Slow Adjustment to Negative Earnings Report Explains Many Documented Anomalies Amongst Large Stocks*

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Abstract

This paper shows that slow adjustment of stock prices to negative earnings reports explains many stock-market anomalies amongst large stocks. This slow adjustment is concentrated amongst small sample of stocks (4% of all large stocks) that are characterized by both low profitability and low book to market ratio (henceforth LPBM). When the returns of the LPBM stocks are censored out of the sample, well-known market anomalies (such as the book to market effect, earnings momentum, the returns of financially distressed stocks, among others) lose their statistical significance. The challenge, therefore, is to explain one anomaly (the slow adjustment) rather than many.

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1. Introduction

The attempts to explain cross sectional differences in expected returns by differences in risk, examine the relations between ex ante stock characteristics and ex post returns. These investigations uncover some surprising relationships. Among the unexpected empirical regularities documented are: book to market effect, size, price momentum, earning momentum, and underperformance of financially distressed stocks. [1] Risk related explanations were offered to some of these empirical regularities (e.g. size [Chan and Chen 1991]) book to market [Fama and French 1992])) while others are viewed as anomalies[2] . This paper presents evidence consistent with the hypothesis that slow stock price adjustment to negative earnings report is the main driving force behind many of these anomalies/empirical regularities.

Most importantly, the evidence presented in this paper indicates that slow adjustment to earnings report explains most of the anomalies associated with relatively large stocks.[3] The typical anomaly associated with a large cap stock is a period of ex post low returns following negative signal regarding the firm. I find that a single anomaly - the extremely low stock returns (negative in our sample) of firms

[1] Book to market effect was first reported by Stattman (1980), the size effect reported by Banz (1981), earnings momentum by Jones and Litzenberger (1970), price momentum by Jegadeesh and Titman (1993) and the underperformance of financially distressed stocks by Dichev (1998).

[2] Behavioral explanations were offered for some of these anomalies. For example Lakonishok, Shleifer and Vishny (1994) offer a behavioral explanation for the book to market anomaly, Bernard and Thomas (1990) for earnings momentum, Barberis, Shleifer and Vishny (1998), Hong and Stein for price momentum and Griffin and Lemmon (2002) for the underperformance of low BM financially distressed stocks.

[3] In this paper large stocks are defined as stocks that are not in the lowest size quintile (NYSE cutoff points). Most of the previously documented anomalies are driven primarily by the returns of relatively small cap stocks. Previous anomalies that were observed to be mainly small stock anomalies include: January effect as observed by Basu (1983), the high returns of past winners (Hong Lim and Stein 2000), earnings momentum (Bernard and Thomas 1990, and Bushan 1994) and others. The empirical regularities associated with small stocks are somewhat less puzzling as they provide limited profit opportunities due to lack of market depth. For the evidence on the limited profit opportunities associated with small stock anomalies see for example: Pontiff (1996) on the underperformance of close end funds, Mendenhall (2003) on earnings momentum, Lesmond Schill and Zhou (2004) on price momentum, Sadka (2002) on Januarry effect among others.

that have both low profitability and low BM ratio (henceforth LPBM)[4] - is the driving force behind most of the documented anomalies associated with these stocks.

It turns out that LPBM stocks tend to be past losers, to have negative earnings change, are financially distressed, and have an increase in volume of trade. Therefore, studies that ranked stocks based on these criteria, lead to a disproportional large number of LPBM stocks in portfolios of past losers, financially distressed firms, and firms experiencing negative earnings. I find that the inclusion of a large number of LPBM in these portfolios largely drives their ex post poor performance.

Consider a study examining the effects of financial distress on stocks expected returns. The empirical investigation would form portfolios ranked based on level of financial distress (henceforth criteria j). One can describe the expected return of portfolio j as follows;

$$(1)\ E(r_j) \equiv \alpha_j * E(r_{LPBM_j}) + (1-\alpha_j) * E(r_{j-LPBM})$$

Where $E(r_j)$ is the estimated expected return of the portfolio, α_j is the proportion of LPBM stocks in portfolio j, $E(r_{LPBM})$ is the estimated expected return of the stocks belonging to the sample of LPBM. The last variable in the equation $E(r_{j\text{-}LPBM})$ is the estimated expected returns of portfolio j purified of LPBM stocks. In the illustrative example this variable is the average return of stocks that are financially distressed but not part of the LPBM sample.

The main finding of this paper is that previously documented underperformance of portfolios of large cap stocks is largely due to the average return on LPBM stocks, whereas the purifying return of these portfolios is similar or slightly underperforms their benchmark. Hence, the larger α is in a portfolio the more it

[4] Profitability is defined as both the level of earnings and earnings change. This definition is thus different than the literature in earnings momentum that typically uses proxies for earnings changes. The

under performs. Thus studies involving large cap stocks found anomalies because of the inclusion of large number of LPBM stocks in some of the ranked portfolios.

This paper focuses on four return regularities that were previously documented amongst large stocks: the low returns of low BM stocks, low returns of past losers, low returns of stocks with negative earnings changes and low returns of financially distressed stocks. Three of the four portfolios that underperform seem related as they are documenting low returns following a negative signal about the firm, either in the form of bad accounting reports, or poor market performance. In contrast, the low return of low BM stocks is typically attributed to the opposite reason: namely the high past earnings of stocks that are in the low BM portfolio (e.g. Fama and French (1993,95) and Lakonishok, Shleifer and Vishny (1994)).[5]

A few relatively recent papers study the intersection between BM and the other anomalies. These papers report a common finding: extremely low returns (similar or below the risk free rate) of the portfolio that is in the intersection between low BM and negative event portfolios. The intersection between low BM and past performance was studied by Asness (1997) and Daniel and Titman (1999), both report that the low BM – past losers portfolio earns extremely low returns. Similarly, Dreman and Berry (1995) sorted stocks by earnings change and growth.[6] They report extremely low returns for the negative earnings change - growth portfolio. Finally, Griffin and Lemmon (2002) report that the portfolio that consists of low BM and

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relation between this paper's findings and the extensive research on earnings momentum is the main focus of Section 4 of this paper.

[5] Fama and French (1993) argue that the low returns of low BM stocks is due to these stocks being less exposed to the distressed risk factor and thus present less risk for the investors. In their 1995 paper they present evidence consistent with this argument by showing that low book to market stocks have on average higher profitability than high book to market stocks. Lakonishok, Shleifer and Vishny (1994) offer a behavioral explanation according to which investors systematically err in extrapolating the high earnings of low BM stocks into expected future earnings thus over estimating their value.

[6] Dreman and Berry used $\frac{E}{P}$ as a proxy for growth. As Fama and French (1992) show $\frac{E}{P}$ and BM are closely related.

financially distressed stocks severely underperforms and this underperformance is concentrated among relatively large stocks. The low returns of low BM and negative event portfolios indicate that at least part of the BM effect is due to the underperformance of these stocks. Consistent with this argument, Liew and Vassalou (2004) show that the BM effect presents itself only in the top two quintiles of financially distressed stocks. Similarly, Asness show that the BM effect is strongest among past losers.

That all of the above anomalies are largely driven by the low returns of low BM firms that received a bad signal is further indicative of the possibility that a single anomaly is behind large stock return regularities, as reported in this paper.

The remainder of this paper is organized as follows: *S*ection 2 presents data and summary statistics, *S*ection 3 examines the characteristics and returns of LPBM stocks, *S*ection 4 focuses on the relation between LPBM stock returns and book-to-market effect. As the returns of LPBM stocks are related to drift after negative accounting results, *S*ection 5 will investigate the relation between LPBM and earnings momentum, while *S*ection 6 examines the relation to other anomalies. *S*ection 7 provides a uniformed test that examines LPBM influence on previously reported return regularities and section 8 concludes the paper.

2. Methodology, data and sample statistic

a. Methodology

The main empirical finding of this paper is that a small sample of stocks (roughly 4% of all large stocks, defined below) has extremely low mean returns following negative earnings announcements. This sample of stocks (henceforth, LPBM) is defined based on three dimensions in the following manner:

1. Size (market value) – On June of each year all NYSE stocks were sorted according to their market capitalization and divided into size quintile. The cut-off points obtained for the NYSE sample were used to allocate all sample stocks into size quintiles. As NASDAQ stocks are typically small stocks, the portfolio of small cap stocks consists of two third of the all the stocks in the databases. In this paper I focus on the potential explanation of price dynamics anomalies associated with stocks contained in all but the traditionally constructed smallest cap portfolio (henceforth large cap stocks). Hence, the stocks contained in the smallest size portfolio are censored out of the sample in all tests in the paper except for the first one.[7]

2. Book-to-market ratio (BM) – Within each of the four size quintile, stocks were ranked based on their book-to-market (BM) ratios and divided into five equal quintiles. Book-to-market is defined as the ratio between the book value of the firm at the end of the previous fiscal year and its market capitalization at the same time. To be included in the LPBM sample, the stock must belong to the lowest BM portfolio.

3. *Profitability* –. I use the well-known Ohlson's O-score model (1980) to create a proxy (profit-score) for profitability.[8] Thus:

$$\text{Profit score} = 2.37\frac{\text{net income}}{\text{total assets}} + 1.83\frac{funds\ from\ operation}{tatal\ liabilities} - 0.285(if\ net\ loss\ for\ the\ last\ two\ years, else\ 0) + 0.521\frac{net\ income_t - net\ income_{t-1}}{|net\ income_t| + |net\ income_{t-1}|}.$$

The Olson's profit score combines level of earnings and the current change in

[7] This is the same methodology as used by Hong Lim and Stein (2000). The issue of censoring all small stocks will be further discussed towards the next subsection.

[8] The O-score model has nine variables that belong to three main categories: size (book value), leverage and profitability. In order to calculate profit-score, only the four variables that are related to profitability are summed. The coefficients are the original coefficients that were estimated by Ohlson (1980). The coefficients are multiplied by (-1) as in the original O-score model positive means high chances of bankruptcy, thus top quintile is actually lowest profitability. Thus, in order to use the more standard way, that the lowest quintile will be lowest profitability, profit-score (and later the O-score model) is multiplied by -1.

earnings.[9] Thus a firm having a low profit score is likely to have both low level of earnings and negative earning surprise.

At the end of each fiscal year all small and large cap stocks are separately ranked based on their profit score and divided into five quintiles. I use this methodological course rather than sorting stocks independently in order to concentrate on the effect of low profitability on the returns of large stocks. [10] All stocks in the lowest profit score quintile in both size groups (small and large stocks) are defined as having low profitability. To be included in the LPBM portfolio a stock has to be defined as low profitability.

The experiment conducted in this paper investigates whether or not inclusion of a large fraction of LPBM stocks in a portfolio is the driving force leading to its documented underperformance in past literature – i.e., the anomaly. To investigate whether or not the inadvertent concentration of LPBM stocks (high α_j in equation 1) is the driving force behind the set of documented anomalies, I use the following simple methodology. First, I reproduce the previous findings (underperformance) by comparing the returns of the portfolios constructed to a benchmark (typically controlling for both size and BM). Next, all LPBM stocks are identified, censored from the sample, and the returns of the purified portfolio are then compared to the same benchmark. If the large fraction of LPBM is not the driving force behind the empirical regularity examined, than the purified portfolio should continue to

[9] This approach is motivated in part by past research that shows that earnings changes have a small predictive power of the returns of large stocks especially during recent sample periods. For the relation between size and earnings momentum on relatively old data see for example Foster Ohlsen and Shevlin (1984) and Bernard and Thomas (1990), for more recent sample period see Johnson and Schwartz (2001) and Sadka and Sadka (2003). In contrast Griffin and Lemmon (2002) findings indicate that the overall profitability level has a predictive power on stock returns as discussed in section six.

[10] Sorting stocks independently according to low profitability leads to the fact that 88% of the stocks in the low profitability quintile are small stocks. Hence the return pattern of this portfolio will be heavily influenced by the return pattern of these stocks, whereas this paper is focusing on large stock returns. Previous literature using independent sorting sometimes value weighed the returns in order to reduce

underperform in comparison to its benchmark.[11] In addition, I use cross-sectional regressions in order to verify the main results.

The comparison between the various portfolios and their benchmarks is done while using equal weighted mean returns.

b. Data

The data for this paper were obtained from two sources. The stock returns were drawn from the CRSP monthly stocks combined files, and the accounting data was taken from the COMPUSTAT files. Only firms with ordinary common equity (share code 10, 11 in CRSP files) were included in the sample, consequently, ADRs, REITs, and close-end funds have been excluded.

The sample period is from July 1981 to June 2001. To be included in the sample for year t, a firm had to have a CRSP record for both June of that year and December of the previous year, COMPUSTAT annual data for the two previous years, and a positive book value of common equity. The resulting sample consists of 898,961 observations of monthly returns of which 328,809 (36.6%) are monthly returns of large cap stocks.

c. Sample statistic

Table 1 presents summary statistics for 25 size/BM portfolios. Panel A presents the average number of firms in each portfolio. As in all papers that divide stocks according to NYSE cut-off points, the majority of stocks (63.9%) belong to the smallest size quintile, whereas, only 6.0% belong to the biggest size quintile. Panel B presents the average market capitalization of stocks in each portfolio during the

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the effect of small stocks. However, in Appendix A I argue that this methodology is inappropriate when testing large stock returns regularities.

[11] It is possible that the ranking criterion is selecting among LPBM stocks those that have lower returns. Yet, the small number of LPBM stocks makes statistical examination of this issue almost impossible. This point is further addressed in section 7 of this paper.

sample period. The average size of stocks ranges from tens of millions in the smallest size portfolios to tens of billions in the largest size portfolios. Consequently, small stocks constitute less than 3% of the sample's total market capitalization. Panels C to E examine the average profitability, earning change, and financial distress in each of the portfolios. The results are consistent with previous findings: For large cap firms, low BM stocks have *on average* higher profitability, higher earning change and are less financially distressed than high BM stocks.[12] These results seem to support the risk-base explanation according to which low BM stocks are glamorous stocks and thus present less risk for the investor that consequently demand lower returns. However, for small cap stocks the portfolio with the lowest profitability and largest financial distress belongs to the smallest size and the lowest BM (1,1) quintiles[13].

3. Low Profitability and Low Book-to-Market (LPBM) Stocks

Previous academic literature showed that low BM stocks experiencing negative information either in the form of a bad earnings report or a drop in market value tend to have lower ex-post returns. Among such papers are the works of Asness (1997) and Daniel and Titman (1999), which show that low BM stocks that are past losers tend to have extremely low returns. Similarly, low BM stocks that are financially distressed (Griffin and Lemmon 2002) or have negative earning change (Dreman and Berry 1995) are also reported to have lower ex-post returns. This paper also examines a sub-group of low BM stocks that in their last annual accounting report suffers from low profitability.

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[12] This is consistent with the findings of Fama and French (1995), Chen and Zhang (1998), Griffin and Lemmon (2002), Hussain et al (2002) among others.

[13] This result is consistent with Loughran (1997) who reported that small cap - low BM portfolio exhibited low profitability during the 1980's and 1990's.

The focus of the first test is the comparison of the ex post returns of LPBM stocks and other low BM stocks. To compare the return pattern of the LPBM portfolio to the other low BM stocks, I formed portfolios based on three criteria: size, BM, and profitability. Stocks were divided into 25 size/BM portfolios, as described above. Next small (lowest size quintile) and large stocks were separately divided into two portfolios based on profit score as described in the methodology section. Stocks belonging to the lowest quintile are defined as having low profitability and stocks from others quintiles defined as having other profitability. This procedure divides each one of the 25 size/BM portfolios into two unequal portfolios, thus creating a total of 50 portfolios.

Simple monthly average return is computed for each of the 50 portfolios. The difference in returns between firms with low profitability and other firms is then calculated for each of the 25 size/BM portfolios using the following equation:

$$(2) \quad \Delta\bar{r}_i = \bar{r}_{LPi} - \bar{r}_{NPi}$$

Where i stands for each of the 25 size/BM portfolios and $\bar{r}_{LPi}$ and $\bar{r}_{NPi}$ for the average monthly returns of low profitability (lowest profit-score quintile) firms and other profitability firms in portfolio i respectively.

Results for $\Delta\bar{r}_i$ (reported in Table 2) shows different effect of low profitability on returns for different level of BM and size. For small stocks the returns of low profitability stocks are slightly higher than returns of other profitability stocks. However, the differences are not statistically significant.[14] As for large stock portfolios the effect of low profitability changes with BM. Amongst low BM

[14] A recent paper by Vassalou and Xing (2004) used an option base model to proxy for financial distress. Their findings also suggest that small financially distressed stocks earn higher returns than non-distressed stocks. It is important to note that Vassalou and Xing's option base model tends to include high BM stocks in the distressed portfolio, whereas an accounting base model (as used in this

portfolios, low profitability stocks severely underperform their benchmark by more than 1% per month in each of the four portfolios. The underperformance of low profitability stocks continues in the second BM quintile, but is much smaller and insignificant in three out of the four portfolios. I find no difference in the returns of low profitability versus other profitability stocks for medium and high BM portfolios.

The results of Table 2 show that the effect of low profitability amongst low BM portfolios chang*es* with size. While among large stocks, low profitability stocks severely underperform other low BM stocks, there is no effect of low profitability amongst small low BM stocks. This finding is consistent with both Hong Lim and Stein (2000) and Griffin and Lemmon (2002), which both show that negative drift after a bad event is primarily related to large stocks. A possible explanation for the difference in return patterns between small and large BM stocks is the difference in characteristics. As shown in Table 1, large BM stocks have on average high profitability whereas small low BM stocks suffer from extremely low profitability. Therefore, a low profitability earnings report is an unexpected bad signal for large low BM stocks, while being the norm amongst small low BM stocks. Hence the slow adjustment to the negative earnings report is expected only amongst large stocks.

The underperformance of small low BM stocks has been a standing puzzle in the asset pricing literature for the last 10 years (see Fama and French 1993). Findings of this paper show that low profitability does not affect the returns of these stocks. Therefore throughout the remainder of this paper all small stocks will be censored from the sample and the focus will be on the four large size quintile representing 97% of all market capitalization.

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paper) tend*s* to include low BM stocks in the financially distressed portfolio. Hence the two methodologies, though both a proxy for financial distress, are bound to have different results.

Table 3 further examines the characteristics of LPBM stocks and compares them to other portfolios. In this table all large stocks were divided into portfolios according to two criteria:

a) All stocks in the lowest quintile of book-to-market ratio are defined as low BM stocks.
b) All stocks in the lowest quintile of profitability are defined as low profitability stocks.

Using the above definitions stocks are allocated to four portfolios, whereas the portfolio that includes stocks that are both low BM and low profitability is the LPBM portfolio that is the main focus of this paper.

Results in the first row of Table 3 present the fraction of the total number of stocks in each portfolio. As detailed in the table, LPBM stocks constitute 4.1% of all large stocks (or 20.5% of all low BM stocks). Assuming independence between the ranking based on BM and the profit-score, the probability of belonging to the LPBM is 0.04. My finding of a frequency of 4.1% of LPBM stocks is consistent with the hypothesis that being a low BM stock is independent of having a low profitability annual accounting report. Yet, row two of Table 3 indicates that the average profit-score of LPBM stocks happens to be significantly lower than that of other low profitability stocks (all differences reported in this section are statistically significant)

On face value this is inconsistent with the view of low BM stocks as growth and glamour stocks. The result closely relates to previous findings by Dichev (1998) and Griffin and Lemmon (2002) which report that the portfolio of the most severely distressed stocks consists mainly of low BM stocks. The next row, consistent with the results of previous studies, shows that NASDAQ stocks tend to have low BM. The

evidence indicates that the proportion of NASDAQ stocks among LPBM portfolio is even higher as three quarters of the stocks in this portfolio are NASDAQ stocks.

Evidence presented in the next row confirms that LPBM stocks have (by construction) low BM. Interestingly the book-to-market ratio of LPBM stocks is lower than that of other low BM stocks (0.12 to 0.18 respectively).[15] Rows Four to Seven show that LPBM stocks tend to be smaller than other stocks, financially distressed, to experience reduction in earnings, and to have negative returns during the six months prior to portfolio formation in which the annual accounting is published ($January_t$ to $June_t$). Row eight in Table 3 shows the ratio between the average dollar value monthly volume during the announcement period and the average dollar value monthly volume in the previous year, so that:

$$Change\ in\ volume = \frac{Average\,volume\,(Jan_t\ to\ Jun_t)}{Avreage\,volume\,(Jan_{t-1}\ to\ Dec_{t-1})} - 1$$

I document an increase in volume trade for all portfolios, which is mainly due to the overall increase of volume of trade the sample period. The largest increase in volume trade documented is for the LPBM stocks. It seems that the observed ex post decrease in the returns of LPBM stocks occurs in a larger volume of trade. This finding is consistent with Lee and Swaminathan (2002) findings that momentum profits are higher for stocks with high volume and that this result is driven by the low returns of past losers with high volume.

[15] Low profitability could have resulted in a sharp deterioration of the market value of the stock hence in an increase in the BM ratio. I find the opposite, low BM stocks that under-perform do not turn into high BM stocks but rather their book to market ratio tend to decrease. This is because the underperforming stocks lose book value of equity in addition to the reduction in the market value. The net result is that they continue to have low BM. Consistent with this empirical regularity I find that low BM that perform the worst ending in their delisting usually continue to have low BM until their delisting while some turn into negative BM stocks and then delist. Dichev (1998) made similar observations.

The last row in Table 3 detailed the average returns and standard error for the four portfolios during the holding period ($July_t$ to $June_{t+1}$). The returns show that the average returns of LPBM stocks is negative (-0.51%) with high standard error (0.21%), thus their returns are not significantly different from zero.[16] The high standard error of the portfolio's return stems from both the small number of LPBM stocks and their high return standard deviation. The mean returns of the other three portfolios are all within 0.3% of each other.

The findings presented in table 3 show that LPBM stocks are very different from other low BM stocks. The LPBM stocks have lower profitability, higher likelihood to be in financial distress, and more likely to experience a reduction in earnings. These characteristics are diametrically opposite to other low BM stocks that are associated with high profitability hence reduced risk. LPBM stocks seem to be closer to other high BM stocks considered risky and more likely to be in financial distress.

The empirical evidence in this section points out the limitation in viewing the stocks with low BM as one homogenous group. In fact I find two distinctly different groups of stocks having low BM. The first group (about 80% of the low BM sample) of stocks is consistent with the traditional perception of low BM stocks and can be indeed viewed as 'glamorous'. These stocks are characterized by high profitability, low leverage, and increases in earnings. However, the second set of stocks (around 20% of the sample of low BM stocks) is characterized by low returns, tends to be

[16] I find lower mean return of LPBM stocks than the mean report in some of the previous literature. Yet, few papers reported close to zero average returns fort some portfolios. For example, Asness (97) reports a mean monthly return of 0.03% for a portfolio of low BM and past losers, and Hong Lim and Stein (00) document a mean monthly return of 0.2% for a portfolio of past losers that have low analyst coverage. Similarly, Lee and Swaminathan (00) report close to zero returns for the past losers and high volume portfolio, and Vassalou and Xing reports 0.34% for their financially distressed and low BM portfolio. All of the above papers, beside Hong et al didn't control for size and therefore their returns are also influenced by small stocks.

financially distressed, experiences decrease in earnings, and tends to have negative return during the six months prior to portfolio formation.

These two groups of stocks have very different ex-post returns. However, contrary to what a risk-based explanation would predict, the ex post returns on the glamour stocks are significantly higher than the returns on the LPBM stocks.

The next section investigates the implication of this anomaly. In particular it shows that the widely cited book to market effect is driven by the low returns of the LPBM stocks.

4. LPBM Stocks and the Book-to-Market Effect

a. book-to-market effect

The relation between book-to-market ratio and stock returns is well documented in academic literature and dates back to Graham and Dodd (1934). Stattman (1980), Rosenberg, Reid and Lanstein (1985) find that BM and average stock returns are positively correlated. In accordance with these findings Fama and French (1992, 1993) develop a three-factor model as an alternative to the "classic" CAPM in which BM plays a key roll in explaining cross sectional variation in stock returns.

The three-factor model raised significant controversy in the academic literature. One of the major arguments against the model is the lack of theoretical background behind it.[17] While the economic risk factor associated with the market β is intuitive and easy to interpret, this is not the case for both size and BM. Therefore, linking size and especially BM to risk factors was one of the major tasks of recent

[17] The other major argument is data snooping. Black (1993) and MacKinlay (1995) argue that the empirical results of a positive correlation between BM and stocks' returns is sample specific and that relations between stock returns and firms' characteristics was bound to be discovered due to the extensive research conducted on the same data base.

academic literature and has produced contradictory results[18]. Fama and French, aware of the importance of this question, argue that high BM stocks are more exposed to the financial distress risk factor. According to this argument (initially put forward by Chan and Chen 1991) financially distressed firms are characterized by recent poor performance, loss of market value, and are likely to have high financial leverage. These characterizations cause the financially distressed firms to be more sensitive to changes in economic conditions and thus present greater risk for the investor. Similarly, the low returns of low BM stocks are explained by the fact that these 'glamour stocks' are less exposed to the distress risk factor, and therefore present lesser risk for investors. In accordance with this explanation, previous studies (and result of Table 1 in this paper), show that, ***on average,*** low BM stocks have higher profitability, lower leverage, and lower variance in future cash flows than high BM stocks. However, recent evidence questions whether the 'glamour effect' is behind the low returns of low BM stocks. These papers show that following a bad signal, low BM stocks have extremely low realized returns, thus undermining the risk base story.

In this paper I argue that the main driving force behind book-to-market effect is the low returns of LPBM stocks, and once these stocks are censored, the BM effect loses much of its predictive power. The test of this hypothesis uses two versions of Fama-MacBeth regressions. I examine the impact of including a LPBM dummy variable on the coefficient of BM in the Fama-Macbeth cross sectional regression. The first regression is a replication of the standard cross sectional regression aimed at estimating the influence of size and BM on stock returns so that:

$$(3)\ r_{i_t} = \gamma_0 + \gamma_1 * Ln(size)_{i_{t-1}} + \gamma_2 * Ln(BM)_{i_{t-1}}$$

[18] Among papers whose results support the risk-based explanation for BM effect are Fama and French (1995), Chan and Zhang (1998), Lewellen (1999), Cohen et al (2000) and Liew and Vassalou (2000) and Gomes Kogan and Zhang (2003). Contradicting results can be found in MacKinlay (1995), Daniel & Titman (1997), Gutirrez (1998), Dichev (1998), Moskowits (1999) among others

As detailed in Table 4 (panel A) the results are similar to those reported in previous studies. The coefficient of the size factor (γ_1=0.0005) is slightly positive and insignificant, showing again that size ceased to explain variation in cross sectional returns in the US markets since the beginning of the 1980's.[19] The coefficient of BM (γ_2=0.0028) is positive and significant at the 5% level. The coefficient of BM is similar to the one reported by Loughran (1997) that has also censored from sample small stocks.[20]

In the second regression I add a dummy variable, to which I assign the value 1 if the stock is LPBM, so that: [21]

$$(4)\ r_{it} = \gamma_0 + \gamma_1 * \ln(size)_{it-1} + \gamma_2 * \ln(BM)_{it-1} + \gamma_3 * d(LPBM)_{it-1}$$

The results, described in Table 4, indicate that the coefficient of BM reduce in value (from 0.0028 to 0.0019) and becomes statistically insignificant. Conversely, the coefficient of the d(LPBM) is negative, -0.0085, and highly significant (3.033). The evidence suggests that the low returns experienced by LPBM stocks, rather than "glamour," is the main driving force behind the positive correlation between lagged values of BM and realized returns. Interestingly, looking at the book-to-market ratio of LPBM stocks along time reveals that their BM decreases as their profitability shrinks.[22] As it turns out, the reduction in the book value of equity associated with poor earnings performance is big enough to drive the BM ratio down even though the market value of equity tend to fall as well. Thus, in that respect, the three-factor model is doing a good job by predicting low returns (though not low enough) for

[19] The same results were reported in Fama and French (1992), Roll (1995), Dichev (1998), Jegadeesh and Titman (2001).
[20] Loughran (1997) reported that the coefficient of Ln(BM) is reduced from 0.33 to 0.26 once small stocks are censored from the sample.
[21] I use a dummy variable rather than profit-score because of the non-linear relation between profitability and stock returns.

LPBM stocks. What a risk-base explanation will have to rationalize is why these low BM stocks that lost a large part of their book value and are likely to lose a significant fraction of their market value in the near future present less risk for the investors.

In order to ensure that the results are not due to the Internet bubble and its bust the same two regressions were run without the last five years of the sample period (ending on June 1996). The results (Table 4, Panel B) show that in the first (standard) regression the coefficient of BM increases once the internet bubble period is excluded from the sample. This is consistent with findings (e.g. Chan and Lakonishok 2004) that show that the BM effect did not exist during that period. However, the main result of this test confirms the above findings and show that the coefficient of BM becomes insignificant once the dummy variable dLPBM is added to the regression equation.

The empirical evidence presented thus far is consistent with the hypothesis that prices of low BM stocks adjust slowly to new negative accounting information. Having lower profitability has a larger negative effect on low BM firms than other firms.[23] Yet, market participants seem to under react to this negative information and do not sufficiently adjust down the stock prices. Consequently, these stocks (LPBM) experience a negative return drift that last up to a year after the announcement. This slow adjustment results in negative ex post returns to LPBM stocks and consequently in lower returns of the entire low BM stock portfolio. This anomaly seems to be the main driving force of the book-to-market effect in the four highest size quintiles constituting 97% of the outstanding market value.

[22] A possible explanation for this result is that among these stocks the market value is five times bigger than the book value. Therefore, for every dollar loss of book value the market value has to drop by 5$ in order for the book market to remain constant.

b. The underperformance of medium size low BM stocks

Regression results from the previous test show that although the BM coefficient becomes insignificant once the dummy variable dLPBM is added to the regression equation, its point estimate is still positive. In order to further examine the relation between book to market low profitability and stock returns a second test is constructed. In this test the returns of standard size/BM portfolios were examined and compared to returns of size/BM portfolio without low profitability stocks (lowest profit-score quintile).

Table 5, Panel A reports the returns of 20 size/BM portfolios. The results are consistent with previous papers that examine the returns of size/BM portfolios. Returns increase with BM across all 4 size quintiles, whereas over the entire sample the spread between the highest and lowest BM quintiles (H-L) is 0.7%. Consistent with the past evidence, the spread between the returns of high and low BM stocks is decreasing with size. For stocks in the second size quintile the spread H-L is 1.03%, whereas, for stocks in the biggest size quintile, the spread is only 0.37%. Interestingly, the high spread amongst mid cap stocks is almost entirely driven by the low returns of low BM stocks.

Panel B of Table 5 controls for low profitability and examines whether BM effects exists among other profitability firms. In this test all low profitability stocks were censored from the sample and the returns of 20 size/BM portfolios are reexamined. Consistent with previous findings of this table results show that the effect of low profitability is concentrated in the lowest BM quintiles. Whereas the returns of high BM stocks remain almost the same after the censoring of low profitability stocks, the returns of low BM stocks grew considerably from 0.7% to 1.02%. Consequently,

[23] Consistent with this argument firms with low BM that report low profitability delists and liquidate more often than other firms.

the spread between highest and lowest BM quintile is reduced by almost half - from 0.7% to 0.38%. The reduction of the spread H-L changes with size: For big-cap stocks (top two size quintiles that represent 87% of all market capitalization) the censoring of low profitability stocks causes the entire BM effect to disappear. However, for med-cap portfolios, the censoring of low profitability stocks only lowers the spread between high and low BM stocks by roughly one third.

The evidence that indicates that mid-cap low BM stocks continue to underperform after the censoring of LPBM may be explained by an omitted risk factor. The effect of the additional factor (if any) on stock returns decreases with size. Indeed, for small stocks I find no evidence of underperformance of low profitability low BM stocks and yet small low BM stocks significantly under perform in comparison to other small stocks

5. LPBM Stock Returns and Earnings Momentum

This section presents evidence linking the poor performance of LPBM stocks to the well-known post earnings announcement drift -- hereafter earnings momentum. The empirical regularity first uncovered by Jones and Litzenberger (1970) is the abnormal positive (negative) stock returns during the six months following positive (negative) earnings surprise.[24] Dreman and Berry (1995) examine the earnings momentum among value (defined as high E/P ratio) and growth stocks (defined as low E/P ratio). They find that negative earning surprise is followed by abnormally low

[24] See also Foster, Olsen and Shevlin (1984), Bernard and Thomas (1990) Chan et al (1996) for confirmation of the existence of earning momentum in different sample periods. Hew, Skerratt, Strong and Walker (1996), and Booth, Kallunki and Martikainen (1996) find earning momentum in non-US equity markets. Chan et al (1996) among others show that the earning momentum cannot be explained by the CAPM model or F&F three-factor model.

returns primarily among growth stocks, whereas, positive earning surprise is followed by abnormally high returns primarily among value stocks.[25]

The proxy profit score used in this study consists of measures of the level of the firm's earnings as well as estimates of its earnings surprise.[26,27] Table 6 examines the relation between earnings changes (one of the proxies for earning surprise), low profitability, and book-to-market. At the end of each $June_t$, stocks were sorted by earning change and allocated into two portfolios. The first consisting of stocks experiencing earnings change in the bottom 20% and the second includes all the other stocks.[28] Simple average return is calculated for each portfolio during the holding period ($July_t$ - $June_{t+1}$).

Results of the first three rows in Table 6 present the stock returns on the portfolio of negative earnings changes (E1), the second portfolio of all the other earnings changes (E2), and the returns on the portfolio that long the first and short the second (E1-E2). The use of a simpler index of profitability did not alter the main

[25] Most of the literature on earning momentum did not control for size and, therefore, primarily investigated the returns of small stocks. Consistent with the conjecture that the sample of firms investigated is biased towards the small stocks, a recent paper by Zadka and Zadka (2003) shows that post announcement earnings drift is highly related to illiquidity.

[26] Previous literature proxy earning surprises by: earning changes, revision in analyst forecast and market reaction to the accounting report. Chang et al (1996) report that each of the three proxies is not subsumed by the presence of the others. Profit-score, which is used in this paper, is the sum of four variables. One of the variables is examining the change in profitability, whereas, the other three examine the ratio between profitability and assets, profitability and debt, and whether or not the firm has negative earnings two years in a row.

[27] The other difference in methodology is that the earnings momentum literature concentrated on the surprise effect of the accounting report. Therefore this literature typically used quarterly earnings report and started examining the portfolio returns shortly after the announcement date. In contrast, this paper using only annual earnings report and is typically allowing for few months gap between the announcement date (typically earnings report are reported before the end of March)and the start of the holding period that starts in July.

[28] Earning changes will be proxy by one of the original variables in the O-score model - the change in net income $\frac{NI_t - NI_{t-1}}{|NI_t| + |NI_{t-1}|}$. Previous academic literature typically used standard unexpected earning (SEU), which is defined as the change in quarterly earning divided by the standard deviation of quarterly earnings. This proxy is not used in this paper as this paper is solely concentrated on the effect of the annual accounting report and SUE focuses on quarterly changes.

findings of this paper - portfolio E1 under performs portfolio E2 and this underperformance is concentrated amongst low BM stocks.

The similar underperformance of portfolio E1 observed is not surprising as 81.1% of stocks included in it are also LPBM stocks. To shed some light on the potential differential effects of the level of profitability and earning change, I compare the returns to portfolio E2-E1 to the returns of a portfolio in which low profitability stocks are long and other profitability stocks are short (LP-OP). As detailed in row three and four of Table 6 the returns on portfolio LP-NP are considerably larger than that of portfolio E1-E2 both overall (-0.40% to –0.23% respectively) and among low BM stocks (-1.51% to –1.04%).

The last two tests of this section aimed to differentiate between the effect of low profitability and negative earnings change. In the first test I censored from the sample all low profitability stocks and reexamine the returns on purified portfolio E1-E2, thus, concentrating on relatively profitable stocks experiencing a negative earning surprise. Results detailed in row seven of Table six show that the returns of purified portfolio E1-E2 are indistinguishable from zero. Next, I examine the returns of low profitability stocks after censoring all stocks with negative earnings surprise (E1). In contrast to the previous test the results (detailed in row eight) show that the returns on portfolio LP-NP are significantly negative even after censoring out all stocks with negative earning surprise.

The new evidence on earnings momentum uncovered in this section suggests that not all stocks experiencing announcements of negative information about their earnings exhibit post announcement drift of negative returns. Having bad news that transform a firm from highly profitable to average is not associated with post

announcement drift. I observe post announcement drift only for firms that have both negative information and low level of profitability.

6. LPBM Stock Returns and Other Anomalies

a. Underperformance of financially distressed stocks

One of the latest anomalies reported in the academic literature is the underperformance of financially distressed stocks. Relating stock returns to financial distress was a natural development of asset pricing literature, hence financial distress was suggested as a risk factor that is behind the book-to-market effect (Fama and French 1992, 1993). Dichev (1998), using both Altman's Z-score and Ohlson's O-score as a proxy for financial distress, finds that the top docile of financially distressed firms consist mainly of low BM. This rather surprising finding, also reported in Griffin and Lemmon (2002), and this paper raise the question whether BM proxies financial distress.[29] Griffin and Lemmon (GL) also use the O-score model as a proxy for financial distress. They report that the top quintile of financially distressed firms have very low returns, which for the most part are due to the low returns of the distress sub-group among large low BM stocks. Estimating a time-series regression, GL show that Fama and French's three-factor model cannot explain these low returns. These findings are closely related to findings of this paper as both show underperformance of sub-groups among relatively large low BM stocks. The main difference between the two papers is that Griffin and Lemmon used the entire O-score to proxy for financial distress, whereas this paper uses only profitability related variables.

[29] Dichev also reports that the top docile of financially distressed stocks underperforms compared to other stocks. Dichev includes all sample stocks in his portfolio, thus, his findings are related primarily to small stocks (according to findings of this paper are 91% of all stocks in financial distress portfolio

The first test of this section examines the underperformance of financially distressed stocks. At the end of each June, stocks were allocated into size/BM portfolios as previously described. Stocks were then independently allocated according to their O-score (multiplied by -1) into two portfolios:

a) Stocks in the lowest quintile of O-score defined as financially distressed.

b) Stocks from all other quintiles defined as non-financially distressed.

Similar to Table 2, simple monthly average returns were computed for each of the 40 portfolios. Next, the difference in returns between financially distressed firms and healthy firms was calculated for each of the 20 size/BM portfolios using the following equation:

$$(5) \quad \Delta\bar{r}_i = \bar{r}_{Di} - \bar{r}_{NDi}$$

Where i stands for each of the 20 size/BM portfolios and $\bar{r}_{Di}$ and $\bar{r}_{NDi}$ for the average monthly returns of financially distressed firms and non-distressed firms in portfolio i respectively.

Results (Table 7) show that amongst low BM stocks, med-cup financially distressed stocks underperform compared to other low BM stocks. Conversely, financially distressed big-cup stocks have similar returns to those of non-distressed stocks.

Ohlson's O-score model that is used as a proxy for financially distressed stocks consists of nine variables that can be divided into three main categories: profitability (four variables), leverage (four variables) and size (one variable – total asset). The four profitability variables and their coefficients are used in order to

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are small). It is important to not that Dichev includes delisting returns in his test whereas most of the

calculate profit-score and have been found to have a predictive power on low BM stock returns. The next test is aimed at examining whether there is a relation between size and/or leverage and low BM stock returns.

In order to make such an examination, I calculated sub-score of each of the three categories in Ohlson model, thus by construction:

$$(6)\quad O-score \equiv \text{int}\,ercept + size\ \ score + leverage\,score + profit\,score\,.$$

Then, all three sub-score were used as explanatory variables and were regressed against the returns of low BM stocks, so that:

$$(7)\quad R_{LBM\,t} = \gamma_0 + \gamma_1\, size\,score_{t-1} + \gamma_2\, leverage\,score_{t-1} + \gamma_3\, profit\,score_{t-1}$$

Where $R_{LBM\,t}$ represents the monthly return of low BM stocks.

Results from the Fama-MacBeth regression estimation are presented in Table 7, Panel A. Results show that, regardless of whether we estimate separately or jointly, the only significant coefficient is γ_3, indicating that profitability, rather than leverage, is behind the low returns of the distressed sub-group. [30]

One could expect the sample of financially distressed and low profitability stocks to have similar effect on low BM stock returns. Amongst low BM portfolios, 62.5% of financially distressed stocks are also LPBM stocks. The next test is set to examine directly whether high leverage influences the returns of low BM stocks. In this test all low profitability stocks are censored from the sample as done previously in this paper and the underperformance of financially distressed stocks is reexamined. Results of the 20 size/BM portfolios (Table 7, Panel B) show that these stocks do not underperform their benchmark in all portfolios. In contrast, the results of additional tests (not reported), show that LPBM stocks that are not financially distressed

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assets pricing literature don't.

[30] The relatively high significance of size-score can be explained by the fact that among low BM stocks there is generally a positive correlation between size and return.

severely underperform their benchmark. Hence, both regression and portfolio results indicate that low profitability is the driving force behind the underperformance of financially distressed stocks. The later finding was argued, but not shown by GL.

b. LPBM stock returns and price momentum

Price momentum was first reported by Jegadeesh and Titman (1993). According to their findings, past winners outperformed past losers up to a year after portfolio formation. Furthermore, similarly to earning momentum, price momentum cannot be explained by a known common risk factor, as both the CAPM model and Fama and French's three-factor model failed to explain the anomaly.[31] . Price momentum shows robustness to different sample periods and exhibits in non-US equity markets ensuring that the phenomenal exist in out-of-sample data.[32] Arsness (1997) and Daniel and Titman (1999) examine the relation between the momentum and BM and report that momentum effect is strongest among low BM stocks and that the spread between the returns of high and low BM stocks is largest among past losers. Daniel and Titman also report that this finding remains evident after censoring the smallest and largest size quintile.[33]

Market capitalization plays a key roll in the profitability of momentum strategies. Hong Lim and Stein (2000) reported that once moved out of the two smallest size deciles, the abnormal high returns of past winners almost disappear and instead, stock returns are characterized by low returns of past losers. The first test in

[31] For example, Fama and French (1996) show that their model cannot explain the price momentum. Jegadeesh and Titman (2001) show that the market beta of winners and losers is similar, and, consistent with Fama and French, they found that the losers are more sensitive to Fama and French factors.

[32] Rouwenhorst (1998) shows that momentum exists in European markets, whereas Chui Titman and Wei (2000) report that price momentum exist in Asian markets (with the notable exception of Japan). Jegadeesh and Titman (2001) report that price momentum exists also during the 90's, a period that was not investigated in their original paper. Grundy and Martin (2001) show that price momentum has existed in the US markets since 1926.

[33] Daniel and Titman attribute their results as consistent with investors over confidence. According to their argument the behavioral biases of investors are likely to play a significant roll in those stocks that

this section reexamined the relation between momentum and BM effects, using similar methodology to the one used by Hong et al. At the end of each June all sample stocks were divided into three past-performance portfolios according to their returns in the six months prior to portfolio formation ($January_t$-$June_t$) period: winners (top 30%), pars (median 40%) and losers (bottom 30%). Then, monthly average returns are calculated for each portfolio during the holding period ($July_t$ to $June_{t+1}$). The average return of the three portfolios and the return of WML (the portfolio in which past winners are long and past losers are short) are reported in the left columns of the first four rows of Table 9. The results show that the return of past winners portfolio (P3) is 0.56% higher than that of past losers (P1). This difference is similar in magnitude to the one reported in Hong et al (1999) who also used three past performance portfolios and censored small stocks from their sample.

Next the interaction between momentum effect and BM is examined. All sample stocks were independently sorted across BM (into five quintiles, as done throughout this paper) and past performance (into three portfolios, as previously described). The returns of 15 portfolios and WML are presented in the other columns of the first four rows. The results are supportive of previous findings; the returns of WML among low BM stocks is 1.01% compared with only 0.36% for high BM stocks. The difference between WML among low and high BM portfolios is also similar to previous findings.

Row Five and Six of Table 9 divide WML spread to winners momentum (P3-P2) and losers momentum (P2-P1). For the overall sample, the results show that two third of WML spread is driven by the low returns of past losers. This result is

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are the hardest to price. Since low BM stocks are arguably harder to price than high BM stocks the mispricing is likely to evident amongst these stocks.

consistent with previous papers that censored small stocks from the sample.[34] Looking across BM portfolios reveals that there is no relation between BM and winners momentum, which fluctuates around 0.2%. In contrast, losers momentum decreases sharply with BM from 0.8%, in the lowest BM portfolio, to around zero in the highest BM portfolio. Thus, results are indicative of the fact that the variation in WML profitability across BM portfolios, is due to losers momentum.

The fact that the variation in WML profitability across BM is due to low returns of the past losers among low BM portfolio raises the possibility that the low returns of LPBM stocks are behind this finding. In order to explore this possibility, all sample stocks are allocated into two profitability portfolios according to their profit-score, as done throughout this paper. Then, all low profitability (lowest profit-score quintile) stocks are censored from the sample and the profitability of the purified WML across BM is reexamined. Results (last row of Table 9) show that overall profitability of WML decreases by one fourth from 0.56% to 0.42%. Thus, in contrast to other return regularities examined in this paper, price momentum is largely not driven by LPBM stock returns.

However, the decrease in WML profitability is not equal across all BM portfolios, but concentrated among low BM stocks. Consequently, the variation in WML between low and high BM is reduced by more than half - from 0.71% and highly significant in the entire sample, to only 0.29% and insignificant once low profitability stocks are censored. Thus the variation of WML profitability that was the

[34] This result is closer to findings by Hong et al (1999) who report that roughly three-quarters of the spread can be attributed to losers momentum, rather than to findings by Jegadeesh and Titman (2001) who report a symmetry in the effect of losers and winners. Jegadeesh and Titman, who used five past-performance portfolios, argue that the difference in portfolio construction may be the reason behind the difference in this result. Another possibility is that the difference in results is due to the difference in the selection process: Jegadeesh and Titman censored the smallest docile from the sample and all stocks whose price is lower than $5, while Hong et al (and this paper) censored the smallest quintile. This explanation coincides with results obtain by Hong et al according to which losers' momentum exists mainly in non-small stocks.

center point of both Asness and Daniel and Titman is also primarily driven by LPBM stock returns.

7. All Are One

Results from the previous three sections indicate that the returns of LPBM stocks are partially or entirely behind numerous return regularities reported in previous papers. In this section, I examine a uniform test that is aimed at investigating further the relation between LPBM stocks and return regularities. There are two purposes for this test: First, examining all return regularities under a unified test helps to determine the extent to which LPBM stock returns are behind the various phenomena. Second, this test is used in order to examine whether the remaining anomalies are different or related.

The first test in this section examines the proportion of LPBM stocks in each portfolio and the portfolio returns. The results are presented in Graph 1, the bars in the graph are the proportion of LPBM stocks of the various portfolios (the α in equation 1), whereas the line represents the portfolio returns. For example for the entire sample stocks (the first portfolio from the left in Graph 1) the proportion of LPBM stocks is 4.1% and the return is 1.18%, whereas for the low BM and negative earnings change portfolio the proportion of LPBM stocks is 81% and the average return is -0.2%. Graph 1 shows a clear pattern: The higher the proportion of LPBM stocks in a portfolio, the lower its ex-post returns. The graph also shows that all the portfolios (with the obvious exception of the entire sample portfolio) significantly under-perform. The underperformance is most severe in the last three portfolios where the proportion of LPBM stocks is higher than 20% and the returns are lower

than the risk free rate. Results presented in Graph 1, therefore, show initial evidence on the pivotal roll of LPBM stocks.

The objective of the next test is to separate between the influence of selecting a high proportion of LPBM stocks and the ranking criteria per-se. The test is based on the decomposition of returns in equation (1):

$$(1)\ E(r_j) \equiv \alpha_j * E(r_{LPBM_j}) + (1-\alpha_j) * E(r_{j-LPBM})$$

If the null hypothesis is correct and the underperformance of various portfolios is due to the high proportion of LPBM stocks then these two conditions must be met:

1. The average return of LPBM stocks that are chosen under criteria j should be similar to LPBM stocks that were not chosen.
2. The average return of stocks that are chosen under criteria j but are not LPBM stocks (henceforth purified returns) should be similar to an appropriate benchmark.

The first test is somewhat limited since it required the portfolio of LPBM stocks to be further divided into two portfolios. Taking into account the already small number of these stocks (only 4.1% of all large stocks), analysis from this test is bound to be limited.[35]

For this reason the focus of this paper is the result of the second test and its results are presented in Table 10. The test examines the returns of eight portfolios, the first four are based on a single ranking criterion, whereas the last four rank stocks according to two criteria.

[35]In accordance with this argument, results of this test (not reported) show that once LPBM stocks are divided according to their earnings change or financial distress, the differences in returns between $LPBM_j$ and $LPBM_{-j}$ are relatively high but insignificant. In contrast, past-losers among LPBM stocks significantly underperform other LPBM stocks. Additional test shows that this result is mainly driven by the relatively high returns of the past-winner and LPBM portfolio. However, it is impossible to

The first column shows the underperformance of various portfolios compared to the average return of all sample stocks. The results show that each of the eight portfolios examined in this test significantly underperform. The last three portfolios are using the combination of book-to-market ratio and another ranking criterion in order to sort stocks. These portfolios show the largest underperformance and the average return of all three portfolios (the interaction between low BM and past losers, financially distressed, and negative earnings change) is below the risk free rate. The second column shows that these portfolios significantly underperform in comparison to the average return of all low BM stocks.

In Column (3) all LPBM stocks are censored from the sample and the underperformance of the eight portfolios is reexamined. Results of this column show that the underperformance of all eight portfolios is reduced once LPBM stocks are censored for the sample. Of the four portfolios that are sorted by a single criterion, the underperformance of two (negative earnings change and financial distress) becomes insignificant. As for low BM stocks, the censoring of LPBM stocks reduces the underperformance by half. Previous tests in this paper (see Table 5) show that this underperformance is concentrated among med-cup stocks, whereas for big-cup stocks the underperformance of low BM stocks disappears after the censoring of LPBM stocks. The portfolio that is least affected by the censoring of LPBM stocks is the past losers portfolio where its underperformance is reduced only by one fourth and becomes slightly bigger than the underperformance of low BM stocks.

In the portfolios that rank stocks according to two criteria the underperformance is reduced significantly in all four portfolios. In two portfolios (past losers & negative earnings change and low BM & negative earnings change) the

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distinguish whether the effect on returns is due to the performance during the announcement period, or due to influence of whether the stocks in the previous year was also low profitability.

underperformance completely disappears. In contrast, both low BM & past losers and low BM & financially distressed portfolios continue to significantly underperform in comparison to all sample stocks (Column 3) and low BM portfolios (Column 4).

The last test of this paper is aimed at ensuring that the results of previous tests in this section are not influenced by the lack of control for size. In this test the actual proportion of each portfolio across size quintiles (W_{s_j}) is examined. Then, using this proportion and the purified average returns of each size quintile, I calculate for each of the eight portfolios its benchmark return. So that:

$$(9)\ \Pr(r_j)^p = \sum_{s=2}^{5} W_{s_j} * E(r_s)^p$$

Where ^{p} represents purified returns, $Bk(r_j)$ are the benchmark returns of each portfolio, and $E(r_s)^p$ is the purified average return of each size quintile s. In the last three portfolios, in order to examine whether the underperformance is significantly different than other low BM portfolios, $E(r_s)^p$ is substituted with $E(r_{LBM_s})^P$, which is the average purified return of low BM stocks in size quintile s:

$$(9a)\ \Pr(r_j)^p = \sum_{s=2}^{5} W_{s_j} * E(r_{LBM_s})^p$$

The last column of Table 10 present the difference between the actual and the benchmark returns ($E[r_j]- Bk(r_j)^p$).

Results of this test show that the returns of seven out of the eight portfolios that are examined in this paper hardly change due to the control for size. The only portfolio that has significant change is the low BM & financially distressed portfolio; its underperformance reduces by one quarter and becomes insignificant. The fact that financially distressed stocks do not underperform after controlling for size is consistent with previous findings of this paper (Table 8).

Graph 2 summarizes these results by reexamining the relation between the proportion of LPBM stocks (the bars as in Graph 1) and the purified returns of each portfolio. The graph shows that, as expected, the relation between the proportion of LPBM stocks and the average return disappears once LPBM stocks are censored from the sample. Out of the original eight portfolios only three continue to underperform once LPBM stocks are censored. Furthermore, in two of the three portfolios that continue to significantly underperform, the underperformance is reduced by half. All of these findings indicate that the low returns of LPBM stocks are the main driving force behind many asset pricing return regularities.

8. Conclusion

Results of this paper show the existence of a sub-group of stocks (consisting of about 4% of - all large stocks), which tend to have negative ex-post returns. This sub-group is characterized by very low book-to-market and very low overall profitability (LPBM). For these stocks, the very low book-to-market is not a sign of high potential growth in the future. As in most cases, it is a reflection of the fact that these companies first lose much of their book value and the adjustment of their market value lags behind. Stocks that belong to this group tend to experience earnings' reductions, to be past losers, and to be financially distressed. Thus, past literature that focused on any one of the above characterizations, documents underperformance. This paper shows that what appears to be many different anomalies are in fact all the result of the ex post negative return of LPBM stocks. Researchers were looking at different angles of the same anomaly. Interestingly, LPBM stocks have high volume trade both in the period that the accounting data is published (six month prior to portfolio formation) and during the holding period in which the slow adjustment

accurse. Thus results of this paper ruling out ‘neglected stock’ and liquidity explanations for the anomaly.

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Appendix A: Value weighting portfolios based on sorting all sample stocks

One of the common methodologies used in asset pricing literature is dividing all sample stocks according to various criteria. This methodology results in a large proportion of small stocks in the extreme portfolios that are typically the main focus of the research. The large proportion of small stocks is derived from the high proportion of these in the sample (about two thirds) and because small stocks tend to have extreme values. Thus, for example 75% of past winners portfolio are small stocks, similarly 78% of past losers, 88% of low profitability and 91% of financially distressed stocks are also small stocks. Therefore using equal weighted returns as typically done in the literature actually examines return patterns of mainly small stocks.

Using value weighted mean returns seems like a reasonable solution to *reduce* the disproportionate representation of small stocks in extreme portfolios. However, while value weighting helps in reducing the disproportionate representation of small stocks, the usage of this methodology is bound to dim any relation between large stock characteristics and returns for the following three reasons:

1) Small number of stocks that have a large effect on portfolio returns –for example in the portfolio of low profitability stocks the proportion of stocks in the highest size quintile is only 0.6% (around 4.5 stocks per year). However, due to the high market value of these stocks they represent 24% of all market capitalization of the low profitability portfolio. Subdividing the low profitability portfolio (as done in this paper) further reduces the number of large stocks. For example, in the low profitability low BM portfolio there are annually on average 2 stocks that belong to the highest size quintile.[36] The small number of large stocks is bound to expose researchers to noise.

2) The weight of small stocks increases considerably in the extreme portfolios. This increase is mainly due to the low proportion of stocks in the highest size quintile

[36] Note the twp large stocks in this portfolio represent an average of all 20 years in the sample. However the number of large stocks and the weight is varying a lot during the sample period. In some years large stocks are not exist at all among the low profitability low BM portfolio, while in others there are 5 stocks that represent more than 50% of all market capitalization of this portfolio. Thus, is some years of the sample the average weighted return will be influence mainly of small stocks while on

and also due to the high proportion of small stocks. For example, the value weighting of small stocks in the low profitability portfolio is 28% compared with only 3% in the entire sample.

3) Large stocks are being pushed towards the middle portfolios – as discussed, previously extreme portfolios have a high proportion of small stocks as these stocks tend to have extreme characteristics. Therefore, the proportion of large stocks in these portfolios is relatively low as they are pushed towards the middle portfolios. This push towards the middle portfolios is likely to dim the relation between stock characteristics and returns amongst large stocks[37].

For these reasons I argue that value-weighting portfolios that were sorted based on all sample stocks is expected to dim any relation between large stock characteristics and returns. Therefore, researchers should use if investigating small stocks. However, if the research is focusing on the returns of large stocks then stocks should be divided within size portfolios.

other the weighted average return will be influence mainly on few large stock, thus adding more noise to the data.

[37] For example: assume that (as found in this paper) large stocks that the quintile of low profitability stocks suffers from ex-post low returns. Sorting all sample stocks according to profitability will lead to the fact that only 12% of large stocks will be included in the low profitability portfolio. Thus the return of the low profitability portfolio will be pushed up (as not all low profitability stocks are included) while the returns of the second portfolio will be pushed down as large low profitability stocks are being pushed to it.

Table 1

Summary Statistics for Profit-Score, Earnings Change and Financial Distress Across 25 Portfolios Sorted on Size and Book-to-Market Ratio, during the Sample Period 1981-2001.

This table presents summary statistics for 25 size/BM portfolios. At the end of each June of year t from 1981-2000 all NYSE, Nasdaq, and AMEX securities (ordinary shares only) are allocated to market capitalization quintile, using only NYSE stocks to determine the cut-off points. In each size quintile, stocks are allocated to 5 equal book-to-market ratio (BM) quintiles using all stocks to determine the cut-off points. Book-to-market ratio is defined in the same manner as Fama & French (1992) - the book value of the equity of year t-1 divided by the market value of the firm in the last trading day of December in year t-1.
Other variables are based on accounting ratios. In order not to be influenced by extreme values of ratio variables the smallest and largest 0.5% from the observations are set equal to the next largest or smallest values of the ratios.

Panel A - Average number of firms across size/BM portfolios

Book-to-market equity ratio

Size	Low	2	3	4	5	**All (%)**
Small	497.1	497.7	497.7	497.7	497.4	**63.9%**
2	107.9	108.5	108.5	108.5	108.0	**13.9%**
3	70.8	71.2	71.3	71.2	70.9	**9.1%**
4	54.4	54.9	55.0	55.0	54.6	**7.0%**
Big	46.4	46.8	46.9	46.8	46.6	**6.0%**

Panel B - Average market value of equity (in millions) across size/BM portfolios

Book-to-market equity ratio

Size	Low	2	3	4	5	**All (%)**
Small	46	50	47	41	28	**2.94%**
2	257	251	252	253	246	**3.80%**
3	616	609	610	622	616	**6.10%**
4	1,563	1,584	1,568	1,603	1,586	**12.09%**
Big	16,737	13,020	10,639	10,772	6,432	**75.07%**

Panel C - Average profit-score across size/BM portfolios.
Profit-score is calculated using the original profitability variables and coefficients from Ohlson's O-score model (1980) multiplied by (-1). Therefore:

$$\text{Profit score} = 2.37\frac{\text{net income}}{\text{total assets}} + 1.83\frac{\textit{funds from operation}}{\textit{tatal liabilities}} - 0.285(\textit{if net loss for the last two years, else } 0) + 0.521\frac{net\,income_t - net\,income_{t-1}}{|net\,income_t| + |net\,income_{t-1}|}.$$

Book-to-market equity ratio

Size	Low	2	3	4	5
Small	-1.73	-0.25	0.23	0.19	-0.13
2	0.43	0.96	0.83	0.66	0.40
3	1.24	1.14	0.92	0.60	0.40
4	1.49	1.15	0.82	0.57	0.37
Big	1.31	0.95	0.78	0.58	0.40

Panel D - Average earning change across size/BM portfolios.

Earning change is calculated as the change in earnings in the last two years divided by sum of the absolute value of the last two years: $\frac{net\ \ income_t - net\ income_{t-1}}{|net\ income_t| + |net\ income_{t-1}|}$

Book-to-market equity ratio

Size	Low	2	3	4	5
Small	-0.020	0.026	-0.040	-0.051	-0.125
2	0.154	0.126	0.060	0.017	-0.029
3	0.177	0.129	0.059	0.006	-0.014
4	0.149	0.090	0.043	0.006	-0.030
Big	0.109	0.059	0.063	0.038	0.003

Panel E – Financial distress across size/BM portfolio.

This panel presents the average O-score multiplied by (-1) for each of the 25 size/BM portfolios. The O-score model (multiplied by -1) is defined as follows:

$$1.32 + 0.407\log(total\ assets) - 6.03\frac{total\ liabilities}{total\ assets} + 1.43\frac{working\ capital}{total\ assets} - 0.076\frac{current\ liabilities}{total\ assets}$$

$$+1.72\ (1 \text{ if total liabilities} < \text{total assets, else o}) + \ 2.37\frac{\text{net income}}{\text{total assets}} + 1.83\frac{funds\ from\ operation}{tatal\ liabilities}$$

$$-0.285\ (1 \text{ if net loss for the last two years, else 0}) + 0.521\ \frac{net\ income_t - net\ income_{t-1}}{|net\ income_t| + |net\ income_{t-1}|}\ .$$

Book-to-market equity ratio

Size	Low	2	3	4	High
Small	-1.98	0.39	0.69	0.68	0.22
2	1.49	2.22	1.95	1.67	1.25
3	2.52	2.48	2.16	1.69	1.34
4	3.03	2.65	2.21	1.78	1.42
Big	3.01	2.60	2.41	2.07	1.71

Table 2
Difference in Returns between Low Profitability Firms and Other Profitability Firms in Each of 25 Size/BM Portfolios for 1981-2001 Sample Period.

At the end of each June from 1981-2000 25 size/BM portfolios are formed in the same way as in table one. Using profit-score as a proxy for the profitability of the firm, small (lowest size quintile) and large stocks are separately allocated at the end of each year (t-1) to two profitability categories:

Low Profitability - Stocks that are in the lowest profit-score quintile.
Other Profitability - Stocks from all other profit-score quintiles.

The examination period is from July (t) to June (t+1), allowing for a six month gap in order to ensure that annual accounting data will be published prior to the examination period.
Simple average return is calculated for each of the 40 (4*5*2) portfolios for the entire sample period July 1981 to June 2001.
The table reports the difference in return between low profitability firms and other profitability firms in each of the 20 size/BM portfolios using the following equation:

$$(2) \quad \Delta E(r_i) = E(r_{LPi}) - E(r_{NPi})$$

Where i is each of the 20 size/BM portfolios, and LP and NP denote low profitability and other profitability respectively.
The numbers in brackets are the t values from a test that examines the probability that both groups of financial distress categories came from the same population.

Book-to-market equity ratio

Size	**Low**	**2**	**3**	**4**	**High**
Small	0.01% (0.000)	0.08% (0.439)	0.10% (0.546)	0.37% (1.778)	0.33% (1.646)
2	-1.31% (-4.269)***	-0.39% (1.042)	-0.47% (-1.817)	-0.11% (-0.488)	-0.15% (0.851)
3	-1.09%* (-2.217)	-0.60% (-1.209)	0.00% (0.000)	0.11% (0.438)	0.26% (1.370)
4	-1.49% (-2.476)*	-1.14% (-2.132)*	-0.50% (1.414)	-0.15% (0.638)	-0.18% (0.884)
Big	-2.99% (-4.107)***	-0.28% (-0.697)	0.24% 0.700	0.44% (1.930)	0.06% (0.733)

*,**,*** the difference between financially distressed firms and non-distressed is significant at the 5%, 1% ,0.1% level.
NA – small stocks portfolios

Table 3

LPBM Stock Characteristics in Comparison to Other Stocks, during the Sample Period July 1981 to June 2000.

At the end of each year all stocks (excluding small stocks) were independently sorted according to the following two criteria:

a. *Profit score* – all stocks in the lowest profit-score quintile are defined as low profitability while other stocks are defined as other profitability stocks.

b. *Book-to-market* – all stocks in the lowest quintile of BM are defined as low BM stocks.

Using the above definitions all stocks were allocated into four portfolios:

1. LPBM - all stocks that are both low profitability (lowest profit-score quintile) and low BM (lowest BM quintile).
2. Only low BM - all stocks in the lowest book-to-market quintile but not in the lowest quintile of profit score.
3. Only low profitability - stocks that are in the lowest quintile of profit-score, but not low BM stocks.
4. Other stocks - all stocks that are not included either in the lowest quintile of profit-score or the lowest quintile of book to market.

The first row presents the equal weighted proportion of each portfolio of the entire sample of stocks. Row (2) presents the proportion of NASDAQ in each portfolio. Rows (3) to (6) show the average BM, profit score, size and O-score in each portfolio.

Row (8) presents the proportion of stocks with negative returns that is the ratio between the numbers of stocks in each portfolio that had negative returns during the six months prior to portfolio formation ($January_t$ to $June_{t+1}$) divided by total number of stocks in that portfolio.

The last row presents the change in volume that is defined as the ratio between the average volume (dollar term) during the announcement period and the average monthly return in the previous year so that:

$$Change\ in\ volume = \frac{Average\,volume\,(Jan_t\ to\ Jun_t)}{Avreage\,volume\,(Jan_{t-1}\ to\ Dec_{t-1})} - 1$$

The last row present the average monthly returns and standard error (in brackets) of each portfolio during the holding period ($July_t$ to $June_{t+1}$)

All other variables are defined in the same way as in Table 1.

		LPBM	Only low BM	Only low profitability	Other stocks
(1)	Proportion from the entire sample	4.1%	15.9%	15.9%	64.2%
(2)	Proportion of NASDAQ stocks	75%	56%	27.2%	29.1%
(3)	BM ratio	0.119	0.183	0.855	0.644
(4)	Profit-score	-2.728	1.945	-0.541	1.038
(5)	Size (ln)	13.136	13.578	13.224	13.503
(6)	Earnings change	-0.379	0.288	-0.509	0.176
(7)	O-score	-1.801	3.361	.252	2.344
(8)	Proportion of stocks with ex-ante negative returns	42.1%	37.0%	30.3%	31.7%
(9)	Change in Volume	0.577	0.361	0.080	0.166
(10)	Average return and standard error during the holding period	-0.51% (0.214%)	1.00% (0.067%)	1.18% (0.066%)	1.30% (0.026%)

Table 4

Regression Results for the Relation between Size, BM, Low Profitability, and Stocks' Subsequent Returns during the Sample Period July 1981 to June 2001 and Excluding the Internet Bubble.

Panel A - All sample period

This panel presents regression results for low profitability size and BM effect for all stocks during the sample period. The first regression is a standard cross-sectional regression on size (market value of stock i as of June of year t) and book to market equity ratio (BM).

$$(3)\ R_{it} = \gamma_0 + \gamma_1 * \ln(size)_{it-1} + \gamma_2 * \ln(BM)_{it-1}$$

Regressions are Fama-MacBeth (1973) regressions with 240 monthly cross-sections. The coefficient in these tests is the average of coefficients and the t-statistic (in brackets) is the average coefficient divided by its time-series standard error.

R_{it}=	γ_0	γ_1 * ln(size)$_{it-1}$	γ_2 *ln(BM)$_{it-1}$
	0.0071	0.0005	0.0028
	(0.661)	(0.723)	(2.001)*

The second regression differentiates between the two sub-groups among low BM stocks by using a dummy variable d(LPBM):

$$(4)\ r_{it} = \gamma_0 + \gamma_1 * \ln(size)_{it-1} + \gamma_2 * \ln(BM)_{it-1} + \gamma_3 * d(LPBM)_{it-1}$$

Where:

d (profit) - a dummy variable that is assigned the value 1 if the stock is both in the lowest profit-score quintile, and lowest BM quintile, else 0.

R_i=	Γ_0	γ_1*ln(size)$_{it-1}$	γ_2*ln(BM)$_{it-1}$	γ_3*d(LPBM)$_{it-1}$
	0.00912	0.0003	0.0019	-0.0085
	(0.873)	(0.492)	(1.325)	(3.033)**

*,**,*** - significant at the 5%, 1% ,0.1% level respectively.

Panel B - excluding the "Internet bubble" period

This panel repeats the examination of Panel A, while excluding from the sample the last five years, meaning the sample period is from July 1981 to June 1996.

$$(3a)\ R_{it} = \gamma_0 + \gamma_1 * \ln(size)_{it-1} + \gamma_2 * \ln(BM)_{it-1}$$

R_{it}=	γ_0	γ_1 * ln(size)$_{it-1}$	γ_2 *ln(BM)$_{it-1}$
	0.00799	0.00043	0.002908
	(0.812)	(0.719)	(2.453)*

$$(4a)\ r_{it} = \gamma_0 + \gamma_1 * \ln(size)_{it-1} + \gamma_2 * \ln(BM)_{it-1} + \gamma_3 * d(LPBM)_{it-1}$$

R_i=	γ_0	γ_1*ln(size)$_{it-1}$	γ_2*ln(BM)$_{it-1}$	γ_3*d(LPBM)$_{it-1}$
	0.00935	0.00031	0.00211	-0.00931
	(0.954)	(0.521)	(1.639)	(3.501)***

*,**,*** - significant at the 5%, 1% ,0.1% level respectively.

Table 5
Portfolios Results for the Relation between Size, BM, Low Profitability, and Stocks' Subsequent Returns during the Sample Period from July 1981 to June 2001.

This table presents the raw returns of 20 size/BM portfolios formed in the same manner as was done throughout this paper and reexamine them after censoring all low profitability stocks (lowest quintile of profit-score). The last column of the table presents the spread between the highest and lowest BM quintiles (H-L). The number in brackets is a t-test that examines the null hypothesis that spread H-L is equal zero.

Panel A – average monthly returns of 20 size/BM portfolios

This panel presents the average raw monthly returns of 20 size/BM portfolios during the sample period July 1981 to June 2001.

Book-to-market equity ratio

Size	Low	2	3	4	High	H-L
Small	NA	NA	NA	NA	NA	NA
2	0.36%	1.08%	1.20%	1.30%	1.40%	1.03% (7.124)***
3	0.66%	1.05%	1.47%	1.36%	1.45%	0.79% (4.703)***
4	1.19%	1.19%	1.31%	1.25%	1.39%	0.20% (1.167)
Big	0.94%	1.18%	1.29%	1.11%	1.31%	0.37% (2.466)*
Total	0.70%	1.11%	1.31%	1.30%	1.39%	0.70% (8.577)***

Panel B – Average purified monthly returns of 20 size/BM portfolios

This panel presents the average raw monthly returns of 20 size/BM portfolios after censoring of all low profitability stocks, during the sample period July 1981 to June 2001.

Book-to-market equity ratio

Size	Low	2	3	4	High	H-L
Small	NA	NA	NA	NA	NA	NA
2	0.79%	1.14%	1.29%	1.40%	1.45%	0.67% (4.255)***
3	0.86%	1.13%	1.47%	1.34%	1.37%	0.50% (2.929)***
4	1.38%	1.32%	1.38%	1.28%	1.44%	0.06% (0.334)
Big	1.21%	1.20%	1.26%	1.04%	1.30%	0.09% (0.588)
Total	1.02%	1.18%	1.35%	1.30%	1.40%	0.38% (4.592)***

Table 6
Relation between Negative Earnings Change, Low Profitability, and Stock Returns during the Sample Period from July 1981 to June 2001.

At the end of each year stocks were independently sorted across three dimensions:
BM - Stocks were allocated into equal quintiles in the same manner as was done throughout this paper.
Earning change - stocks were divided to quintiles according to change in net income in the last two fiscal years: $\frac{\text{net income}_t - \text{net income}_{t-1}}{|\text{net income}_t| + |\text{net income}_{t-1}|}$.
Stocks were then allocated into two portfolios - negative earning change (lowest quintile) and other earning change (all other quintiles).
Profitability - Stocks were allocated into two portfolios: Low Profitability (LP) and other profitability (OP) as done throughout this paper.
The first two rows of the table present the average returns of each of the 10 BM/earning change portfolios. Row (3) presents the returns of a portfolio in which negative earnings stocks are long and other earning change stocks are short (E1-E2). Rows (4) present the returns of portfolio in which low profitability stocks are short and other profitability stocks are short (LP-NP). Row (5) presents the proportion of negative earning change in each of the BM quintile, whereas Row (6) presents the proportion of low profitability stocks. Row (7) presents the profitability of (E2-E1) portfolio after censoring of low profitability stocks, Row (8) presents the profitability of portfolio in which other profitability stocks are long and low profitability stocks are short (NP-LP) after the censoring of all negative earning change stocks.

		Total	**Low BM**	**2**	**3**	**4**	**High BM**
(1)	Returns of negative earnings change (E1)	0.98%	-0.19%	0.75%	1.15%	1.30%	1.34%
(2)	Returns of expected earnings change (E2)	1.21%	0.85%	1.17%	1.34%	1.31%	1.42%
(3)	Returns of negative minus other earning change (E1-E2)	-0.23% (3.358**)	-1.04% (4.267***)	-0.41% (1.939)	-0.19% (1.394)	-0.01% (0.071)	-0.06% (0.806)
(4)	Returns of low minus normal profitability (NP-LP)	-0.40% (5.642***)	-1.51% (6.760***)	-0.55% (2.357*)	-0.28% (1.724)	0.01% (0.071)	-0.08% (0.806)
(5)	Proportion of negative earnings change stocks	20.00%	15.1%	14.2%	18.8%	22.8%	29.0%
(6)	Proportion of low profitability stocks	20.00%	20.4%	13.8%	15.4%	19.8%	30.7%
(7)	Purified (E1-E2) returns (without low profitability stocks)	0.07% (0.692)	0.66% (1.778)	0.06% (0.221)	-0.01% (0.068)	-0.22% (1.222)	0.01% (0.043)
(8)	Purified (NP - LP) returns (without negative earnings change stocks)	-0.45% (3.255)**	-1.33% (3.839)***	-0.31% (0.600)	-0.18% (0.506)	-0.24% (1.006)	0.17% (1.119)

*,**,*** - significant at the 5%, 1% ,0.1% level respectively.

Table 7

Difference in Returns between Financially Distressed Firms and Non-Distressed Firms in Each of 20 Size/BM Portfolios for 1981-2001 Sample Period.

At the end of each June from 1981-2000 20 size/BM portfolios are formed in the same way as in table 1.
Using Ohlson's O-score model (multiplied by -1) as a proxy for financial distress, all stocks were independently allocated at the end of each year (t-1) to two financial distress categories:
Financially distressed - stocks that are in the lowest O-score quintile.
Non-financially distressed - stocks from all other O-score quintiles.
The examination period is from July (t) to June (t+1), allowing for a six month gap in order to ensure that annual accounting data will be published prior to the examination period.
Average monthly equal weighted returns are calculated for each of the 40 (4*5*2) portfolios for the entire sample period July 1981 to June 2001.
The table reports the difference in return between financially distressed firms and non-distressed firms in each of the 20 size/BM portfolios using the following equation:

$$(5) \quad \Delta E(r_i) = E(r_{D\,i}) - E(r_{ND\,i})$$

Where i is each of the 20 size/BM portfolios, and $E(r_{Di})$ and $E(r_{NDi})$ is the average return of financially distressed stocks and non-distress stocks in portfolio i respectively.

The numbers in brackets are the t values from a test that examines the probability that both groups of financial distress categories came from the same population.

Book-to-market equity ratio

Size	**Low**	**2**	**3**	**4**	**High**
Small	NA	NA	NA	NA	NA
2	-0.93% (-3.514)***	-0.17% (0.559)	-0.47% (-2.178)*	0.04% (0.189)	-0.06% (-0.344)
3	-1.01% (-2.647)*	-0.69% (-1.905)	-0.12% (-0.408)	-0.11% (-0.446)	-0.32% (-1.653)
4	-0.61% (-1.423)	-0.66% (-1.654)	-0.26% (-0.782)	-0.52% (-1.797)	0.05% (0.203)
Big	-0.10% (-0.191)	-0.27% (-0.608)	-0.28% (-0.487)	-0.47% (-1.174)	-0.11% (-0.300)

*,**,*** - significant at the 5%, 1% ,0.1% level respectively.

Table 8
Average Slopes and t-Statistic from Month-by-Month Regressions of Low BM Stock Returns on Size-Score, Leverage-Score and Profit-Score from July 1981 to June 2001.

Ohlson's O-score model uses accounting data in order to estimate the probability of bankruptcy. The O-score model is composed of nine variables and their coefficients, the sum of which is O-score. The nine variables can be divided into three main categories: size (book), leverage, and profit. Using this division, three sub-score were calculated for each of the above categories using the original O-score variables and coefficients.

Panel A - regression results

Using the above division at the end of each year all three sub-scores were calculated and regressed (separately and jointly) against the stock monthly returns from July of year t to June of year t+1.

Regressions are Fama-MacBeth (1973) regressions with 240 monthly cross-sections of the following regression:

$$(6)\ R_{LBM_t} = \gamma_0 + \gamma_1\ Size\ score_{t-1} + \gamma_2\ Leverage\ score_{t-1} + \gamma_3\ profit\ score_{t-1}$$

R_{LBM} – is the monthly return of all sample stocks with low book-to-market (lowest BM quintile in each of the size quintiles).

The coefficient in these tests is the average of coefficients and the t-statistic (in brackets) is the average coefficient divided by its time-series standard error.

R_L=	γ_0	γ_1 *size-score	γ_2 *leverage-score	γ_3 *profit-score
	-0.0094	0.0036		
	(-1.31)	(+1.62)		
	-0.0005		0.0004	
	(0.15)		(-0.47)	
	-0.0179			0.0016
	(-1.09)			(-3.91)***
	-0.0026	0.0038	0.0007	0.0013
	(-0.64)	(1.96)	(0.89)	(3.33)**

Panel B – portfolio analysis

This Panel reexamines the underperformance of financially distressed stocks after the censoring of low profitability stocks.

At the end of each June all sample stocks were allocated into 20 size/BM portfolios and independently sorted into two financial distress portfolios as described in Table 7. All low profitability stocks (lowest profit-score quintile) were then censored from the sample and the underperformance of financially distressed stocks is reexamined. Results in this panel present the difference in returns between financially distressed stocks and non-distressed stock across 20 size/BM portfolios.

Size	**Low**	**2**	**3**	**4**	**High**
Small	NA	NA	NA	NA	NA
2	-0.31% (-0.975)	-0.23% (-0.756)	-0.23% (-0.805)*	0.08% (0.369)	0.27% (1.281)
3	-0.62% (-1.617)	-0.27% (-0.717)	-0.28% (-0.751)	-0.12% (-0.359)	0.37% (1.403)
4	-0.31% (-0.758)	*0.28*% (0.574)	0.36% (0.774)	-0.80% (-1.504)	0.27% (0.570)
Big	-0.11% (-0.253)	-0.16% (-0.208)	-0.66% (-0.480)	-1.86% (-1.516)	-1.25% (-1.641)

Table 9

Price Momentum in Stock Returns Between the Announcement Period (January to June) and the Holding Period (July to June) - the Effect of Past Returns and Profitability.

At the end of each year stocks were independently sorted across three dimensions:
BM - Stocks were allocated into equal quintiles in the same manner as was done throughout this paper.
Past performance - Stocks were allocated into three portfolios according to their returns during the announcement period: losers (bottom 30%) pars (middle 40%) and winners (top 30%).
Profitability - Stocks were allocated into two portfolios: Low profitability and non-LP as done throughout this paper.
The first three rows of the table present the average return of each of the 15 BM/past performance portfolios. Row (4) presents WML returns for the entire sample and across BM portfolios. Rows (5) and (6) divide the spread between winners and losers to the spread between losers and pars (losers' momentum) and the spread between winners and pars (winners' momentum). Row (7) presents WML once low profitability stocks are censored from the sample.

		Total	**Low BM**	**2**	**3**	**4**	**High BM**
(1)	Returns of past-losers (P1)	**0.84%**	0.11%	0.78%	1.03%	1.21%	1.35%
(2)	Returns of past-pars (P2)	**1.22%**	0.92%	1.17%	1.39%	1.27%	1.27%
(3)	Returns of past-winners (P3)	**1.41%**	1.12%	1.39%	1.48%	1.46%	1.65%
(4)	Returns of WML (P3-P1)	**0.56% (8.298***)**	1.01% (5.800***)	0.61% (3.856***)	0.45% (3.230***)	0.25% (1.885)	0.30% (2.318*)
(5)	Losers' momentum (P2-P1)	**0.38% (6.530***)**	0.80% (4.832***)	0.39% (2.861**)	0.36% (3.045)**	0.05% (0.506)	-0.08% (0.742)
(6)	Winners' momentum (P3-P2)	**0.19% (3.218**)**	0.20% (1.219)	0.22% (1.568)	0.09% (0.743)	0.19% (1.732)	0.38% (3.582***)
(7)	WML without low profitability stocks	**0.42% (5.965***)**	0.65% (3.836***)	0.39% (2.520*)	0.37% (2.533*)	0.23% (1.637)	0.36% (2.331*)

*,**,*** - significant at the 5%, 1% ,0.1% level respectively.

Table 10
The Underperformance of Selected Portfolios Before and After the Censoring of LPBM Stocks in Comparison to all Sample Stocks and an Appropriate Benchmark during the Sample Period July 1981 and June 2001.

This table compare between the underperformance of eight portfolios before and after the censoring of LPBM stocks.
The first column presents the underperformance of each portfolio in comparison to all sample stocks. Meaning $E(r_j) - E(r_{all})$, whereas $E(r_{all})$ is the simple average monthly return of all sample stocks.
The second column compares between the returns of the last three portfolios that are all sub-samples of low BM stocks to that of the entire BM portfolio. Meaning $E(r_j)$-$E(r_{LBM})$, whereas $E(r_{LBM})$ represents the returns of the low BM portfolio.
The third and fourth columns repeat the examination of the first two columns (respectively) after the censoring of all LPBM stocks. Meaning $E(r_j)^P$-$E(r_{all})^P$ and $E(r_j)^P$-$E(r_{LBM})^P$ respectively, whereas ^{P} represents purified returns.

The last column examines the underperformance after controlling for size. In this test the proportion of each portfolio across size quintiles was examine. Then the predicted returns were calculated using these proportions and the average return of each size quintile so that:

$$(9)\ \Pr(r_j)^p = \sum_{s=2}^{5} W_{s_j} * E(r_s)^p$$

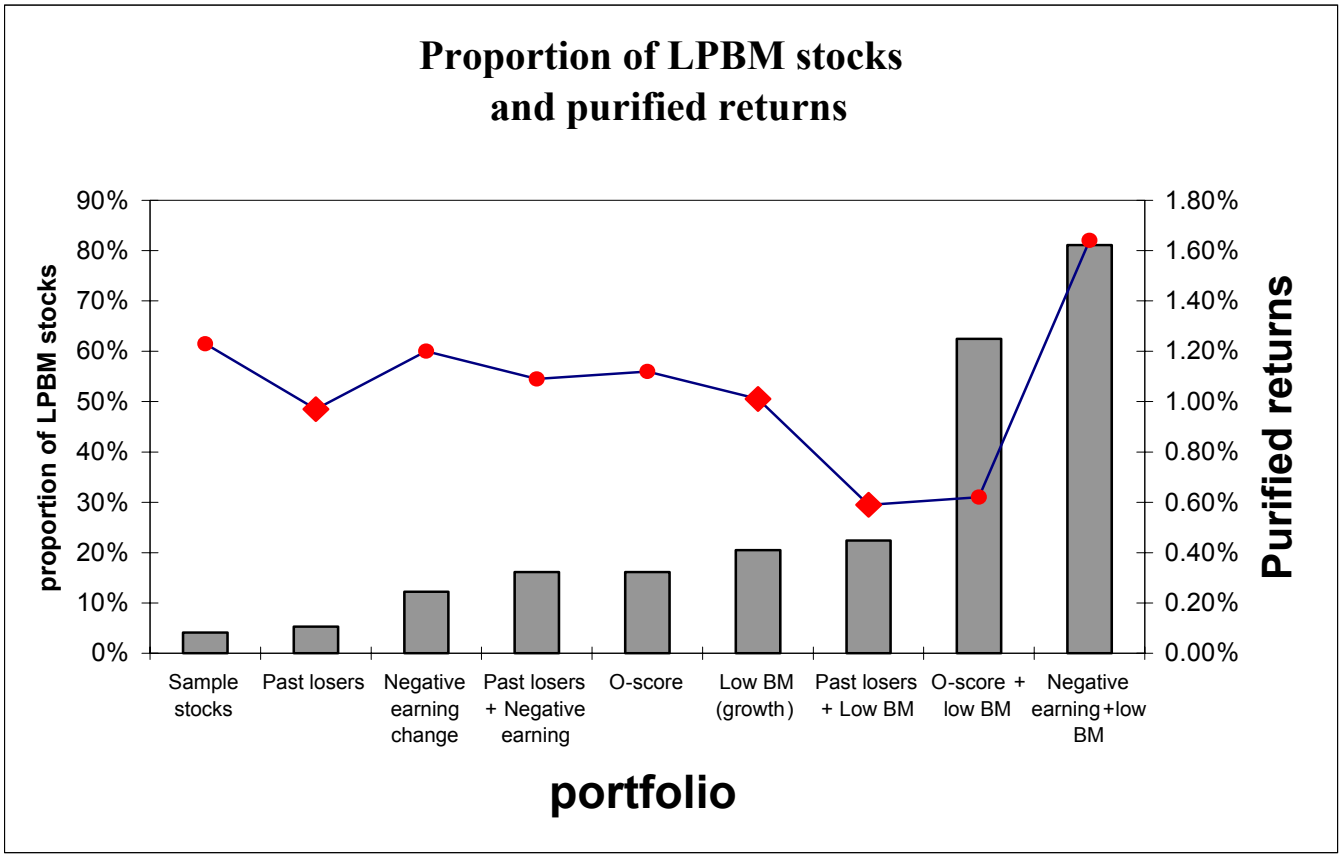
Where (s) stands for size quintile, and W_{s_j} is the proportion of stocks in portfolio j in size quintile (s). In the last three portfolios (sub-sample of low BM stocks) $E(r_s)^p$ was replaced by $E(r_{LBN_s})^p$ which is the average return of low BM stocks in size quintile s.
Next the difference between the actual and predicted return is calculated, meaning $E(r_j)^p - \Pr(r_j)^p$.

Portfolio	**$E(r_j) - E(r_{all})$**	**$E(r_j) - E(r_{LBM})$**	**$E(r_j)^P - E(r_{all})^P$**	**$E(r_j)^P - E(r_{LBM})^P$**	**$E(r_j)^P - Pr(r_j)^P$**
Low BM	-0.47% (6.753)		-0.23% (3.407)		-0.23% (3.407)
Past – losers	-0.32% (6.642)		-0.25% (5.580)		-0.25% (5.528)
Negative earnings change	-0.18% (2.911)		-0.03% (0.509)		-0.03% (0.495)
Financially distressed	-0.28% (-4.421)		-0.11% (1.825)		-0.10% (1.623)
Past-losers & negative earnings change	-0.55% (4.229)		-0.13% (1.095)		-0.13% (1.063)
Low BM & past-losers	-1.05% (8.414)	-0.58% (4.674)	-0.64% (5.505)	-0.41% (3.556)	-0.39% (3.310)
Low BM & financially distressed	-1.17% (-7.159)	-0.70% (4.308)	-0.62% (3.379)	-0.39% (2.128)	-0.30% (1.687)
Low BM & negative earnings change	-1.35% (5.678)	-0.88% (3.721)	0.42% (1.126)	0.64% (1.742)	0.62% (1.701)

*,**,*** - significant at the 5%, 1% ,0.1% level respectively.

Graph 1
Proportion of LPBM Stocks and Portfolios Simple Average Returns during the Sample Period 1981-2001.

This graph compares between the proportion of LPBM stocks and different portfolios that previously reported to have low returns. The bars in the graph are the proportion of LPBM stocks of the entire portfolio and the line represents the simple average return of the portfolio. In addition, the returns of each portfolio were compared to a benchmark. The five leftist portfolios were compared to the overall sample; whereas the three portfolios on the right were compared to the returns of all low BM stocks.
The small dot represents the portfolio that did not significantly underperform whereas large squares are portfolios that underperform.



Graph 2
Proportion of LPBM Stocks and Portfolios Returns After Censoring all LPBM Stocks during the Sample Period 1981-2001.

This graph presents the proportion of LPBM stocks and the average returns of portfolios after the censoring of these stocks. The bars represent the proportion of LPBM stocks, while the line represents the purified returns.
In addition, the returns of each portfolio were compared to a benchmark. The five leftist portfolios were compared to the overall sample; whereas the three portfolios on the right were compared to the returns of all low BM stocks.
The small dot represents the portfolio that did not significantly underperform whereas large squares are portfolios that underperform.