Average Returns, B/M, and Share Issues

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ABSTRACT

The book-to-market ratio, *B/M*, is a noisy measure of expected stock returns because *B/M* also varies with expected cashflows. Our hypothesis is that the evolution of *B/M*, in terms of past changes in book equity and price, contains independent information about expected cashflows that can be used to improve estimates of expected returns. The tests support this hypothesis, with results that are largely but not entirely similar for Microcap stocks (below the 20th NYSE market capitalization percentile) and All but Micro stocks.

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Firms with higher ratios of the book value of common stock to its market value have higher average stock returns (Rosenberg, Reid, and Lanstein (1985), Fama and French (1992), Lakonishok, Shleifer, and Vishny (1994)). The book-to-market ratio, *B/M*, is, however, a noisy measure of expected returns because it also varies with expected cashflows (dividends). Vuolteenaho (2002) finds that differences in forecasts of cashflows loom large in the cross-section of B/M for individual stocks.

To absorb dispersion in the cross-section of *B/M* due to expected cashflows, Fama and French (2006) develop estimates of expected cashflows that combine a wide range of accounting fundamentals and other variables. They use the estimates of expected cashflows, along with *B/M*, to explain the cross-section of average returns, with limited success. (They cite a large literature that uses variants of this approach.) We take a different approach here. Specifically, we examine whether the evolution of *B/M* itself, in terms of past changes in book equity and price, contains independent information about expected cashflows that can enhance estimates of expected returns.

By way of motivation, the log of the time t book-to-market ratio, BM_t, is the log of the ratio at t-k, BM_{t-k}, plus the difference between the change in the log of book equity from t-k to t, $dB_{t-k,t}$, and the change in the log of price, $dM_{t-k,t}$:

$$BM_t = BM_{t-k} + dB_{t-k,t} - dM_{t-k,t}. \tag{1}$$

Our hypothesis is that the past changes in price and book equity in (1) contain information about expected cashflows and expected returns that can improve estimates of expected returns. The past and expected future economic outcomes that differentiate high BM_t value stocks from low BM_t growth stocks are summarized in $dB_{t-k,t}$ and $dM_{t-k,t}$. Growth in book equity, $dB_{t-k,t}$, tends to be high for growth stocks and low to negative for value stocks, the result of high earnings and reinvestment by growth stocks and low earnings and reinvestment by value stocks (Fama and French (1995)). This pattern in fundamentals persists in the years after t. The change in price, $dM_{t-k,t}$, summarizes changes from t-k to t in expected future returns and expected cashflows, and $dM_{t-k,t}$ is high for growth stocks and low for value stocks. In short, using BM_t alone to forecast returns may bury independent information in its components about expected cashflows and expected returns. There is thus reason to expect that we can improve estimates of expected returns by replacing BM_t with its three components in (1).

We proceed as follows. Section I further motivates the tests and presents the specifics of the (cross-section regression) approach. Section II discusses the results for All but Micro (ABM) stocks, that is, NYSE, Amex, and NASDAQ stocks above the 20th percentile of market capitalization (market cap, price times shares outstanding) for NYSE stocks. The ABM tests for 1927 to 2006 support our hypothesis that using the three components of BM_t to predict returns provides better estimates of expected returns than BM_t alone. The reason is not that a 1% change in book equity has more or less information about expected returns than a 1% change in price, but rather that more recent changes have more information than more distant changes (new news is more relevant than old news).

Section III presents the results for Microcap stocks (below the 20th percentile of NYSE market cap). Microcaps produce even stronger evidence that forecasting returns with the components of BM_t enhances estimates of expected returns. The explanatory power seems to come mostly from lagged price changes, which have more force in return regressions than lagged changes in book equity. Like ABM stocks, Microcaps also produce the result that new news is more relevant than old news. The general inference from the tests for both ABM and Microcap stocks is that the breakdown of BM_t into its components does seem to capture information about expected cashflows that enhances estimates of expected returns.

Our tests of the information in the components of the book-to-market ratio are similar to those of Daniel and Titman (2006), but their inferences are different. Based on tests for 1968 to 2003 and a sample of stocks similar to our ABM sample, they conclude that changes in BM_t due to changes in book equity (what they call tangible information) do not predict returns, but changes in price unrelated to changes in book equity (what they call intangible information) have marginal forecast power. This seems in conflict with our evidence that for ABM stocks changes in book equity are as informative about expected returns as changes in price. Section IV argues that in fact their results are consistent with ours.

To examine how the book-to-market ratio evolves via changes in market and book values, either total or per share changes can be used. Total changes in market and book values include net share issues (issues minus repurchases). Firms that issue stock tend to have large (past and future) investments relative to earnings, while the opposite is true for firms that repurchase (Fama and French (2005)). Net share issues are thus a candidate to help isolate information about expected cashflows to better estimate expected returns. To disentangle the effects of net share issues from the effects of per share changes in market and book values, we include net share issues as a separate explanatory variable for returns. The results are discussed in Section V.

Existing work documents negative abnormal returns after stock issues (Loughran and Ritter (1995)), and positive abnormal returns after repurchases (Ikenberry, Lakonishok, and Vermaelen (1995)). Our results for 1963 to 2006 results are consistent with earlier work. With controls for the components of BM_t, we find a strong negative relation between net share issues and average returns. Like Pontiff and Woodgate (2006), however, we find that net issues do not predict returns for 1927 to 1963. In our framework, these results suggest that during 1963 to 2006, net share issues help disentangle expected cashflows from expected returns to improve estimates of expected returns, but (for whatever reason) this is not true for 1927 to 1963. The results for 1927 to 1963 also undermine the behavioral market timing stories commonly offered to explain the returns observed after stock issues and repurchases.

Section VI concludes, with emphasis on the interpretation of the results.

I. Motivation and Methods

Leaning on the framework of Fama and French (2006), this section first expands the motivation for the tests. We then discuss the cross-section regression setup that produces the empirical evidence of later sections.

A. Motivation

In the dividend discount valuation model, the market value of a share of stock is the present value of expected dividends per share,

$$M_t = \sum_{\tau=1}^{\infty} \mathrm{E}(D_{t+\tau})/(1+r)^{\tau}\ , \tag{2}$$

where M_t is the price at time t, $\mathrm{E}(D_{t+\tau})$ is the expected dividend for $t+\tau$, and r is (approximately) the long-term average expected stock return or, more precisely, the internal rate of return on expected dividends. With clean surplus accounting, the time t dividend, D_t, is equity earnings per share, Y_t, minus the change in book equity per share (retained earnings), $dB_{t-1,t} = B_t - B_{t-1}$. (Note that here and only here $dB_{t-1,t}$ is the change in levels, rather than logs.) The dividend discount model is then

$$M_t = \sum_{\tau=1}^{\infty} \mathrm{E}(Y_{t+\tau} - dB_{t+\tau-1,t+\tau})/(1+r)^{\tau}, \tag{3}$$

or, dividing by time t book equity,

$$\frac{M_t}{B_t} = \frac{\sum_{\tau=1}^{\infty} \mathrm{E}(Y_{t+\tau} - dB_{t+\tau-1,t+\tau})/(1+r)^{\tau}}{B_t}. \tag{4}$$

Equation (4) says that, controlling for expected equity cashflows (earnings minus changes in book equity, measured relative to current book equity), a higher book-to-market equity ratio, B_t/M_t, implies a higher average expected stock return, r. This is the motivation for using the book-to-market ratio as a proxy for expected returns. It is clear from (4), however, that dispersion across stocks in expected cashflows can act like noise that obscures the information in B_t/M_t about the cross-section of expected stock returns. Thus, using variables in addition to B_t/M_t to predict returns will improve estimates of expected returns if the additional variables help disentangle expected cashflows and expected returns.

Fama and French (2006) search extensively for proxies for expected cashflows that improve estimates of expected returns from B_t/M_t, with limited success. We take a simpler approach here. Specifically, we argue that the evolution of the book-to-market ratio itself provides interesting candidates.

Recalling equation (1), the log of the book-to-market ratio at time t, BM_t, is the log ratio at t-k, BM_{t-k}, plus the difference between the change in the log of book equity, $dB_{t-k,t}$, and the change in the log of price, $dM_{t-k,t}$. The lagged growth in book equity, $dB_{t-k,t}$, is related to past and expected future cashflows.

Past growth in book equity tends to be high for growth (low BM_t) stocks and low to negative for value (high BM_t) stocks, the result of high earnings and reinvestment for growth stocks and low earnings and reinvestment for value stocks (Lakonishok, Shleifer, and Vishny (1994), Fama and French (1995)). This behavior of fundamentals tends to persist in the years after t, making $dB_{t-k,t}$ an interesting proxy for expected cashflows. Likewise, the logic of the dividend discount equation (2) is that the lagged change in price, $dM_{t-k,t}$, summarizes changes from t-k to t in expected future returns and expected cashflows.

The interplay between $dB_{t-k,t}$ and $dM_{t-k,t}$ is also important in explaining how stocks migrate between value and growth. Stocks typically move to high expected return value portfolios as a result of poor past profitability and low (often negative) growth in book equity accompanied by even sharper declines in stock prices (Fama and French (1995)). Conversely, stocks that move to lower expected return growth portfolios typically have high past profitability and growth in book equity along with even sharper past increases in stock prices.

In short, using BM_t to forecast returns may bury independent information in its components about expected cashflows and expected returns. There is thus reason to expect that using the components of BM_t in (1) to predict returns provides better estimates of expected returns than BM_t alone.

An extension of this logic suggests that more distant changes in book equity and price have less information about expected cashflows and returns than more recent changes; that is, old news is less relevant than new news. A simple way to test this prediction is to examine the estimates of expected returns provided by the components of BM_t in (1) for different lags k. If old news is less relevant, the slopes in regressions of returns on the components of BM_t should decay as the lag k for changes in price and book equity is increased. Moreover, the slope for the lagged book-to-market ratio BM_{t-k} (which summarizes the history of growth in book equity and price preceding $dB_{t-k,t}$ and $dM_{t-k,t}$) should be weaker than the slopes for one or both of $dB_{t-k,t}$ and $dM_{t-k,t}$.

The book-to-market ratio is the same whether we use price and book equity per share or total market cap and total book equity. The choice of total or per share growth rates of book equity and market value, however, does affect the decomposition of BM_t in (1) because total changes include net share issues (issues minus repurchases). But net share issues is itself an interesting candidate to capture variation in the cross-section of BM_t due to expected cashflows, to better estimate expected returns. Thus, prior work says that firms that issue stock tend to have large (past and future) investments relative to earnings, while the opposite is true for firms that repurchase (Fama and French (2005)). To disentangle the effects of net share issues from the effects of per share changes in market and book values, we use per share growth rates and include net share issues as a separate explanatory variable for returns.

The success of our predictions is not guaranteed. Thus, it is plausible that newer information about expected cashflows is more relevant for enhancing estimates of expected returns, but it is also possible that information about expected cashflows cumulates in a martingale fashion, so old news is as relevant as new news. Likewise, it is plausible that lagged changes in price and book equity have different mixes of information about expected cashflows and returns, but it is also possible that information in the two variables combines in such a way that 1% changes in $dB_{t-k,t}$ and $dM_{t-k,t}$ have similar marginal effects on estimates of expected returns. And there is no reason that all this works out in the same way for different kinds of firms. We shall see that the results on old versus new news are similar for Micro and All but Micro stocks, but (for whatever reason) the marginal information in $dB_{t-k,t}$ and $dM_{t-k,t}$ about expected returns is different for the two size groups.

Finally, it is worth emphasizing that in the framework of the valuation equation (4), the cross-section of BM_t is determined entirely by differences across stocks in expected cashflows and expected returns. Thus, when we later infer that a variable helps forecast returns because it helps disentangle expected cashflows and expected returns, we are not talking loosely, even though we do not present direct evidence about how the marginal information splits between expected cashflows and returns.

B. Regression Setup

Fama and French (1992) use cross-section regressions of individual stock returns on market cap and the book-to-market ratio to identify differences in average returns related to the size and value-growth characteristics of firms. Here we test whether the origins of the book-to-market ratio, in terms of share issues and changes in price and book equity per share, can be used to improve estimates of expected returns. In the tradition of Fama and MacBeth (1973), our tests center on the average slopes from monthly cross-section regressions of stock returns on five variables,

$$R_{t+n} = a_{0,t+n} + a_{1,t+n}MC_t + a_{2,t+n}BM_{t-k} + a_{3,t+n}dM_{t-k,t} + a_{4,t+n}dB_{t-k,t} + a_{5,t+n}NS_{t-k,t} + e_{t+n}. \quad (5)$$

In this regression, R_{t+n} is a stock's simple return for month $t+n$ in excess of the 1-month Treasury bill rate, MC_t is the stock's market cap at time t, BM_{t-k} is its book-to-market ratio for t-k (with k = 12, 36, or 60), and $dM_{t-k,t}$, $dB_{t-k,t}$, and $NS_{t-k,t}$ are the change in price per split-adjusted share, the change in book equity per split-adjusted share, and the change in split-adjusted shares outstanding for the preceding one, three, and five years. The explanatory variables in the regression are updated at the end of June each year, and they are used in the monthly regressions for July through the following June. Thus, the subscript n runs from 1 to 12 and the subscript t jumps in increments of 12, from one June to the next. The data start in June 1926, so when k = 12, t starts in June 1927 and the first regression explains returns for July 1927. For lags k = 36 and k = 60, t starts in June 1929 and June 1931. To simplify the notation, the subscript j (for stock j) that should appear on the dependent return and all the explanatory variables in (5) is omitted. The variables MC_t and BM_{t-k} are natural logs of market cap and the book-to-market ratio, and the three change variables are changes in logs.

To ensure that book equity per share, B_t, is known in June (time t), we use the fiscal year value reported during the previous calendar year. As in Fama and French (1992), the stock price in MC_t is for the end of June (time t), but the price in BM_t is for the end of the preceding December. The three change variables line up with BM_t. Thus, $dB_{t-k,t}$ is the change in book equity per share for the preceding one, three, or five fiscal years, and $dM_{t-k,t}$ and $NS_{t-k,t}$ are the changes in price per share and split-adjusted shares outstanding for the k months that end in December. To be precise, $dM_{t-k,t}$ is the continuously compounded without-dividend return, from CRSP, over the preceding one, three, or five calendar years; $NS_{t-k,t}$ is the difference between the continuously compounded growth in total market equity, computed using the price and shares outstanding reported by CRSP, and the continuously compounded capital gain ($dM_{t-k,t}$) over the same period; and $dB_{t-k,t}$ is the difference between the continuously compounded growth in total book equity over the preceding one, three, or five fiscal years and the matching $NS_{t-k,t}$ computed from fiscal year-end to fiscal year-end. Thus, with these definitions, total changes in market cap and book equity are per share changes plus our measure of share issues. Book equity data are from Compustat, with missing data for NYSE stocks filled in by us as in Davis, Fama, and French (2000).

Our null hypothesis is that breaking the book-to-market ratio into its components does not enhance the estimates of expected returns provided by BM_t. In terms of regression (5), the null is that the true slopes for BM_{t-k}, $dB_{t-k,t}$, and $dM_{t-k,t}$ have the same magnitude, with positive slopes for BM_{t-k} and $dB_{t-k,t}$ and a negative slope for $dM_{t-k,t}$. The alternative hypothesis is that the components of BM_t help isolate information about expected cashflows, thus improving estimates of expected returns. Under the alternative, the true slopes for the components of BM_t differ because the three components capture different mixes of information about expected cashflows and expected returns. For example, if old information is less relevant than new information, the true slopes on the components of BM_t decline as the lag k for changes in price and book equity increases. And the true slope for BM_{t-k}, which summarizes older forecasts of cashflows and returns, is closer to zero than the slope for $dB_{t-k,t}$ and/or the slope for $dM_{t-k,t}$.

In general, however, beyond predicting that the average slopes for the three components of BM_t do not have the same magnitude, the alternative hypothesis that breaking BM_t into its components improves expected return estimates does not make strong predictions about average slopes. The reason is that the three components of BM_t may each be a different mix of forecasts of cashflows and returns, so there are no clear predictions about marginal effects. On the other hand, if the average slopes for the components of BM_t are equal in magnitude, positive for BM_{t-k} and $dB_{t-k,t}$ and negative for $dM_{t-k,t}$, the unavoidable conclusion is that forecasts of returns from the components collapse to forecasts from BM_t, so there is no additional information in the origins of BM_t beyond that in BM_t alone.

There is a simple way to test the hypothesis that the true slopes for $dM_{t-k,t}$ and $dB_{t-k,t}$ in regression (5) are equal in magnitude to the slope for BM_{t-k}. Consider an alternative regression that substitutes the most recent book-to-market ratio, BM_t, for the lagged BM_{t-k} in (5),

$$R_{t+n} = a_{0,t+n} + a_{1,t+n}MC_t + a_{2,t+n}BM_t + a_{3,t+n}dM_{t-k,t} + a_{4,t+n}dB_{t-k,t} + a_{5,t+n}NS_{t-k,t} + e_{t+n} \,. \tag{6}$$

Since $BM_t = BM_{t-k} + dB_{t-k,t} - dM_{t-k,t}$, the slopes in (6) link directly to those in (5). The slopes for MC_t and $NS_{t-k,t}$ do not change in going from (5) to (6). Similarly, the slope for BM_{t-k} in (5) is the slope for BM_t in (6). Intuitively, the slope for BM_t in (6) is the marginal effect of BM_t, given the lagged changes in price and book equity, $dM_{t-k,t}$ and $dB_{t-k,t}$, but this is also the marginal effect of BM_{t-k} in (5). The slopes for $dM_{t-k,t}$ and $dB_{t-k,t}$ are, however, different in (5) and (6). The slope for $dB_{t-k,t}$ in (6) is the slope for $dB_{t-k,t}$ in (5) minus the slope for BM_{t-k}. And the slope for $dM_{t-k,t}$ in (6) is the slope for $dM_{t-k,t}$ in (5) plus the slope for BM_{t-k}.[1] The average slopes for $dM_{t-k,t}$ and $dB_{t-k,t}$ in (6) thus provide a formal test of whether the true slopes for the two changes in (5) have the same magnitude as the slope for BM_{t-k}. More directly, if the true slopes on $dM_{t-k,t}$ and $dB_{t-k,t}$ in (6) are zero, the origins of BM_t in terms of lagged changes in price and book equity add nothing to forecasts of returns from BM_t.

We estimate the monthly regressions (5) and (6) separately for All but Micro (ABM) stocks (market cap above the 20th percentile of market cap for NYSE stocks) and for Microcaps (market cap below the 20th NYSE percentile). Before 1963 the tests cover only NYSE stocks, and there are on average just 141 Microcap stocks. Amex stocks are added in 1963, NASDAQ stocks in 1973. Amex and NASDAQ stocks are mostly Microcaps. In the estimates of (5) and (6) that use 1-year (k = 12) versions of $dM_{t-k,t}$ and $dB_{t-k,t}$, the All but Micro (ABM) sample on average has 1,274 stocks during July 1963 to December 2006. There are on average 1,709 Microcap stocks, but they account for only about 3% of the market cap of NYSE-Amex-NASDAQ stocks. Because they are so numerous and their returns and explanatory variables in (5) and (6) have more dispersion, Microcaps are influential in regressions that use all stocks. Estimating the regressions on ABM stocks thus provides a more reliable view of the cross-section of average returns for the stocks that account for the lion's share of stock market wealth. And we shall see that in one important respect, Microcaps do produce a different story.

We have also examined regressions that break the ABM sample between Big stocks (market cap above the 50^{th} NYSE percentile) and Small stocks (market cap between the 20^{th} and 50^{th} NYSE percentiles). Skipping the details, we can report that the average slopes in (5) and (6) are similar for Big and Small stocks. Several readers have suggested that we split ABM stocks into even finer groups, such as the top four NYSE market cap quintiles. The problem here is small sample sizes that would destroy any power to identify differences in true slopes across size quintiles. Moreover, the fact that average regression slopes are similar for Big and Small stocks, but different for Micro stocks, suggests that the split of stocks into the ABM and Micro samples captures the main differences in results for size groups.

There are, of course, potentially interesting splits of the regression results on variables other than market cap. And there are many variables beyond those we break out of the book-to-market ratio that may have information about expected cashflows that can enhance estimates of expected returns. (Examining a broad range of candidates is the approach in Fama and French (2006).) The simple approach taken here, however, produces quite a full plate for this paper.

The initial tables show results only for the full July 1927 to December 2006 period (henceforth 1927 to 2006). We have examined results for two periods that split in July 1963, the start date in many previous studies. There are differences in nuance between the results for the two subperiods, but except for net share issues, $NS_{t-k,t}$, the average slopes for July 1927 to June 1963 are mostly within a standard error of the average slopes for July 1963 to December 2006. Thus, there seems little point in spending table space on the subperiods, at least in the discussion of results for variables other than $NS_{t-k,t}$. We do, however, occasionally interject comments about the subperiod results to reinforce or shade inferences from the results for the full sample period. Finally, when we consider net share issues in Section V, the subperiod average slopes for $NS_{t-k,t}$ are the thrust of the story and they are examined in detail.

C. Baseline Regressions

As a baseline for the estimates of regressions (5) and (6), Table I summarizes average slopes from a regression that, as in Fama and French (1992), uses just market cap and the book-to-market ratio, MC_t and BM_t, to describe the cross-section of stock returns. For ABM stocks, the average slope for BM_t for 1927 to 2006 is strongly positive (t = 3.29). Thus, like earlier work, we find that high book-to-market (value) stocks have higher average returns than low book-to-market (growth) stocks. Also as in earlier work, Table I shows that ABM stocks with lower market cap have higher average returns, but it takes the power of the full 1927 to 2006 sample period to push the t-statistic for the average MC_t slope close to -2.0. The full regressions (5) and (6), with their enhanced explanatory power, will typically produce more reliable evidence of a size effect in ABM average returns.

Table I about here

A striking result in Table I is that the size effect is stronger among Microcaps. The negative average slope for MC_t in the regressions for Micro stocks is -4.77 standard errors from zero, and it is more than seven times the average slope from the ABM sample. The MC_t slope for Microcaps is also strong in the full regressions (5) and (6), presented later. The positive relation between average return and BM_t also seems stronger for Micro stocks than for ABM stocks when only MC_t and BM_t are used to estimate expected returns, but this will not be true in the full regressions (5) and (6).

II. Regressions (5) and (6) for ABM Stocks

Table II summarizes estimates of regressions (5) and (6) for All but Micro (ABM) stocks for 1927 to 2006. Recall that if the origins of the book-to-market ratio BM_t are irrelevant for estimating expected returns (the null hypothesis that only BM_t counts), then the true slopes for the three components of BM_t in (5) are equal in magnitude (positive for BM_{t-k} and $dB_{t-k,t}$ and negative for $dM_{t-k,t}$). The estimates of (5) for ABM stocks support this hypothesis, at least with respect to the slopes for $dM_{t-k,t}$ and $dB_{t-k,t}$. The average slopes for $dM_{t-k,t}$ and $dB_{t-k,t}$ are more than 2.4 standard errors from zero, the negative average slopes for $dM_{t-k,t}$ are about the same magnitude as the positive average slopes for $dB_{t-k,t}$, and there is no clear pattern in which slope is further from zero.

Table II about here.

In our Fama-MacBeth approach, the average value of the sum of the monthly slopes for $dM_{t-k,t}$ and $dB_{t-k,t}$ in the estimates of (5) for a given lag k provides a simple test of whether the true slopes for $dM_{t-k,t}$ and $dB_{t-k,t}$ (opposite in sign) have the same magnitude. The means of the sum of the slopes for $dM_{t-k,t}$ and $dB_{t-k,t}$ (last column of Part A of Table II) are within a standard error of zero. Skipping the details, we can report that we find similar results for 1927 to 1963 (July 1927 to June 1963) and 1963 to 2006 (July 1963 to December 2006). In short, it seems that changes in BM_t due to changes in book equity are about as relevant as changes in price for estimates of ABM expected returns.

If changes in book equity are as relevant as changes in price, information about the origins of the book-to-market ratio does not enhance estimates of expected returns if the true slope for the lagged book-to-market ratio BM_{t-k} in (5) is equal in magnitude to the slopes for $dM_{t-k,t}$ and $dB_{t-k,t}$. The interesting alternative hypothesis here is that the slope for BM_{t-k} is closer to zero than the slopes for $dM_{t-k,t}$ and $dB_{t-k,t}$; in other words, the old information about changes in book equity and price in BM_{t-k} is less relevant than the more recent information in $dM_{t-k,t}$ and $dB_{t-k,t}$. The alternative hypothesis also says that the slopes for $dM_{t-k,t}$ and $dB_{t-k,t}$ decline as the lag k increases.

The estimates of (5) for 1927 to 2006 in Part A of Table II favor the conclusion that old news is less relevant than new news. The average slopes for changes in price and book equity over the last k months, $dM_{t-k,t}$ and $dB_{t-k,t}$, are close to or more than two times the magnitude of the average slope for the book-to-market ratio of k months ago, BM_{t-k}, and the slopes for BM_{t-k}, $dM_{t-k,t}$, and $dB_{t-k,t}$ decline for longer lags k. The estimates of (6) in Part B of Table II provide tests of whether the true slope for BM_{t-k} in (5) is closer to zero than the true slopes for $dM_{t-k,t}$ and $dB_{t-k,t}$. The estimates of (6) say that when the most recent book-to-market ratio, BM_t, is used as an explanatory variable in place of BM_{t-k}, the lagged changes in price and book equity, $dM_{t-k,t}$ and $dB_{t-k,t}$, continue to have explanatory power (average slopes mostly near or beyond two standard errors from zero). Thus, more recent changes in the book-to-market ratio seem to have more information about ABM expected returns.

This inference about old versus new news gets lots of its thrust from the monthly regressions for 1927 to 1963. In the estimates of (5) for 1963 to 2006 (not shown), the average slopes for BM_{t-k} decline as the lag k increases, and the average slopes for BM_{t-k} are closer to zero than the average slopes for $dM_{t-k,t}$ and $dB_{t-k,t}$, all of which is consistent with our inference that old news about price and book equity is less relevant for expected returns than new news. But leaning against this inference, the average slopes for $dM_{t-k,t}$ and $dB_{t-k,t}$ for 1963 to 2006 do not decline as the lag k increases, and the average slopes for $dM_{t-k,t}$ and $dB_{t-k,t}$ are rather close in magnitude to (less than two standard errors from) the average slopes for BM_{t-k}. If we were restricted to the results for 1963 to 2006, we could not reject the hypothesis that only BM_t counts, that is, the origins of the ratio in terms of past changes in price and book equity add nothing to the explanation of expected stock returns, which implies that old and new news are equally relevant.

It is also true, however, that the average slopes for BM_{t-k}, $dM_{t-k,t}$, and $dB_{t-k,t}$ for 1963 to 2006 are statistically close to the average slopes for 1927 to 1963. With three slopes (BM_{t-k}, $dM_{t-k,t}$, and $dB_{t-k,t}$) and three lags (k = 12, 36, 60) there are nine comparisons of the slopes for 1927 to 1963 and 1963 to 2006. We can report that for two of the nine, the *t*-statistics for the difference between the average slopes for the two periods are around two (one above and one below). For the remaining seven, the differences between the average slopes for the two periods are within a standard error of zero. Thus, there is little evidence that the true regression slopes for $dM_{t-k,t}$, $dB_{t-k,t}$, and BM_{t-k} in (5) are different for 1927 to 1963 and 1963 to 2006. These results, and the hints in the results for 1963 to 2006 that old news about book equity and price is less relevant for expected returns, makes us comfortable that this conclusion, drawn from the tests on the full 1927 to 2006 sample period, is valid.

In sum, for ABM stocks the true slopes for $dB_{t-k,t}$ in (5) are not reliably different from the slopes for $dM_{t-k,t}$. Thus, a 1% change in book equity is about as informative about ABM expected returns as a 1% change in price. Nevertheless, breaking BM_t into its components enhances estimates of expected returns because more recent changes in book equity and price are more informative than more distant changes. In terms of our valuation framework, the full-period results suggest that breaking the book-to-market ratio into the three components of equation (1) unlocks information about expected cashflows that improves estimates of ABM expected returns.

III. Regressions (5) and (6) for Microcap Stocks

The main difference between the results for Microcap and ABM stocks is in the slopes for the lagged price change, $dM_{t-k,t}$. For ABM stocks the negative average slopes for $dM_{t-k,t}$ 1927 to 2006 in regression (5) are similar in magnitude to the positive average slopes for the lagged change in book equity, $dB_{t-k,t}$ (Part A of Table II). But for Microcaps, the average slopes for $dM_{t-k,t}$ (Part A of Table III) are more extreme than the average slopes for either $dB_{t-k,t}$ or the lagged book-to-market ratio, BM_{t-k}. (Similar results are observed in the 1927 to 1963 and 1963 to 2006 regressions for Microcaps, not shown). The results suggest that for Microcaps the lagged price change, $dM_{t-k,t}$, has more power to explain expected returns than either the change in book equity, $dB_{t-k,t}$, or the lagged book-to-market ratio, BM_{t-k}.

Table III about here.

Formal tests support this inference. For 1927 to 2006, the mean of the sum of the slopes for $dB_{t-k,t}$ and $dM_{t-k,t}$ in (5) ranges from -1.70 (k = 12) to -3.07 (k = 60) standard errors from zero (Part A of Table III), thus suggesting that for Microcaps the true slopes for $dM_{t-k,t}$ are further from zero than the slopes for $dB_{t-k,t}$. In the estimates of (6), which substitutes the most recent BM_t for the lagged ratio in (5), the average slope for $dM_{t-k,t}$ is -2.76 (k = 12) to -4.70 (k = 60) standard errors from zero (Part B of Table III). This test thus suggests that for Microcaps, the true slopes for $dM_{t-k,t}$ in (5) are also further from zero than the true slopes for BM_{t-k}. Or more directly, $dM_{t-k,t}$ improves forecasts of returns from BM_t.

The remaining issue is whether $dB_{t-k,t}$ and BM_{t-k} add anything to return predictions for Microcaps. In the estimates of (5) for 1927 to 2006, the average slope for BM_{t-k} is 2.83 standard errors from zero for k = 12. The average slopes and t-statistics fall for longer lags, but this is not surprising if old news is less relevant than new news (see below). The average slopes for $dB_{t-k,t}$ are close to the slopes for BM_{t-k}. The absence of marginal explanatory power for $dB_{t-k,t}$ in the estimates of (6) in Part B of Table III confirms that the true slopes for $dB_{t-k,t}$ in (5) are not distinguishable from the slopes for BM_{t-k}. A reasonable conclusion is that $dB_{t-k,t}$ and BM_{t-k} contribute to the estimates of expected returns on Microcaps, they do so with about equal force but with less force than past price changes.

Microcaps may share one result with ABM stocks: more recent news about book equity and price seems to be more relevant than old news. Thus, for Microcaps the average slopes for $dM_{t-k,t}$, $dB_{t-k,t}$, and BM_{t-k} in (5) are less extreme for longer lags, two of the three average slopes for BM_{t-k} are closer to zero than the slopes for $dB_{t-k,t}$, and the average slopes for BM_{t-k} are much closer to zero than the slopes for $dM_{t-k,t}$ (Part A of Table III).

All this matches, at least qualitatively, what we observe for ABM stocks, but the formal inference that old news is less relevant than new news is more clouded for Microcaps. The problem may arise from the evidence that lagged changes in price are more informative about expected returns on Microcaps than lagged changes in book equity. Though BM_{t-k} is older than $dB_{t-k,t}$, BM_{t-k} is in part due to past price changes, which tends to beef up its information about expected returns relative to $dB_{t-k,t}$. Perhaps as a result, the average slopes for $dB_{t-k,t}$ are always well within a standard error of the average slopes for BM_{t-k} (see the estimates of (6) in Part B of Table III.) The average slopes for $dM_{t-k,t}$ are always much further from zero than the BM_{t-k} slopes, but this may not mean that old news is less relevant than new news, since changes in price are in general more informative about expected returns on Microcaps than changes in book equity, and BM_{t-k} is a mix of both.

In sum, the regressions for Microcap stocks suggest that the components of the book-to-market ratio produce better estimates of expected returns than BM_t alone. In terms of our valuation framework, the results for Microcaps say that breaking BM_t into its components helps isolate information about expected cashflows that enhances estimates of expected returns. For Microcaps, the heavy lifting in terms of marginal explanatory power seems to come from lagged changes in price. (The conclusions in Section VI offer explanations.) The tests on Microcaps also suggest that new news improves estimates of expected returns more than old news, but this inference is less clearcut for Microcaps than for ABM stocks.

IV. Tangible and Intangible Information

Focusing on 5-year lagged changes in book equity, price, and shares outstanding, Daniel and Titman (2006) estimate regression (5) for July 1968 to December 2003 for a sample of stocks similar to our ABM sample. Their inferences, however, center on a different regression in which the lagged change in price, $dM_{t-60,t}$, is replaced by the residual from the regression of $dM_{t-60,t}$ on BM_{t-60} and $dB_{t-60,t}$. They call the change in book equity, $dB_{t-60,t}$, tangible information and they call the residual from their $dM_{t-60,t}$ regression intangible information. In their return regressions, BM_{t-60} and the orthogonalized version of $dM_{t-60,t}$ show explanatory power, but the average slope on $dB_{t-60,t}$ is close to zero. They conclude that changes in the book-to-market ratio from *t*-60 to *t* due to intangible information that arises during the period are important for estimates of expected returns, but changes due to the tangible information in the change in book equity have no role. This conclusion seems in conflict with our inference that for ABM stocks, changes in book equity are as relevant for expected returns as changes in price.

In fact there is no conflict. To see the point, consider a simplified version of the Daniel-Titman model that captures the essence of their story.[2] Accepting their definition, suppose the change in book equity, $dB_{t-k,t}$, is the tangible information that arises between *t*-*k* and *t*. Suppose the change in price from *t*-*k* to *t* includes both tangible and intangible information, $dM_{t-k,t} = dB_{t-k,t} + I_{t-k,t}$, so intangible information is $I_{t-k,t} = dM_{t-k,t} - dB_{t-k,t}$. If we substitute $I_{t-k,t}$ for $dM_{t-k,t}$ in regression (5), nothing changes except the slope for $dB_{t-k,t}$, which becomes the sum of the slopes for $dB_{t-k,t}$ and $dM_{t-k,t}$ in (5). For ABM stocks, the average slopes for $dM_{t-k,t}$ and $dB_{t-k,t}$ are close in magnitude and opposite in sign, and the sum of the slopes is indistinguishable from zero (last column of Part A of Table II). Thus, the average slope for $dB_{t-k,t}$ disappears in the version of regression (5) emphasized by Daniel and Titman (2006), leading to their inference that tangible information that arises between *t*-*k* and *t* is irrelevant for future expected returns.

In our terms, there is a simpler interpretation of the regression that substitutes $I_{t-k,t}$ for $dM_{t-k,t}$ in (5). From equation (1) and the definition of intangible information as $I_{t-k,t} = dM_{t-k,t} - dB_{t-k,t}$, the change in the book-to-market ratio from *t-k* to *t* is

$$BM_t - BM_{t-k} = dB_{t-k,t} - dM_{t-k,t} = -I_{t-k,t}. \quad (7)$$

In words, the book-to-market ratio changes only because of intangible information, the excess of the change in price over the change in book equity. Thus, the conclusion that expected returns change only because of intangible information is equivalent to our more direct conclusion that for ABM stocks, the change in the book-to-market ratio from *t-k* to *t* is relevant for future expected returns, but the origins of the change in BM_t in terms of past changes in book equity and past changes in price are irrelevant because a 1% change in book equity contributes as much to expected return estimates as a 1% change in price.

Does the transformation of variables emphasized by Daniel and Titman (2006) provide interesting information about the roles of tangible and intangible information in expected returns? The answer is yes if one accepts that it is reasonable to define tangible information as the change in book equity, $dB_{t-k,t}$ (and if one keeps in mind that their conclusion about the irrelevance of tangible information is equivalent to our simpler conclusion that a change in the book-to-market ratio due to a 1% change in book equity adds as much to estimates of expected returns as a 1% change in price). But our view (motivated by the evidence of Fama and French (1995)), is that the part of $dB_{t-k,t}$ that was unexpected as of *t-k* contains news about expected cashflows after *t* that is properly viewed as intangible. In this view, the return regression emphasized by Daniel and Titman (2006) does not isolate the effects of tangible and intangible information since their version $dM_{t-k,t}$ is orthogonalized with respect to $dB_{t-k,t}$, and the slope on $dB_{t-k,t}$ is left to capture its mix of tangible and intangible information. (The slope on $dB_{t-k,t}$ is the same as if $dM_{t-k,t}$ is not in the regression.)

We see no way to set up a return regression that separates the effects of tangible and intangible information in an interesting and meaningful way. But that is not what we are trying to do. Our simple goal is to examine whether the origins of the book-to-market ratio in terms of past changes in book equity and price enhance the estimates of expected returns provided by BM_t alone. For this purpose, including $dB_{t-k,t}$ and $dM_{t-k,t}$ directly in the return regressions, as in (5) and (6), does the trick.

V. Share Issues and Repurchases

Earlier studies typically identify stock issues and repurchases via public announcements. With this approach, many events are missed and sample periods are limited. Like Daniel and Titman (2006) and Pontiff and Woodgate (2006), we measure net share issues via CRSP, using the change over k months in split-adjusted shares outstanding, $NS_{t-k,t}$ (k = 12, 36, 60), which is negative when firms on balance repurchase during the k-month period and positive when on balance they issue. This approach allows us to cover all issues and repurchases, including those not publicized. It also allows us to examine the relation between average returns and net issues for the entire 1927 to 2006 period.

It is worth noting that, like other variables in regression (5), $NS_{t-k,t}$ is measured long before the returns it is used to explain. Specifically, $NS_{t-k,t}$ is the change in shares outstanding for the k months ending in December of year t-1, so the *last* month of share changes in $NS_{t-k,t}$ is at least six months before the monthly returns $NS_{t-k,t}$ is used to explain (July of t through June of t+1). Thus, pure announcement effects associated with net share issues should have played out when we use $NS_{t-k,t}$ to predict returns, and any forecast power can be attributed to longer-term information about expected returns.

A. Average Regression Slopes

Tables II and III provide results for only the full 1927 to 2006 sample because most of the slopes for the first half of the sample are indistinguishable from the estimates for the second. The average slopes for the net share issues for All but Micro stocks are the exception. The estimates for 1927 to 1963 and 1963 to 2006, in Table IV, differ by more than two standard errors. Indeed, the contrast between the slopes for the two periods is the most interesting part of the $NS_{t-k,t}$ story.

Table IV about here.

Consistent with Daniel and Titman (2006), Table IV shows that net share issues help predict stock returns during 1963 to 2006. In the regressions for 1963 to 2006 the average slopes for $NS_{t-k,t}$ are negative, more than -5.0 standard errors from zero for ABM stocks, and more than -3.5 standard errors from zero for Microcaps. Without showing the details, we can report that, using *t*-statistics for the average slopes as the metric, $NS_{t-k,t}$ is the most powerful explanatory variable in the regressions for ABM stocks for 1963 to 2006, and its explanatory power for Microcaps is similar to that of the price change, $dM_{t-k,t}$. Thus, like earlier work, our 1963 to 2006 results say that larger net share issues are followed by lower long-term returns. (See Mitchell and Stafford (2000) and Ritter (2003) for summaries of previous work.) Note, however, that for ABM and Microcaps alike, the average slopes for $NS_{t-k,t}$ decline for longer lags *k*. Thus, a 1% change in shares outstanding says less about expected returns the further it is in the past.

The earlier 1927 to 1963 period produces a startling turnabout, at least for the ABM stocks that account for the lion's share of stock market wealth. Like Pontiff and Woodgate (2006), we find that the explanatory power of net share issues observed for ABM stocks for 1963 to 2006 is absent in the earlier period. The average $NS_{t-k,t}$ slopes for ABM stocks for 1927 to 1963 are small relative to their standard errors, and two of three are positive (Table IV).

The average $NS_{t-k,t}$ slopes for Microcaps for 1927 for 1963 are all negative, and they are not typically closer to zero than the slopes for 1963 to 2006. But high return volatility and small sample sizes (on average there are just 141 Microcaps during 1927 to 1963) render the 1927 to 1963 regression results for Microcaps unreliable. The portfolio tests below suggest that, for Microcaps and ABM stocks alike, there is no pattern in the relation between average returns and $NS_{t-k,t}$ during 1927 to 1963.

The results for net share issues for 1927 to 1963 are so contrary to the results for later periods that have stirred the literature, they warrant further study. We first examine how the cross-section of net issues changes over time for clues as to why predictions of returns from net issues might change. We then use a portfolio approach to provide a more direct perspective on stock returns after net issues.

B. The Cross-Section of Net Share Issues

Table V summarizes the cross-section of $NS_{t-k,t}$ for All but Micro stocks for 1- and 5-year issuing intervals (k = 12 and 60, omitting k = 36 to save space). Results are shown for 1927 to 1963, 1963 to 2006, and for periods that split in 1963 and (except for the first and last) are 10 years long. The table shows the average percents of ABM firms and ABM total market cap with negative, zero, and positive $NS_{t-k,t}$. The table also shows averages of the annual quintile breakpoints for positive net issues (called issues) by ABM firms and the 50th percentile of negative net issues (repurchases). Issues outnumber repurchases more than three to one, so we show a finer grid for issues. Finally, $NS_{t-k,t}$ is the change from t-k to t in the log of shares outstanding, but the breakpoints shown in Table V are simple percent changes.

Table V about here.

Viewed on a yearly basis ($NS_{t-12,t}$), most ABM firms do not issue or repurchase stock during the early years of 1927 to 2006. In more recent years, most firms issue or repurchase every year. The fraction of firms with zero $NS_{t-12,t}$ peaks at 92.2% for 1933 to 1943 and declines rather steadily to 2.6% for 1993 to 2006 (Table IV). The percent of ABM firms that issue ($NS_{t-12,t} > 0$) rises from 6.1% for 1933 to 1943 to 73.4% for 1993 to 2006. Similarly, the fraction of ABM firms that repurchase ($NS_{t-12,t} < 0$) increases from a low of 1.7% for 1933 to 1943 to 24.0% for 1993 to 2006. Confirming Bagwell and Shoven (1989), there is a surge in repurchases after 1982. The clear inference from these results is that the costs associated with issues and repurchases decline over time and/or the benefits increase.

On average, only 24.0% of ABM firms are net issuers during any given year from 1927 to 1963, but the average rises to 44.5% for 5-year issuing intervals. Thus, even during the early years of the sample, large fractions of ABM firms issue stock at some point during any 5-year period, a result of some import for evaluating the return evidence of early years. In contrast, during 1963 to 2006 an impressive 68.1% of ABM firms issue in any given year, rising only to 75.8% for 5-year intervals. We conclude that during later years, firms that issue tend to issue frequently, but this is less true in earlier years.

A similar result holds for repurchases. During 1927 to 1963, on average 6.1% of ABM firms repurchase (or otherwise reduce shares outstanding) in any given year, and the fraction almost doubles to

11.5% for 5-year intervals. More than 23% of ABM firms repurchase during any given year of the 1983 to 2006 peak period, but the fraction rises only to about 27% for 5-year intervals. Thus, during the later years of the sample, ABM firms that repurchase tend to repurchase often.

Stock issues are less frequent during the early years of 1927 to 2006, but when they occur, they tend to be larger than in later years. For example, among ABM firms with positive $NS_{t-12,t}$, the 60th percentile of annual issues averages 8.53% of stock outstanding for 1927 to 1963, versus 2.55% for 1963 to 2006. A likely explanation is that many stock issues of later years are to employees via options, grants, and other benefit programs that, on a year-to-year basis, involve rather small fractions of shares outstanding. Such benefit programs are rare during the early years of the sample. Stock issues via seasoned equity offerings (SEOs) or as payment in mergers tend to be larger. They are relatively infrequent throughout the sample period, but they are a larger fraction of issue events earlier in the period.

The differences between the ABM cross-sections of share issues for early and later years of the sample shrink when we expand the interval for measuring issues from one to five years. In fact, the average quintile breakpoints for 5-year issues ($NS_{t-60,t}$) are similar for 1931 to 1963 and 1963 to 2006. For 5-year intervals, issues are large even at lower percentiles of the cross-section. For example, the 40th percentile of 5-year issues is 9.48% of stock outstanding for 1931 to 1963 and 9.24% for 1963 to 2006. In contrast, the 40th percentile of 1-year issues is 2.89% of stock outstanding for 1927 to 1963 and a puny 0.94% for 1963 to 2006.

Why do the cross-sections of issues for early and later years converge when we extend the issuing interval from one to five years? Later in the sample, many firms make relatively small issues of stock, primarily in employee compensation plans (Fama and French (2006)). Except at the high end, these small issues dominate the cross-section of 1-year issues. Over 5-year intervals, however, firms are more likely to engage in one or more large issues (SEOs and stock financed mergers). These large events play a big role in the entire cross-section of 5-year issues. As a result, the distribution of 5-year issues for later years looks much like that of earlier years, where large issues always dominate the cross-section.

Repurchases are more frequent after 1982, and they increase in size. In the 10-year periods before 1983, the median repurchase of ABM firms that retire shares in any given year averages less than 0.6% of shares outstanding. During 1983 to 2006, the median repurchase is about 2.0% of outstanding shares. The median repurchase size for 5-year changes also jumps after 1982, from 2.70% of shares for for 1973 to 1983, to a substantial 6.40% for 1983 to 1993.

Unfortunately, there are no clear clues in all this about why net share issues have more information about ABM expected returns later in the sample period. Issues and repurchases are more common in later years. If market timing is the story, intuition suggests that net issues should be less informative when they are more humdrum, the opposite of what we observe. On the other hand, if net issues help isolate information about expected cashflows that improves estimates of expected returns, the higher frequency and more complete spectrum of net issues in later years may enhance the role of $NS_{t-k,t}$. The problem with this story is that there are plenty of large net stock issues throughout the sample period, and it is difficult to explain why large issues add nothing to the explanation of ABM expected returns during the early years of the sample period but (as we see next) they play a big role later on.

C. The Cross-Section of Average Returns

Table VI shows average residuals, sorted on $NS_{t-k,t}$, from the regressions in Table I, which use MC_t and BM_t to estimate expected returns. Table VI allows us to examine how average returns vary with $NS_{t-k,t}$ after adjusting for market cap and book-to-market effects. We call these adjusted average returns abnormal returns. To have comparable results for ABM and Microcaps, the breakpoints for $NS_{t-k,t}$ in Table VI are those for ABM stocks summarized in Table V.

Table VI about here.

The portfolio results in Table VI confirm the inferences from the regression slopes in Table IV. For all issuing horizons, net share issues do not reliably predict returns during 1927 to 1963. For ABM stocks, the 1927 to 1963 abnormal returns following the extreme 50% of repurchases of the last year and the last three years (k = 12 and 36) are positive and similar to those for 1963 to 2006, but the small repurchase samples of the early years make for unreliable inferences. There is no pattern in the 1927 to 1963 abnormal returns following the more numerous stock issues of ABM firms. Thus, like the regression slopes in Table IV, the sorts for 1927 to 1963 in Table VI fail to produce the negative relation between ABM average returns and net share issues observed in papers that focus on the subsequent period.

For Microcaps, there are no patterns in 1927 to 1963 abnormal returns after repurchases or issues (Table VI). Thus, the fact that the average $NS_{t-k,t}$ slopes for Microcaps for 1927 to 1963 in the regressions (Table IV) are negative is apparently less important than the fact that they are statistically unreliable. In any case, like the sorts for ABM stocks, the $NS_{t-k,t}$ sorts for Microcaps for 1927 to 1963 fail to produce the negative relation between average returns and net share issues observed in the subsequent period.

Like the regressions, the $NS_{t-k,t}$ sorts for 1963 to 2006 produce strong evidence that net share issues predict returns. For ABM stocks, the action in the returns for 1963 to 2006 from the sorts is in the extremes of net issues. The abnormal return for the extreme 50% of repurchases of the preceding year is 0.25% per month (t = 4.66), the abnormal return for the extreme 20% of last year's issues is -0.41% per month (t = -5.57), and abnormal returns outside the extremes are much closer to zero (Table VI). These results are not surprising since much of the action in $NS_{t-k,t}$ itself during 1963 to 2006 is in the extremes (Table V).

Earlier studies find that the negative abnormal returns following stock issues and the positive abnormal returns following repurchases persist for years. Like the regressions (Table IV), the sorts of ABM abnormal returns for 1963 to 2006 (Table VI) support this conclusion. The extreme 50% of repurchases of the last five years are good news for ABM monthly returns (the abnormal return is more than four standard errors above zero), and returns following these large repurchases do not decline as the repurchase horizon is extended from one to five years. Abnormal returns after stock issues fall a bit when the issuing horizon is extended beyond a year, but the extreme 20% of the issues of the last one, three, and five years are nevertheless bad news for ABM returns (abnormal returns more than -4.5 standard errors from zero).

The abnormal returns for 1963 to 2006 for Microcap firms that issue stock ($NS_{t-k,t} > 0$) are similar to the ABM results. Again, we observe strong negative abnormal returns for the largest quintile of issues. And the abnormal returns of Microcap firms that issue decay only slightly as the horizon for issues is extended from one to five years. The results for the repurchases of 1963 to 2006 are, however, different for Microcaps. In particular, the strong positive abnormal returns observed in the year after extreme repurchases by Microcap firms disappear for repurchases over the last three or five years. This is in contrast to the persistence of repurchase returns for ABM stocks.

Finally, we caution against reading too much into the full cross-section of abnormal returns in Table VI. The abnormal returns are averages across months of regression residuals that average to zero every month. Thus, large abnormal returns in the extremes must be absorbed by the remaining cells in the sorts. Patterns in the way abnormal returns vary across the cells of the sorts are, however, meaningful. For example, the decline in ABM abnormal returns across the sort cells from the extreme repurchases to the extreme issues of 1963 to 2006 is meaningful (and consistent with the negative average regression slopes for $NS_{t-k,t}$ in Table IV), but the fact that the average residuals for less extreme issues are mostly positive is probably misleading. There is, however, nothing mechanical in the finding that abnormal returns for 1927 to 1963 bounce about rather randomly across the cells of the $NS_{t-k,t}$ sorts (which is consistent with the statistically weak average regression slopes for $NS_{t-k,t}$ observed for this period in Table IV).

VI. Conclusions

We examine whether the origins of the book-to-market ratio, BM_t, in terms of past share issues, $NS_{t-k,t}$, past changes in price and book equity, $dM_{t-k,t}$ and $dB_{t-k,t}$, and the more distant changes in price and book equity summarized by BM_{t-k} can be used to provide better estimates of expected returns than BM_t alone. Our hypothesis is that the components of BM_t help disentangle the information in the ratio about expected cashflows and expected returns, thus enhancing estimates of expected returns.

Our tests favor this hypothesis, and the results for Micro and All but Micro stocks are similar in three respects. (i) For both size groups, the average regression slopes for BM_{t-k}, $dM_{t-k,t}$, and $dB_{t-k,t}$ for 1927 to 1963 are close to the average slopes for 1963 to 2006. (ii) In contrast, $NS_{t-k,t}$ is a powerful variable in estimates of expected returns for 1963 to 2006 but not for 1927 to 1963. (iii) For Microcap and ABM stocks alike, more recent changes in price, book equity, and shares outstanding are more relevant for estimates of expected returns than more distant changes.

The results for Microcap and ABM stocks diverge in one important respect. For ABM stocks, there is no reliable evidence that the true slopes for $dM_{t-k,t}$ and $dB_{t-k,t}$ in (5) differ in magnitude. In other words, though old news about changes in price and book equity is less relevant in estimates of expected returns than new news, a 1% change in book equity is as relevant as a 1% change in price of the same age. In contrast, for Microcaps, changes in price play a much more powerful role in expected return estimates than changes in book equity.

Why do past changes in price contribute more than changes in book equity to estimates of expected returns on Microcaps? The valuation framework of equation (4) tells us that past variables contribute to expected returns because they have information about expected cashflows and/or expected returns. The high volatility of fundamentals for Microcaps may mean that past changes in fundamentals like book equity have more noise and thus less information about the future than is the case for ABM stocks. Likewise, the higher volatility of price changes for Microcaps implies more volatility in changes in expected cashflows and/or expected returns that may help make the information in changes in book equity less relevant for estimates of expected returns.

A caveat is, however, in order. Our tests hinge on the proposition that past changes in book equity and price contain different mixes of information about expected cashflows and expected returns, but there are no clear predictions about how this plays out in terms of marginal explanatory power. And there is no particular reason that the story should be the same for different types of stocks.

Indeed, the more surprising evidence may be that for ABM stocks, $dM_{t-k,t}$ and $dB_{t-k,t}$ seem to have similar roles in estimates of expected returns. Before doing the tests, our presumption was strong that

$dM_{t-k,t}$ and $dB_{t-k,t}$ contain different mixes of information about expected cashflows and returns that would lead to different regression slopes for the two variables in (5). For ABM stocks, however, and for whatever reason, the information about expected cashflows and returns in the two variables combines in such a way as to leave us powerless to identify differences in their true slopes in (5).

The existing literature leans toward a mispricing story for the long-term abnormal returns after the stock issues and repurchases of 1963 to 2006. (Firms issue when stock prices are too high, firms repurchase when prices are too low, and prices respond only slowly to these actions.) The results for 1927 to 1963 render this story suspect, unless one is willing to argue that managers only learned over time to recognize when their stocks are mispriced, and investors never learned. In terms of our valuation framework, the results say that $NS_{t-k,t}$ helps isolate information about expected cashflows to improve estimates of expected returns for 1963 to 2006, but (for whatever reason) this is not true for 1927 to 1963.

Finally, there is an issue on which our results are silent: whether the cross-section of expected stock returns is the result of rational or irrational pricing. Our tests are motivated by the valuation equation (4). Fama and French (2006) emphasize that (4) accommodates both rational and irrational stories about expected returns and cannot in itself distinguish between them. And whether breaking BM_t into its components enhances estimates of expected returns sheds no light on the timeworn conundrum of whether expected returns are the result of rational or irrational pricing.

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Endnotes

[1] The links between the slopes in (1) and (3) do not hold exactly in the results reported below. The violations (always trivial) are caused by differences in the winsorized versions of BM_{t-k} and BM_t. (We winsorize the explanatory variables in (1) and (3) at the 0.005 and 0.995 levels each month.) Without winsorization, the links between the slopes in (1) and (3) hold exactly.

[2] We thank a referee for suggesting this simplification of the model of Daniel and Titman (2006).

Table I
Regressions that use market cap (MC_t) and the book-to-market ratio (BM_t) to predict monthly excess returns for All but Micro and Microcaps for 1927-2006

The table shows average slopes and their *t*-statistics from cross-section regressions to predict monthly returns (in excess of the 1-month Treasury bill rate) for individual All but Micro stocks (above the 20th percentile of market cap for NYSE stocks) and Microcaps (below the 20th NYSE market cap percentile). Here and in the tables that follow, the *t*-statistics for the average slopes use the time-series standard errors of the average slopes, as in Fama and Macbeth (1973). The regressions, estimated monthly, use variables that are updated at the end of June each year to explain monthly returns from July through June of the following year. Results are shown for July 1927 to December 2006 (1927-2006). Stocks is the average number of stocks in the regressions. MC_t is the natural log of market cap (price times shares outstanding) at the end of June, and BM_t is the log of the ratio of book and market equity per share. Book equity in BM_t is for the fiscal year ending in the preceding calendar year, and market equity is for the end of December of the preceding calendar year. The monthly regressions for July of year *t* to June of *t*+1 include NYSE, Amex (after 1962), and NASDAQ (after 1972) stocks with positive book equity for the fiscal yearend in the preceding calendar year, *t*-1. Book equity for 1962-2006 is Compustat's total assets (data item 6), minus liabilities (181), plus deferred taxes and investment tax credit (35) if available, minus (as available) liquidating (10), redemption (56), or carrying value (130) of preferred stock. Book equity for NYSE stocks for years before 1962, and for NYSE firms missing from Compustat after 1962, is hand collected from Moody's manuals. The regression R^2 is the average of monthly coefficients of determination adjusted for degrees of freedom.

	Stocks	Intercept	MC_t	BM_t	R^2
		All but Micro Stocks			
Slope	958	1.15	-0.07	0.21	0.03
t-statistic		3.69	-1.98	3.29	
		Microcaps			
Slope	1000	1.97	-0.53	0.30	0.02
t-statistic		5.68	-4.77	4.17	

Table II
Estimates of regressions (5) and (6) for All but Micro stocks for 1927-2006

The table shows average slopes and their *t*-statistics from cross-section regressions to predict monthly returns (in excess of the 1-month bill rate) for All but Micro stocks (those with market cap above the 20th percentile for NYSE stocks). The regressions are estimated monthly, using variables updated annually at the end June to explain returns for July through the following June. The 1927-2006 date range corresponds to the k = 12 period for monthly returns, specifically July 1927 to December 2006. For k = 36 and k = 60 the first regressions are for July 1929 and July 1931, respectively. Stocks is the average number of stocks in the regressions. MC_t is the natural log of market cap at the end of June, and BM_t is the log of the ratio of book and market equity per share, defined as in Table I. The changes in the logs of price and book equity per share, $dM_{t-k,t}$ and $dB_{t-k,t}$, are for the k months preceding the price and book equity in BM_t. The change in the log of split-adjusted shares outstanding, $NS_{t-k,t}$, covers the same period as $dM_{t-k,t}$. The regression R^2 is an average of monthly values that are adjusted for degrees of freedom. The last column of Part A shows the average value of the sum of the slopes for $dB_{t-k,t}$ and $dM_{t-k,t}$ along with the *t*-statistic for the average value, computed (like the *t*-statistics for all the average slopes) using the time-series standard error of the average sum, as in Fama and Macbeth (1973).

Part A: Estimates of regression (5), which uses BM_{t-k} as an explanatory variable

	Stocks	Intercept	MC_t	BM_{t-k}	$dM_{t-k,t}$	$dB_{t-k,t}$	$NS_{t-k,t}$	R^2	$dB_{t-k,t} + dM_{t-k,t}$
k = 12									
Slope	958	1.17	-0.08	0.15	-0.33	0.41	-0.98	0.05	0.08
t-statistic		4.17	-2.36	2.65	-2.41	3.61	-4.39		0.41
k = 36									
Slope	878	1.17	-0.09	0.15	-0.29	0.38	-0.41	0.05	0.09
t-statistic		4.34	-2.82	2.39	-3.06	4.71	-3.49		0.98
k = 60									
Slope	810	1.34	-0.09	0.12	-0.28	0.25	-0.31	0.05	-0.03
t-statistic		5.01	-3.21	1.95	-3.56	3.64	-3.66		-0.40

Part B: Estimates of regression (6), which uses BM_t as an explanatory variable

	Stocks	Intercept	MC_t	BM_t	$dM_{t-k,t}$	$dB_{t-k,t}$	$NS_{t-k,t}$	R^2
k = 12								
Slope	958	1.17	-0.07	0.16	-0.17	0.25	-0.98	0.05
t-statistic		4.18	-2.35	2.75	-1.38	2.31	-4.41	
k = 36								
Slope	878	1.17	-0.09	0.15	-0.14	0.24	-0.41	0.05
t-statistic		4.35	-2.83	2.34	-1.77	3.42	-3.49	
k = 60								
Slope	810	1.34	-0.09	0.12	-0.16	0.13	-0.30	0.05
t-statistic		5.02	-3.21	1.92	-2.64	2.32	-3.60	

Table III
Estimates of regressions (5) and (6) for Microcaps for 1927-2006

The table shows average slopes and their *t*-statistics from cross-section regressions to predict monthly returns (in excess of the 1-month bill rate) for Microcap stocks (those with market cap below the 20th percentile for NYSE stocks). The regressions are estimated monthly, using variables updated annually at the end June to explain returns for July through the following June. The 1927-2006 date range corresponds to the k = 12 period for monthly returns, specifically July 1927 to December 2006. For k = 36 and k = 60 the first regressions are for July 1929 and July 1931, respectively. Stocks is the average number of stocks in the regressions. MC_t is the natural log of market cap at the end of June, and BM_t is the log of the ratio of book and market equity per share, defined as in Table I. The changes in the logs of price and book equity per share, $dM_{t\text{-}k,t}$ and $dB_{t\text{-}k,t}$, are for the k months preceding the price and book equity in BM_t. The change in the log of split-adjusted shares outstanding, $NS_{t\text{-}k,t}$, covers the same period as $dM_{t\text{-}k,t}$. The regression R^2 is an average of monthly values that are adjusted for degrees of freedom. The last column of Part A shows the average value of the sum of the slopes for $dB_{t\text{-}k,t}$ and $dM_{t\text{-}k,t}$ along with the *t*-statistic for the average value.

Part A: Estimates of regression (5), which uses $BM_{t\text{-}k}$ as an explanatory variable

	Stocks	Intercept	MC_t	$BM_{t\text{-}k}$	$dM_{t\text{-}k,t}$	$dB_{t\text{-}k,t}$	$NS_{t\text{-}k,t}$	R^2	$dB_{t\text{-}k,t} + dM_{t\text{-}k,t}$
k = 12									
Slope	1000	1.97	-0.51	0.21	-0.62	0.19	-2.21	0.02	-0.43
t-statistic		6.21	-4.88	2.83	-3.76	1.02	-1.71		-1.70
k = 36									
Slope	803	1.67	-0.44	0.13	-0.54	0.17	-0.78	0.03	-0.36
t-statistic		5.05	-3.77	1.66	-4.80	1.57	-2.57		-2.67
k = 60									
Slope	650	1.62	-0.41	0.10	-0.53	0.12	-0.34	0.03	-0.40
t-statistic		5.02	-3.42	1.20	-5.00	1.22	-1.70		-3.07

Part B: Estimates of regression (6), which uses BM_t as an explanatory variable

	Stocks	Intercept	MC_t	BM_t	$dM_{t\text{-}k,t}$	$dB_{t\text{-}k,t}$	$NS_{t\text{-}k,t}$	R^2
k = 12								
Slope	1000	1.97	-0.51	0.20	-0.42	-0.02	-2.22	0.02
t-statistic		6.24	-4.89	2.74	-2.76	-0.08	-1.72	
k = 36								
Slope	803	1.66	-0.44	0.14	-0.40	0.04	-0.78	0.03
t-statistic		5.03	-3.70	1.80	-3.76	0.33	-2.57	
k = 60								
Slope	650	1.60	-0.40	0.13	-0.42	0.01	-0.35	0.03
t-statistic		4.99	-3.30	1.57	-4.70	0.10	-1.73	

Table IV
Average Slopes for $NS_{t\text{-}k,t}$ in regression (5)

The table shows average slopes and their *t*-statistics for the net share issues variable, $NS_{t\text{-}k,t}$, in the estimates of regression (5) for All but Micro stocks (market cap above the 20th percentile for NYSE stocks) and Microcaps (market cap below the 20th NYSE percentile) for 1927-1963 and 1963-2006. The difference between the average slopes for the two periods and the *t*-statistic for the difference are also shown. The date ranges correspond to the *k* = 12 period for monthly returns. Thus, 1927-1963 starts in July 1927 (*k* = 12), July 1929 (*k* = 36), or July 1931 (*k* = 60), and ends in June 1963. The 1963-2006 period is July 1963 to December 2006 for *k* = 12, 36, and 60.

	All but Micro			Microcaps		
k	12	36	60	12	36	60
1927-1963						
Average Slope	-0.43	0.07	0.05	-3.17	-0.77	-0.15
t-statistic	-1.14	0.36	0.43	-1.12	-1.16	-0.34
1963-2006						
Average Slope	-1.42	-0.77	-0.57	-1.42	-0.79	-0.48
t-statistic	-5.63	-5.17	-5.08	-4.94	-5.31	-3.54
Average slope for 1963-2006 minus average slope for 1927-1963						
Difference	-0.99	-0.84	-0.62	1.75	-0.01	-0.33
t-statistic	-2.16	-3.57	-3.74	0.62	-0.02	-0.72

Table V
Cross-section distributions of net share issues ($NS_{t-k,t}$) for All but Micro Stocks

$NS_{t-k,t}$ is the change over k (= 12 or 60) months in split-adjusted shares outstanding for All but Micro stocks. The table shows averages for the years in a period of the percent of stocks and the percent of market cap with negative (Neg), zero (0), and positive (Pos) $NS_{t-k,t}$. The table also shows averages of the median (-50%) of $NS_{t-k,t}$ for firms that repurchase ($NS_{t-k,t} < 0$) and the quintile breakpoints (20%, 40%, 60%, 80%) of $NS_{t-k,t}$ for firms that issue ($NS_{t-k,t} > 0$). The date ranges correspond to the returns that are explained by $NS_{t-k,t}$ in the regressions. For example, the results for 1963-2006 summarize the net share issues for 1- and 5-year intervals ending in December 1962 to December 2005, which are used to explain the returns for July 1963 to December 2006.

	% of Stocks			% of Market Cap			Net Share Issues				
	Neg	0	Pos	Neg	0	Pos	-50%	20%	40%	60%	80%
$k = 12$											
1927-1963	6.1	69.9	24.0	7.0	57.9	35.1	-0.56	0.35	2.89	8.53	23.25
1963-2006	18.9	13.0	68.1	25.7	8.7	65.6	-1.44	0.33	0.94	2.55	9.38
1927-1933	3.5	79.3	17.2	4.1	60.4	35.5	-0.10	0.44	6.88	15.23	37.92
1933-1943	1.7	92.2	6.1	2.8	87.2	10.0	-0.79	0.60	3.28	11.12	28.67
1943-1953	8.1	73.5	18.4	10.0	63.6	26.4	-0.76	0.21	2.31	7.80	23.14
1953-1963	9.9	38.5	51.6	9.9	21.4	68.8	-0.40	0.19	0.69	2.65	9.12
1963-1973	13.2	21.6	65.2	12.2	12.9	74.9	-0.57	0.15	0.49	1.57	5.65
1973-1983	13.6	24.8	61.6	13.6	20.2	66.2	-0.94	0.22	0.74	2.19	9.22
1983-1993	23.0	6.9	70.2	34.2	3.7	62.1	-1.88	0.28	0.83	2.27	8.78
1993-2006	24.0	2.6	73.4	38.0	1.1	60.9	-2.11	0.58	1.50	3.71	12.60
$k = 60$											
1931-1963	11.5	44.0	44.5	9.9	31.8	58.4	-1.09	2.11	9.48	21.87	50.63
1963-2006	21.8	2.4	75.8	25.6	1.1	73.3	-4.58	3.08	9.24	20.32	45.13
1931-1933	8.6	42.9	48.5	8.2	16.8	75.0	-0.08	7.44	18.25	34.24	76.39
1933-1943	6.0	68.6	25.4	6.7	50.9	42.4	-0.88	2.26	11.16	24.36	59.32
1943-1953	15.6	46.5	37.9	13.1	39.7	47.2	-1.59	1.24	8.12	20.77	51.73
1953-1963	13.7	17.0	69.4	10.1	7.6	82.2	-0.99	1.76	7.41	18.01	35.70
1963-1973	14.3	5.3	80.4	10.2	2.3	87.5	-1.72	1.38	4.35	10.73	25.28
1973-1983	17.6	2.7	79.8	14.0	1.7	84.3	-2.70	1.88	6.39	15.92	35.13
1983-1993	26.9	1.1	72.0	35.8	0.5	63.7	-6.40	3.28	9.76	20.90	44.65
1993-2006	26.7	0.9	72.4	37.5	0.4	62.1	-6.66	5.01	14.40	29.91	66.81

Table VI
Abnormal returns for All but Micro and Microcaps stocks sorted on net share issues ($NS_{t-k,t}$)

The residuals from the monthly regressions of stock returns on market cap (MC_t) and the book-to-market ratio (BM_t) in Table I are sorted on net share issues ($NS_{t-k,t}$) and grouped using the intervals of $NS_{t-k,t}$ for All but Micro stocks in Table V. The table shows the regression residuals averaged first within the cells of the sort for a month and then across months in a period. The *t*-statistics for the average residuals are also shown. Firms that repurchase are sorted into two groups, those below (<-50%) and above (-50%) the median for firms with $NS_{t-k,t} < 0$. Firms that issue ($NS_{t-k,t} > 0$) are sorted into quintiles, Low, 2, 3, 4, High. The date ranges correspond to the $k = 12$ period for monthly returns. Thus, 1927-1963 starts in July 1927 for $k = 12$, July 1929 for $k = 36$, and July 1931 for $k = 60$, and ends in June 1963. The second period, 1963-2006, is from July 1963 to December 2006 for $k = 12$, 36, and 60.

	All but Micro								Microcaps							
	Repurchases			Issues					Repurchases			Issues				
	<-50%	-50%	0	Low	2	3	4	High	<-50%	-50%	0	Low	2	3	4	High
1927-1963																
$k = 12$																
Average	0.15	-0.08	-0.00	0.10	0.28	-0.18	0.03	0.01	0.24	-0.54	-0.01	0.05	-0.51	0.58	0.13	-0.03
t-statistic	0.78	-0.54	-0.07	0.77	1.74	-1.23	0.13	0.03	0.44	-0.83	-0.21	0.06	-0.89	0.60	0.17	-0.05
$k = 36$																
Average	0.26	0.05	-0.04	0.07	0.13	0.13	0.12	-0.06	-0.16	0.26	-0.06	-0.45	-0.42	0.18	0.18	0.07
t-statistic	2.22	0.41	-1.16	0.85	1.50	1.18	0.97	-0.42	-0.33	0.77	-1.21	-1.04	-0.89	0.24	0.38	0.12
$k = 60$																
Average	0.03	0.06	-0.05	0.08	0.13	0.10	-0.03	0.09	0.25	-0.43	-0.08	-0.14	-0.88	0.28	0.34	0.29
t-statistic	0.27	0.73	-1.35	0.95	1.62	1.19	-0.28	0.66	0.43	-1.04	-1.15	-0.34	-1.50	0.62	0.75	0.69
1963-2006																
$k = 12$																
Average	0.25	0.08	-0.04	0.08	0.08	0.12	-0.05	-0.41	0.26	0.04	-0.11	-0.02	0.25	0.23	0.04	-0.38
t-statistic	4.66	1.62	-0.46	1.89	2.37	2.70	-0.91	-5.57	3.24	0.56	-2.04	-0.28	4.00	3.31	0.51	-4.58
$k = 36$																
Average	0.23	0.05	-0.13	0.03	0.10	0.10	-0.06	-0.31	0.08	0.06	-0.24	0.05	0.19	0.25	0.02	-0.35
t-statistic	3.93	0.97	-1.19	0.89	2.90	2.76	-1.05	-4.59	1.03	0.87	-2.54	0.83	3.11	3.75	0.26	-4.44
$k = 60$																
Average	0.25	0.08	-0.10	0.02	0.11	0.02	-0.02	-0.33	-0.00	0.01	-0.37	-0.00	0.16	0.15	0.12	-0.31
t-statistic	4.21	1.47	-0.81	0.42	3.54	0.55	-0.33	-5.14	-0.05	0.12	-2.93	-0.03	2.38	1.95	1.37	-3.56