Resurrecting the size effect:
Firm size, profitability shocks, and expected stock returns

Kewei Hou and Mathijs A. van Dijk*

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Abstract

Recent studies report that the size effect in U.S. stock returns has disappeared after the early 1980s. We show that the disappearance of the size effect can be attributed to unexpected shocks to the profitability of small and big firms. Small firms experience large negative profitability shocks after the early 1980s, while big firms experience large positive shocks. As a result, realized stock returns of small and big firms over this period differ substantially from expected returns. After adjusting for the impact of profitability shocks on stock returns, we find that there still is a robust size effect in expected returns. Our results suggest that in-sample cash flow shocks can have a non-trivial effect on inferences drawn from asset pricing tests.

* Kewei Hou is at the Fisher College of Business, Ohio State University. Mathijs A. van Dijk is at the Rotterdam School of Management, Erasmus University. Emails: hou.28@osu.edu and madijk@rsm.nl. We thank Ravi Bansal, Michael Brandt, Alon Brav, Karl Diether, Campbell Harvey, Ron Kaniel, Andrew Karolyi, Stewart Myers, Lubos Pástor, Jay Ritter, David Robinson, René Stulz, and seminar participants at Case Western University, Chinese University of Hong Kong, Duke University, Erasmus University, Florida State University, Hong Kong University of Science and Technology, Nanyang Technological University, National University of Singapore, Ohio State University, Robeco Asset Management, Singapore Management University, University of Florida, University of Mannheim, University of Toronto, and the 2008 Chicago Quantitative Alliance Spring Conference in Las Vegas for helpful comments and discussion. We gratefully acknowledge financial support from Inquire Europe. All errors remain our own.

The size effect in the cross-section of stock returns is one of the oldest and best-known asset pricing anomalies. Since Banz (1981) reported that small firms earn higher returns than big firms, a large body of research has evolved on the size effect.[1] However, in recent years a consensus seems to have developed that the size effect has disappeared. Several studies report that small firms have not outperformed big firms after the early 1980s.[2]

Realized stock returns are a very noisy measure of expected returns (Blume and Friend, 1973; Sharpe, 1978; Froot and Frankel, 1989; Elton, 1999). Elton (1999) provides examples demonstrating that realized returns can deviate significantly from expected returns over prolonged periods of time. From a standard Campbell and Shiller (1988) decomposition, we know that realized stock returns must, by their very definition, equal the sum of expected returns, shocks to cash flows, and shocks to discount rates. Furthermore, Vuolteenaho (2002) shows that individual stock returns are primarily driven by cash flow shocks. In this paper we build on these arguments and hypothesize that differences in cash flow shocks between small and big firms are responsible for the disappearance of the size effect after the early 1980s. In other words, the size effect has gone away because the returns of small firms were lower than expected due to negative in-sample cash flow shocks and/or the returns of big firms were higher than expected due to positive cash flow shocks.

Our hypothesis is further motivated by two major economic developments since the early 80s. First, we have seen a dramatic increase in the number of newly listed firms on major U.S. exchanges. Fama and French (2004) report that these new lists (especially those that are small)

[1] See Van Dijk (2006) for a survey of the literature to date.

[2] Dichev (1998), Chan, Karceski, and Lakonishok (2000), Horowitz, Loughran, and Savin (2000), and Amihud (2002) find no evidence of a size effect in the periods 1981-1995, 1984-1998, 1979-1995, and 1980-1997, respectively. Fama and French (1992, table AIV) report that the relation between stock returns and firm size is much weaker in the 1980s than in the 1960s and 1970s. Hirshleifer (2001, footnote 8) suggests 1984 as the year in which the disappearance of the size effect first materialized. Schwert (2003, p. 943) asserts that "(…) it seems that the small-firm anomaly has disappeared since the initial publication of the papers that discovered it."

perform badly, and raise the possibility that a "bad draw" occurred and the poor performance of the new lists was not anticipated by the market ex ante. Second, we have witnessed an unprecedented increase in the level of competition due to industry deregulation and trade liberalization in the 80s and 90s (e.g., Revenga, 1992; MacDonald, 1994; Winston, 1998). There is evidence suggesting that big firms turned out to be better equipped than small firms to cope with the challenges and opportunities in the new competitive environment (e.g., Borenstein, 1992; Sachs and Schatz, 1994; Zingales, 1998). Consistent with these observations, Chan (2003) finds that firms that experience good news are much bigger than firms that experience bad news over the period 1980-2000.

We sort NYSE, Amex, and Nasdaq stocks into decile portfolios based on size and examine their returns over the period 1963-2005 and two subperiods of equal length (1963-1983 and 1984-2005). For 1963-1983, the value-weighted average return (in excess of the risk-free rate) is 0.93% per month for the smallest size portfolio and 0.11% per month for the largest portfolio, which implies a size premium of close to 10% per annum. By way of contrast, for 1984-2005, small (big) firms earn an average excess return of 0.77% (0.71%) per month, which implies a size premium of less than 1% per annum – a number that is insignificant both statistically and economically.

To investigate our hypothesis that differences in cash flow shocks are responsible for the disappearance of the size effect, we use the cross-sectional profitability model developed by Fama and French (2000) and extended by Fama and French (2006) and Hou and Robinson (2006). This model captures a substantial part (around 60%) of the variation in annual profitability across firms. As a proxy for cash flow shocks, we compute "profitability shocks" for individual firms by taking the difference between realized profitability and expected profitability (the one-year ahead profitability forecast based on the model). We find that profitability shocks are close to zero for all size deciles before 1984. But after 1984, small firms experience negative profitability shocks, while big firms experience positive shocks. These results suggest that the realized returns of small (big) firms for 1984-2005 are lower (higher) than expected. As a result, the observed size premium understates the “true” premium in expected returns.

We find a strong and positive relation between profitability shocks and contemporaneous stock returns, consistent with Vuolteenaho’s (2002) finding that cash flow shocks are an important driver of individual stock returns. For the entire 1963-2005 sample period (as well as for both subperiods), the average return difference between the quintile of stocks with the highest profitability shocks and the quintile of stocks with the lowest profitability shocks is close to 2% per month. Thus, profitability shocks have the potential to drive a large wedge between realized and expected returns.

To assess the effect of profitability shocks on the size effect, we use two different methods to adjust the realized returns of individual firms for the price impact of profitability shocks (details are provided in Section 4 below). After the adjustments, we uncover a statistically and economically significant size premium of 0.72% to 0.85% per month for 1984-2005. On the other hand, the return adjustments have little effect on the size premium for 1963-1983. Firm-level Fama-MacBeth (1973) cross-sectional regressions using profitability shock-adjusted returns also confirm the resurrection of the size effect after 1984. The average regression coefficient on size is negative and significant in all specifications and of similar magnitude for 1963-1983 and 1984-2005.

The above findings raise an immediate question: What are the sources of the large profitability shocks to small and big firms during the second half of our sample period? Additional tests suggest that new lists and industry competition play an important role. We find that new lists account for about half of the negative profitability shocks to small firms after 1984.

In addition, the bulk of the profitability shocks to small and big firms is concentrated in a small number of industries that have experienced significant changes in their competitive environment in the 80s and 90s.

Overall, we offer a straightforward explanation for the disappearance of the size effect after the early 1980s. We show that shocks to the profitability of small and big firms have caused the size premium to appear negligible during this period. After adjusting for the impact of these profitability shocks, the returns of small firms exceed those of big firms by close to 10% per annum. Our findings suggest that the size effect in expected stock returns is alive and well.

Elton (1999, p. 1199) argues that the belief that "(…) information surprises tend to cancel out over the period of a study" is misplaced and stresses the need for developing better measures of expected returns. We complement his argument by showing that shocks to the profitability of small and big firms do not cancel out over a prolonged period of time. Further, although it is well-known that cash flow shocks render realized stock returns an imperfect measure of expected returns, to the best of our knowledge our paper is the first to explicitly adjust realized returns for the impact of these shocks in order to arrive at a more accurate measure of expected returns.

The results in this paper are not only relevant for academic researchers, but also for investment practitioners who are interested in the role of size in portfolio optimization, active-risk budgeting, performance evaluation, and style/attribution analysis. Our analysis suggests that tilting equity portfolios toward small cap stocks produces systematically higher expected returns. Although small firms may again experience negative profitability shocks in the future, we show that the size effect in expected returns has not gone away.

The rest of the paper is organized as follows. Section 1 describes the data and summarizes the size effect for the entire sample period as well as for the pre-1984 and post-1984 subperiods. Section 2 introduces our firm-level cross-sectional profitability model. Section 3 examines the relation between size and profitability shocks. Section 4 re-estimates the size effect after adjusting realized returns for the impact of profitability shocks. Section 5 explores several potential explanations for the profitability shocks to small and big firms after the early 80s. Section 6 concludes.

1. Sample selection and data description

Our sample includes all NYSE, Amex, and Nasdaq listed firms with sharecodes 10 or 11 (i.e., excluding ADRs, closed-end funds, and REITs) that are contained in the intersection of the CRSP monthly returns file and the Compustat industrial annual file between July 1963 and December 2005. Excluding financial firms and utilities does not affect our findings. Following Fama and French (1992), we match CRSP stock return data from July of year t to June of year t+1 with Compustat accounting information for the fiscal year ending in year t–1. We use the following variable definitions. Size (CRSP market equity) is the product of the number of shares outstanding and the stock price at the end of June of year t. Earnings is operating income after depreciation from Compustat. Book equity is Compustat stockholder's equity (or common equity plus preferred stock par value, or assets minus liabilities) plus balance sheet deferred taxes and investment tax credit minus the book value of preferred stock and post retirement assets. Total assets and dividends are also from Compustat. The market value of a firm is defined as its total assets plus Compustat market equity (stock price times the number of shares outstanding at fiscal year end) minus book equity. For some of our tests, we also calculate operating accruals using the indirect balance sheet method as the change in non-cash current assets less the change in current liabilities excluding the change in short-term debt and the change in taxes payable minus depreciation and amortization expense.

Table 1 presents the results of portfolio sorts on size. At the end of June of each year between 1963 and 2005, we sort firms into size decile portfolios using NYSE breakpoints, and we calculate the value-weighted and equal-weighted monthly returns on the decile portfolios from July to June of next year. Table 1 reports the summary statistics (Panel A) and the value-weighted (Panel B) and equal-weighted (Panel C) average returns (in excess of the 1-month T-Bill rate) of each size portfolio as well as the differences in returns between Decile 1 ("small") and Decile 10 ("big"). The table reports results for the whole sample period (1963:07-2005:12) and for the two subperiods (1963:07-1984:06 and 1984:07-2005:12). Previous studies suggest that the size effect disappeared in the early 1980s (see footnote 2). As we do not want to engage in a debate on exactly when the size effect went away, we split the sample period down the middle and contrast the two subperiods with each other throughout the paper.[3] Our main findings do not change when we use 1980 as the cut-off point instead of 1984.

Over the whole sample period, the value-weighted average return spread between small firms and big firms is 0.44% per month (barely two standard errors from zero). Consistent with previous literature, the size effect for the first half our sample period is very strong. The average return spread is 0.82% (*t*-stat = 2.48) per month for 1963:07-1984:06, which implies a size premium of close to 10% per annum. By contrast, the average return spread is only 0.07% (*t*-stat = 0.21) per month for 1984:07-2005:12. Interestingly, the reduction in the size premium derives to a large extent from the remarkable performance of big firms, as the average excess return of Decile 10 increases from 0.11% per month for the first half of the sample period to 0.71% per month for the second half. The results for equal-weighted returns (reported in Panel C of Table 1) paint a similar picture.

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[3] Using the Andrews (1993) test for a structural change with unknown change point, we find evidence of a structural break in the size premium after 1983. The choice of our cut-off point is consistent with this breakpoint.

Figure 1 gives a graphical representation of the size effect over time. Although there are several years before 1984 in which small firms earn lower returns than big firms, the poor performance of small firms during the second half of the sample period – and especially in the 1980s and the 1990s – is striking.

2. Measuring profitability shocks

Building on the work of Campbell and Shiller (1988) and Campbell (1991), a substantial body of research focuses on measuring the relative importance of cash flow shocks and discount rate shocks for stock returns. Vuolteenaho (2002) provides evidence that individual stock returns are predominantly driven by cash flow shocks. Campbell and Vuolteenaho (2004) find that a firm's beta with respect to the component of market returns reflecting cash flow shocks ("bad beta") carries a much higher price of risk than a firm's beta with respect to discount rate shocks ("good beta"). The importance of cash flow shocks as a driver of individual stock returns suggests that, even if there is a significant size effect in expected returns, differences in cash flow shocks between small and big firms can obscure the size effect in certain periods. Alternatively, one can argue that the substantial size premium observed in the pre-1984 period could be driven by differences in cash flow shocks rather than differences in expected returns.

To estimate cash flow shocks at the firm level, we use the profitability models in Fama and French (2000, 2006) and Hou and Robinson (2006). Specifically, we estimate, for each year between 1963 and 2005, a cross-sectional regression of profitability on variables that have been shown to capture differences in expected profitability across firms:

$$\frac{E_{t+1}}{A_t} = \alpha_0 + \alpha_1 \frac{V_t}{A_t} + \alpha_2 DD_t + \alpha_3 \frac{D_t}{B_t} + \alpha_4 \frac{E_t}{A_{t-1}} + \eta_{t+1}, \tag{1}$$

where E_{t+1}/A_t is earnings in year t+1 scaled by lagged total assets, V_t/A_t is the ratio of the market value to the book value of assets, DD_t is a dummy variable that equals 0 for dividend payers and 1 for non-payers, and D_t/B_t is the ratio of dividend payments to book equity. All explanatory variables are measured at the end of year t.[4]

For each firm, we compute the expected profitability for year t+1 ($E_t[E_{t+1}/A_t]$) using the independent variables observed at the end of year t and the regression coefficients from the profitability regression the year before (that is, the regression in which E_t/A_{t-1} is regressed on independent variables measured at the end of year t–1, to ensure that all the information necessary to forecast year t+1 profitability is available at the end of year t). Our proxy for a firm's cash flow shock in year t+1 is its unexpected profitability (or profitability shock), computed as the difference between realized and expected profitability for year t+1.

Table 2 presents the average coefficients from the annual profitability regressions as well as their time series t-statistics for the 1963-2005 period and for the two subperiods 1963-1983 and 1984-2005. Our numbers are similar to those reported in Fama and French (2000, 2006) and Hou and Robinson (2006). Over the whole sample period, profitability is positively related to the market-to-book ratio of assets and the dividend-to-book ratio, which suggests that firms with a higher market-to-book ratio of assets (commonly used as a proxy for Tobin's Q) and those that pay out more dividends tend to be more profitable. The coefficient on DD_t is negative, which confirms the findings in Fama and French (2001) that non-dividend payers tend to be much less profitable than dividend payers. The coefficient on lagged profitability is large and positive,

[4] Firms with total assets or book equity close to zero could produce extreme observations for the variables in (1). To prevent these extreme observations from dominating the profitability regressions, we exclude firms with total assets less than \$5 million and book equity less than \$3 million. We also winsorize E_{t+1}/A_t, V_t/A_t, and D_t/B_t annually at the 0.5% and 99.5% percentiles. Our main results are robust to changing the total assets and book equity cut-offs or removing the winsorization.

which suggests that profitability is highly persistent. All coefficients are statistically significant at the 1% level.

We observe some differences between the results for the two subperiods. The coefficient on V_t/A_t is large in magnitude and statistically significant in the first subperiod, but not in the second. The reverse holds for the coefficient on DD_t. The findings of Fama and French (2004) suggest that the variation in the market-to-book ratio is less meaningful in explaining the cross-sectional differences in profitability after the early 1980s because of the emergence of a large number of young firms with strong growth opportunities and low near-term profitability. At the same time, the "disappearing dividends" effect documented by Fama and French (2001) suggests that the dividend dummy is a more powerful indicator of performance in the second subperiod. The coefficients on the dividend-to-book ratio and lagged profitability are almost identical for the two subperiods.

Table 2 also presents the estimation results of extended profitability models that include a negative earnings dummy, asset growth, and positive and negative accruals (following Fama and French, 2006). Although the coefficients on most of these variables are significantly different from zero, they do not add much to the overall explanatory power of the model. Therefore, we focus on the basic profitability model for the rest of the paper. Our main results are slightly stronger when we use the extended models. As an additional robustness check, we also estimate the baseline profitability model for each sector separately and find our key findings unaffected.[5]

We believe that our baseline model does a good job in capturing the market's expectation about profitability for a number of reasons. First, it explains a significant fraction of the cross-sectional variation in profitability using variables that are strictly ex ante. Table 2 reports an

[5] We classify firms into five sectors (Consumer, Manufacturing, Hi-Tech, Health, and Other) based on their SIC codes using the definitions downloaded from Ken French's website.

average adjusted R^2 of around 60% for the whole sample period and for both subperiods. This is quite remarkable considering the parsimonious specification in equation (1).

Second, profitability shocks obtained from the model have an autocorrelation that is close to zero. True shocks to a firm's profitability should not be predictable based on past shocks. We estimate a first-order auto-regression for each firm in our sample. The cross-sectional average of the autoregressive coefficient is -0.02, with a cross-sectional *t*-statistic of -0.25. We also estimate a pooled regression with firm fixed effects and obtain similar results. Hence, the profitability shocks generated by our model are not predictable based on past shocks.

Third, profitability shocks are positively and significantly related to contemporaneous stock returns. For each year between 1963 and 2005, we sort firms into quintile portfolios based on their profitability shock for that year (using NYSE breakpoints). Table 3 reports the value-weighted (Panel A) and equal-weighted (Panel B) average profitability shocks and stock returns of the quintile portfolios. Our profitability model produces substantial variation in profitability shocks across firms. For the whole sample period, Quintile 1 shows an average profitability shock of -6.15% per annum, while Quintile 5 shows a positive shock of 7.61% per annum. The relation between profitability shocks and contemporaneous returns is positive and highly significant. For the whole sample period, the value-weighted average excess return increases monotonically from -0.60% per month for Quintile 1 to 1.38% per month for Quintile 5. The return spread between the Quintile 5 and Quintile 1 is 1.98% per month with a *t*-statistic of 14.54. The results for the two subperiods are very similar to those for the whole sample period, in terms of the dispersion in profitability shocks and the spread in average returns. The equal-weighted results in Panel B of Table 3 show even greater spreads in profitability shocks and average returns. The average 5-1 return spread is over 3% per month for the whole sample period as well as for the two subperiods. These findings suggest that our measure of cash flow shocks is economically meaningful: firms that turn out to be more profitable than expected earn significantly higher stock returns. They also complement the finding in Vuolteenaho (2002) that individual stock returns are primarily driven by cash flow shocks.

Fourth, expected profitability based on our model does not predict stock returns. A significant relation between expected profitability and returns would imply that expectations about profitability are not fully incorporated into stock prices, which is an indication that the model is misspecified (that is, it contains information that is not in the market's information set when it makes the profitability forecast). Table 4 reports the value-weighted (Panel A) and equal-weighted (Panel B) average expected profitability and stock returns of quintile portfolios sorted by expected profitability at the beginning of each year from 1963 to 2005. Our model generates considerable cross-sectional variation in expected profitability. For the whole sample period, Quintile 1 has a value-weighted average expected profitability of 2.66% per annum, while the expected profitability of Quintile 5 is 22.75%. However, there is no significant relation between expected profitability and average returns. For the whole sample period and for both subperiods, average returns are approximately the same for all expected profitability quintiles. For example, the value-weighted average return spread between Quintile 5 and Quintile 1 is only 8 basis points (with a *t*-statistic of 0.50) for 1963-2005.

In sum, our profitability model provides a good approximation of expected profitability for individual firms. In the next section, we proceed to examine the profitability shocks to small and big firms.

3. The profitability shocks to small and big firms

Table 5 reports the value-weighted (Panel A) and equal-weighted (Panel B) average expected profitability and profitability shock of size deciles. The table shows that expected profitability of all size deciles declines over the sample period. This decline is most pronounced for small firms, in line with the findings of Fama and French (2004).

Further, there is no discernable pattern in profitability shocks across size deciles for the 1963-1983 subperiod; average profitability shocks are close to zero for all size deciles in both economic and statistical terms. The difference in profitability shocks between Decile 1 and Decile 10 is also not statistically distinguishable from zero. By way of contrast, profitability shocks and size are strongly positively correlated for the 1984-2005 subperiod. Small firms experience a value-weighted average profitability shock of -1.23% per year (*t*-stat = -4.41), which amounts to 50% of their average expected profitability of 2.45%. On the other hand, big firms experience a positive profitability shock of 1.92% per year on average (*t*-stat = 4.96).

The equal-weighted results (Panel B) show a similar pattern. None of the size deciles exhibits significant profitability shocks for the first half of the sample period, but small firms experience large negative shocks and big firms experience large positive shocks after 1984.

Panel C of Table 5 reports the average cross-sectional standard deviation of expected profitability and profitability shocks within each size decile. The most noticeable result is that the standard deviation of profitability shocks within a decile decreases monotonically as size increases, and the difference between Decile 1 and Decile 10 is large and statistically significant. This pattern is observed for the entire sample period as well as for both subperiods. It raises the possibility that the size effect in expected returns (if there is indeed an effect) is related to differences in the level of uncertainty about future profitability between small and big firms. We leave an investigation of this issue for a future paper.

The key result in Table 5 is that small firms experience negative profitability shocks after 1984 whereas big firms experience positive shocks. An alternative interpretation is that our profitability model fails to take into account an ex ante relation between size and expected profitability, thus causing profitability shocks (which are misspecified under this alternative explanation) to be mechanically related to size. The fact that profitability shocks are close to zero for all size deciles for the pre-1984 period suggests that size is not a consistent predictor of profitability for the entire sample period. Nevertheless, we test this alternative explanation by analyzing the relation between returns and both profitability shocks and expected profitability generated by an extended profitability model that includes size as an additional forecasting variable.

In untabulated results, we find that the relation between profitability shocks and contemporaneous returns is significantly weakened once we add size to the baseline profitability model (equation 1). The average return spread between the highest and lowest profitability shock-sorted quintile portfolios decreases from 1.99% per month (Table 3) to 1.50% per month for the post-1984 period. Perhaps more importantly, the extended model produces expected profitability estimates that positively and significantly predict returns. The average return spread between the highest and lowest quintile portfolios sorted on expected profitability increases from 0.28% per month (*t*-stat = 1.22, Table 4) under the baseline model to 0.77% per month (*t*-stat = 2.02) under the extended model. Since the market should incorporate expectations about profitability into stock prices before returns are measured, this predictability suggests that the expected profitability estimates produced by adding size to the baseline model are in part unexpected. We therefore conclude that the observed relation between profitability shocks and size after 1984 is not due to an ex ante relation between size and expected profitability that our baseline profitability model fails to account for.

4. Adjusting realized returns for profitability shocks

The results in the previous section suggest that the spread in expected returns between small and big firms for the 1984-2005 subperiod is more positive than the size premium in realized returns implies. In this section, we reexamine the size effect for 1984-2005 after adjusting the realized stock returns of individual firms for the impact of shocks to their profitability.

We use two different methods to adjust realized stock returns for the price impact of profitability shocks. The first approach corrects individual stock returns for the contemporaneous relation between returns and profitability shocks across firms. More specifically, we measure the price impact per unit of profitability shock by dividing the value-weighted return spread between the highest and the lowest profitability shock-sorted quintile portfolios each month by the difference in profitability shocks between the two extreme quintiles.[6] We then subtract the product of a firm's profitability shock and this scaled return spread each month from the firm's realized excess return to obtain an estimate of the return adjusted for the effect of profitability shocks.

In the second method, we use the approach in Brennan, Chordia, and Subrahmanyam (1998) and Chordia and Shivakumar (2006) to measure the systematic price impact of profitability shocks by regressing individual stock returns on the value-weighted return spread between the highest and the lowest profitability shock-sorted quintile portfolios. We also include market excess returns in the regressions to correct for the market exposure of the profitability shock spread portfolio. We estimate the regressions with 60 months (36 months minimum) of monthly returns ending in June of each year, and we calculate each stock's adjusted returns from July to June next year by subtracting the product of the estimated loading on the profitability

[6] We use value-weighted returns here to obtain a more conservative estimate of return adjustments. Using equal-weighted returns produces considerably stronger results.

shock spread portfolio and the returns on the spread portfolio from its realized excess returns.[7] We note that this adjustment method uses a slightly smaller sample of firms due to the minimum of three years of past returns requirement. It also means that the first subperiod starts in 1966 instead of 1963 under this return adjustment.

4.1 The size effect

Table 6 presents average value-weighted (Panel A) and equal-weighted (Panel B) unadjusted and adjusted returns of the size decile portfolios, as well as the 1-10 spread. To be included in the analysis, a firm has to have sufficient information to calculate its profitability shocks. This data requirement increases the value-weighted size premium based on realized returns from 0.44% per month (*t*-stat = 1.94, see Table 1) to 0.65% (t-stat = 2.87) for the whole sample period. A similar increase applies to the two subperiods as well as to the equal-weighted size premium.

For the whole sample period, adjusting individual stock returns for the impact of profitability shocks raises the value-weighted size premium by about 0.20% per month. This increase stems exclusively from the return adjustments for the second half of the sample period. For 1963:07-1984:06, we see only minor changes in the size premium after the return adjustments (for example, the size premium decreases slightly from 1.05% per month unadjusted to 0.98% per month under the first adjustment procedure), consistent with the findings in Table 5 that profitability shocks are close to zero for both small and big firms during this period.

For 1984:07-2005:12, the size premium increases from 0.27% per month (*t*-stat = 0.91) unadjusted to 0.72% per month (*t*-stat = 2.32) adjusted using the first method (Adjustment 1), and to 0.85% (*t*-stat = 2.66) using the second method (Adjustment 2). The increase in the size

[7] As a robustness check, we use the Dimson (1979) procedure with one lag to account for thin trading when estimating the loadings, and find the return adjustment results to be slightly stronger.

premium derives from both the long side (small firms) and the short side (big firms). For example, under Adjustment 1, the average return on small firms (Decile 1) increases from 0.97% per month to 1.26% per month, whereas the average return on big firms (Decile 10) decreases from 0.70% per month to 0.54% per month. These results are in line with our findings in Table 5 that during the second half of our sample period small firms experience negative profitability shocks while big firms experience positive shocks. The equal-weighted results in Panel B of Table 6 display comparable patterns. In sum, after adjusting for the impact of profitability shocks, the size premium for the second half of the sample period amounts to approximately 10% per annum (value-weighted) or 12% per annum (equal-weighted).

4.2 Fama-MacBeth cross-sectional regressions

Table 7 reports the results of monthly Fama and MacBeth (1973) cross-sectional regressions of individual stocks' unadjusted and adjusted returns on size.[8] These regressions complement and provide further robustness checks to our portfolio-based results in Table 6 by using all firms without imposing decile breakpoints, and therefore steering clear of the potential data-snooping biases in the portfolio-based approaches (see, e.g., Lo and MacKinlay, 1990; Ferson, Sarkissian, and Simin, 1999). They also provide an alternative weighting scheme to the value-weighted and equal-weighted portfolios employed in Table 6. Each coefficient from a cross-sectional regression is the return on a zero-cost minimum variance portfolio with a weighted average value of size equal to one. The weights are tilted towards small and volatile stocks. In addition, using adjusted returns as the dependent variable in the cross-sectional regressions avoids the error-in-variable problems created by errors in estimated firm-level profitability shocks and loadings on

[8] The tenor of the results is unchanged when we include the book-to-market ratio and past twelve months' return (skipping the most recent month) to control for the value and momentum effects.

the profitability shock spread portfolio, because these errors are impounded into the dependent variable directly.

Table 7 reports the average monthly regression coefficients as well as their time series *t*-statistics. The first column of Table 7 shows that size is strongly negatively related to average unadjusted returns for the whole sample period and for the pre-1984 subperiod, but not for the post-1984 subperiod. The average coefficient on size is equal to -0.17 (*t*-stat = 3.95) for 1963:07-2005:12, -0.22 (*t*-stat = -3.30) for 1963:07-1984:06, and -0.11 (*t*-stat = -1.83) for 1984:07-2005:12. The significance of the size effect appears to be stronger than the portfolio results in Table 6 based on value-weighed returns, but in line with the equal-weighted return results. This is not surprising since Fama-MacBeth regressions minimize the sum of squared errors, which tends to put more weight on small and volatile stocks among which the size effect is more pronounced.

The next three columns of Table 7 report regression results for adjusted returns. Adjusting individual stock returns for the impact of profitability shocks strengthens the significance of the size effect for the whole sample period. The average coefficient on size increases from -0.17 unadjusted to -0.22 (*t*-stat = -4.98) under Adjustment 1, and to -0.19 (*t*-stat = -3.89) under Adjustment 2. More impressively, for the post-1984 subperiod, the two return adjustment methods raise the coefficient on size from -0.11 unadjusted to -0.23 (*t*-stat = -3.90) and -0.17 (*t*-stat = -2.86), respectively. On the other hand, for the pre-1984 subperiod, the average coefficient on size is virtually unaffected by the return adjustments.

The last column of Table 7 presents "purged" coefficient estimates when returns are adjusted according to the second method. Brennan, Chordia, and Subrahmanyam (1998) and Chordia and Shivakumar (2006) demonstrate that when individual stock returns that have been adjusted for their exposures to known risk factors are used in Fama-MacBeth regressions, the monthly regression coefficients will be biased if the errors in the estimated factor loadings are correlated with the independent variables of the Fama-MacBeth regressions. In our context, this argument implies that the average regression coefficient on size could be biased by an amount that depends on the average return of the profitability shock spread portfolio. To account for this potential bias, we follow Black, Jensen, and Scholes (1972) and regress the monthly regression coefficients on size on the returns of the profitability shock spread portfolio, and obtain the purged estimator as the intercept from this time series regression. These purged estimates are very similar to the coefficients reported in the second to last column, suggesting that our Fama-MacBeth regressions are not affected by the aforementioned bias. They also confirm the resurrection of the size effect in adjusted returns for the second half of our sample period.

In sum, the results in Tables 6 and 7 suggest that unexpected returns driven by in-sample profitability shocks are responsible for the disappearance of the size effect after the early 1980s. After adjusting for the impact of profitability shocks on stock returns, we are able to uncover a significant size premium for the post-1984 period.

4.3 The January effect

Brown, Kleidon, and Marsh (1983), Keim (1983), and Reinganum (1983) link the size effect to the January seasonal in stock returns (Rozeff and Kinney, 1976). Both the size effect and the January effect are to a large extent driven by the extraordinary performance of small stocks in January.[9] It is therefore interesting to examine whether there still is a January seasonal in the returns of small firms after the early 1980s even though the size effect over the entire year is insignificant. We also want to investigate how the return adjustments for profitability shocks affect small and large firms in January versus other months.

[9] Explanations for the January effect include tax-loss selling by retail investors (Keim, 1983; Reinganum, 1983) and window dressing by institutional investors (Ritter and Chopra, 1989).

Table A1 in the Appendix reports the average unadjusted and adjusted returns of size deciles for January and for February-December separately. The table shows a strong January effect for both halves of our sample period. Small firms on average outperform big firms in January by 8.47% for 1963-1983 and by 5.09% for 1984-2005. In contrast, small firms outperform big firms by only 0.36% per month in February-December for 1963-1983 and actually underperform by 0.16% per month for 1984-2005.

Adjusting returns for the impact of profitability shocks affects the size premium in January and in February-December in a similar way. For instance, for the post-1984 subperiod, Adjustment 1 raises the size premium in January by 0.55% (from 5.09% to 5.64%) and in February-December by 0.44% (from -0.16% to 0.28% per month). Adjustment 2 increases the size premium in January by 0.53% and in February-December by 0.59%. Thus, it appears that profitability shocks are impounded into stock prices equally throughout the year.

5. Explaining the profitability shocks to small and big firms

Our results thus far show that small firms experience negative shocks to their profitability while big firms experience positive shocks for 1984-2005. After adjusting for the price impact of these profitability shocks, we find an economically and statistically significant size effect for the post-1984 period.

Of course, these results beg an important question: What economic forces are behind the profitability shocks to small and big firms after the early 1980s? A possible explanation for the poor performance of small firms is the “new lists” effect documented by Fama and French (2004). They report that the number of newly listed firms on major U.S. exchanges increased dramatically in the 80s and 90s. However, both the profitability and the survival rate of these newly listed firms decline sharply over this period, especially for small new lists. Fama and

French argue that a decline in the cost of equity allowed weaker firms and firms with more distant expected payoffs to raise equity after the early 1980s, and raise the possibility that "(…) ex post, a bad draw occurs; the failure rates of the new weaker class of new lists turn out to be higher than was rationally anticipated ex ante, and the overall new list returns are low."

For 1984-2005, new lists make up a substantial fraction of the firms in the smallest size decile. The negative profitability shocks to small firms during this period might thus to a considerable extent stem from the poor performance of those new lists. We investigate this hypothesis in Table 8, which reports the value-weighted (Panel A) and equal-weighted (Panel B) average expected profitability and profitability shock of size deciles based on seasoned firms only. Following Fama and French (2004), we define seasoned firms as firms that have been listed for more than five years, based on the first appearance of a firm (PERMCO) on CRSP. We use the same size decile breakpoints as in Table 5 to allow for a direct comparison of the average profitability shocks of each size decile. Table 8 shows that roughly half of the negative profitability shock to small firms (Decile 1) over 1984-2005 can be attributed to new lists. Small seasoned firms experience a profitability shock of -0.67% per year, compared to a shock of -1.23% for all small firms (seasoned and new lists). This result suggests that the unexpected poor performance of the new weaker class of new lists contributes significantly to the disappearance of the size effect after the early 80s.

Another potential explanation for the opposite profitability shocks to small and big firms is greater competition as a result of trade liberalization and industry deregulation. The U.S. economy has become increasingly open in the 80s and 90s, with the ratification of the 1979 Tokyo round of the GATT, the 1988 Canada-U.S. Free Trade Agreement, and NAFTA in 1993 as legislative landmarks of trade liberalization. One of the consequences is a strong and steady rise in import penetration ratios (see, e.g., Revenga, 1992; MacDonald, 1994). Also, starting in the late 1970s, we see a wave of deregulation in many U.S. industries. Adjustments of deregulated industries to their new competitive environment can take decades and the impacts on the performance of different companies are hard to anticipate ex ante (Winston, 1998). There is evidence suggesting that big firms turned out be more effective in dealing with increased competition than small firms. Sachs and Schatz (1994) document that large multinationals played an important role in the dramatic increase in international trade. Borenstein (1992), Mitchell and Mulherin (1996), and Pryor (2001) show that deregulation and foreign competition forced firms to consolidate in the 1980s and 1990s. The results of Zingales (1998) suggest that big firms are more likely to survive after deregulation, consistent with the theoretical predictions of Telser (1966) and Bolton and Scharfstein (1990).

We explore the role of industry market structure and competition by examining to what extent the profitability shocks to small and big firms after the early 1980s are concentrated in certain industries. Table 9 reports the five industries that contribute the most to the profitability shocks to small firms (-1.23%) and big firms (1.92%) for 1984-2005. We classify firms into 72 2-digit SIC industries in Panel A and into 48 Fama-French industries in Panel B. We also report the contribution of the remaining industries to the profitability shocks to small and big firms.

Table 9 yields two interesting results. First, the profitability shocks are concentrated in a small number of industries. Over 70% of the shocks to small firms and big firms for 1984-2005 can be attributed to the top five industries. This holds for both the 2-digit SIC industries and the Fama-French industries.[10]

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[10] We note that there is substantial overlap between the industries in Panels A and B. For example, Fama-French industry 13 (Pharmaceutical Products) is a subset of 2-digit SIC industry 28 (Chemicals and Allied Products) and Fama-French industry 34 (Business Services) contains mainly firms in the 2-digit SIC industry 73 (Business Services and Computer Software).

Second, the negative profitability shocks to small firms and the positive profitability shocks to big firms stem to a large extent from the same set of industries. Four out of the top five 2-digit SIC industries in terms of their contribution to the profitability shock to small firms are also in the top five for big firms. The same holds for three out of the top five Fama-French industries. In particular, Fama-French industry 13 (Pharmaceutical products) accounts for 35% of the profitability shocks to small firms and 22% of the shocks to big firms.

These results point to industry competition as an important source of the profitability shocks to small and big firms after the early 80s. A number of the industries that are highlighted in Table 9 underwent significant changes in their competitive environment during this period. For example, Li (1995) and Scherer (1993) document that foreign entry, deregulation, and technological innovations drastically altered the competitive landscape of the pharmaceutical industry over the course of the 1980s. These developments led to a large number of new entrants (Zucker, Darby, and Brewer, 1998) and IPOs (Lerner, 1994), but also to intense consolidation in the industry in the 80s and 90s (Danzon, Epstein, and Nicholson, 2004).

The market structure of several of the other industries in Table 9 also experienced a major transformation during the same period of time. For example, Kraemer and Dedrick (1998) study the rapid globalization of the computer hardware industry and conclude that successful U.S. firms responded to globalization by focusing on business segments with increasing returns to scale. Campbell-Kelly (1995) shows that changes in the competitive structure of the computer software industry resulted in a period of consolidation in which many of the early firms were shaken out and a small number of U.S. firms emerged as global players. Mitchell, Shaver, and Yeung (1992) document the complex consequences of globalization for the medical equipment industry. Berger, Kashyap, and Scalise (1995) and Winston (1998) discuss the major deregulation process in the banking industry in the 1980s.

We interpret the results in this section as supportive of our conjecture that new lists and industry competition are important driving forces of the profitability shocks to small and big firms after the early 1980s. Of course, these two forces are potentially intertwined: new lists affect industry market structure and vice versa. It is interesting to note that four out of the top five 2-digit SIC industries (35, 36, 38, and 73) in terms of their contribution to the profitability shocks to small firms are also among the top five of industries with the highest number of IPOs for 1975-2000 (see Helwege and Liang, 2004, p. 533), and the other industry (SIC 28) ranks number six in terms of the number of IPOs. We consider a full investigation of the sources of the profitability shocks a fruitful area of future research.

6. Conclusion

The size effect in the cross-section of stock returns is one of the most extensively studied topics in financial economics. It was widely accepted that small firms earn higher returns than big firms – until the mysterious disappearance of the size effect in the early 1980s. Our paper examines the hypothesis that differences across firms in unexpected returns that arise from in-sample profitability shocks are responsible for the disappearance of the size effect.

To investigate this hypothesis, we estimate the profitability shocks to individual firms using a cross-sectional profitability model. We show that profitability shocks are close to zero for small and big firms over 1963-1983, but there is a clear positive relation between profitability shocks and firm size after 1984. Small firms on average experience substantial negative shocks to their profitability, while big firms experience positive shocks. After adjusting for the price impact of profitability shocks, we uncover a significant size premium of around 10% per annum for 1984-2005. The resurrection of the size effect for post-1984 period is robust to alternative profitability models, different return adjustments, and different test methods.

There are a number of interesting areas for future research. First, we hope that the finding that the size effect in the cross-section of expected returns has not disappeared will lead to a revival of academic research on the underlying causes of the size effect, which has dried up in recent years.

Second, we show that the differences between realized and expected returns lead to different inferences on the size effect. In a concurrent paper, we examine the implications of these differences for a broad range of anomalies studied in the asset pricing literature.

Third, there may be room for improvement in the way we adjust realized stock returns to obtain a better measure of expected returns. For example, we examine only near-term cash flow shocks and do not attempt to measure changes in expectations about more distant cash flows. We also do not control for discount rate shocks, yet they may have a non-trivial effect on realized returns. We leave a thorough investigation of these and other issues for future research.

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Table 1: Summary statistics for size deciles

This table reports the average number of firms, the value-weighted (VW) and equal-weighted (EW) average size in billions of dollars (Panel A), the value-weighted (Panel B) and equal-weighted (Panel C) average returns (in excess of the risk-free rate and expressed in percent per month) and their corresponding *t*-statistics for decile portfolios of NYSE, Amex, and Nasdaq stocks formed on the basis of their market equity at the end of June of each year using NYSE breakpoints, as well as the return spread between Deciles 1 and 10. The table reports results for the full 1963:07-2005:12 sample period and for the 1963:07-1984:06 and 1984:07-2005:12 subperiods.

Panel A: Summary statistics

	Small	2	3	4	5	6	7	8	9	Big
1963:07-2005:12										
# of firms	2,299	550	365	288	242	206	183	171	157	151
VW size	0.04	0.10	0.16	0.25	0.38	0.58	0.90	1.54	3.07	35.34
EW size	0.02	0.09	0.16	0.25	0.38	0.57	0.88	1.49	2.93	14.49
1963:07-1984:06										
# of firms	1,644	353	257	218	196	168	155	147	139	137
VW size	0.02	0.04	0.06	0.08	0.12	0.18	0.28	0.45	0.77	10.73
EW size	0.01	0.04	0.06	0.08	0.12	0.18	0.27	0.44	0.75	3.22
1984:07-2005:12										
# of firms	2,939	743	471	356	288	242	211	195	175	164
VW size	0.06	0.15	0.27	0.42	0.64	0.96	1.50	2.57	5.27	58.83
EW size	0.04	0.15	0.26	0.41	0.63	0.95	1.47	2.50	5.00	25.26

Panel B: Value-weighted average returns

	Small	2	3	4	5	6	7	8	9	Big	Small-Big
1963:07-2005:12											
VW excess return	0.85	0.65	0.70	0.69	0.72	0.60	0.68	0.62	0.54	0.41	0.44
t-statistic	*2.92*	*2.29*	*2.57*	*2.59*	*2.80*	*2.48*	*2.89*	*2.71*	*2.57*	*2.15*	*1.94*
1963:07-1984:06											
VW excess return	0.93	0.66	0.67	0.69	0.61	0.45	0.43	0.40	0.23	0.11	0.82
t-statistic	*2.08*	*1.60*	*1.68*	*1.80*	*1.69*	*1.29*	*1.25*	*1.26*	*0.78*	*0.42*	*2.48*
1984:07-2005:12											
VW excess return	0.77	0.64	0.73	0.69	0.82	0.75	0.93	0.83	0.84	0.71	0.07
t-statistic	*2.05*	*1.64*	*1.96*	*1.86*	*2.25*	*2.22*	*2.86*	*2.54*	*2.80*	*2.50*	*0.21*

Table 1, continued

Panel C: Equal-weighted average returns											
	Small	2	3	4	5	6	7	8	9	Big	Small-Big
1963:07-2005:12											
EW excess return	1.11	0.67	0.71	0.69	0.72	0.60	0.67	0.61	0.55	0.42	0.69
t-statistic	*3.72*	*2.36*	*2.58*	*2.59*	*2.79*	*2.48*	*2.86*	*2.67*	*2.60*	*2.10*	*2.88*
1963:07-1984:06											
EW excess return	1.15	0.67	0.68	0.69	0.61	0.45	0.42	0.39	0.24	0.12	1.04
t-statistic	*2.53*	*1.63*	*1.70*	*1.79*	*1.69*	*1.30*	*1.23*	*1.22*	*0.81*	*0.43*	*3.03*
1984:07-2005:12											
EW excess return	1.07	0.66	0.73	0.69	0.82	0.74	0.92	0.83	0.85	0.72	0.35
t-statistic	*2.76*	*1.70*	*1.96*	*1.86*	*2.24*	*2.21*	*2.83*	*2.53*	*2.81*	*2.48*	*1.05*

Table 2: Cross-sectional profitability regressions

This table reports the average slopes and their time series *t*-statistics from annual Fama and MacBeth (1973) cross-sectional regressions of profitability (earnings scaled by lagged total assets, E_{t+1}/A_t) on variables that are hypothesized to capture differences in expected profitability across firms. V_t/A_t is the market-to-book ratio of a firm's assets. DD_t is a dummy variable that equals 0 for dividend payers and 1 for non-dividend payers. D_t/B_t is the ratio of dividends to book equity. $Neg\ E_t$ is a dummy variable that equals 1 for firms with negative earnings (0 otherwise). dA_t/A_t is the growth rate of total assets. $-AC_t/B_{t-1}$ and $+AC_t/B_{t-1}$ are operating accruals for firms with negative and positive accruals, respectively. We run the regressions for each year between 1963 and 2005. The table reports results for the full 1963-2005 sample period as well as for the 1963-1983 and 1984-2005 subperiods.

	Intercept	V_t/A_t	DD_t	D_t/B_t	E_t/A_{t-1}	$Neg\ E_t$	dA_t/A_{t-1}	$-AC_t/A_{t-1}$	$+AC_t/A_{t-1}$	Adj. R^2
1963-2005										
Coefficient	0.0153	0.0059	-0.0075	0.2067	0.6926					0.60
t-statistic	*11.21*	*4.09*	*-5.84*	*10.58*	*53.43*					
Coefficient	0.0176	0.0070	-0.0053	0.1464	0.7208	-0.0075	-0.0357			0.61
t-statistic	*12.28*	*4.27*	*-4.67*	*6.56*	*45.87*	*-1.82*	*-5.58*			
Coefficient	0.0185	0.0070	-0.0071	0.1453	0.7242	-0.0105	-0.0238	-0.0570	-0.1094	0.61
t-statistic	*10.00*	*4.11*	*-5.76*	*6.40*	*48.50*	*-2.36*	*-3.91*	*-4.29*	*-9.94*	
1963-1983										
Coefficient	0.0125	0.0124	-0.0025	0.2043	0.6934					0.63
t-statistic	*6.60*	*7.92*	*-1.79*	*6.14*	*40.58*					
Coefficient	0.0146	0.0140	-0.0031	0.0785	0.7752	0.0111	-0.0717			0.64
t-statistic	*7.54*	*7.58*	*-2.23*	*2.29*	*46.43*	*5.81*	*-15.77*			
Coefficient	0.0155	0.0143	-0.0031	0.0786	0.7740	0.0102	-0.0585	-0.0107	-0.0786	0.63
t-statistic	*7.21*	*7.14*	*-2.18*	*2.33*	*48.62*	*4.85*	*-13.63*	*-0.82*	*-6.49*	
1984-2005										
Coefficient	0.0182	-0.0005	-0.0126	0.2091	0.6917					0.58
t-statistic	*10.02*	*-0.38*	*-8.24*	*9.79*	*34.72*					
Coefficient	0.0204	0.0003	-0.0075	0.2110	0.6691	-0.0252	-0.0015			0.58
t-statistic	*10.49*	*0.16*	*-4.40*	*9.87*	*32.00*	*-4.60*	*-0.32*			
Coefficient	0.0213	0.0000	-0.0108	0.2090	0.6768	-0.0302	0.0092	-0.1010	-0.1388	0.59
t-statistic	*7.39*	*0.01*	*-6.73*	*8.76*	*33.38*	*-5.21*	*2.25*	*-5.51*	*-8.73*	

Table 3: Average returns of portfolios sorted on profitability shocks

This table reports the value-weighted (Panel A) and equal-weighted (Panel B) average profitability shocks, returns (in excess of the risk-free rate and expressed in percent per month), and their corresponding *t*-statistics for quintile portfolios formed on the basis of profitability shocks using NYSE breakpoints, as well as the differences between Quintile 5 and Quintile 1. The table reports results for the full 1963:07-2005:12 sample period and for the 1963:07-1984:06 and 1984:07-2005:12 subperiods.

Panel A: Value-weighted average profitability shocks and returns

	Low	2	3	4	High	High-Low
1963:07-2005:12						
VW profitability shock	-6.15	-1.52	0.22	2.16	7.61	13.76
t-statistic	*-15.31*	*-9.09*	*1.34*	*11.18*	*20.42*	*23.12*
VW excess return	-0.60	0.19	0.54	0.80	1.38	1.98
t-statistic	*-2.51*	*0.94*	*2.67*	*3.94*	*5.71*	*14.54*
1963:07-1984:06						
VW profitability shock	-5.84	-1.83	-0.13	1.68	6.50	12.35
t-statistic	*-11.68*	*-6.32*	*-0.46*	*5.36*	*14.88*	*27.31*
VW excess return	-0.76	-0.18	0.34	0.64	1.21	1.97
t-statistic	*-2.37*	*-0.63*	*1.20*	*2.22*	*3.63*	*11.31*
1984:07-2005:12						
VW profitability shock	-6.44	-1.23	0.56	2.63	8.66	15.11
t-statistic	*-10.26*	*-7.73*	*3.64*	*13.92*	*17.13*	*15.02*
VW excess return	-0.45	0.55	0.73	0.96	1.54	1.99
t-statistic	*-1.25*	*1.95*	*2.58*	*3.35*	*4.43*	*9.49*

Panel B: Equal-weighted average profitability shocks and returns

	Low	2	3	4	High	High-Low
1963:07-2005:12						
EW profitability shock	-9.07	-1.57	0.24	2.22	8.86	17.93
t-statistic	*-21.15*	*-9.41*	*1.46*	*11.79*	*21.27*	*24.59*
EW excess return	-0.60	0.39	0.80	1.33	2.64	3.24
t-statistic	*-2.04*	*1.74*	*3.43*	*5.33*	*8.79*	*35.13*
1963:07-1984:06						
EW profitability shock	-7.28	-1.83	-0.08	1.77	7.14	14.43
t-statistic	*-15.88*	*-6.31*	*-0.27*	*5.86*	*17.71*	*30.13*
EW excess return	-0.78	0.17	0.73	1.28	2.44	3.22
t-statistic	*-1.88*	*0.48*	*1.98*	*3.33*	*5.55*	*24.82*
1984:07-2005:12						
EW profitability shock	-10.77	-1.32	0.55	2.65	10.49	21.26
t-statistic	*-22.42*	*-8.16*	*3.40*	*13.73*	*20.72*	*24.92*
EW excess return	-0.42	0.60	0.87	1.37	2.83	3.25
t-statistic	*-1.00*	*2.30*	*3.04*	*4.35*	*6.93*	*24.82*

Table 4: Average returns of portfolios sorted on expected profitability

This table reports the value-weighted (Panel A) and equal-weighted (Panel B) average expected profitability, returns (in excess of the risk-free rate and expressed in percent per month), and their corresponding *t*-statistics for quintile portfolios formed on the basis of expected profitability using NYSE breakpoints, as well as the differences between Quintile 5 and Quintile 1. The table reports results for the full 1963:07-2005:12 sample period and for the 1963:07-1984:06 and 1984:07-2005:12 subperiods.

Panel A: Value-weighted average expected profitability and returns						
	Low	2	3	4	High	High-Low
1963:07-2005:12						
VW expected profitability	2.66	7.67	10.37	13.51	22.75	20.09
t-statistic	*4.33*	*21.57*	*29.12*	*30.59*	*35.56*	*46.98*
VW excess return	0.43	0.60	0.47	0.43	0.51	0.08
t-statistic	*1.61*	*2.84*	*2.42*	*2.03*	*2.45*	*0.50*
1963:07-1984:06						
VW expected profitability	5.65	9.46	12.05	15.61	25.81	20.16
t-statistic	*12.98*	*21.93*	*27.09*	*27.45*	*31.62*	*40.46*
VW excess return	0.29	0.35	0.27	0.28	0.16	-0.14
t-statistic	*0.84*	*1.16*	*0.96*	*0.91*	*0.53*	*-0.68*
1984:07-2005:12						
VW expected profitability	-0.06	6.05	8.84	11.60	19.96	20.02
t-statistic	*-0.08*	*25.77*	*32.06*	*37.36*	*44.55*	*29.00*
VW excess return	0.56	0.84	0.67	0.57	0.84	0.28
t-statistic	*1.39*	*2.83*	*2.46*	*1.98*	*2.90*	*1.22*
Panel B: Equal-weighted average expected profitability and returns						
	Low	2	3	4	High	High-Low
1963:07-2005:12						
EW expected profitability	-0.41	7.58	10.35	13.46	22.33	22.74
t-statistic	*-0.52*	*21.56*	*28.14*	*30.47*	*37.17*	*45.99*
EW excess return	0.94	0.94	0.86	0.83	0.73	-0.20
t-statistic	*3.04*	*3.91*	*3.78*	*3.55*	*2.89*	*-1.33*
1963:07-1984:06						
EW expected profitability	4.15	9.34	12.11	15.58	25.12	20.96
t-statistic	*8.92*	*21.75*	*26.03*	*27.55*	*32.94*	*50.20*
EW excess return	0.93	0.90	0.81	0.77	0.62	-0.30
t-statistic	*2.04*	*2.29*	*2.18*	*2.04*	*1.62*	*-1.55*
1984:07-2005:12						
EW expected profitability	-4.55	5.98	8.76	11.53	19.79	24.35
t-statistic	*-7.09*	*25.75*	*32.78*	*37.76*	*41.79*	*34.17*
EW excess return	0.95	0.98	0.92	0.89	0.84	-0.11
t-statistic	*2.26*	*3.43*	*3.36*	*3.15*	*2.52*	*-0.47*

Table 5: Expected profitability and profitability shocks of size deciles

This table reports the value-weighted (Panel A) and equal-weighted (Panel B) average expected profitability and profitability shock (in percent) and their corresponding *t*-statistics for the size decile portfolios. Expected profitability is the one-period ahead forecast of profitability. Profitability shock is the difference between realized profitability and expected profitability. The final column reports the *t*-statistics for the null that the expected profitability and profitability shock of Decile 1 are equal to those of Decile 10. Panel C shows the average cross-sectional standard deviation of expected profitability and profitability shocks within each size decile. The table reports results for the full 1963-2005 sample period as well as for the 1963-1983 and 1984-2005 subperiods.

Panel A: Value-weighted average expected profitability and profitability shocks

	Small	2	3	4	5	6	7	8	9	Big	*t*(Small=Big)
1963-2005											
VW expected profitability	6.33	8.83	9.91	10.81	11.65	11.91	12.51	12.51	12.42	15.42	10.00
t-statistic	*8.32*	*11.96*	*15.76*	*19.12*	*20.76*	*22.89*	*26.70*	*29.87*	*29.47*	*31.05*	
VW profitability shock	-0.66	-0.04	0.45	0.64	0.94	0.98	0.89	0.88	0.66	0.99	4.33
t-statistic	*-2.75*	*-0.18*	*2.25*	*2.87*	*3.88*	*4.31*	*3.90*	*3.60*	*2.70*	*3.34*	
1963-1983											
VW expected profitability	10.60	12.78	13.16	13.55	14.30	14.25	14.80	14.52	14.43	18.01	9.03
t-statistic	*17.36*	*20.62*	*24.58*	*24.98*	*26.29*	*27.40*	*29.88*	*32.62*	*32.76*	*32.85*	
VW profitability shock	-0.07	0.13	0.28	0.17	0.36	0.39	0.20	0.04	-0.19	0.02	0.18
t-statistic	*-0.19*	*0.29*	*0.81*	*0.47*	*0.98*	*1.16*	*0.62*	*0.11*	*-0.67*	*0.06*	
1984-2005											
VW expected profitability	2.45	5.23	6.95	8.32	9.23	9.78	10.43	10.68	10.59	13.07	15.51
t-statistic	*4.15*	*8.05*	*11.51*	*14.49*	*15.69*	*16.92*	*24.32*	*27.05*	*25.89*	*37.81*	
VW profitability shock	-1.23	-0.21	0.61	1.09	1.49	1.54	1.54	1.68	1.46	1.92	6.61
t-statistic	*-4.41*	*-0.89*	*2.84*	*4.86*	*5.46*	*5.92*	*6.07*	*5.96*	*4.82*	*4.96*	

Table 5, continued

Panel B: Equal-weighted average expected profitability and profitability shocks

	Small	2	3	4	5	6	7	8	9	Big	*t*(Small=Big)
1963-2005											
EW expected profitability	5.17	8.77	9.87	10.76	11.64	11.89	12.51	12.52	12.41	14.10	10.01
t-statistic	*6.89*	*11.85*	*15.65*	*18.93*	*20.85*	*22.95*	*26.41*	*30.02*	*29.15*	*29.14*	
EW profitability shock	-0.90	-0.07	0.45	0.64	0.94	0.96	0.89	0.88	0.63	0.79	5.11
t-statistic	*-3.89*	*-0.30*	*2.25*	*2.89*	*3.92*	*4.24*	*3.96*	*3.65*	*2.62*	*3.34*	
1963-1983											
EW expected profitability	9.51	12.75	13.14	13.53	14.28	14.23	14.83	14.51	14.46	16.48	8.79
t-statistic	*16.17*	*20.56*	*24.74*	*25.11*	*26.09*	*27.70*	*29.89*	*32.85*	*32.08*	*30.99*	
EW profitability shock	-0.31	0.13	0.29	0.18	0.38	0.37	0.21	0.04	-0.18	-0.03	0.61
t-statistic	*-0.89*	*0.30*	*0.84*	*0.48*	*1.03*	*1.11*	*0.66*	*0.14*	*-0.64*	*-0.12*	
1984-2005											
EW expected profitability	1.22	5.14	6.89	8.25	9.24	9.76	10.41	10.70	10.54	11.94	16.32
t-statistic	*2.41*	*8.03*	*11.43*	*14.28*	*15.88*	*16.95*	*23.81*	*26.89*	*26.25*	*28.66*	
EW profitability shock	-1.46	-0.27	0.59	1.08	1.47	1.53	1.54	1.69	1.40	1.58	8.05
t-statistic	*-5.77*	*-1.11*	*2.87*	*4.89*	*5.56*	*5.82*	*6.19*	*6.10*	*4.64*	*5.64*	

Panel C: Standard deviation of expected profitability and profitability shocks within size deciles

	Small	2	3	4	5	6	7	8	9	Big	*t*(Small=Big)
1963-2005											
st.dev. expected profitability	10.12	10.67	10.29	9.57	9.53	8.82	8.53	7.97	7.72	7.80	3.36
st.dev. profitability shock	10.19	9.54	8.73	7.64	7.47	6.70	5.90	5.61	5.06	4.91	6.93
1963-1983											
st.dev. expected profitability	7.20	7.77	7.91	7.82	8.33	7.75	8.10	8.19	7.36	8.09	2.18
st.dev. profitability shock	7.37	6.97	6.35	6.06	5.56	5.43	4.94	4.47	3.89	3.78	10.74
1984-2005											
st.dev. expected profitability	12.78	13.31	12.45	11.16	10.62	9.78	8.91	7.78	8.05	7.54	5.45
st.dev. profitability shock	12.88	11.98	11.00	9.15	9.29	7.92	6.81	6.70	6.18	5.99	6.03

Table 6: Average unadjusted and adjusted returns of size deciles

This table shows value-weighted (Panel A) and equal-weighted (Panel B) average unadjusted and adjusted returns (in percent per month) and their corresponding t-statistics for the size decile portfolios as well as the return differences between Deciles 1 and 10. Unadjusted returns are realized returns in excess of the risk-free rate. Adjusted returns 1 are computed by subtracting from the realized excess returns of a firm the product of its profitability shock and the return difference between the highest and lowest profitability shock-sorted portfolios scaled by the difference in profitability shocks between the two portfolios. Adjusted returns 2 are computed by running, for each firm, rolling 60-month regressions of excess returns on market excess returns and returns on the long-short quintile spread portfolio based on profitability shocks, and then subtracting the estimated loadings on the profitability shock spread portfolio multiplied by the returns on the spread portfolio from the realized excess returns. The table reports results for the full 1963:07-2005:12 sample period and for the 1963:07-1984:06 and 1984:07-2005:12 subperiods.

Panel A: Value-weighted average unadjusted and adjusted returns

	Small	2	3	4	5	6	7	8	9	Big	Small-Big
1963:07-2005:12											
VW unadjusted return	1.06	0.78	0.75	0.76	0.81	0.65	0.71	0.67	0.57	0.40	0.65
t-statistic	*3.60*	*2.76*	*2.77*	*2.85*	*3.15*	*2.69*	*2.98*	*2.90*	*2.74*	*2.08*	*2.87*
VW adjusted return 1	1.19	0.85	0.75	0.73	0.76	0.59	0.65	0.61	0.53	0.34	0.85
t-statistic	*4.00*	*2.93*	*2.72*	*2.71*	*2.92*	*2.40*	*2.64*	*2.61*	*2.47*	*1.72*	*3.68*
VW adjusted return 2	1.11	0.90	0.83	0.78	0.87	0.69	0.73	0.72	0.56	0.25	0.86
t-statistic	*3.46*	*2.92*	*2.82*	*2.72*	*3.14*	*2.65*	*2.86*	*2.93*	*2.52*	*1.17*	*3.39*
1963:07-1984:06											
VW unadjusted return	1.15	0.85	0.73	0.76	0.77	0.54	0.50	0.47	0.27	0.09	1.05
t-statistic	*2.47*	*1.97*	*1.74*	*1.87*	*2.02*	*1.48*	*1.39*	*1.40*	*0.90*	*0.35*	*3.07*
VW adjusted return 1	1.12	0.85	0.72	0.75	0.77	0.54	0.50	0.50	0.33	0.14	0.98
t-statistic	*2.41*	*1.98*	*1.74*	*1.86*	*2.01*	*1.46*	*1.39*	*1.48*	*1.11*	*0.52*	*2.86*
VW adjusted return 2	0.87	0.73	0.53	0.52	0.60	0.33	0.31	0.33	0.12	0.00	0.87
t-statistic	*1.62*	*1.47*	*1.13*	*1.14*	*1.37*	*0.79*	*0.77*	*0.88*	*0.35*	*0.00*	*2.16*
1984:07-2005:12											
VW unadjusted return	0.97	0.72	0.78	0.75	0.84	0.75	0.91	0.85	0.86	0.70	0.27
t-statistic	*2.66*	*1.92*	*2.21*	*2.18*	*2.46*	*2.37*	*2.90*	*2.73*	*2.98*	*2.50*	*0.91*
VW adjusted return 1	1.26	0.84	0.78	0.71	0.74	0.65	0.79	0.73	0.73	0.54	0.72
t-statistic	*3.38*	*2.18*	*2.15*	*1.98*	*2.12*	*1.96*	*2.39*	*2.22*	*2.39*	*1.85*	*2.32*
VW adjusted return 2	1.32	1.05	1.08	1.00	1.11	1.01	1.10	1.05	0.96	0.46	0.85
t-statistic	*3.50*	*2.74*	*3.00*	*2.83*	*3.16*	*3.10*	*3.42*	*3.32*	*3.24*	*1.56*	*2.66*

Table 6, continued

Panel B: Equal-weighted average unadjusted and adjusted returns											
	Small	2	3	4	5	6	7	8	9	Big	Small-Big
1963:07-2005:12											
EW unadjusted return	1.26	0.81	0.76	0.76	0.80	0.65	0.71	0.66	0.59	0.44	0.82
t-statistic	*4.21*	*2.83*	*2.79*	*2.86*	*3.14*	*2.69*	*2.97*	*2.88*	*2.78*	*2.19*	*3.50*
EW adjusted return 1	1.44	0.87	0.76	0.74	0.76	0.59	0.65	0.61	0.55	0.39	1.05
t-statistic	*4.74*	*3.00*	*2.74*	*2.73*	*2.92*	*2.40*	*2.64*	*2.61*	*2.54*	*1.89*	*4.41*
EW adjusted return 2	1.34	0.93	0.83	0.79	0.86	0.69	0.73	0.71	0.59	0.34	1.01
t-statistic	*4.10*	*3.01*	*2.83*	*2.75*	*3.12*	*2.66*	*2.86*	*2.90*	*2.60*	*1.56*	*3.86*
1963:07-1984:06											
EW unadjusted return	1.30	0.87	0.74	0.76	0.78	0.55	0.50	0.47	0.29	0.15	1.15
t-statistic	*2.73*	*2.00*	*1.77*	*1.87*	*2.02*	*1.50*	*1.38*	*1.37*	*0.94*	*0.51*	*3.31*
EW adjusted return 1	1.29	0.86	0.73	0.75	0.78	0.54	0.50	0.50	0.35	0.20	1.09
t-statistic	*2.72*	*2.00*	*1.76*	*1.87*	*2.03*	*1.47*	*1.39*	*1.47*	*1.14*	*0.69*	*3.14*
EW adjusted return 2	1.07	0.75	0.54	0.53	0.60	0.35	0.31	0.32	0.13	0.00	1.06
t-statistic	*1.94*	*1.51*	*1.15*	*1.15*	*1.37*	*0.83*	*0.77*	*0.85*	*0.37*	*0.01*	*2.58*
1984:07-2005:12											
EW unadjusted return	1.22	0.75	0.78	0.76	0.83	0.75	0.91	0.85	0.87	0.72	0.50
t-statistic	*3.30*	*2.00*	*2.21*	*2.20*	*2.43*	*2.35*	*2.89*	*2.73*	*2.99*	*2.55*	*1.60*
EW adjusted return 1	1.58	0.87	0.78	0.72	0.74	0.65	0.79	0.73	0.75	0.58	1.00
t-statistic	*4.20*	*2.27*	*2.15*	*2.00*	*2.11*	*1.95*	*2.39*	*2.24*	*2.45*	*1.96*	*3.09*
EW adjusted return 2	1.59	1.09	1.08	1.02	1.09	0.99	1.09	1.05	0.99	0.63	0.96
t-statistic	*4.15*	*2.84*	*2.99*	*2.87*	*3.13*	*3.07*	*3.40*	*3.32*	*3.34*	*2.16*	*2.89*

Table 7: Cross-sectional return regressions

This table reports the average slopes and their time series *t*-statistics from monthly Fama and MacBeth (1973) cross-sectional regressions of individual stocks' unadjusted and adjusted returns on firm size. Unadjusted returns are realized returns in excess of the risk-free rate. Adjusted returns 1 are computed by subtracting from the realized excess returns of a firm the product of its profitability shock and the return difference between the highest and lowest profitability shock-sorted portfolios scaled by the difference in profitability shocks between the two portfolios. Adjusted returns 2 are computed by running, for each firm, rolling 60-month regressions of excess returns on market excess returns and returns on the long-short quintile spread portfolio based on profitability shocks, and then subtracting the estimated loadings on the profitability shock spread portfolio multiplied by the returns on the spread portfolio from the realized excess returns. Ln(Size) is the natural logarithm of CRSP market equity. The purged estimates are the intercepts from time-series regressions of the monthly Fama-MacBeth coefficients on the returns of the long-short quintile spread portfolio based on profitability shocks. We run the regressions for each month from 1963:07 to 2005:12. The table reports results for the full 1963:07-2005:12 sample period and for the 1963:07-1984:06 and 1984:07-2005:12 subperiods.

Dependent variable:	Unadjusted return	Adjusted return 1	Adjusted return 2	Adjusted return 2 (purged)
1963:07-2005:12				
Intercept	2.89	3.53	3.16	3.02
t-statistic	*4.40*	*5.32*	*4.35*	*3.44*
Ln(size)	-0.17	-0.22	-0.19	-0.18
t-statistic	*-3.95*	*-4.98*	*-3.89*	*-3.00*
Adj. R^2	0.02	0.02	0.02	
1963:07-1984:06				
Intercept	3.25	3.19	2.96	3.14
t-statistic	*3.20*	*3.13*	*2.47*	*2.08*
Ln(size)	-0.22	-0.22	-0.21	-0.22
t-statistic	*-3.30*	*-3.21*	*-2.67*	*-2.17*
Adj. R^2	0.02	0.02	0.03	
1984:07-2005:12				
Intercept	-2.54	3.87	3.35	3.01
t-statistic	*3.03*	*4.54*	*3.81*	*2.93*
Ln(size)	-0.11	-0.23	-0.17	-0.15
t-statistic	*-1.83*	*-3.90*	*-2.86*	*-2.10*
Adj. R^2	0.01	0.01	0.01	

Table 8: Expected profitability and profitability shocks of size deciles, seasoned firms

This table reports the value-weighted (Panel A) and equal-weighted (Panel B) average expected profitability and profitability shock (in percent), and their corresponding *t*-statistics for size decile portfolios based on seasoned firms only. Size decile breakpoints are the same as in Table 5. We define seasoned firms as firms that have been listed for more than five years, based on their first appearance (PERMCO) on CRSP. Expected profitability is the one-period ahead forecast of profitability. Profitability shock is the difference between realized profitability and expected profitability. The final column reports the *t*-statistics for the null that the expected profitability and the profitability shock of Decile 1 are equal to those of Decile 10. The table reports results for the full 1963-2005 sample period as well as for the 1963-1983 and 1984-2005 subperiods.

Panel A: Value-weighted average expected profitability and profitability shocks

	Small	2	3	4	5	6	7	8	9	Big	*t*(Small=Big)
1963-2005											
VW expected profitability	6.39	8.76	9.68	10.51	11.30	11.61	12.33	12.32	12.37	15.47	11.35
t-statistic	*10.01*	*13.83*	*17.80*	*20.12*	*23.78*	*25.63*	*28.28*	*31.17*	*32.79*	*32.17*	
VW profitability shock	-0.39	0.12	0.46	0.62	0.74	0.79	0.77	0.80	0.58	1.03	3.82
t-statistic	*-1.84*	*0.50*	*2.25*	*2.86*	*3.34*	*3.24*	*3.85*	*3.53*	*2.49*	*3.37*	
1963-1983											
VW expected profitability	9.83	12.11	12.40	13.00	13.69	13.77	14.49	14.18	14.23	17.97	10.02
t-statistic	*16.01*	*19.41*	*22.35*	*23.02*	*27.45*	*25.14*	*29.38*	*31.79*	*33.22*	*33.85*	
VW profitability shock	-0.09	0.12	0.22	0.21	0.27	0.31	0.27	0.03	-0.18	0.04	0.28
t-statistic	*-0.27*	*0.28*	*0.62*	*0.60*	*0.78*	*0.90*	*0.85*	*0.10*	*-0.61*	*0.13*	
1984-2005											
VW expected profitability	3.26	5.72	7.21	8.25	9.12	9.66	10.35	10.62	10.68	13.19	17.01
t-statistic	*6.80*	*11.42*	*14.77*	*16.79*	*22.72*	*26.12*	*30.02*	*29.50*	*35.09*	*39.54*	
VW profitability shock	-0.67	0.12	0.70	1.00	1.19	1.24	1.25	1.52	1.30	1.97	5.64
t-statistic	*-2.91*	*0.50*	*3.23*	*4.32*	*4.63*	*3.90*	*6.07*	*6.46*	*4.49*	*4.84*	

Table 8, continued

Panel B: Equal-weighted average expected profitability and profitability shocks											
	Small	2	3	4	5	6	7	8	9	Big	*t*(Small=Big)
1963-2005											
EW expected profitability	5.33	8.71	9.64	10.47	11.29	11.60	12.31	12.31	12.35	14.19	11.44
t-statistic	*8.45*	*13.71*	*17.69*	*19.93*	*23.88*	*25.76*	*27.96*	*31.20*	*32.05*	*31.71*	
EW profitability shock	-0.62	0.11	0.48	0.62	0.74	0.78	0.77	0.80	0.56	0.88	4.53
t-statistic	*-2.97*	*0.46*	*2.32*	*2.89*	*3.34*	*3.20*	*3.94*	*3.55*	*2.43*	*3.42*	
1963-1983											
EW expected profitability	8.89	12.07	12.37	12.97	13.68	13.74	14.51	14.17	14.25	16.45	9.94
t-statistic	*15.45*	*19.39*	*22.32*	*23.10*	*27.33*	*25.30*	*29.47*	*31.93*	*32.46*	*33.09*	
EW profitability shock	-0.29	0.14	0.23	0.21	0.28	0.30	0.29	0.04	-0.17	0.01	0.66
t-statistic	*-0.82*	*0.33*	*0.65*	*0.60*	*0.82*	*0.86*	*0.92*	*0.13*	*-0.61*	*0.05*	
1984-2005											
EW expected profitability	2.10	5.65	7.17	8.18	9.12	9.65	10.31	10.62	10.61	12.13	18.67
t-statistic	*5.10*	*11.33*	*14.61*	*16.45*	*22.99*	*26.27*	*29.36*	*29.29*	*34.67*	*35.21*	
EW profitability shock	-0.93	0.08	0.71	1.01	1.18	1.24	1.24	1.53	1.25	1.71	6.66
t-statistic	*-4.25*	*0.32*	*3.41*	*4.37*	*4.63*	*3.89*	*6.25*	*6.36*	*4.37*	*5.17*	

Table 9: Profitability shocks for different industries, 1984-2005

This table presents the five 2-digit SIC (Panel A) and Fama-French (Panel B) industries that contribute the most to the profitability shocks of the smallest and the largest size decile portfolios over the period 1984-2005. The table reports the contribution of each industry to the value-weighted average profitability shocks (in percent) of size decile portfolios 1 and 10, the cumulative contribution of the top five industries (on a 0-1 scale), and the contribution of all other industries.

Panel A: 2-Digit SIC industry classification

Small firms			**Big firms**		
Industry	*Contribution to profitability shock of decile 1*	*Cumulative contribution*	*Industry*	*Contribution to profitability shock of decile 10*	*Cumulative contribution*
28: Chemicals and allied products	-0.46	0.37	28: Chemicals and allied products	0.51	0.26
38: Advanced medical equipment	-0.19	0.53	73: Business services (computer software)	0.36	0.45
35: Computer hardware	-0.13	0.64	35: Computer hardware	0.21	0.56
73: Business services (computer software)	-0.13	0.75	20: Food products	0.19	0.66
36: Electronic equipment	-0.12	0.84	36: Electronic equipment	0.18	0.75
other industries	-0.19	1.00	other industries	0.48	1.00
Total	-1.23		Total	1.92	

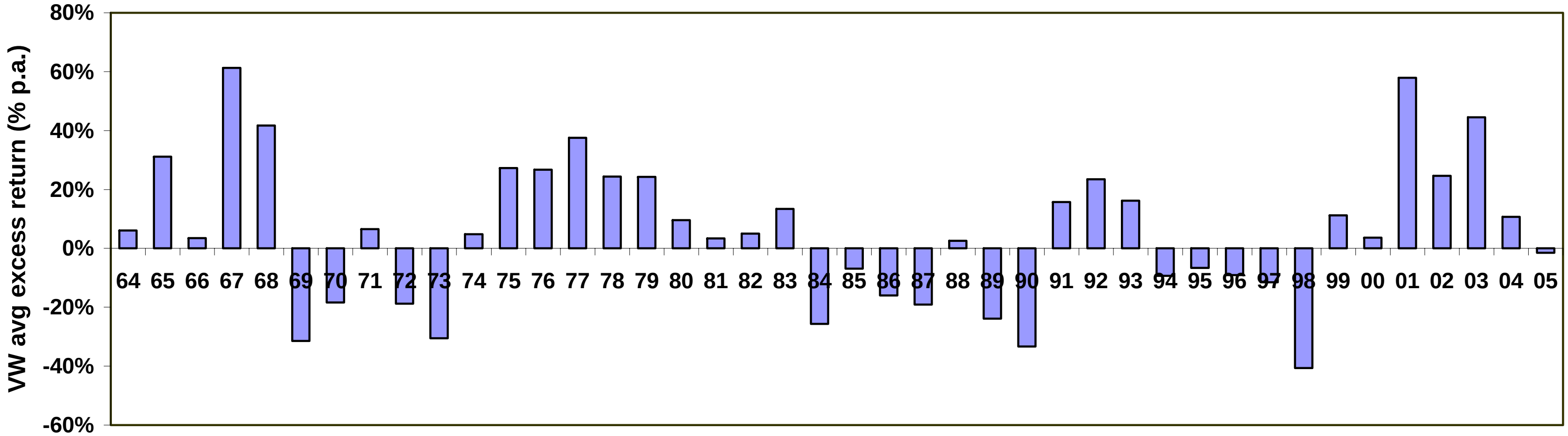
Panel B: Fama-French industry classification

Small firms			**Big firms**		
Industry	*Contribution to profitability shock of decile 1*	*Cumulative contribution*	*Industry*	*Contribution to profitability shock of decile 10*	*Cumulative contribution*
13: Pharmaceutical products	-0.43	0.35	13: Pharmaceutical products	0.42	0.22
34: Business services	-0.20	0.52	34: Business services	0.36	0.40
12: Medical Equipment	-0.15	0.64	42: Retail	0.21	0.51
35: Computers	-0.10	0.72	35: Computers	0.19	0.61
44: Banks	-0.07	0.78	36: Electronic equipment	0.19	0.71
other industries	-0.27	1.00	other industries	0.55	1.00
Total	-1.23		Total	1.92	

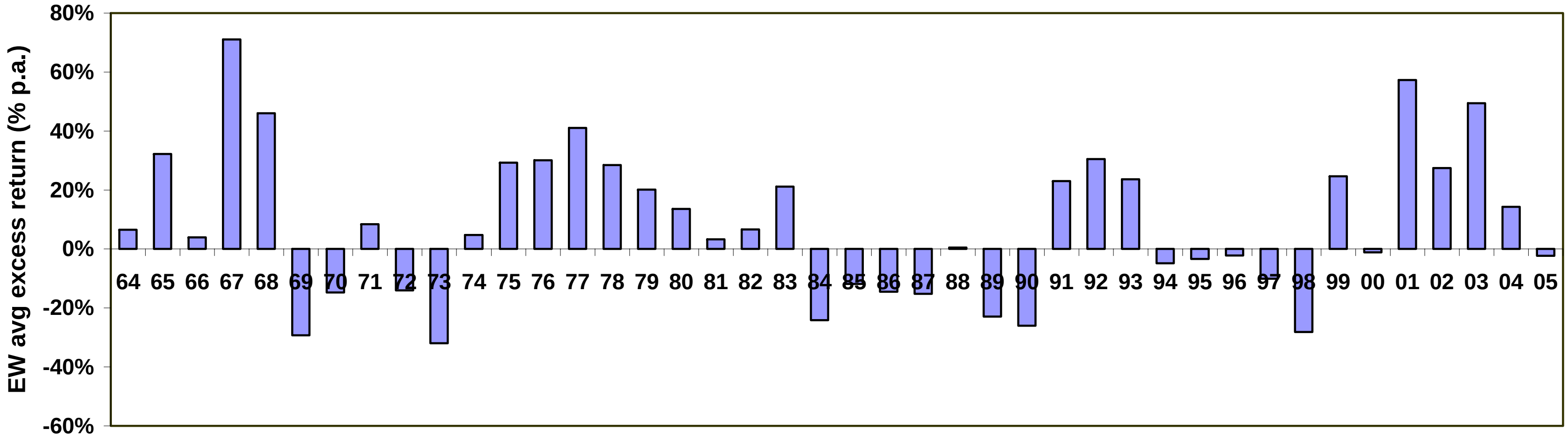
Figure 1: Time series plot of the size premium

This graph depicts the value-weighted (Panel A) and equal-weighted (Panel B) average return differences (on a per annum basis) between the smallest and the largest size decile portfolios from 1964 to 2005.

Panel A: Value-weighted size premium



Panel B: Equal-weighted size premium



APPENDIX

Table A1: Average unadjusted and adjusted returns of size deciles – January versus other months

This table shows value-weighted (Panel A) and equal-weighted (Panel B) average unadjusted and adjusted returns in January and in February-December (in percent per month), and their corresponding *t*-statistics for the size decile portfolios as well as the return differences between Deciles 1 and 10. Unadjusted returns are realized returns in excess of the risk-free rate. Adjusted returns 1 are computed by subtracting from the realized excess returns of a firm the product of its profitability shock and the return difference between the highest and lowest profitability shock-sorted portfolios scaled by the difference in profitability shocks between the two portfolios. Adjusted returns 2 are computed by running, for each firm, rolling 60-month regressions of excess returns on market excess returns and returns on the long-short quintile spread portfolio based on profitability shocks, and then subtracting the estimated loadings on the profitability shock spread portfolio multiplied by the returns on the spread portfolio from the realized excess returns. The table reports results for the full 1963:07-2005:12 sample period and for the 1963:07-1984:06 and 1984:07-2005:12 subperiods.

Panel A: Value-weighted average unadjusted and adjusted returns											
	Small	2	3	4	5	6	7	8	9	Big	Small-Big
1963:07-2005:12											
VW unadjusted return – Jan	7.95	5.40	4.28	3.30	2.75	2.39	2.11	1.73	1.62	1.17	6.78
t-statistic	*6.00*	*4.10*	*3.50*	*2.88*	*2.42*	*2.24*	*2.03*	*1.80*	*1.89*	*1.47*	*6.73*
VW unadjusted return – Feb to Dec	0.43	0.36	0.43	0.52	0.63	0.49	0.58	0.57	0.48	0.33	0.10
t-statistic	*1.53*	*1.31*	*1.60*	*1.96*	*2.44*	*2.01*	*2.41*	*2.42*	*2.23*	*1.68*	*0.45*
VW adjusted return 1 – Jan	8.18	5.65	4.55	3.42	2.92	2.39	2.22	1.82	1.65	1.20	6.99
t-statistic	*6.34*	*4.39*	*3.72*	*3.02*	*2.60*	*2.25*	*2.14*	*1.91*	*1.92*	*1.53*	*6.99*
VW adjusted return 1 – Feb to Dec	0.55	0.41	0.41	0.49	0.56	0.43	0.50	0.50	0.43	0.26	0.29
t-statistic	*1.94*	*1.44*	*1.48*	*1.78*	*2.14*	*1.71*	*2.03*	*2.09*	*1.95*	*1.29*	*1.34*
VW adjusted return 2 – Jan	8.42	5.82	4.69	3.37	2.94	2.48	2.20	1.68	1.50	1.11	7.30
t-statistic	*5.65*	*3.96*	*3.43*	*2.63*	*2.32*	*2.10*	*1.96*	*1.64*	*1.59*	*1.25*	*6.58*
VW adjusted return 2 – Feb to Dec	0.45	0.46	0.48	0.55	0.68	0.53	0.60	0.63	0.48	0.17	0.28
t-statistic	*1.49*	*1.53*	*1.66*	*1.90*	*2.46*	*2.02*	*2.31*	*2.52*	*2.10*	*0.79*	*1.18*

Table A1, continued

Panel A: Value-weighted average unadjusted and adjusted returns, continued											
	Small	2	3	4	5	6	7	8	9	Big	Small-Big
1963:07-1984:06											
VW unadjusted return – Jan	8.95	6.82	5.72	4.59	3.90	3.02	2.41	1.97	1.42	0.48	8.47
t-statistic	*4.12*	*3.16*	*2.77*	*2.39*	*2.06*	*1.72*	*1.34*	*1.19*	*1.01*	*0.40*	*6.01*
VW unadjusted return – Feb to Dec	0.42	0.30	0.26	0.40	0.48	0.31	0.33	0.33	0.17	0.06	0.36
t-statistic	*0.96*	*0.72*	*0.65*	*1.00*	*1.28*	*0.85*	*0.91*	*0.99*	*0.55*	*0.21*	*1.15*
VW adjusted return 1 – Jan	8.87	6.82	5.89	4.61	4.07	2.88	2.47	2.02	1.44	0.60	8.27
t-statistic	*4.14*	*3.25*	*2.89*	*2.48*	*2.19*	*1.69*	*1.41*	*1.25*	*1.04*	*0.52*	*5.85*
VW adjusted return 1 – Feb to Dec	0.39	0.30	0.24	0.39	0.46	0.32	0.32	0.36	0.23	0.09	0.30
t-statistic	*0.90*	*0.72*	*0.60*	*0.98*	*1.23*	*0.87*	*0.89*	*1.06*	*0.76*	*0.35*	*0.95*
VW adjusted return 2 – Jan	9.33	7.16	6.09	4.40	4.05	2.82	2.23	1.63	1.02	0.16	9.17
t-statistic	*3.40*	*2.67*	*2.41*	*1.85*	*1.73*	*1.31*	*1.07*	*0.85*	*0.61*	*0.12*	*5.09*
VW adjusted return 2 – Feb to Dec	0.10	0.15	0.02	0.17	0.28	0.10	0.13	0.21	0.04	-0.01	0.11
t-statistic	*0.19*	*0.31*	*0.05*	*0.38*	*0.67*	*0.25*	*0.34*	*0.57*	*0.10*	*-0.05*	*0.31*
1984:07-2005:12											
VW unadjusted return – Jan	6.95	3.99	2.85	2.01	1.59	1.75	1.82	1.49	1.82	1.86	5.09
t-statistic	*4.52*	*2.64*	*2.20*	*1.63*	*1.27*	*1.42*	*1.66*	*1.47*	*1.81*	*1.77*	*3.70*
VW unadjusted return – Feb to Dec	0.44	0.43	0.59	0.64	0.77	0.67	0.83	0.80	0.77	0.59	-0.16
t-statistic	*1.24*	*1.13*	*1.63*	*1.78*	*2.18*	*2.03*	*2.53*	*2.42*	*2.57*	*2.06*	*-0.55*
VW adjusted return 1 – Jan	7.45	4.42	3.14	2.18	1.70	1.86	1.95	1.62	1.87	1.82	5.64
t-statistic	*5.21*	*3.02*	*2.44*	*1.73*	*1.40*	*1.47*	*1.74*	*1.57*	*1.81*	*1.73*	*4.08*
VW adjusted return 1 – Feb to Dec	0.71	0.52	0.57	0.58	0.66	0.54	0.69	0.65	0.62	0.43	0.28
t-statistic	*1.95*	*1.33*	*1.52*	*1.55*	*1.80*	*1.58*	*1.99*	*1.88*	*1.96*	*1.41*	*0.95*
VW adjusted return 2 – Jan	7.60	4.62	3.43	2.45	1.95	2.17	2.17	1.73	1.94	1.97	5.62
t-statistic	*5.28*	*3.21*	*2.71*	*2.05*	*1.64*	*1.84*	*2.01*	*1.77*	*1.92*	*1.76*	*4.41*
VW adjusted return 2 – Feb to Dec	0.76	0.74	0.88	0.88	1.03	0.90	1.00	0.99	0.87	0.33	0.43
t-statistic	*2.07*	*1.88*	*2.34*	*2.36*	*2.82*	*2.68*	*2.99*	*2.97*	*2.82*	*1.08*	*1.36*

Table A1, continued

Panel B: Equal-weighted average unadjusted and adjusted returns											
	Small	2	3	4	5	6	7	8	9	Big	Small-Big
1963:07-2005:12											
EW unadjusted return – Jan	9.14	5.48	4.31	3.31	2.76	2.40	2.13	1.74	1.63	0.99	8.15
t-statistic	*6.75*	*4.16*	*3.51*	*2.89*	*2.42*	*2.25*	*2.05*	*1.81*	*1.89*	*1.20*	*7.87*
EW unadjusted return – Feb to Dec	0.54	0.38	0.43	0.53	0.62	0.49	0.58	0.57	0.49	0.39	0.15
t-statistic	*1.94*	*1.37*	*1.61*	*1.97*	*2.42*	*2.01*	*2.39*	*2.41*	*2.27*	*1.89*	*0.72*
EW adjusted return 1 – Jan	9.31	5.72	4.57	3.43	2.93	2.39	2.23	1.84	1.67	1.05	8.26
t-statistic	*7.01*	*4.46*	*3.73*	*3.02*	*2.60*	*2.25*	*2.15*	*1.92*	*1.93*	*1.31*	*7.99*
EW adjusted return 1 – Feb to Dec	0.72	0.43	0.41	0.49	0.56	0.43	0.50	0.50	0.45	0.33	0.39
t-statistic	*2.53*	*1.50*	*1.49*	*1.80*	*2.14*	*1.72*	*2.01*	*2.09*	*2.01*	*1.55*	*1.81*
EW adjusted return 2 – Jan	9.75	5.96	4.74	3.42	2.97	2.49	2.22	1.69	1.55	0.96	8.79
t-statistic	*6.36*	*4.05*	*3.45*	*2.66*	*2.34*	*2.12*	*1.99*	*1.63*	*1.62*	*1.07*	*7.59*
EW adjusted return 2 – Feb to Dec	0.59	0.48	0.48	0.55	0.67	0.53	0.59	0.62	0.50	0.28	0.31
t-statistic	*1.93*	*1.60*	*1.66*	*1.92*	*2.43*	*2.02*	*2.30*	*2.49*	*2.17*	*1.27*	*1.30*

Table A1, continued

Panel B: Equal-weighted average unadjusted and adjusted returns, continued											
	Small	2	3	4	5	6	7	8	9	Big	Small-Big
1963:07-1984:06											
EW unadjusted return – Jan	10.00	6.84	5.72	4.63	3.91	3.07	2.42	2.00	1.47	0.30	9.70
t-statistic	*4.43*	*3.18*	*2.77*	*2.42*	*2.05*	*1.75*	*1.35*	*1.20*	*1.03*	*0.23*	*6.73*
EW unadjusted return – Feb to Dec	0.49	0.31	0.27	0.40	0.49	0.32	0.32	0.32	0.18	0.13	0.35
t-statistic	*1.11*	*0.76*	*0.68*	*1.00*	*1.29*	*0.87*	*0.89*	*0.96*	*0.58*	*0.46*	*1.15*
EW adjusted return 1 – Jan	9.89	6.83	5.89	4.65	4.07	2.93	2.48	2.05	1.48	0.43	9.46
t-statistic	*4.44*	*3.26*	*2.88*	*2.51*	*2.19*	*1.71*	*1.42*	*1.27*	*1.06*	*0.34*	*6.51*
EW adjusted return 1 – Feb to Dec	0.49	0.31	0.25	0.39	0.47	0.32	0.32	0.35	0.24	0.18	0.31
t-statistic	*1.11*	*0.74*	*0.63*	*0.98*	*1.24*	*0.87*	*0.88*	*1.04*	*0.78*	*0.61*	*1.01*
EW adjusted return 2 – Jan	10.62	7.25	6.10	4.46	4.06	2.88	2.26	1.67	1.09	-0.13	10.75
t-statistic	*3.73*	*2.71*	*2.40*	*1.88*	*1.73*	*1.34*	*1.10*	*0.86*	*0.64*	*-0.09*	*5.92*
EW adjusted return 2 – Feb to Dec	0.20	0.16	0.04	0.17	0.28	0.12	0.13	0.20	0.04	0.02	0.18
t-statistic	*0.39*	*0.34*	*0.08*	*0.38*	*0.67*	*0.28*	*0.33*	*0.53*	*0.11*	*0.05*	*0.50*
1984:07-2005:12											
EW unadjusted return – Jan	8.28	4.12	2.90	1.99	1.61	1.72	1.85	1.49	1.79	1.67	6.60
t-statistic	*5.40*	*2.72*	*2.23*	*1.61*	*1.28*	*1.39*	*1.68*	*1.46*	*1.77*	*1.65*	*4.58*
EW unadjusted return – Feb to Dec	0.60	0.45	0.59	0.65	0.76	0.66	0.83	0.80	0.79	0.64	-0.04
t-statistic	*1.69*	*1.19*	*1.62*	*1.81*	*2.14*	*2.01*	*2.52*	*2.43*	*2.60*	*2.16*	*-0.14*
EW adjusted return 1 – Jan	8.71	4.56	3.19	2.14	1.73	1.82	1.97	1.61	1.87	1.71	7.00
t-statistic	*6.02*	*3.13*	*2.46*	*1.70*	*1.42*	*1.45*	*1.76*	*1.56*	*1.79*	*1.69*	*4.81*
EW adjusted return 1 – Feb to Dec	0.95	0.55	0.57	0.59	0.65	0.54	0.69	0.65	0.65	0.48	0.47
t-statistic	*2.63*	*1.40*	*1.51*	*1.59*	*1.78*	*1.58*	*1.98*	*1.90*	*2.03*	*1.55*	*1.54*
EW adjusted return 2 – Jan	8.96	4.79	3.52	2.47	1.99	2.15	2.19	1.71	1.96	1.93	7.03
t-statistic	*6.19*	*3.33*	*2.76*	*2.06*	*1.67*	*1.82*	*2.02*	*1.74*	*1.94*	*1.91*	*5.02*
EW adjusted return 2 – Feb to Dec	0.93	0.76	0.87	0.89	1.02	0.89	1.00	0.99	0.90	0.52	0.42
t-statistic	*2.55*	*1.95*	*2.31*	*2.39*	*2.77*	*2.65*	*2.97*	*2.97*	*2.92*	*1.70*	*1.33*