks and M&A stocks. The findings of Barber and Lyon (1997) for US data are confirmed for the European case:

excluding the financial firms from the sample only has a small effect on the SMB return spread. It increases by 5 basis points per month.

4.3.2 Additional robustness checks for the BM effect

Table 10 reports the results for the same additional checks on the HML premium. The most important finding here is that the look-ahead bias is indeed important for studying the BM effect across Europe. The basic method ranking stocks on the previous month BM reveals a HML premium of 0.87% which is significant. If we account for the look-ahead bias using the FF methodology, this spread drops to an insignificant 0.16% per month.
Second, excluding UK stocks also has an effect on the returns on value and growth stocks. The returns of the decile 1 and decile 10 are far below the returns for the portfolios including UK stocks. The general conclusion, that the overall spread is statistically not different from 0% remains.
Finally, excluding dead stocks and excluding financial stocks has little impact on the results.

[Insert Table 10 about here]

4.3.3 Transaction costs

The previous analysis indicated that on a European level, a significant size premium exists. A natural question is whether this strategy is investable. Indeed, the previously reported premium is in fact a premium in a costless world. In reality, however, frequently rebalancing portfolios can provoke important costs. Especially, when a portfolio manager rebalances his portfolio every month costs could be important. To look into the impact of costs the following analysis is performed.

Every July we calculate the absolute weight differences for the different decile portfolios. Next, we assume a transaction cost of 0.50% (Lynch and Balduzzi, 2000) per unit of weight difference. Finally, the average decile returns are reduced with the product of the average absolute weight difference and the trading cost. The effective (after subtracting the costs) SMB and HML premia are calculated as follows:

$SMB_e = small\text{-}big\text{-}(cot_s + cot_b)$,
$HML_e = value\text{-}growth\text{-}(cot_v + cot_g)$,

where SMB_e is the effective SMB premium,
small is the average return on the small stock portfolio,
big is the average return on the big stock portfolio,
cot_s is the average cost of trading of the small stock portfolio,
cot_b is the average cost of trading of the big stock portfolio,
HML_e is the effective HML premium,
value is the average return on the value stock portfolio,
growth is the average return on the growth stock portfolio,
cot_v is the average cost of trading of the value stock portfolio,
cot_g is the average cost of trading of the growth stock portfolio.

Table 11 presents the results. When using a transaction cost of 0.50% the SMB premium decreases from 1.45% per month to 1.40% per month due to transaction costs. This premium is still significantly different from zero (t-value of 5.53). The HML premium computed based on market capitalization weighted returns was statistically not different from zero. When taking into account transaction costs, the HML premium disappears completely.

[Insert table 11 about here]

The results indicate that the HML premium is more expensive for a European strategy than the SMB strategy. The largest cost impact is found in rebalancing the value stock portfolio.

5. Conclusion

The aim of this paper is to evaluate the return on investment strategies based on size and Book-to-Market. A lot of evidence has been reported on this subject. The novelty in this paper is that we evaluate the returns for a cross-section of European data, taking into consideration the possible problems such as currency risk and differences in accounting rules. In this way, finding a return on these two investment strategies makes that these strategies are useful for the investment process. Second, we also use net book value to distinguish value from growth stocks. We argue that excluding intangibles makes the comparison between value and growth stocks more transparent. The focus of this paper is on the validation of the findings' robustness.

We find that the size premium between 1974 and 2000 for a cross-section of European stocks is 1.45% per month or approximately 19% on an annual basis. Currency risk is of no importance, but if we look at relative size instead of absolute size, this large premium is no longer existent. Other methodological aspects do not influence the results. This is important for the practical implementation of the size strategy. Hence the conclusion for the size premium is that it is high and significant if stocks are selected on a European basis and not on a country-by-country basis.

The market capitalization weighted value premium for the same period of time is 0.16% per month or about 2% per year and not significant. Investing in European value strategies is hence not profitable over the studied period. The individual European value premiums reported by FF(1998) suggest that this finding is not unusual for a European dataset. Still, it conflicts with most findings for other markets. We essentially find that if the value premium occurs in subperiods, it is to a large extent explained by a size effect. The equally weighted value-growth return on the other hand is 0.58% per month or about 7% per year and is significant. Again, this return cannot be separated from the size effect. Furthermore, we find that accounting for the look-ahead bias matters for the estimation of the value premium. Not accounting for the look-ahead bias leads to a significant annual premium of 11% instead of the previously reported 2%.

Two lessons for European practitioners. First, the value premium is very debatable. If there is a premium, it occurs only in some periods. Also, if it occurs it can be explained by the size effect. On top of that, value-growth strategies are more expensive in terms of transaction

costs than the size strategy. Second, practitioners should take possible data problems into account. When they evaluate any kind of strategy, different possible data problems might occur. The consequence is that the results are erroneous or misleading. In this paper we showed what the possible impact of backfilling in databases can be when using accounting data.

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Table 1: Description of the dataset

countries:	AUS	BEL	FRA	GER	DEN	FIN	IRE	ITA	NET	NOR	UK	SWI	SPA	POR	SWE
Panel A: Number of firms in country															
1973	0	0	31	0	0	0	6	0	52	0	294	0	0	0	0
1985	0	20	73	14	23	0	8	0	64	14	385	12	0	0	23
2000	46	37	176	175	43	50	38	124	97	49	544	138	115	39	50
Average (1973-2000)	17	20	100	61	23	16	13	41	73	19	415	52	37	13	26
% of delisted	18%	20%	24%	2%	30%	6%	15%	15%	22%	26%	30%	12%	19%	23%	31%
Panel B: Market capitalization in % of total															
1973	-	-	8.2%	-	-	-	0.7%	-	18.6%	-	72.5%	-	-	-	-
1985	0.0%	1.4%	7.2%	4.6%	1.0%	-	0.4%	0.1%	13.0%	0.8%	66.9%	2.3%	-	-	1.8%
2000	0.3%	1.7%	15.2%	12.3%	1.1%	3.8%	0.7%	8.4%	7.4%	0.7%	31.4%	8.3%	4.1%	0.7%	3.8%
Average (1973-2000)	0.5%	2.0%	12.4%	12.4%	1.1%	1.7%	0.6%	6.1%	8.6%	0.7%	38.0%	8.2%	4.1%	0.6%	3.2%
Delisted	0.1%	0.3%	1.7%	0.3%	0.2%	0.0%	0.0%	0.2%	0.6%	0.1%	6.2%	1.1%	0.5%	0.1%	0.7%
Panel C: Average Size															
1973	-	-	632	-	-	-	265	-	848	-	586	-	-	-	-
1985	-	672	948	3149	424	-	450	-	1965	536	1677	1855	-	-	753
2000	1072	8184	15049	12208	4369	13353	3404	11853	13342	2312	10042	10445	6203	3346	13127
Average (1973-2000)	890	3131	3924	6395	1547	3318	1556	4704	3702	1194	2885	4983	3475	1492	3853
Delisted	2074	10074	52943	8710	4856	747	521	7633	18264	3379	194796	35055	15407	2976	22483
Panel D: Median Size															
1973	-	-	528	-	-	-	282	-	162	-	169	-	-	-	-
1985	76	252	591	1566	346	-	389	3191	341	471	509	606	-	-	481
2000	741	3056	2116	1884	1394	1473	876	2577	1959	946	1609	1581	1011	975	3701
Average (1973-2000)	491	503	491	515	503	503	503	515	517	517	519	517	517	519	534
Delisted	360	346	1118	3919	234	324	248	1178	979	376	610	1579	1195	551	882
Panel E: Value weighted BTM															
1973	-	-	0.51	-	-	-	0.84	-	1.20	-	0.79	-	-	-	-
1985	0.45	0.98	0.61	0.24	0.66	-	1.27	0.34	1.10	1.11	0.73	1.08	-	-	1.16
2000	0.54	0.35	0.11	0.21	0.23	0.11	0.28	0.18	0.22	0.50	0.30	0.21	0.21	0.47	0.16
Average (1973-2000)	0.62	0.61	0.62	0.35	0.60	0.73	0.91	0.61	1.10	0.71	0.76	0.73	0.63	0.68	0.62
Delisted	0.90	0.65	0.61	0.39	0.79	1.45	0.82	0.57	1.48	0.58	0.69	0.76	0.72	1.11	0.52
Panel F: Monthly returns															
1973	-	-	-1.17%	-	-	-	-4.37%	-	-1.98%	-	-3.79%	-	-	-	-
1985	2.36%	2.30%	4.13%	4.87%	3.23%	-	4.99%	2.04%	4.23%	2.23%	2.05%	2.89%	-	-	1.64%
2000	0.64%	0.37%	1.46%	0.18%	3.64%	0.38%	1.44%	1.96%	0.86%	0.99%	1.14%	2.33%	0.35%	1.05%	0.12%
Average (1973-2000)	1.00%	1.41%	1.60%	1.25%	1.30%	1.48%	1.50%	1.21%	1.35%	2.17%	1.72%	1.18%	1.33%	1.06%	1.95%
Delisted	1.09%	1.69%	1.83%	1.61%	1.21%	1.43%	1.68%	1.34%	1.41%	1.59%	1.83%	1.21%	1.37%	2.09%	1.89%
Panel G: Monthly standard deviations															
1973	-	-	7%	-	-	-	4%	-	5%	-	6%	-	-	-	-
1985	9%	5%	6%	6%	4%	-	6%	7%	3%	9%	5%	3%	-	-	5%
2000	2%	4%	4%	5%	5%	4%	5%	7%	3%	6%	4%	3%	5%	5%	4%
Average (1973-2000)	6%	5%	6%	5%	5%	8%	7%	8%	5%	8%	7%	5%	7%	6%	7%
Delisted	8%	6%	7%	7%	6%	15%	12%	9%	5%	10%	7%	8%	7%	8%	7%

This table describes the dataset. In panel A, the average number of stocks is shown for every country in the sample in 1973, 1985, 2000 and for the period 1973-2000. Panel B shows the market capitalization of the country as a percentage of total market capitalization. Panel C and panel D present the average size in DEM and median size of the countries. Panel E presents the value weighted book-to-market equity ratios for the countries. The last two panels show the monthly equally weighted country returns and the monthly standard deviations of the monthly equally weighted country returns.

Table 2: Country and sector statistics

Panel A: Country statistics – dead and alive stocks

	Alive stocks		Dead stocks	
	Number	Average monthly return	Number	Average monthly return
AUS	48	1.05%	14	1.09%
BEL	89	1.31%	26	1.69%
FRA	200	1.52%	79	1.83%
GER	215	1.24%	6	1.61%
DEN	49	1.41%	51	1.21%
FIN	62	1.46%	22	1.43%
IRE	47	1.45%	17	1.68%
ITA	160	1.15%	38	1.34%
NET	129	1.38%	32	1.41%
NOR	50	2.31%	48	1.59%
UK	546	1.67%	365	1.83%
SWI	149	1.47%	30	1.21%
SPA	119	1.38%	42	1.37%
POR	50	0.87%	49	2.09%
SWE	70	2.09%	64	1.89%
Average return		1.45%		1.55%

Panel B: Sector statistics – all stocks

	Average monthly return	Monthly standard deviation of the returns
resources	1.5%	1.2%
basic industries	1.5%	1.6%
general industries	1.9%	2.0%
cyclical consumer goods	1.3%	1.2%
non-cyclical consumer goods	1.8%	1.5%
cyclical services	2.1%	1.7%
non-cyclical services	2.5%	3.0%
utilities	1.7%	1.5%
Average return	2.0%	

Table 2 panel A presents country statistics for the dead stocks and alive stock separately. For each category the total number of stocks as well as the equally weighted average monthly returns are reported. The last row of panel A shows the equally weighted average return. Panel B of table 2 shows the monthly equally weighted sector returns and their monthly standard deviations.

Table 3: Properties of portfolios formed on size

	1 (SMALL)	2	3	4	5	6	7	8	9	10 (LARGE)	SMB	t-value
MW return	2.64	1.99	1.93	1.56	1.42	1.30	1.25	1.25	1.26	1.19	**1.45**	5.73
EW return	2.76	1.96	1.91	1.58	1.47	1.33	1.27	1.30	1.33	1.18	**1.58**	6.73
σ	6.45	6.17	6.03	6.15	5.71	5.92	6.08	6.13	6.48	5.61	4.59	
β	0.88	0.96	0.97	1.00	0.94	0.99	1.02	1.03	1.10	0.96		
β^*	1.06	1.07	1.08	1.11	0.99	1.04	1.07	1.05	1.10	0.94		
Sharpe ratio	0.34	0.24	0.24	0.18	0.17	0.14	0.13	0.13	0.12	0.13		
ln(Av.Size)	4.36	5.11	5.59	5.98	6.30	6.64	7.05	7.53	8.22	9.64		
ln(AV.BTM)	0.13	0.05	-0.01	-0.07	-0.08	-0.11	-0.19	-0.21	-0.17	-0.20		

Sample period: **July 1973 to January 2001.** At the end of June each year *t*, 10 portfolios are formed on the basis of ranked values of size (price of the stock times number of ordinary shares). Portfolios 1 - 10 cover deciles of the ranking variables. Portfolio 1 contains the 10% smallest stocks, while portfolio 10 contains the 10% largest stocks. We calculate each portfolio's monthly equal-and market capitalization weighted return for July of year *t* to June of year *t*+1, and then reform the portfolios in June of *t*+1. Firm size is measured in June of year *t*, with size denoted in millions of German mark. The row denoted "MW return" shows the time-series average of the monthly market capitalization weighted portfolio returns, in percent. The row denoted "EW return" shows the time-series average of the monthly equally weighted portfolio returns, in percent. β is the coefficient on the excess market return from the regression of the excess portfolio return (excess to the three-month Bundesbank FIBOR) on the excess market return. β* (Dimson,1979) is the sum of the slopes on the current and one month lagged excess market return in the regression of the excess portfolio return (excess to the three-month Bundesbank FIBOR) on the current and one month lagged excess market return. The Sharpe ratio of the decile portfolios is defined as the MWreturn in excess of the risk free rate (FIBOR) relative to the standard deviation of the decile portfolio MWreturns. The row denoted "ln(Av.Size)" presents the natural logaritm of the time -series average of the monthly size of the portfolios. The row denoted "ln(AV.BTM)" presents the natural logaritm of the time-series average of the monthly book-to-market values of the portfolios. σ is the monthly standard deviation of the market capitalization weighted decile portfolio returns.

Table 4: Properties of portfolios formed on book-to-market equity

	1 (GROWTH)	2	3	4	5	6	7	8	9	10 (VALUE)	HML	t-value
MW return	1.39	1.34	1.28	1.43	1.43	1.49	1.55	1.64	1.59	1.55	**0.16**	0.72
EW return	1.62	1.69	1.61	1.75	1.77	1.74	1.75	1.90	2.02	2.20	**0.58**	3.29
σ	6.17	6.45	6.61	6.43	5.88	5.91	6.23	6.18	5.83	5.81	**4.01**	
β	1.01	1.08	1.10	1.07	0.97	0.98	1.03	1.02	0.96	0.88		
β^*	1.00	1.05	1.12	1.10	0.95	0.95	1.07	1.03	0.97	0.91		
Sharpe ratio	0.15	0.13	0.12	0.15	0.16	0.17	0.17	0.19	0.19	0.18		
ln(Av.Size)	7.96	8.16	7.90	7.95	8.23	8.08	7.73	7.63	7.20	6.90		
ln(Av.BTM)	-4.84	-0.88	-0.61	-0.42	-0.25	-0.11	0.02	0.17	0.34	0.71		

Sample period: **July 1974 to January 2001.** At the end of year *t*-1, 10 portfolios are formed on the basis of ranked values of book-to-market equity (BTM). Portfolios 1 - 10 cover deciles of the ranking variables. Portfolio 1 contains the 10% stocks with the lowest BTM (growth stocks), while portfolio 10 contains the 10% stocks with the highest BTM (value stocks). The market value to book value (also called discount to net asset value) divides the market value by the net book value. By dividing the Net tangible assets by the market value, the BTM is obtained. The Net tangible assets (also referred to as net book value) is defined as total assets, excluding intangible assets less total liabilities, minority interest and preference stock. It can also be defined as ordinary shareholder's equity less tangible assets. This accounting ratio is measured using market equity in December of year *t*-1. We calculate each portfolio's monthly equal-and market capitalization weighted return for July of year *t* to June of year *t*+1 and then reform the portfolios at the end of year *t*. "MW return" is the time-series average of the monthly market capitalization weighted portfolio returns, in percent. "EW return" is the time-series average of the monthly equally weighted portfolio returns, in percent. β is the coefficient on the excess market return from the regression of the excess portfolio return (excess to the three-month Bundesbank FIBOR) on the excess market return. β^* (Dimson,, 1979) is the sum of the slopes on the current and one month lagged excess market return in the regression of the excess portfolio return (excess to the three-month Bundesbank FIBOR) on the current and one month lagged excess market return. The Sharpe ratio of the decile portfolios is defined as the MWreturn in excess of the risk free rate (FIBOR) relative to the standard deviation of the decile portfolio MWreturns. The row denoted "ln(Av.Size)" presents the natural logaritm of the time-series average of the monthly size of the portfolios. The row denoted "ln(Av.BTM)" presents the natural logaritm of the time-series average of the monthly book-to-market values of the portfolios. σ is the monthly standard deviation of the market capitalization weighted decile portfolio returns.

Table 5: HML: the international evidence

	UK	France	Germany	Italy	Netherlands	Belgium	Switzerland	Sweden
HML	**0.38**	**0.62**	**0.23**	**-0.51**	**0.19**	**0.36**	**0.29**	**0.64**
t-value	1.08	**2.08**	0.92	-0.91	0.44	**1.99**	0.80	1.16

Source: table II in Fama&French (1998) , p. 1979. The row denoted "HML" presents the monthly HML for the different countries. The row denoted "t-value" shows the t-values of the test whether the reported HML premium is statistically different from zero.

Table 6: Two-way-sorts: HML within size portfolios

Panel A: Two Way Sort - full sample

	Small			Medium			Large		
	Growth	**Value**	**HML**	**Growth**	**Value**	**HML**	**Growth**	**Value**	**HML**
Aver.Ret	2.29	2.19	-0.09	1.47	1.82	0.35	1.39	1.37	-0.02
Stdev	7.36	6.17	5.54	6.57	5.71	3.84	6.16	5.87	4.17
Sharpe	0.24	0.28	-0.01	0.15	0.23	-0.04	0.15	0.15	-0.09
β	1.06	0.77	-0.29	1.06	0.88	-0.18	0.97	0.91	-0.06
t-beta	25.51	17.65	-5.64	41.18	31.22	-4.99	36.09	32.97	-1.49
Rsqrd	67%	50%	9%	84%	75%	7%	80%	77%	1%
ln(Aver.Size)	5.14	5.10		6.65	6.59		8.75	8.34	
ln(Aver.Btm)	-1.60	1.00		-1.68	0.72		-1.89	0.64	
Panel B: Two Way Sort – subperiod 1: July 1974 – December 1986									
Aver.Ret	2.48	2.38	-0.10	1.43	2.21	0.78	1.47	1.41	-0.05
Stdev	7.83	6.07	6.78	7.56	6.05	4.77	6.83	6.18	4.60
Sharpe	0.25	0.31	0.03	0.12	0.28	-0.01	0.14	0.14	-0.06
ln(Aver.Size)	4.19	4.04		5.74	5.74		7.71	7.50	
ln(Aver.Btm)	-0.93	1.31		-1.10	0.97		-1.25	0.93	
Panel C: Two Way Sort – subperiod 2: January 1987 – January 2001									
Aver.Ret	2.12	2.03	-0.09	1.51	1.47	-0.04	1.31	1.33	0.01
Stdev	6.94	6.27	4.17	5.57	5.39	2.74	5.51	5.59	3.76
Sharpe	0.24	0.25	-0.09	0.19	0.19	-0.11	0.16	0.16	-0.14
ln(Aver.Size)	5.58	5.56		7.08	7.00		9.21	8.74	
ln(Aver.Btm)	-3.47	0.60		-2.89	0.43		-3.46	0.28	

This table presents the HML premium within different size portfolios. The first column presents the monthly market capitalization weighted returns of the Value and Growth portfolios within portfolios consisting of the 30% smallest stocks (size is measured by market capitalization). Value stocks are defined as the 10% lowest book-to-market equity stocks. The second column presents the monthly market capitalization weighted returns of the Value and Growth portfolios within the portfolio consisting of the 40% medium size stocks, while column three presents the monthly market capitalization weighted returns of the Value and Growth portfolios within the portfolio consisting of the 30% biggest stocks. Subcolumn three shows the HML premium within the size portfolios. β is the coefficient on the excess market return from the regression of the excess portfolio return (excess to the three-month Bundesbank FIBOR) on the excess market return. "Rsqrd" is the coefficient of determination of the regression in which the β is estimated.

Table 7: SMB and HML using hedged returns

	Hedged returns				Benchmark case			
	Size							
	1	10	SMB	t-value	1	10	SMB	t-value
MW return	3.24%	1.54%	**1.69%**	6.49	2.93%	1.28%	**1.65%**	6.31
EW return	3.33%	1.57%	**1.77%**	7.43	3.03%	1.29%	**1.73%**	7.30
	BM							
	1	10	HML	t-value	1	10	HML	t-value
MW return	1.63%	1.73%	**0.10%**	0.46	1.33%	1.47%	**0.13%**	0.62
EW return	1.86%	2.39%	**0.53%**	3.11	1.56%	2.13%	**0.57%**	3.32

Decile returns are calculated from March 1976 until January 2001. The rows denoted "MW return" show the market capitalization weighted rates of return , while the rows denoted "EW return" show the equally weighted rates of return. The size panel evaluates the SMB return spreads, the BM panel evaluates the HML return spreads. "1" refers to decile 1 and "10" refers to decile 10. The benchmark case refers to the FF-methodology described in the paper. Hedged returns are computed as follows: first, the forward premium/discount is determined: $fp_t^i = (F_t^i - S_t^i)/S_t^i$, where Fit is the one month forward rate of currency *i* at time *t* expressed as domestic currency (DEM) per unit of foreign currency. S^i_t is the spot rate of currency *i* at time *t* expressed as domestic currency per unit of foreign currency. Second, it can be shown that the hedged returns can be approximated by (Eun and Resnick ,1988) $r_t^{h,i} \approx r_t^i + fp_{t-1}^i$, where $r_t^{h,i}$ is the hedged holding period return of stock *i* over period *t* and r^i_t is the unhedged holding period return of stock *i* over period *t*.

Table 8: SMB and HML demeaned size and BM

	Demeaned characteristics				Benchmark case			
	Size							
	1	10	SMB	t-value	1	10	SMB	t-value
MW return	1.15%	1.20%	**-0.05%**	-0.22	2.93%	1.28%	**1.65%**	6.31
EW return	1.57%	1.21%	**0.36%**	1.45	3.03%	1.29%	**1.73%**	7.30
	BM							
	1	10	HML	t-value	1	10	HML	t-value
MW return	1.40%	1.55%	**0.15%**	0.75	1.33%	1.47%	**0.13%**	0.62
EW return	1.69%	2.14%	**0.45%**	2.84	1.56%	2.13%	**0.57%**	3.32

Decile returns are calculated from March 1976 until January 2001. The rows denoted "MW return" show the market capitalization weighted rates of return , while the rows denoted "EW return" show the equally weighted rates of return. The size panel evaluates the SMB return spreads, the BM panel evaluates the HML return spreads. "1" refers to decile 1 and "10" refers to decile 10. The benchmark case refers to the FF-methodology described in the paper. Demeaning implies correcting the size and BM of every stock on a monthly basis for the average size and BM of the home country (Lewellen, 1999).

Table 9: Robustness checks for the SMB return spread

	Small (1)	Large (10)	SMB	t-value
Benchmark case	2.64%	1.19%	1.45%	5.73
Basic method	2.50%	1.15%	1.35%	6.28
Excluding dead stocks	2.60%	1.24%	1.36%	4.92
Excluding financial stocks	2.71%	1.20%	1.50%	5.79
Excluding UK stocks	2.03%	1.14%	0.89%*	3.88

The benchmark case is the previously outlined FF methodology that takes the lookahead bias into account. The basic method ranks all stocks based on the characteristic value at the end of the previous month and monthly recalculates portfolio returns for the next month. Excluding dead stocks evaluates the FF methodology for the sample of surviving firms. The row denoted 'Excluding financial stocks' applies the FF methodology on the sample of non-financial stocks. The row denoted "Excluding UK stocks" applies the FF methodology on the sample of non-UK stocks. The column denoted "Small (1)" shows the market capitalization weighted return for the smallest decile stock portfolio, while the column denoted "Large (10)" presents the results for the largest decile portfolio. The column denoted "SMB" shows the SMB premium in the different situations. The column denoted "t-value" presents the t-value for the test whether the reported SMB premium is statistically different from zero. SMB premia marked with a * indicate that they are statistically different from the benchmark case at the 5% level.

Table 10: Robustness checks for the HML return spread

	Growth (1)	Value (10)	HML	t-value
Benchmark case	1.39%	1.55%	0.16%	0.72
Basic method	1.04%	1.91%	0.87%*	4.04
Excluding dead stocks	1.43%	1.46%	0.03%	0.12
Excluding financial stocks	1.39%	1.52%	0.13%	0.52
Excluding UK stocks	1.08%	1.02%	-0.06%	-0.21

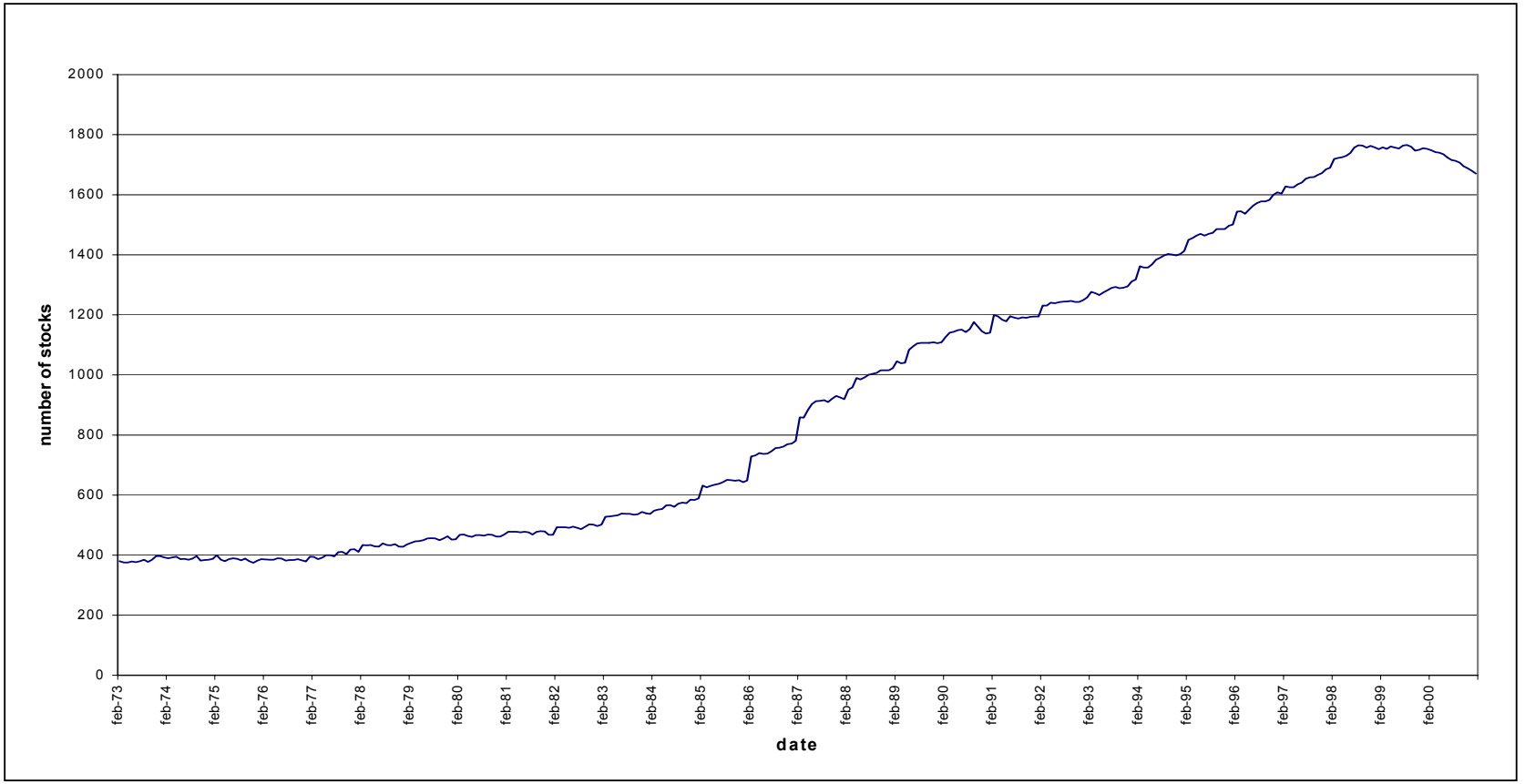
The benchmark case is the previously outlined FF methodology that takes the lookahead bias into account. The basic method ranks all stocks based on the characteristic value at the end of the previous month and monthly recalculates portfolio returns for the next month. Excluding dead stocks evaluates the FF methodology for the sample of surviving firms. The row denoted 'Excluding financial stocks' applies the FF methodology on the sample of non-financial stocks. The row denoted "Excluding UK stocks" applies the FF methodology on the sample of non-UK stocks. The column denoted "Growth (1)" shows the market capitalization weighted return for the growth stock portfolio, while the column denoted "Value (10)" presents the results for the value stock portfolio. The column denoted "HML" shows the HML premium in the different situations. The column denoted "t-value" presents the t-value for the test whether the reported HML premium is statistically different from zero. HML premia marked with a * indicate that they are statistically different from the benchmark case at the 5% level.

Table 11: Investability of the SMB and HML premia when accounting for transaction costs

	Without transaction costs	With transaction costs (50 bps)
SMB	1.45%	1.40%
HML	0.16%	0.09%

This table presents the SMB and HML premium based on the FF methodology (correction for lookahead bias) without taking transaction costs into account (see the column denoted "Without transaction costs") and with taking the transaction costs into account (see the column denoted "With transaction costs (50 bps)"). The reported premia are monthy premia based on market capitalization weighted decile portfolio returns.

Figure 1: Evolution of the sample size



This figure presents the evolution of the sample size. In the early months, not all stocks in the sample were already listed . In addition, there are stocks that have a return observation in certain month, but no book-to-market observation in the end of the previous month. These stocks are also discarded from the analysis.

Figure 2: Size decile formation procedure

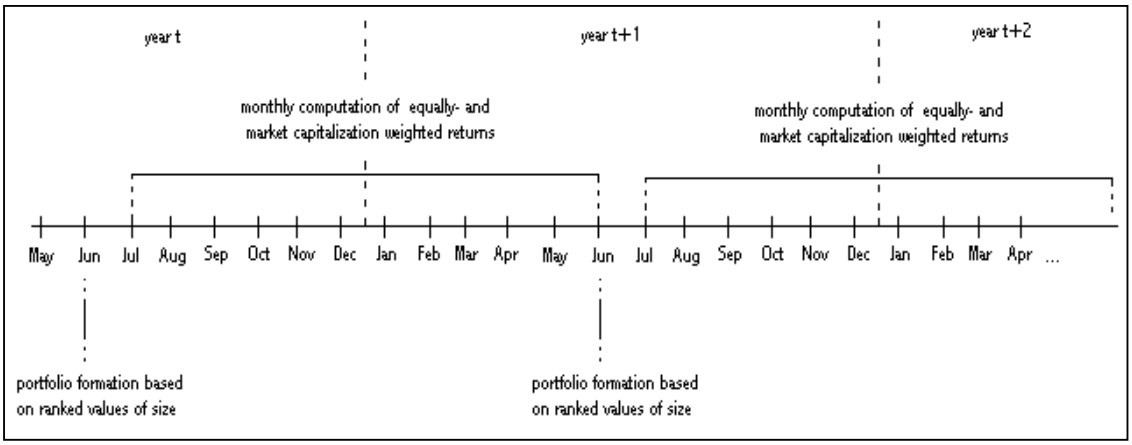
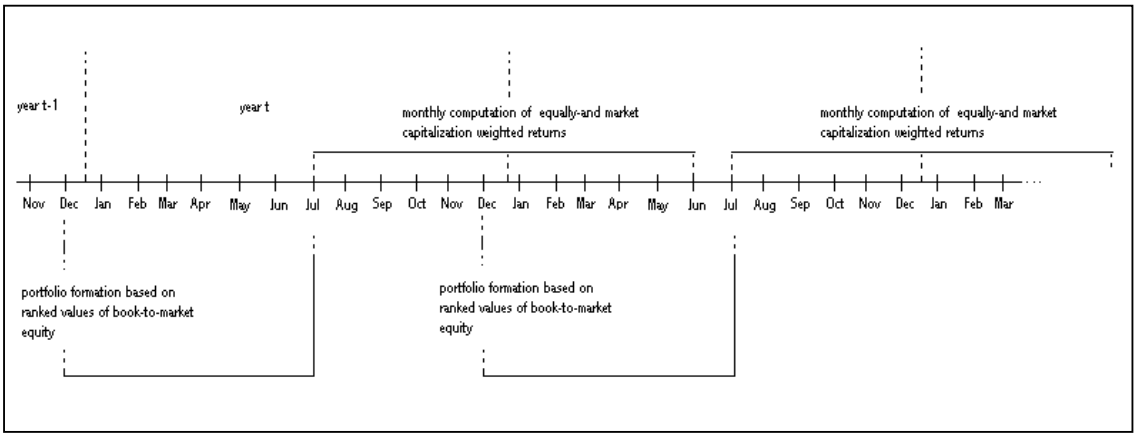


Figure 3: Book-to-market decile formation procedure



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