Profitability shocks and the size effect in the cross-section of expected stock returns

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Abstract

Recent studies report that the size effect in the cross-section of U.S. stock returns has disappeared after the early 1980s. We examine whether the disappearance of the size effect in realized returns can be attributed to unexpected shocks to the profitability of small and big firms. We show that small firms experience large negative profitability shocks after the early 1980s, while big firms experience large positive shocks. As a result, realized returns of small and big firms over this period differ substantially from expected returns. After adjusting for the price impact of profitability shocks, we find that there still is a robust size effect in expected returns. Our results suggest that in-sample cash flow shocks can significantly affect inferences about predictability in the cross-section of stock returns.

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The size effect in the cross-section of stock returns is one of the most extensively studied topics in asset pricing. Since Banz (1981) reported higher stock returns for small firms than for big firms, the size effect has been examined and applied in numerous papers in finance and accounting.[1] In addition, multi-factor models that include a mimicking factor for the size effect (e.g., the Fama and French three-factor model) have become increasingly popular among investment practitioners for portfolio optimization, active-risk budgeting, performance evaluation, and style/attribution analysis.

However, recent empirical evidence suggests that the size effect has disappeared since the early 1980s. Specifically, Dichev (1998), Chan, Karceski, and Lakonishok (2000), Horowitz, Loughran, and Savin (2000), and Amihud (2002) report that small firms did not earn higher average realized returns than big firms during the 1980s and 1990s. Schwert (2003) also asserts that "it seems that the small-firm anomaly has disappeared since the initial publication of the papers that discovered it." In this paper, we argue that although the size effect in realized returns has disappeared, there remains a robust size effect in ex ante expected returns.

It is well understood that realized stock returns are a noisy measure of expected returns (Blume and Friend, 1973; Sharpe, 1978; Froot and Frankel, 1989; Elton, 1999). Elton (1999) provides examples that show that realized returns can deviate significantly from expected returns over prolonged periods of time. He argues that the belief that "information surprises tend to cancel out over the period of a study" is misplaced and questions the common practice of using realized returns as a proxy for expected returns in asset pricing tests.

The return decomposition described in Campbell (1991) provides an intuitive framework for understanding the relation between realized and expected returns. According to Campbell (1991), realized stock returns must, mechanically, equal the sum of expected returns, news about

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

future cash flows (cash flow shocks), and news about future expected returns (discount rate shocks). Using this return decomposition framework, a number of recent studies (e.g., Vuolteenaho, 2002; Chen and Zhao, 2009) show 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 in realized returns 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 1980s. 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) 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 (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 on average much bigger than firms that experience bad news during the 1980s and 1990s.

An alternative explanation for the evidence on the size effect to date is that size is not related to expected returns, neither before the early 1980s nor after, and the significant size effect in realized returns in the 1960s and 1970s is driven by differences in cash flow shocks between small firms and big firms rather than differences in expected returns. Yet another possibility is that there is no systematic difference in cash flow shocks between small firms and big firms throughout the sample period, and the disappearance of the size effect after the early 1980s thus represents a genuine shift in the relation between size and expected returns. Which of these hypotheses is most consistent with the data is ultimately an empirical question, which we investigate in this paper.

We study the size effect over the period 1963-2005 as well as two subperiods of equal length (1963-1983 and 1984-2005). For 1963-1983, the value-weighted average realized return (in excess of the risk-free rate) is 0.93% per month for the smallest size decile portfolio and 0.11% per month for the largest size decile portfolio, which implies a size premium of close to 10% per annum. In contrast, for 1984-2005, the average excess return is 0.77% for the smallest size portfolio and 0.71% for the largest size portfolio, which implies a size premium of less than 1% per annum – a number that is insignificant both statistically and economically.

To investigate whether cash flow shocks can explain the disappearance of the size effect in realized returns, 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). The profitability model captures a substantial part (around 60%) of the variation in annual profitability across firms using variables that are strictly ex ante. 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, whereas big firms experience positive shocks. These results suggest that the realized returns of small (big) firms for the post-1984 period are lower (higher) than expected. As a result, the observed size premium in realized returns understates the "true" size premium in expected returns.

We find a strong positive relation between profitability shocks and contemporaneous stock returns, consistent with the findings of Vuolteenaho (2002) and Chen and Zhao (2009) 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 value-weighted 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. This result indicates that our measure of profitability shocks is economically meaningful; firms that are more (less) profitable than expected earn significantly higher (lower) stock returns. It also suggests that profitability shocks have the potential to drive a large wedge between realized and expected returns.

To assess the effect of profitability shocks on the observed size premium, 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). After the adjustments, we uncover a statistically and economically significant size premium of 0.72% to 0.85% per month for 1984-2005. 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 confirm the negative relation between size and expected returns 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. Our results are also robust to controlling for discount rate shock proxies and the January effect.

These 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 much of the negative profitability shocks to small firms after 1984. In addition, a significant part of the profitability shocks to small and big firms is concentrated in industries that experienced structural shifts in their competitive environment in the 1980s and 1990s.

In sum, 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.

Our paper is part of a recent literature that develops alternative proxies of expected returns. Brav, Lehavy, and Michaely (2005) construct measures of expected returns for individual stocks from analysts' target prices. Pástor, Sinha, and Swaminathan (2008) estimate the intertemporal risk-return relation using the implied cost of capital based on market prices and analysts' earnings forecasts as a proxy for expected market returns. Campello, Chen, and Zhang (2008) construct firm-specific measures of expected returns using corporate bond yields. To the best of our knowledge, our study is the first to explicitly adjust realized returns for the impact of cash flow shocks in order to arrive at a more accurate measure of expected returns.

A key advantage of our methodology is that our expected return measure can be constructed for a very large sample of firms. Small firms generally have little analyst following and no corporate bonds, which can impede tests of the size effect (and other asset pricing anomalies that are concentrated among small firms) if one is to use expected returns constructed from analysts' forecasts or corporate bond yields. In addition, our approach does not rely on any of the assumptions that are needed to calculate expected returns from analysts' forecasts or bond yields, and is not affected by biases in analysts' forecasts. And, perhaps most importantly, instead of backing out expected returns from market prices (yields) directly, our approach allows us to attribute differences between realized and expected returns to information shocks to individual firms.

The results in this paper are not only relevant for academic researchers, but also for the asset management industry. 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 the cross-section of expected returns has not gone away.

The rest of the paper is organized as follows. Section 1 describes the data and reports 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 1980s. Section 6 concludes.

1. Data and sample 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. 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.

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 firms) and Decile 10 (big firms). 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 Introduction). 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 throughout the paper.[2] Our main findings do not change when we use 1980 as the cut-off point instead of 1984.

Over the entire 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

[2] 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.

previous studies, there is a strong size effect during the first half of our sample period. 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. In contrast, the average return spread is only 0.07% (*t*-stat = 0.21) per month for 1984:07-2005:12, which implies a size premium of less than 1% per annum. The results for equal-weighted returns (reported in Panel C of Table 1) show a similar pattern. Figure 1 plots the annualized size premium 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 return decomposition framework of Campbell and Shiller (1988) and Campbell (1991), a growing body of research studies the relative importance of cash flow shocks and discount rate shocks for explaining the variation in stock returns. Vuolteenaho (2002) uses a vector autoregressive (VAR) model to decompose stock returns into an expected return component, a cash flow shock component, and a discount rate shock component, and shows that individual stock returns are predominantly driven by cash flow shocks. Chen and Zhao (2009) reach similar conclusions using analyst forecasts instead of VAR decompositions. These findings are consistent with the notion that cash flow shocks are largely firm-specific, while discount rate shocks are tied to macroeconomic conditions and are therefore common across firms.

The importance of cash flow shocks as a driver of individual stock returns raises the possibility that, even if there is a significant size effect in the cross-section of expected returns, differences in cash flow shocks between small and big firms can obscure the size effect in certain periods. Alternatively, the strong size effect observed in the 1960s and 1970s could be due to differences in cash flow shocks instead of differences in expected returns.

To investigate these hypotheses, we use a cross-sectional model similar to those in Fama and French (2000, 2006) and Hou and Robinson (2006) to measure expected profitability and profitability shocks at the individual firm level. Previous tests of profitability (e.g., Brooks and Buckmaster, 1976; Freeman, Ohlson, and Penman, 1982) are typically based on individual time series models estimated on firms with long earnings histories. This data requirement introduces survivorship bias into the tests. In addition, estimates from those individual time series regressions are statistically not very reliable. The advantage of our cross-sectional approach is that it uses the large cross-section of individual firms and therefore generates statistical power while imposing minimal survivorship requirements.

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.

For each firm, we then compute the expected profitability for year t+1 ($\mathrm{E}_t[E_{t+1}/A_t]$) 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 for year t+1 is its unexpected profitability (or profitability shock), computed as the difference between realized and expected profitability for year t+1.

Firms with total assets or book equity close to zero can have extreme values for the scaled variables in Equation (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. We also obtain nearly identical results when we estimate Equation (1) excluding financial firms and utilities, using pooled data over the past five or ten years, or for each sector separately (we classify firms into five sectors based on their SIC codes using the definitions downloaded from Ken French's web site).

Table 2 reports the average coefficients from the annual profitability regressions as well as their time series t-statistics over 1963-2005 and for the two subperiods 1963-1983 and 1984-2005. Our results are similar to those reported in Fama and French (2000, 2006) and Hou and Robinson (2006). Over the entire sample period, profitability is positively related to the market-to-book and the dividend-to-book ratios, 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 indicates that non-dividend payers tend to be less profitable than dividend payers. The coefficient on lagged profitability is large and positive, which suggests that profitability is highly persistent. All coefficients are statistically significant at the 1% level. More importantly, our profitability model captures significant variation in profitability across firms using variables that are strictly ex ante. Table 2 reports an average adjusted R^2 of 60% for the whole sample period, which is quite remarkable considering the parsimonious specification of Equation (1).

We observe some differences in the regression results between the two subperiods. The coefficient on V_t/A_t is large in magnitude and statistically significant for the first subperiod, but not 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 during the second subperiod. The coefficients on the dividend-to-book ratio and lagged profitability as well as the adjusted R^2 are very similar for the two subperiods.

Table 2 also reports the average coefficients for two 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 statistically significant, 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 discussed above, we compute profitability shocks to individual firms as the difference between realized profitability and the one-year ahead profitability forecast based on the model. True shocks to a firm's profitability should be unpredictable. Consistent with this notion, we find that profitability shocks obtained from the model have an autocorrelation that is close to zero. We estimate a first-order auto-regression for each firm in our sample, and the cross-sectional average of the autoregressive coefficient is -0.02 (*t*-stat = -0.25). In addition, the R^2's of these regressions are puny. We also estimate pooled regressions with firm fixed effects and obtain similar results. Hence, the profitability shocks generated by the model are not predictable based on past shocks.

If our model does a good job capturing the market's expectations about profitability, we should expect a strong stock price reaction when realized profitability deviates from the model's forecast. To investigate this, we study the relation between profitability shocks obtained from the model and 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 cross-sectional model produces considerable variation in profitability shocks across firms. For the entire sample period, Quintile 1 has a value-weighted average profitability shock of -6.15% per annum, while Quintile 5 has a positive shock of 7.61% per annum. The relation between profitability shocks and contemporaneous returns is strongly positive. For the entire 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 Quintile 5 and Quintile 1 is 1.98% per month and highly significant with a *t*-statistic of 14.54.[3] The results for the two subperiods are very similar to those for the entire 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 entire sample period as well as for the two subperiods.

[3] We note that this return spread does not represent a profitable trading strategy since profitability shocks are not known at portfolio formation.

These results suggest that our profitability model provides a good approximation of market expectations as firms that turn out to be more (less) profitable than the model's forecast earn significantly higher (lower) stock returns. They are also consistent with the findings of Vuolteenaho (2002) and Chen and Zhao (2009) that individual stock returns are primarily driven by cash flow shocks. 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

Panel A of Table 4 reports the value-weighted average expected profitability and profitability shock of the size decile portfolios. The table shows that the 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). There is no discernable pattern in profitability shocks across the size deciles for the 1963-1983 subperiod; average profitability shocks are close to zero for all size deciles and the difference between Decile 1 and Decile 10 is also indistinguishable from zero statistically (*t*-stat = 0.18).

In contrast, the profitability shocks to small and big firms are large and of opposite signs for the 1984-2005 subperiod. Small firms (Decile 1) 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 (2.45%). On the other hand, big firms (Decile 10) experience an average positive profitability shock of 1.92% per year (*t*-stat = 4.96). The difference in profitability shocks between the two extreme deciles, 3.15% per year, is highly significant with a *t*-statistic of 6.61. The equal-weighted results reported in Panel B of Table 4 show a similar pattern; none of the size deciles exhibits significant profitability shocks before 1984, but small firms experience large negative shocks and big firms experience large positive shocks after 1984.

Panel C of Table 4 reports the dispersion in expected profitability and in profitability shocks within each size decile. The within-group standard deviation of profitability shocks decreases monotonically as size increases, and the difference between Decile 1 and Decile 10 is large and statistically significant (for the entire sample period as well as for both subperiods). This finding raises the possibility that the size effect in expected returns (if there is indeed an effect) is related to differences between small and big firms in the level of uncertainty about their future profitability. We leave an extensive investigation of this hypothesis for future work.

The pattern in profitability shocks across small and big firms uncovered in this section suggests that the difference in expected returns between small and big firms over 1984-2005 is more positive than the realized return spread implies. In the next section, we reexamine the size effect after adjusting the realized stock returns of individual firms for the price impact of their profitability shocks.

4. The size effect after adjusting realized returns for profitability shocks

4.1 Adjustment methods

We use two different methods to adjust realized stock returns for the price impact of profitability shocks. The first approach corrects individual stock returns based on 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.[4] We then subtract the product between each individual firm's profitability shock and this price impact measure each

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

month from the firm's realized return to obtain an estimate of the return adjusted for the effect of profitability shocks. We obtain similar results when we carry out this return adjustment by computing the price impact measure at the sector level.

In the second method, we follow Brennan, Chordia, and Subrahmanyam (1998) and Chordia and Shivakumar (2006) and measure the systematic price impact of profitability shocks by running time series regressions of 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 then compute each stock's adjusted returns from July to June of next year by subtracting from its realized returns the product between the estimated loading on the profitability shock spread portfolio and the returns on the spread portfolio.[5] 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.

4.2 The adjusted size effect: Portfolio sorts

Table 5 reports average value-weighted (Panel A) and equal-weighted (Panel B) unadjusted (realized) and adjusted returns of the size decile portfolios, as well as the 1-10 return 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

[5] 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.

returns from 0.44% per month (see Table 1) to 0.65% for the whole sample period. A similar increase applies to the two subperiods as well as to the equal-weighted size premium.

For the entire 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 entirely 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 4 that profitability shocks are close to zero for both small and big firms during this period.

But 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 premium derives from both the long side (small firms) and the short side (big firms). For example, under Adjustment 1, the average return of small firms (Decile 1) increases from 0.97% per month to 1.26% per month, whereas the average return of big firms (Decile 10) decreases from 0.70% per month to 0.54% per month. This result is consistent with our finding in Table 4 that small firms experience negative profitability shocks while big firms experience positive shocks after 1984. The equal-weighted results in Panel B of Table 5 are very similar. After adjusting individual stock returns for the impact of profitability shocks, the equal-weighted size premium for the second half of the sample period increases from 0.50% per month (t-stat = 1.60) to 1.00% per month (t-stat = 3.09) using the first adjustment method and 0.96% per month (t-stat = 2.89) using the second.

4.3 The adjusted size effect: Fama-MacBeth cross-sectional regressions

Table 6 reports the results of monthly Fama and MacBeth (1973) cross-sectional regressions of individual stocks' unadjusted and adjusted returns on size.[6] These regressions complement and provide further robustness checks to our portfolio-based results in Table 5 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 5. Each coefficient from a cross-sectional regression is the return on a zero-cost minimum variance portfolio with a weighted average 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 the profitability shock spread portfolio, because these errors are impounded into the dependent variable directly.

Table 6 presents the average monthly regression coefficients as well as their time series *t*-statistics. The first column of Table 6 shows that size is significantly 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 -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 5 based on value-weighed returns, but in line with the equal-weighted results. This is not surprising since

6 The tenor of the results remain 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.

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 6 report Fama-MacBeth 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 and the second subperiod, but not for the first subperiod. For the entire sample period 1963:07-2005:12, 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 1984:07-2005:12 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 1963:07-1984:06 subperiod, the average coefficient on size is virtually unaffected by the return adjustments.

The last column of Table 6 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 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 in 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, which suggests that our Fama-MacBeth regressions are not affected by the aforementioned bias.

In sum, the results in Tables 5 and 6 show 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 uncover a significant size premium that is close to 10% per annum for the post-1984 period.

4.4 Controlling for discount rate shocks

So far, we have only focused on cash flow shocks and ignored the impact of discount rate shocks on the size effect. We have done so because the prevailing wisdom in the literature is that cash flow shocks are largely firm-specific while discount rate shocks are associated with macroeconomic fluctuations and thus are common across firms (big and small). Consequently, discount rate shocks should have a minimal impact on cross-sectional return patterns such as the size effect. This supposition is further supported by recent empirical findings that firm-level returns are primarily driven by cash flow shocks and the effects of discount rate shocks tend to show up only in aggregate returns (see, for example, Vuolteenaho, 2002 and Chen and Zhao, 2009 for firm-level evidence and Kothari, Lewellen, and Warner, 2006 and Hou and Loh, 2010 for aggregate-level evidence). Nevertheless, in this section we attempt to assess the potential effect of discount rate shocks by estimating a regression of the adjusted size premium on proxies for discount rate shocks.

Following the approach of Breeden, Gibbons, and Litzenberger (1989), Lamont (2001), and Ang, Hodrick, Xing, and Zhang (2006), we first create mimicking portfolios for shocks to a number of discount rate proxies as the fitted values of time series regressions of innovations in these proxies on the excess returns of industry portfolios as base assets (we use the 30 industry portfolios downloaded from Ken French's Web site). Our discount rate proxies include several variables that have been shown by previous studies to track variation in expected stock returns in response to business cycles and business conditions: the dividend yield on the CRSP value-weighted market index, the yield spread between the 10-year T-Bond and the 3-month T-Bill (term spread), the yield spread between BAA and AAA corporate bonds (default spread), and the 3-month T-Bill rate.[7] We measure shocks to these discount rate proxies using both first differences and forecast errors from an AR(1) model. To conserve space, the results of these first-stage regressions are not reported, but they are available upon request.

In the second step, we regress the value-weighted size premium adjusted for profitability shocks on the returns of the mimicking portfolios for discount rate shocks. (The results using equal-weighted size premiums are very similar. For brevity, they are not reported.) We can measure the marginal effect of discount rate shocks on the size effect by comparing the regression intercept to the average adjusted size premium.

Table 7 presents the results of estimating the regression for the whole sample period and the two subperiods, for the two methods of adjusting returns for the price impact of profitability shocks, and for the two ways of measuring shocks to the discount rate proxies. The coefficients on some of the discount rate shock mimicking portfolios (the default spread in particular) are statistically significant and the R^2 of the regression generally lies between 10% and 20% depending on the specification. Thus, the size premium and discount rates do appear to move together. However, controlling for this relation appears to have little effect on the magnitude of the adjusted size premium (if anything, it raises it). For example, our results in Table 5 show that for the second half of our sample period, adjusting realized returns for the price impact of profitability shocks produces a size premium of 0.72% using the first return adjustment method.

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[7] Shiller (1984), Campbell and Shiller (1988), Fama and French (1988, 1989), Kothari and Shanken (1997), and Lewellen (2004) show that the aggregate dividend yield predicts stock returns. Keim and Stambaugh (1986), Fama and French (1989), Pontiff and Schall (1998) show that the term spread and default tracks variation in expected stock returns. Fama and Schwert (1977), Breen, Glosten, and Jagannathan (1989), and Ang and Bekaert (2007) find that the short rate also predicts stock returns.

Further controlling for discount rate shocks raises this number slightly to 0.89% per month when we use first differences to measure shocks to discount rate proxies or 0.83% per month when we use the forecast errors from an AR(1) model. Similarly, the size premium increases from 0.85% per month after adjusting for profitability shocks using the second method to 1.02% or 0.97% per month after additionally controlling for shocks to our discount rate proxies. Hence, our finding in the previous sections that there exists a significant size premium for the post-1984 period after adjusting realized returns for profitability shocks is robust to controlling for discount rate effects.

4.5 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.[8] 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 observed size effect across all months is insignificant. We also want to investigate how the return adjustments for profitability shocks affect small and big firms in January versus other months.

Table 8 reports the average unadjusted (realized) and adjusted returns for Deciles 1 (small firms) and 10 (big firms) for January and for February-December separately. We see a strong January effect in realized returns for both halves of our sample period. Small firms on average outperform big firms in January by 8.47% for 1963:07-1984:06 and by 5.09% for 1984:07-2005:12. In contrast, small firms outperform big firms by only 0.36% per month in February-

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[8] 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).

December for 1963:07-1984:06 and actually underperform by 0.16% per month for 1984:07-2005:12.

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.

These results raise an immediate 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 1980s and 1990s. 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 9, which reports the value-weighted (Panel A) and equal-weighted (Panel B) post-1984 average expected profitability and profitability shock of Deciles 1 (small firms) and 10 (big firms) for new lists and seasoned firms separately. Following Fama and French (2004), we define new lists as firms that have been listed for less than five years, based on the first appearance of a firm (PERMCO) on CRSP. Seasoned firms are those that have been listed for more than five years. We use the same size decile breakpoints as in Table 4 to allow for a direct comparison of the average profitability shocks of the extreme deciles.

Panel A of Table 9 shows that the value-weighted average expected profitability is lower for new lists than for seasoned firms of similar size, which suggests that the poor performance of new lists during the second half of our sample period was at least in part anticipated by the market. However, small new lists also have much more negative profitability shocks. The value-weighted average profitability shock to small firms over 1984-2005 is -2.86% per year for new lists and -0.67% per year for seasoned firms, compared to an average shock of -1.23% for all small firms (new lists and seasoned, see Table 4). Hence, a significant portion of the profitability shocks to small firms can be attributed to new lists. On the other hand, big new lists have an average profitability shock that is much closer to zero (0.85% per year) than that for seasoned big firms (1.97% per year). The latter number is indistinguishable from the average shock of 1.92% for all big firms (see Table 4), which suggests that the profitability shocks to big firms are almost entirely driven by seasoned big firms. The equal-weighted results reported in Panel B of Table 9 are very similar to those in Panel A. Overall, the results in Table 9 suggest that the unexpectedly poor performance of the new weaker class of new lists contributes significantly to the disappearance of the size effect after the early 1980s.

A second potential explanation for the opposite profitability shocks to small and big firms is the change in industry market structures as a result of trade liberalization and industry deregulation. The U.S. economy became increasingly open during the 1980s and 1990s, 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). Starting in the late 1970s, we also see a wave of deregulation in many U.S. industries. Adjustments of industries to their new competitive environment can take decades and the effects 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 than small firms in dealing with the challenges and opportunities stemming from trade liberalization and industry deregulation. 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 industries 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).

In Table 10, 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 industries that experienced significant changes in their competitive environments due to trade liberalization or deregulation. The table reports the value-weighted (Panel A) and equal-weighted (Panel B) post-1984 average expected profitability and profitability shock of

Deciles 1 (small firms) and 10 (big firms) for industries that went through structural shifts and for other industries separately. We obtain the list of industries that experienced deregulation or increased foreign competition from Mitchell and Mulherin (1996).[9] Similar to Table 9, we use the same size decile breakpoints as in Table 4 to allow for a direct comparison of the average profitability shocks of the extreme deciles.

Panel A of Table 10 shows that the average value-weighted expected profitability of small (big) firms from industries with structural shifts is lower (higher) than the expected profitability of similar-size firms from other industries. More importantly, small firms and big firms from the first group of industries have more extreme profitability shocks than similar-size firms from the other industries. In particular, the average value-weighted profitability shock to small firms over 1984-2005 is -1.82% per year in industries with structural shifts and -0.44% per year in other industries, compared with an average shock of -1.23% for small firms across all industries. On the other hand, the average profitability shock to big firms is 2.45% in industries with structural shifts and 1.15% in other industries, compared with an average shock of 1.92% for big firms across all industries. Hence, industries that experienced significant changes in their market structure contribute disproportionally to the profitability shocks to small firms and big firms. Panel B of Table 10 reports very similar equal-weighted results. Taken together, the evidence in Table 10 points to changes in industry market structure as an importance source of the profitability shocks to small and big firms after the early 1980s.

It is worth mentioning that the two explanations based on new lists and industry competition should be viewed as complementary as they are potentially intertwined: new lists

[9] These industries are Air Transportation, Broadcasting and Communications, Entertainment, Natural Gas, Trucking and Transport Leasing, Footwear, Machine Tool, Apparel, Construction Machinery, Office Equipment, Computer Data Processing, Auto Parts, Household Appliances, Electronics, Tire and Rubber, Machinery, Steel, Electrical Equipment, Textiles, Chemicals and Allied Products, and Precision Instruments. See Mitchell and Mulherin (1996) for further details.

affect industry market structure and vice versa. It is interesting to note that several of the industries that experienced significant changes in their market structure (e.g., Computer Data Processing, Electronics and Electrical Equipment, Precision Instruments, Chemicals and Allied Products, and Broadcasting and Communications) are also among the top industries with the highest number of IPOs for 1975-2000 (see Helwege and Liang, 2004). We consider a full investigation of the interaction between these two effects to be an interesting area for future research.

6. Conclusions

The size effect in the cross-section of stock returns is one of the most extensively studied subjects in the asset pricing literature. It was widely accepted that small firms earn higher returns than big firms – until the disappearance of the size effect in the early 1980s. Our paper examines the hypothesis that differences in cash flow shocks between small and big firms are responsible for the disappearance of the size effect in realized returns.

To investigate this hypothesis, we estimate the shocks to profitability of individual firms using a cross-sectional model. The model produces profitability shock estimates that are strongly and positively related to contemporaneous stock returns. We find that both small and big firms have profitability shocks that are close to zero over 1963-1983, but have significant profitability shocks that are in opposite directions after 1984. Small firms on average experience large 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 is robust to alternative profitability models, different return adjustments, different test methods, and controlling for discount rate shocks. We identify new lists and changes in industry market structure as important sources of the profitability shocks to small and big firms for the post-1984 period.

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

Second, we show that the differences between ex post realized and ex ante expected returns as a result of in-sample profitability shocks lead to different inferences on the size effect. In a follow-up paper, we plan to examine the implications of profitability shocks 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 only consider near-term profitability shocks and do not attempt to measure changes in expectations about more distant profitability. We leave a thorough investigation of these and other issues for future research.

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Table 1: Summary statistics and average returns 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 estimate 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: 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 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 reports 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 4, 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: Dispersions in expected profitability and profitability shocks within each size decile											
	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 5: Average unadjusted and adjusted returns of size deciles

This table reports 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 between its profitability shock and the price impact per unit of profitability shock (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 5, 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 6: Cross-sectional regressions of unadjusted and adjusted returns on size

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 between its profitability shock and the price impact per unit of profitability shock (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 estimate the cross-sectional 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 7: Regressions of the adjusted size premium on discount rate shock proxies

This table reports the coefficients and *t*-statistics from time series regressions of the spread between the value-weighted adjusted returns of small and big firms (the "adjusted size premium") on returns of mimicking portfolios for discount rate shocks. We use the following discount rate proxies: the dividend yield on the CRSP value-weighted market index, the yield spread between the 10-year T-Bond and the 3-month T-Bill (term spread), the yield spread between the BAA and AAA corporate bonds (default spread), and the 3-month T-Bill yield. We construct mimicking portfolios for shocks to each of the discount rate proxies as the fitted value of a regression of the innovations in the variable on the excess returns of 30 industry portfolios downloaded from Ken French's Web site. We measure innovations in the discount rate proxies using first differences as well as forecast errors from an AR(1) model. Adjusted returns 1 are computed by subtracting from the realized excess returns of a firm the product between its profitability shock and the price impact per unit of profitability shock (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.

Dependent variable:	Adjusted size premium 1	Adjusted size premium 1	Adjusted size premium 2	Adjusted size premium 2
Innovation:	*First difference*	*AR(1)*	*First difference*	*AR(1)*
1963:07-2005:12				
Intercept (in %)	0.89	0.86	0.93	0.90
t-statistic	*4.07*	*3.93*	*3.87*	*3.72*
Dividend yield	-5.44	-5.57	-4.39	-4.45
t-statistic	*-2.95*	*-2.97*	*-2.17*	*-2.17*
Term spread	-0.02	-0.02	-0.04	-0.03
t-statistic	*-0.88*	*-0.65*	*-1.24*	*-1.03*
Default spread	-0.58	-0.55	-0.58	-0.54
t-statistic	*-6.54*	*-6.04*	*-5.97*	*-5.49*
T-Bill yield	-0.03	-0.03	-0.05	-0.05
t-statistic	*-1.65*	*-1.69*	*-2.33*	*-2.27*
Adj. R^2	0.12	0.11	0.10	0.09
1963:07-1984:06				
Intercept (in %)	1.05	1.04	1.02	0.99
t-statistic	*3.36*	*3.25*	*3.37*	*2.66*
Dividend yield	-10.72	-11.37	-8.97	-9.64
t-statistic	*-4.09*	*-4.21*	*-2.97*	*-3.08*
Term spread	-0.03	0.01	-0.06	-0.01
t-statistic	*-0.76*	*0.27*	*-1.25*	*-0.09*
Default spread	-0.58	-0.42	-0.63	-0.43
t-statistic	*-4.20*	*-2.82*	*-4.01*	*-2.55*
T-Bill yield	-0.06	-0.03	-0.10	-0.06
t-statistic	*-1.71*	*-0.74*	*-2.49*	*-1.41*
Adj. R^2	0.19	0.16	0.19	0.15

Table 7, continued

Dependent variable:	Adjusted size premium 1	Adjusted size premium 1	Adjusted size premium 2	Adjusted size premium 2
Innovation:	*First difference*	*AR(1)*	*First difference*	*AR(1)*
1984:07-2005:12				
Intercept (in %)	0.89	0.83	1.02	0.97
t-statistic	*3.09*	*2.94*	*3.37*	*2.55*
Dividend yield	2.00	1.89	2.61	2.55
t-statistic	*0.81*	*0.76*	*1.00*	*0.98*
Term spread	-0.03	-0.04	-0.03	-0.05
t-statistic	*-0.93*	*-1.42*	*-1.01*	*-1.65*
Default spread	-0.62	-0.67	-0.59	-0.67
t-statistic	*-5.70*	*-6.19*	*-5.19*	*-5.79*
T-Bill yield	-0.01	-0.02	-0.01	-0.03
t-statistic	*-0.32*	*-0.93*	*-0.55*	*-1.23*
Adj. R^2	0.17	0.17	0.14	0.15

Table 8: Average unadjusted and adjusted returns of small and big firms: January versus other months

This table shows the 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 size Deciles 1 (small firms) and 10 (big firms) as well as the return differences between Deciles 1 and 10. Unadjusted returns are realized returns in excess of the risk-free rate. Table 5 explains the two methods to adjust realized stock returns for the price impact of profitability shocks. This 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

	January				**February to December**		
	Small firms	Big firms	Small-Big		Small firms	Big firms	Small-Big
1963:07-2005:12				**1963:07-2005:12**			
VW unadjusted return	7.95	1.17	6.78	VW unadjusted return	0.43	0.33	0.10
t-statistic	*6.00*	*1.47*	*6.73*	*t-statistic*	*1.53*	*1.68*	*0.45*
VW adjusted return 1	8.18	1.20	6.99	VW adjusted return 1	0.55	0.26	0.29
t-statistic	*6.34*	*1.53*	*6.99*	*t-statistic*	*1.94*	*1.29*	*1.34*
VW adjusted return 2	8.42	1.11	7.30	VW adjusted return 2	0.45	0.17	0.28
t-statistic	*5.65*	*1.25*	*6.58*	*t-statistic*	*1.49*	*0.79*	*1.18*
1963:07-1984:06				**1963:07-1984:06**			
VW unadjusted return	8.95	0.48	8.47	VW unadjusted return	0.42	0.06	0.36
t-statistic	*4.12*	*0.40*	*6.01*	*t-statistic*	*0.96*	*0.21*	*1.15*
VW adjusted return 1	8.87	0.60	8.27	VW adjusted return 1	0.39	0.09	0.30
t-statistic	*4.14*	*0.52*	*5.85*	*t-statistic*	*0.90*	*0.35*	*0.95*
VW adjusted return 2	9.33	0.16	9.17	VW adjusted return 2	0.10	-0.01	0.11
t-statistic	*3.40*	*0.12*	*5.09*	*t-statistic*	*0.19*	*-0.05*	*0.31*
1984:07-2005:12				**1984:07-2005:12**			
VW unadjusted return	6.95	1.86	5.09	VW unadjusted return	0.44	0.59	-0.16
t-statistic	*4.52*	*1.77*	*3.70*	*t-statistic*	*1.24*	*2.06*	*-0.55*
VW adjusted return 1	7.45	1.82	5.64	VW adjusted return 1	0.71	0.43	0.28
t-statistic	*5.21*	*1.73*	*4.08*	*t-statistic*	*1.95*	*1.41*	*0.95*
VW adjusted return 2	7.60	1.97	5.62	VW adjusted return 2	0.76	0.33	0.43
t-statistic	*5.28*	*1.76*	*4.41*	*t-statistic*	*2.07*	*1.08*	*1.36*

Table 8, continued

Panel B: Equal-weighted average unadjusted and adjusted returns							
	January				February to December		
	Small firms	Big firms	Small-Big		Small firms	Big firms	Small-Big
1963:07-2005:12				**1963:07-2005:12**			
EW unadjusted return	9.14	0.99	8.15	EW unadjusted return	0.54	0.39	0.15
t-statistic	*6.75*	*1.20*	*7.87*	*t-statistic*	*1.94*	*1.89*	*0.72*
EW adjusted return 1	9.31	1.05	8.26	EW adjusted return 1	0.72	0.33	0.39
t-statistic	*7.01*	*1.31*	*7.99*	*t-statistic*	*2.53*	*1.55*	*1.81*
EW adjusted return 2	9.75	0.96	8.79	EW adjusted return 2	0.59	0.28	0.31
t-statistic	*6.36*	*1.07*	*7.59*	*t-statistic*	*1.93*	*1.27*	*1.30*
1963:07-1984:06				**1963:07-1984:06**			
EW unadjusted return	10.00	0.30	9.70	EW unadjusted return	0.49	0.13	0.35
t-statistic	*4.43*	*0.23*	*6.73*	*t-statistic*	*1.11*	*0.46*	*1.15*
EW adjusted return 1	9.89	0.43	9.46	EW adjusted return 1	0.49	0.18	0.31
t-statistic	*4.44*	*0.34*	*6.51*	*t-statistic*	*1.11*	*0.61*	*1.01*
EW adjusted return 2	10.62	-0.13	10.75	EW adjusted return 2	0.20	0.02	0.18
t-statistic	*3.73*	*-0.09*	*5.92*	*t-statistic*	*0.39*	*0.05*	*0.50*
1984:07-2005:12				**1984:07-2005:12**			
EW unadjusted return	8.28	1.67	6.60	EW unadjusted return	0.60	0.64	-0.04
t-statistic	*5.40*	*1.65*	*4.58*	*t-statistic*	*1.69*	*2.16*	*-0.14*
EW adjusted return 1	8.71	1.71	7.00	EW adjusted return 1	0.95	0.48	0.47
t-statistic	*6.02*	*1.69*	*4.81*	*t-statistic*	*2.63*	*1.55*	*1.54*
EW adjusted return 2	8.96	1.93	7.03	EW adjusted return 2	0.93	0.52	0.42
t-statistic	*6.19*	*1.91*	*5.02*	*t-statistic*	*2.55*	*1.70*	*1.33*

Table 9: Expected profitability and profitability shocks of small and big firms: New lists versus seasoned firms, 1984-2005

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 of size Deciles 1 (small firms) and 10 (big firms) for new lists and seasoned firms separately, over the period 1984-2005. Size decile breakpoints are the same as in Table 4. We define new lists and seasoned firms as firms that have been listed for less than and more than five years, respectively, 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 table also reports the *t*-statistics for the null that the expected profitability and the profitability shock of small firms are equal to those of big firms.

Panel A: Average value-weighted expected profitability and profitability shocks

	New lists				Seasoned firms		
	Small firms	Big firms	*t*(Small=Big)		Small firms	Big firms	*t*(Small=Big)
1984-2005				**1984-2005**			
VW expected profitability	0.01	11.75	4.46	VW expected profitability	3.26	13.19	17.01
t-statistic	*0.01*	*4.74*		*t-statistic*	*6.80*	*39.54*	
VW profitability shock	-2.86	0.85	2.57	VW profitability shock	-0.67	1.97	5.64
t-statistic	*-5.86*	*0.61*		*t-statistic*	*-2.91*	*4.84*	

Panel B: Average equal-weighted expected profitability and profitability shocks

	New lists				Seasoned firms		
	Small firms	Big firms	*t*(Small=Big)		Small firms	Big firms	*t*(Small=Big)
1984-2005				**1984-2005**			
EW expected profitability	-1.56	11.21	4.62	EW expected profitability	2.10	12.13	18.67
t-statistic	*-1.65*	*4.23*		*t-statistic*	*5.10*	*35.21*	
EW profitability shock	-3.12	0.58	2.46	EW profitability shock	-0.93	1.71	6.66
t-statistic	*-7.26*	*0.39*		*t-statistic*	*-4.25*	*5.17*	

Table 10: Expected profitability and profitability shocks of small and big firms: Industries with structural shifts versus other industries, 1984-2005

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 of size Deciles 1 (small firms) and 10 (big firms) for industries that experienced significant changes in their market structure due to trade liberalization or deregulation and other industries separately, over the period 1984-2005. Size decile breakpoints are the same as in Table 4. The list of industries that experienced deregulation or increased foreign competition is obtained from Mitchell and Mulherin (1996). Expected profitability is the one-period ahead forecast of profitability. Profitability shock is the difference between realized profitability and expected profitability. The table also reports the *t*-statistics for the null that the expected profitability and the profitability shock of small firms are equal to those of big firms.

Panel A: Average value-weighted expected profitability and profitability shocks

	Industries with structural shifts				Other industries		
	Small firms	Big firms	*t*(Small=Big)		Small firms	Big firms	*t*(Small=Big)
1984-2005				**1984-2005**			
VW expected profitability	0.79	14.15	13.90	VW expected profitability	4.59	11.64	16.54
t-statistic	*0.93*	*32.39*		*t-statistic*	*14.81*	*39.68*	
VW profitability shock	-1.82	2.45	6.77	VW profitability shock	-0.44	1.15	5.24
t-statistic	*-4.60*	*4.99*		*t-statistic*	*-2.25*	*4.95*	

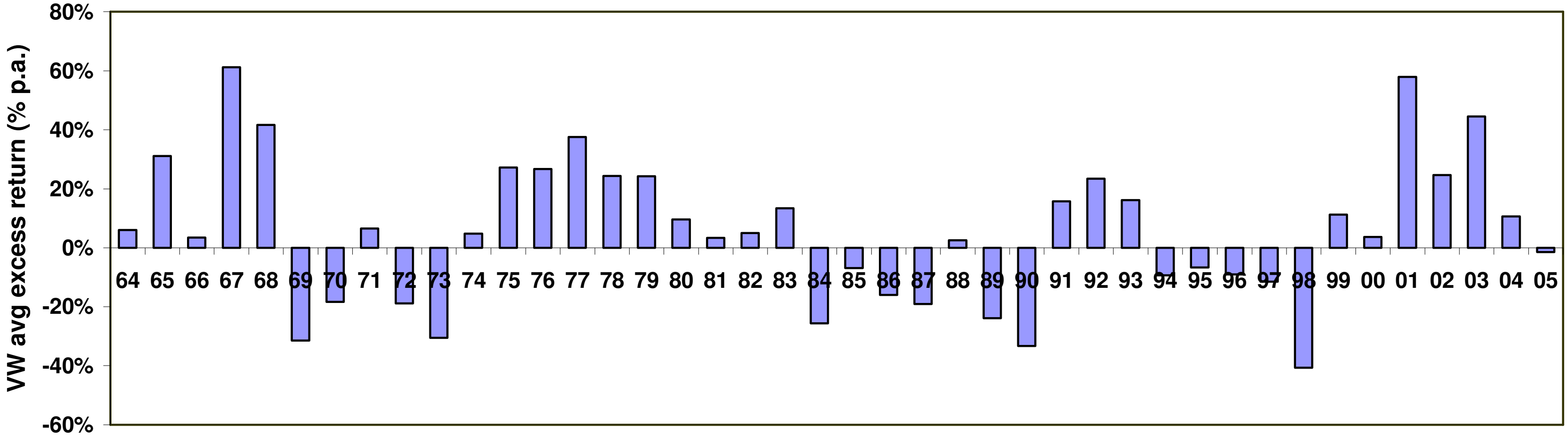
Panel B: Average equal-weighted expected profitability and profitability shocks

	Industries with structural shifts				Other industries		
	Small firms	Big firms	*t*(Small=Big)		Small firms	Big firms	*t*(Small=Big)
1984-2005				**1984-2005**			
EW expected profitability	-0.35	12.76	13.94	EW expected profitability	3.35	11.20	18.92
t-statistic	*-0.47*	*22.21*		*t-statistic*	*12.30*	*35.71*	
EW profitability shock	-2.04	2.25	8.15	EW profitability shock	-0.64	0.88	6.26
t-statistic	*-5.79*	*5.75*		*t-statistic*	*-3.53*	*5.45*	

Figure 1: Time series plot of the size premium

This graph plots the value-weighted (Panel A) and equal-weighted (Panel B) 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