The Cross-Section of Stock Returns before World War I*

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Abstract

We examine the cross-section of stock returns using an original data set containing annual observations on price, dividends, and shares outstanding for nearly all stocks listed on UK exchanges between 1870 and 1913. We supplement this data set with additional information about attrition. We construct portfolios based on past returns, size, and dividend yield and compare the properties of these portfolios created with historical UK data to identically constructed portfolios created with CRSP data. The cross-section of stock returns is completely different in historical UK and modern CRSP data. The only clear pattern in the historical UK data is the very good performance of extremely small stocks, which may merely be the result of data problems. Among the largest 99.8% of stocks by market capitalization, unlike the CRSP data, the historical UK data do not display excess returns for portfolios of small stocks or portfolios of stocks that have done badly in the past five years. Unlike modern CRSP data, stocks that do not pay dividends do not outperform stocks that pay small dividends during this period. But like modern CRSP data, there is a weak relationship between dividend yield and performance for stocks that pay dividends. In sum, the size and reversal anomalies present in modern data are not present in our historical data, while there is some evidence for a value anomaly.

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1. Introduction

In this paper, we examine the cross-section of stock returns in pre-World War I UK data. Over the last 25 years, documenting deviations from the capital asset pricing model (CAPM, Sharpe (1964) and Lintner (1965)) has been an extremely active area of research. Of these documented anomalies, the size, value, and reversal effects have been among the most studied.[3] We compare historical UK data with modern CRSP data to look for evidence of these cross-sectional asset pricing anomalies in the earlier period.

Although the presence of these anomalies has been documented in modern data for many countries, including the US and UK (Dimson et al (2002)), their interpretation is hotly debated. Many take some or all of these findings to mean that factors other than the covariance with market returns influence security returns (Jaganathan and Wang (1996), Fama and French (1993, 1996), Lettau and Ludvigson (2001a, 2001b), and many others). Another view is that these anomalies were found merely through data snooping (Lo and MacKinlay (1990)). To the degree that historical UK data are comparable to modern data, analyzing historical data may provide an out-of-sample test of the data-snooping hypothesis. We present evidence that the size and reversal anomalies are not present in historical UK data, and very weak evidence that the value anomaly (documented using dividend yield) is present in this data. While we find high returns for extremely small stocks (those comprising the smallest 0.2% of market capitalization), these results are likely the result of errors in the original publication of returns or the

[3] Momentum is a fourth commonly studied anomaly. Jagadeesh and Titman (1993) show that firms that have done well (badly) over the last three months to one year tend to continue to do well (badly). We do not look for momentum because our annual data are too coarse to identify it.

extreme illiquidity of these tiny stocks. Excluding these extremely small stocks, there is no clear relationship between size or past returns and future returns. These results provide evidence in favor of the data-snooping hypothesis, as our out-of-sample data do not contain the size or reversal anomalies discovered in the modern sample.

The remainder of the paper is laid out as follows: Section 2 provides a brief introduction to the financial market in 19th and early 20th centuries and shows their similarities to modern markets; Section 3 describes the data set and procedure used; Section 4 presents evidence on the cross-section of historical stock market returns; Section 5 concludes.

2. Overview of 19th and early 20th century British Financial Markets

Like modern American markets, British markets of the late nineteenth century were the largest and most studied equity markets of the time.[5] What were these markets like? Were British markets of a century ago large enough and diversified enough to make a useful comparison with American equity markets of the last three quarters of a century?

One difference between British markets of the 1870-1913 period and more modern American markets is that the British markets were primarily debt markets. The market capitalization of the equities in our sample is between £750 million and £1.5

[5] There were more than a dozen exchanges in England, Scotland, and Ireland during this period, with shares frequently traded on more than on exchange. London was by far the most important of these markets. (Morgan and Thomas (1962) and Michie (1987, 1999)) Kennedy (1987) discusses the consequences of capital market structures for British industrial performance.

billion. The total amount of British government debt alone ranged from £760 million to £1 billion. Including other domestic government, foreign government, and private debt, equities accounted for between about 15 percent and one third of the market during the period of our sample.

Despite the predominance of debt, the equity component of pre-World War I British markets was substantial. During the period under study, equity market capitalization of UK market data ranged from 45 percent to 85 percent of Britain's GDP. In comparison, from 1926 through 1995, the total market capitalization of the US market as measured by the CRSP data set ranged from about 20 percent (in 1942) to almost 89 percent (1995) of U.S. GDP. From 1996 through the end of our sample period (1999), the market capitalization of CRSP stocks exceeded 100 percent of GDP.

At the beginning of the period, the equity portion of the UK market was heavily weighted towards railroads and, to a lesser extent, banks but became more diversified over time. In 1870, railroads accounted for slightly over three-quarters of the market capitalization of the sample and 10 percent of the securities.[6] The industry composition of firms by market capitalization and number in 1870 is illustrated in Figure 1. The 90 percent of non-railroad firms represented a variety of industries including banking, insurance, mining, and utilities. Consequently, while railroad stocks dominated the value-weighted index at the beginning of the sample, the equal-weighted index was quite diversified across industries.

Railroads became less than 50 percent of the market capitalization in 1894, and were less than 16 percent of market capitalization by 1913. Banks grew as a share of

[6] The number of securities in the full sample ranges from about 500 to about 1150.

market capitalization, equaling nearly 19 percent by the end of the period. The other large categories (by market capitalization) at the end of the period included mines (15 percent), insurance (6 percent), canals and docks (6 percent), iron, coal, and steel (6 percent), and miscellaneous, primarily industrial (18 percent). The industry composition of firms by market capitalization and number in 1913 is illustrated in Figure 2.

3. Description of Data and Procedure

a. IMM Data

The main source of British data for this study is the Investor's Monthly Manual (IMM), which was published in London beginning in 1864.[7] The IMM presents comprehensive end-of-month data for "stocks" (i.e., bonds) and "shares" (i.e., equities) traded on British, and some foreign, exchanges.[8] In this paper, we use the modern convention of using the word "stock" to mean equities. The complete sample contains more than 40,500 observations on some 3,100 equity securities issued by approximately 2,700 companies.[9]

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[7] For a more comprehensive discussion of the British data used in this paper, see Grossman (2002).

[8] The IMM included securities traded on both the London and provincial stock exchanges, as well as securities that were simultaneously listed on British and foreign exchanges.

[9] This dataset is not the first to be constructed to investigate late nineteenth century British markets. Smith and Horne (1934) collected monthly data on between 25 and 77 companies between January 1867 and June 1914. Unfortunately, this data set is relatively small, contains no data on banks, insurance companies, or railroads, contains no dividend data, and uses an inconvenient weighting scheme. Edelstein (1976) presents annual holding returns (dividends plus capital gains) on domestic and foreign equity, preference, and debenture issues for the period 1870-1913 using 556 issues. See also Edelstein (1982). Dimson et al.'s (2002) annual index starts in 1900. Green et al. (1996) construct a monthly index starting in 1866 that consists of between 25 and 150 industrial and utility shares. See also Green et al. (2000).

Annual data on all ordinary shares are gathered from the December issue of the IMM. For each share in each year, end-of-year data are collected on: (1) the number of shares outstanding; (2) the nominal share amount; (3) the paid-in amount; (4) share price; and (5) dividends paid in the calendar year. Information is not collected on shares for which any of this information—with the exception of dividends, which are typically zero if left blank—was omitted.[10]

Calculating the one-year holding return of a modern share is straightforward: it is merely the change in price plus any dividends that accrue to that share. Shares listed in Britain during the 1870-1913 period, however, had an additional feature not found in modern US equities. Shares were typically issued with a non-trivial nominal value, although frequently only a portion of this nominal value was paid in by shareholders. Thus, a shareholder who purchased a £20 share with £15 "paid in," both purchased an equity stake in the company as well as a £5 liability that could be called by the company at some time in the future. Shares not fully paid in account for approximately a third of the observations in the sample. They have similar dividend yields and slightly lower average market capitalization than fully paid in firms. Since it is not clear how best to scale returns for firms that were not fully paid in, we do not include such firms in our portfolios. These firms can be identified and excluded ex-ante, so there is no reason to believe that their exclusion introduces selection bias in the results.

Despite the wealth of data available, the peculiarities of the IMM and the idiosyncrasies of late nineteenth century British securities market present several obstacles. For example, the IMM did not include separate tables for stocks and bonds. Fixed income securities are sometimes distinguishable by the title of the issue (which

[10] A missing latest price suggests that the share was not actively traded in the month.

might, for example, include a maturity or an interest rate) or by other means. Issues that appear to be fixed income securities by any of these criteria are excluded.[11] In addition, shares issued in foreign currencies are excluded.[12]

Dividend data present several difficulties. For each share, the IMM reported the last four dividend payments, usually expressed as a percent of the share's par value.[13] To the extent possible, dividends are credited to total return in the calendar year in which they were paid, which may differ from the year in which they were announced. However, dating dividends precisely is often difficult. Before 1880, for example, the IMM reported the previous four dividends without dates (i.e., "5 6 7 8") instead of the form that was more typical after 1880 (i.e., "6%Jan91, 7%July91"). Occasionally, consecutive strings of four undated numbers do not agree from one period to another (i.e., IMM may have reported "5 6 7 8" in December of 1875, referring to the semi-annual dividends of 5 and 6 percent paid in 1874 and of 7 and 8 percent paid in 1875, and "7 7 8 8" in December of 1876, suggesting two dividends of 7 percent in 1875). Typically, the series reported closest to the actual payment of the dividend in question is taken as

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[11] Despite this screening method, the variety of securities makes it difficult to definitively distinguish debt from equity. Duguid (1901) and the Stock Exchange Yearbook helped to resolve some ambiguities. To make the sample as close to a purely equity index as possible, preference (preferred) shares, debenture shares, guaranteed shares, and deferred shares were all excluded from the sample. In some cases, the designation of a share changed from year to year. In those cases, shares were not included in years in which they were listed as something other than ordinary shares (i.e., common stock).

[12] Several large French railroad shares (e.g., Northern of France, and Paris, Lyons, and Mediterranean) and American shares were excluded from the sample since the market capitalization reported by the IMM included the total number of shares traded in both British and foreign markets. Since the majority of trading in these companies took place in their home markets (France and the US), including their total market capitalization would overstate their importance in the British index.

[13] The fact that dividends were expressed as a percent of par was deduced by comparing dividends reported in the IMM with those reported in the Stock Exchange Yearbook. When dividends were paid twice a year, which was most common, they were reported at half-yearly rates. For example, half yearly dividends of 5 percent and 7 percent of par were, in fact, 6 percent of par for the entire year. Dividends that were paid only once a year were reported at the annual rate. Dividends were occasionally reported in pounds, shillings, and pence. Bonuses were typically included in reported dividends, except for insurance companies, where they were reported separately.

authoritative, unless inspection of the months preceding and following the December issue could identify some typographical or other error that resolved the inconsistency. And, periodically, dividends that were reported accurately are difficult to interpret: for example, dividends dated "1898-99" were assumed to have been paid one half in 1898 and one half in 1899.

Despite the advantages of the newly gathered UK historical data, it falls far short of CRSP data in a number of ways. For example, CRSP data are available monthly, while our UK data are only collected annually. Similarly, CRSP data has been adjusted for mergers and failures and consequently is better equipped to handle attrition. In addition, CRSP data have stock split flags. By contrast, the IMM contains no information about delisting returns, the reason for delisting, or whether a stock split took place.

b. Attrition Data

The IMM does not contain data about attrition. When a firm exits the CRSP sample, the data identifies the reason it exited the sample (e.g., merger, failure) and the delisting return. This sort of information is absent from the IMM. This lack of delisting returns may introduce bias since the firms most likely to have negative returns are also the firms most likely to disappear from the sample. This can affect the cross-section of return if the probability of exit or delisting return is a function of observable variables. To reduce this problem, we collect data on a random sub-sample of delisting firms to try to determine why they exited the sample. We use this attrition data to estimate the impact of observable firm characteristics on the probability of failure given exit. These estimates are then used to estimate the probability of failure for every firm that exits the sample. These estimated probabilities of failure are used to construct estimated delisting returns for all firms that exit the sample.

For a randomly chosen 10% of 1261 delisting stocks with at least 3 years of return history, we searched The Economist, The New York Times, The Wall Street Journal, and Google.com. For some of these firms, we were able to determine whether the delisting was the result of acquisition (22%), merger (5%), change of name/registration (6%) or failure (1%). However, for the remaining 66% of firms in this sub-sample, no information about reason for exit from the sample was available. We believe that the vast majority of these firms for which no delisting data was available went out of business. From the perspective of an investing publication, investors need to be told if they need to turn in their physical stock certificates (in order to get the new shares in the case of a merger or acquisition); whereas failures just make share certificates worthless. Therefore, we believe that failures were much less likely to be reported than mergers.

While not significantly different from other firms in dividend yield and past returns, firms with missing data about their reason for disappearance had substantially lower uncalled liability than firms which disappeared due to merger or acquisition. Firms with missing data are also much more likely to come from the smallest 5% of stocks by market capitalization. Unlike firms which delisted for reasons of merger, acquisition, or name change, these firms did not have the ability to avoid failure by raising additional capital.

To correct for attrition bias to the fullest extent possible, we use a logistic regression to calculate the predicted probability of delisting due to acquisition, merger, or name change as opposed to failure or disappearance for all firms that delist. This regression controls for firm size (both the fraction of total market capitalization in firms smaller than this firm and an indicator variable if the firm is in the smallest 5% by market capitalization), dividend yield, the proportion of uncalled liability, and return in the previous period. The results of this regression are shown in Table 1. Firms with uncalled liability (which are excluded from our sample) are much less likely to delist for unknown reasons, while firms in the smallest 5% of market capitalization are much more likely to delist for unknown reasons. Other variables are not significant in predicting the reason for delisting. Making a rough guess that firms which disappeared or failed had a -50% delisting return while firms which merged, were acquired, or changed names had 10% delisting returns, these predicted probabilities are used to compute predicted delisting returns for all stocks that delist. Replacing these hedonic estimates of delisting returns with delisting returns of zero has no material impact on the results. Since the nature of the delist is not correlated with size (outside of the smallest 5% of stocks by market capitalization), D/P, or past performance, there is no reason to believe that attrition bias should have any impact on the relative performance of the portfolios, except perhaps among the smallest stocks.

To show that our results are not the explained by the absence of delisting returns in the historical sample, CRSP delisting returns are not used. Delisting CRSP stocks are assumed to have a zero delisting return. Using delisting return data has no material impact on the cross-section of stock returns in CRSP data.

c. Procedure

To address the limitations of our data, we adopt the approach of Romer (1986) to make historical UK and modern CRSP data easier to compare. We use only those components of the CRSP data that were available in the earlier data set. Specifically, since the UK data is available annually and the CRSP data is available more frequently, we annualize the CRSP data, using December prices and the sum of dividends over the past 12 months. We ignore information in the CRSP dataset on attrition (mergers and failures) and stock splits. We use the same procedure to form portfolios in both modern US and historical UK samples. The same cross-sectional asset pricing patterns remain in the CRSP data regardless of whether delisting returns information is used, suggesting that delisting bias isn't critical for the cross-section of CRSP returns.

Our strategy is to construct portfolios based on ex-ante criteria and then see how well these portfolios perform. Since our data set consists of information about price, dividend, and number of shares outstanding, there are three obvious criteria to use in forming portfolios: market capitalization, dividend yield (D/P), and past returns. In order to ensure that results for the UK are not solely the consequences of partially paid shares or changes in the par values of shares, we use portfolios containing only shares which were: (a) fully paid in; and (b) did not experience a change in par value in the year in which we observe them. The results are not qualitatively different when we perform a robustness check using the full sample.

First, we create size-sorted portfolios. We compute the market capitalization of each security and rank securities by size. We then split the sample into several groups and form equal-weighted portfolios consisting of all the stocks in that group. We then track the performance of that portfolio in the following year, using estimated delisting return for all UK stocks that disappear from the sample. We perform this exercise in each year, so that the composition of each portfolio changes annually.

Next, we create portfolios sorted by past performance. A natural question in this case is how far back to look when calculating a measure of past performance. Since we only have annual data, we look for long-run reversals in the data. The data are too coarse to identify the higher frequency momentum effect. Therefore, we sort stocks on their cumulative return over the past five years, restricting ourselves to stocks with at least a five-year return history. Sorting on three-year cumulative returns yields similar results. We form equal-weighted portfolios of stocks with similar cumulative returns and calculate their returns.

Finally, we create portfolios sorted by dividend yield, the ratio of dividends to prices. We cannot follow the same procedure used to calculate size-sorted portfolios, since more than 20% of the stocks in any given year generally do not pay dividends. Consequently, we set the first D/P group to consist of all stocks that do not pay dividends. We sort the stocks that do pay dividends into four additional portfolios by dividend yield, with an equal number of stocks in each. Therefore, in each year the first group consists of all stocks that do not pay dividends, the second consists of the 25% of dividend paying stocks with the smallest D/P, and the fifth consists of the 25% of dividend paying stocks with the largest D/P. As with the size-sorted portfolios, we form equal-weighted portfolios annually for each group and record their performance in the following year.

4. Results

a. Market Returns

We present summary statistics on market returns for the historical UK data and the transformed CRSP market data in Table 2. The most striking difference between market returns in the two data sets is that the historical UK indices have both a much lower mean return and a much lower standard deviation than the CRSP indices. Regardless of the delisting return adjustment used, both returns and standard errors in the historical UK data are substantially lower than those in the CRSP data. Another striking feature of the historical UK data is that the correlation between the equal-weighted and value-weighted indices is lower than for the CRSP data, about 80% compared with almost 90%. This indicates that small stocks did not move closely with large stocks in the historical UK data. This may result simply from the fact that one industry, railroads, constituted a large fraction of market capitalization but not a large fraction of the firms at the beginning of the sample. Risk specific to this industry would lower the correlation between value- and equal-weighted index returns.

b. Size-Sorted Portfolios

To examine the impact of size on stock returns, we look at equal-weighted portfolios formed on size. Table 3 and Table 4 present descriptive statistics for these portfolios, which are formed annually based on the size in the previous year.[15] Since the

[15] All moments are calculated using simple returns and are annual. The CRSP data covers the period 1926-1999. The UK data covers the period 1870-1913. In each year, we group the shares by size. For example, the 13th group represents the shares that were the largest 1% by market capitalization. We present portfolio summary statistics for firms in the year in which the portfolio was formed. For each group, we form equal-weighted portfolios of all stocks in that group in the previous year. We note that a fraction of firms attrit from the sample after the formation of portfolios but before their returns can be realized. We cannot include these missing observations, possibly introducing bias to our estimates of returns.

size of stocks varies widely, the market capitalization of these portfolios also varies dramatically. The "share" column shows the average market capitalization for each portfolio in each data set. We note that the "share" numbers are quite similar in the two data sets. The largest 1% of stocks account for on average 33% and 41% of the CRSP and UK value-weighted indices, respectively. Similarly, the smallest 10% of stocks average roughly 0.15% of both the CRSP and the UK value-weighted index. The pattern of dividend yields is somewhat different in the two samples. Although nearly all large firms pay dividends in the CRSP sample, some of the largest firms in the historical UK sample do not pay dividends.

Unsurprisingly, small firms tend to have lower past returns in both samples, as negative past returns make firms smaller. Also, smaller firms are more likely to drop out of both samples. Without an adequate correction for attrition, this could potentially introduce an upward bias to our estimates of the returns of the smallest two portfolios relative to portfolios of large and medium-size stocks. Except for these portfolios of extremely small stocks, the rate of attrition is roughly similar for all portfolios in the historical UK data and also for all portfolios in the CRSP data. Among firms that attrit, firms in the smallest 5% of market capitalization are much less likely to have data on their reason for delisting. Given our assumption that firms which delisted without appearing in newspapers were likely failures, correcting for attrition bias reduces the relative return of smallest two deciles, which have both higher levels of attrition and are more likely to have attrition be the result of failure.

Table 5 shows the returns of the size-sorted portfolios. The CRSP data show a smooth and relatively monotonic relationship between size and average returns, consistent with the size effect (Banz (1981)). Larger stocks have lower returns than smaller ones. By contrast, there is no clear relationship between size and returns in the UK data. The smallest portfolio of UK stocks, which make up under 0.1% of stocks by market capitalization but 5% by number, have much higher returns than other portfolios. However, the stocks in these portfolios make up such a small fraction of the market, and have such high rates of attrition, that we are reluctant to read too much into their high returns. The returns of these portfolios may be explained by their much higher rates of attrition or by publication errors, which led incorrectly low prices to be followed by correct higher prices, giving positive returns. Among portfolios that make up 99.9% of the value-weighted index, we can see no clear pattern in their returns. Furthermore, regardless of the correction made for attrition bias, there is no relationship between size and returns in the largest 8 deciles. Figure 4 shows the returns of an arbitrage portfolio that buys small stocks and sells large ones short. The value of this portfolio declines dramatically between the early 1870s and early 1880s but is otherwise fairly constant.

c. Past Performance Sorted-Portfolios

Next, we examine the properties of portfolios sorted on cumulative past returns over the previous five years, shown in Table 6 and Table 7. Since the large positive returns of extremely small stocks may be the result of data problems in the historical UK data, we exclude these stocks when forming past-return sorted portfolios.[17] To aid in

[17] Accidentally omitting a zero in one year in the Investor's Monthly Manual will give a firm a very low market capitalization, a very low past return, and a very high future return.

comparability, we exclude ex-ante the smallest 0.2% of stocks by market capitalization for both the historical UK and modern CRSP data. The dividend yields of stocks sorted on past returns are quite different in the two samples. In the historical UK data, nearly all firms with average or good past performance pay a dividend. Furthermore, firms in the historical UK sample with getter past returns are more likely to pay relatively high dividends, suggesting that dividends increase even more than prices for these firms. In the CRSP data, a substantial fraction of even the best past performers continues to pay no dividend. Also, the fraction of firms paying a relatively high dividend falls with past performance, consistent with dividends moving slowly to adjust to changes in prices.

Table 8 shows the returns of portfolios sorted on past performance. Consistent with DeBondt and Thaler (1985), the CRSP data shows a clear and relatively monotonic relationship between past performance and current returns. The better a stock has performed in the last five years, the worse it is likely to perform in the future. This result is much more ambiguous in the UK data. Although the worst performing portfolio has higher returns than the all others, there is no clear relationship between past performance and current returns outside of this portfolio.

Figure 5 plots the performance of arbitrage portfolios that go long either good or bad past performing stocks and go short average past performing stocks. This figure shows that firms with average past performance had relatively low returns in the 1890s.

d. Dividend-Yield Sorted-Portfolios

Finally, we examine portfolios sorted on dividend yield. As with past return-sorted portfolios, we exclude the smallest 0.2% of stocks from these portfolios; double sorted portfolios will be presented later. Ideally we would like to have formed portfolios sorted on the price-earnings ratio or the book-to-market ratio, following Basu (1983) and Rosenberg, Reid, and Lanstein (1985). However, we do not have measures for earnings or book value in the historical UK data. Consequently, we use dividend yield as the best available proxy for "value" or "growth." (Litzenberger and Ramaswamy (1979)) Portfolios sorted on dividend yield are somewhat similar in composition for the two data sets, though a much larger fraction of stocks in the CRSP data do not pay any dividends. As shown in the "share" column of Table 9, in the CRSP data, these no-dividend stocks tend to have much lower market capitalization and very high past returns. In the UK data, stocks that do not pay dividends have only slightly lower market capitalizations and relatively low past returns. Among stocks that do pay dividends, average firm size is smaller for higher dividend paying firms. This is most pronounced in the UK data, suggesting that small firms found it necessary or desirable to pay dividends in the earlier period. This is consistent with a model in which small firms had fewer growth opportunities. Alternatively, it is consistent with a model in which smaller firms had to pay higher dividends since shareholders were more concerned that company executives would steal company assets.

In the modern CRSP data, among stocks that do pay dividends, stocks with a high dividend yield have higher returns than stocks with a low dividend yield. This same pattern is present in the historical UK data. However, stocks which do not pay dividends have very high returns in the CRSP data but low returns in the UK data. Figure 6 plots the returns of the dividend yield-sorted high minus low (HML) portfolio, which is an arbitrage portfolio formed by buying stocks with high dividend yields and selling short stocks with a low but non-zero dividend yield. The positive returns of this portfolio are confined to the last 10 years of the sample.

e. Double-Sorted Portfolios

Next, we show results for portfolios sorted on both dividend yield and past return. To create double-sorted portfolios, we limit ourselves to portfolios with at least 5 years of return history. We separate firms in each year into those that pay dividends and those that do not. We divide the firms that do pay dividends into firms with above average or below average dividend yields in that year. We now divide each of the three groups (no dividends, low dividends, high-dividends) into five portfolios based on past returns. The excess returns for these 15 portfolios are shows in Table 11.

In the CRSP data, there is a monotonically decreasing relationship between past returns and future returns, regardless of dividend yield. In historical UK data, this pattern is only present in stocks that do not pay dividends. The pattern is absent or reversed for stocks that do pay dividends. In the CRSP data, stocks that do not pay dividends and stocks that pay high dividends outperform stocks that pay low dividends for stocks with poor, average, and high past returns. In the historical UK data, only part of this pattern is present. While high dividend paying stocks outperform low dividend paying stocks, there is no consistent pattern in the relative performance of stocks that do and do not pay dividends. Stocks that do not pay dividends and have poor past returns have very high future returns while stocks that do not pay dividends and have high past returns have very low future returns. In short, while the pattern of high dividend-yield stocks outperforming low dividend yield stocks is similar in the two samples, other patterns found in modern CRSP data are not present in the historical UK data.

f. Dividend Policy and the Cross-Section of Stock Returns

The fact that results in the two samples are similar for portfolios sorted on dividend yield (that pay dividends) but different for portfolios sorted on past returns is puzzling. In the CRSP sample, these two types of findings are probably related. In the absence of dividend changes, higher past returns lead mechanically to lower dividend yields. The presence of one "anomaly" but not another in the UK data suggests that dividend policy was much more responsive to price changes in the earlier period. This is, in fact, the case. Among firms that did relatively well in the CRSP sample (Table 8, groups 5 through 12), the fraction of firms with relatively high dividend yields decreases as past returns increase (moving from group 5 to group 12). By contrast, among firms that did relatively well in the historical UK sample, the fraction of firms with relatively high dividend yields increases as past returns increase. Put another way, good performing CRSP companies tend to reinvest their extra cash and not distribute the wealth as dividends; good performing UK companies return their wealth to their shareholders as dividends.

The difference in dividend policy between the two samples is quite pronounced. To see this more clearly, we define a scaled measure of a firm's change in dividends,

$\Delta(t) \equiv (D(t)-D(t-1))/P(t-1)$. $\Delta(t)$ represents the change in dividend yield induced by changes in dividends, not changes in price. In the CRSP data, the correlation between this measure of dividend changes and contemporaneous returns is only 1.7%; in the historical UK sample, this same correlation is 20%. While this result suggests strongly that dividends were more responsive to returns in the historical sample, it is difficult to identify causation in this case. To address this issue, we can regress this measure of changes in dividends on lagged returns and lagged changes in dividends. The results are shown in Table 12. Past returns have a much larger impact on changes in dividends in the historical sample. For example, a doubling of the share price in the last year leads, ceteris paribus, to a 2% increase in the dividend yield (e.g., from 1% to 3%) in the historical sample but only a 0.3% increase in the modern sample. These results suggest that dividend policy was much more responsive to changes in returns in the historical UK data. Firms responded to success by returning more wealth to shareholders. These results suggest the modern firms were more able to smooth dividends, or felt that doing so was more desirable, than firms in our historical sample.

5. Conclusion

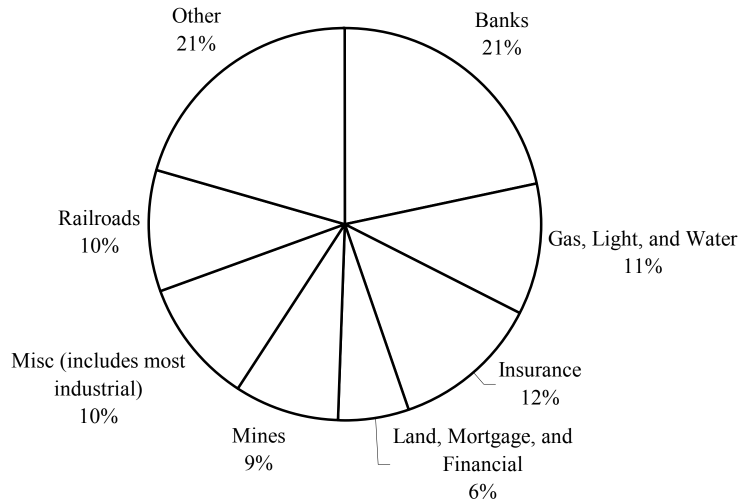
The behavior of the aggregate UK stock markets before World War I is similar in many ways to that of modern US markets. The relative size of the market and relative numbers of large and small stocks are similar in the two samples. Also, among dividend paying stocks, portfolios sorted on dividend yield have quite similar relative returns in the two samples.

However, the cross-section of stock returns looks quite different in the two samples. In the historical UK sample, small stocks do not outperform large stocks as they do in CRSP data. Higher past returns tend to be followed by low future returns in the modern CRSP data but not in the historical UK data. Stocks that do not pay dividends have high returns in modern CRSP data but low returns in historical UK data. Among stocks that do pay dividends, returns increase strongly with dividend yield in the modern CRSP data. In the historical UK data among firms that pay dividends, there is also a relationship between high dividend-yields and high returns.

We have identified several major differences in the cross-section of stock returns in the two samples. An aggressive interpretation of our results, requiring the comparability of the two markets and periods, is that we have performed an out-of-sample test of cross-sectional asset pricing anomalies. We find no support for the existence of size or reversal anomalies, but some support for the existence of a value anomaly.

Figure 1

Industry Composition of Firms, 1870
Fraction of Firms, by Number (top)
and by Market Capitalization (bottom)



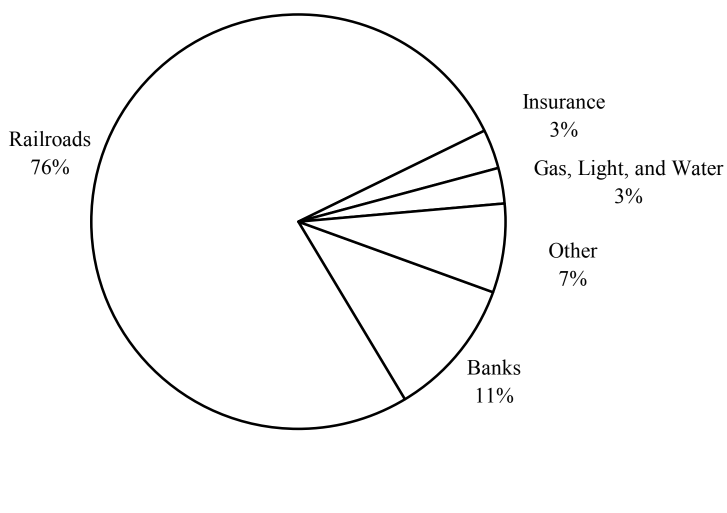
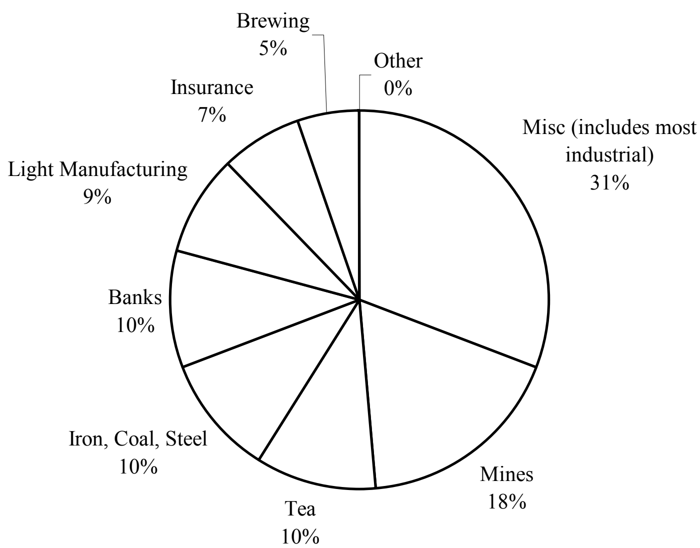


Figure 2

Industry Composition of Firms, 1913
Fraction of Firms, by Number (top)
and by Market Capitalization (bottom)



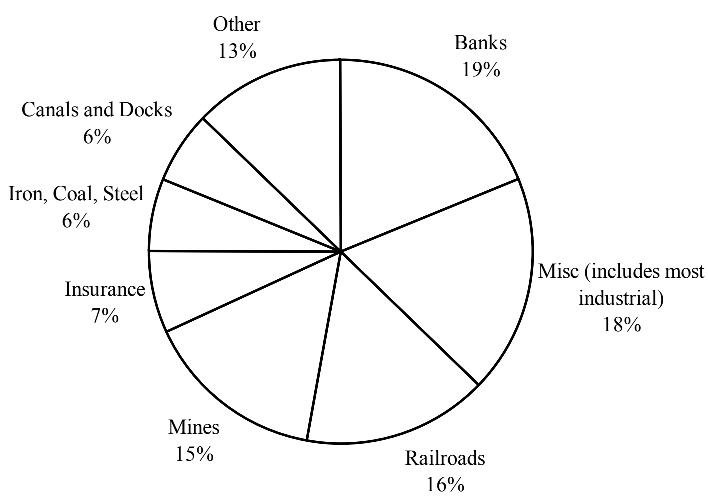
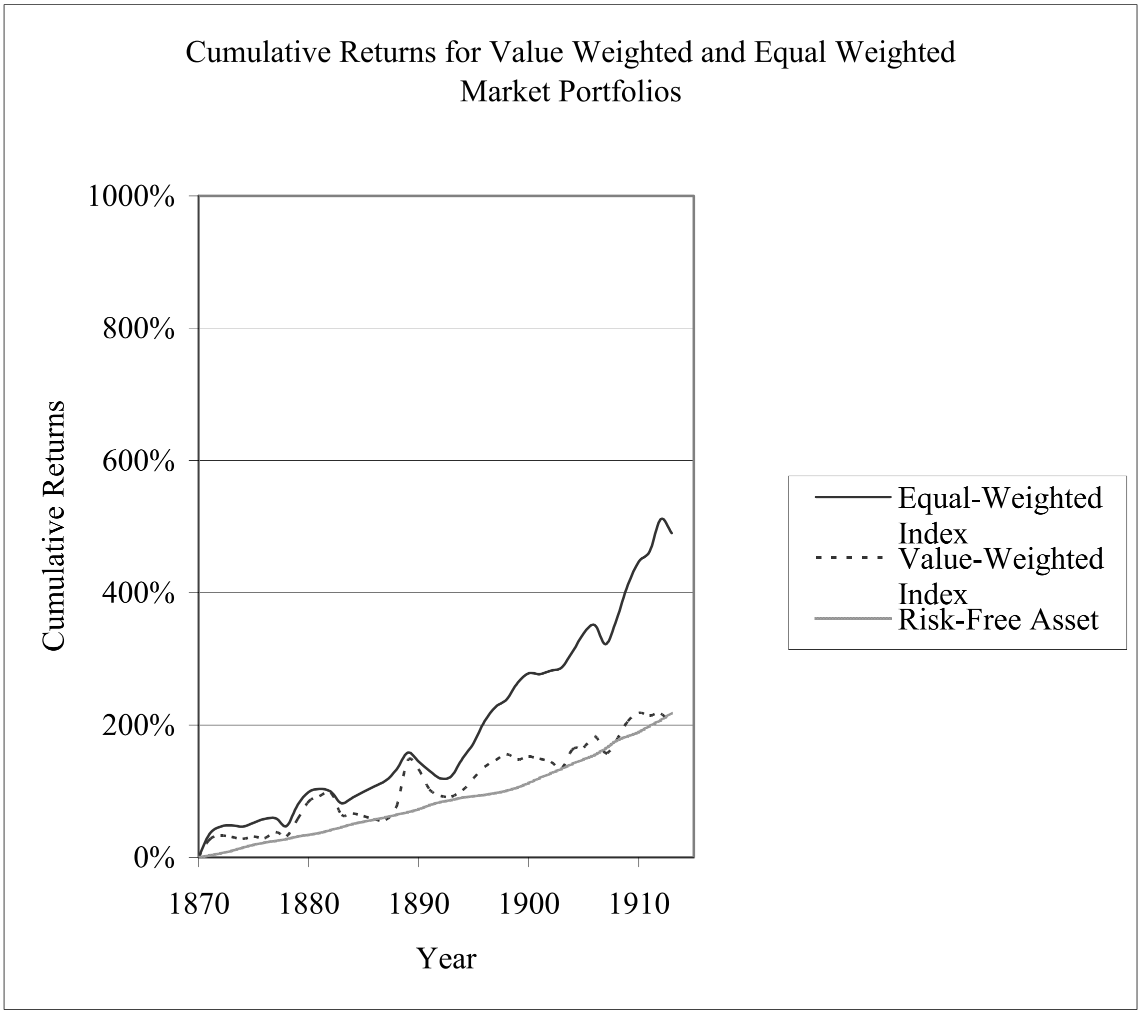
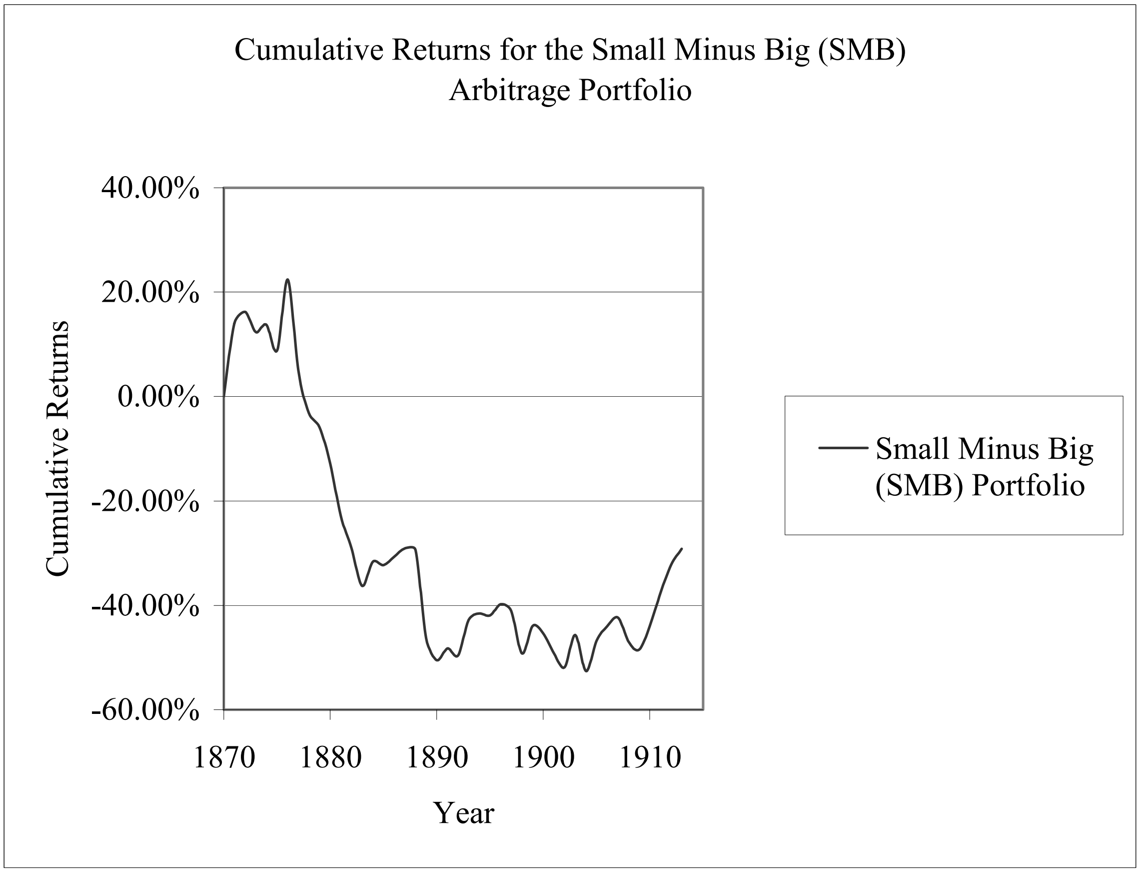


Figure 3



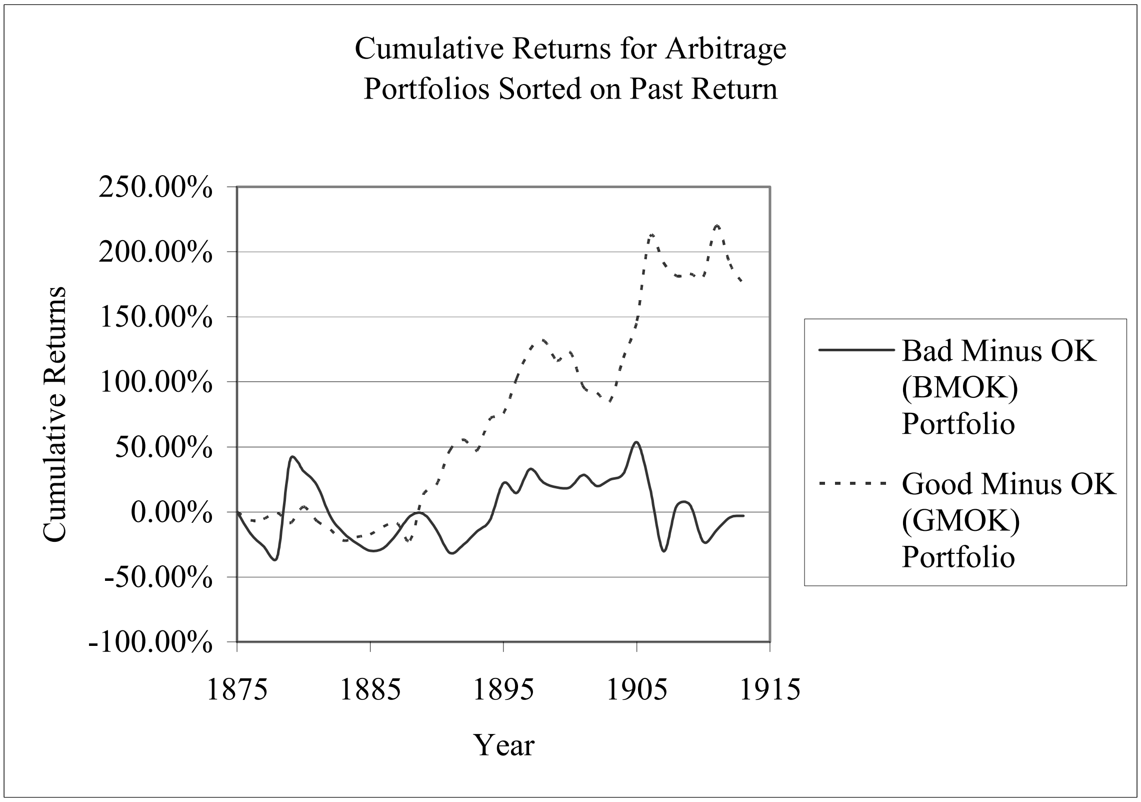
Returns are simple, cumulative returns for the equal-weighted and value-weighted market portfolios, with the correction for attrition described in the paper. The cumulative return on the risk-free asset is also included.

Figure 4



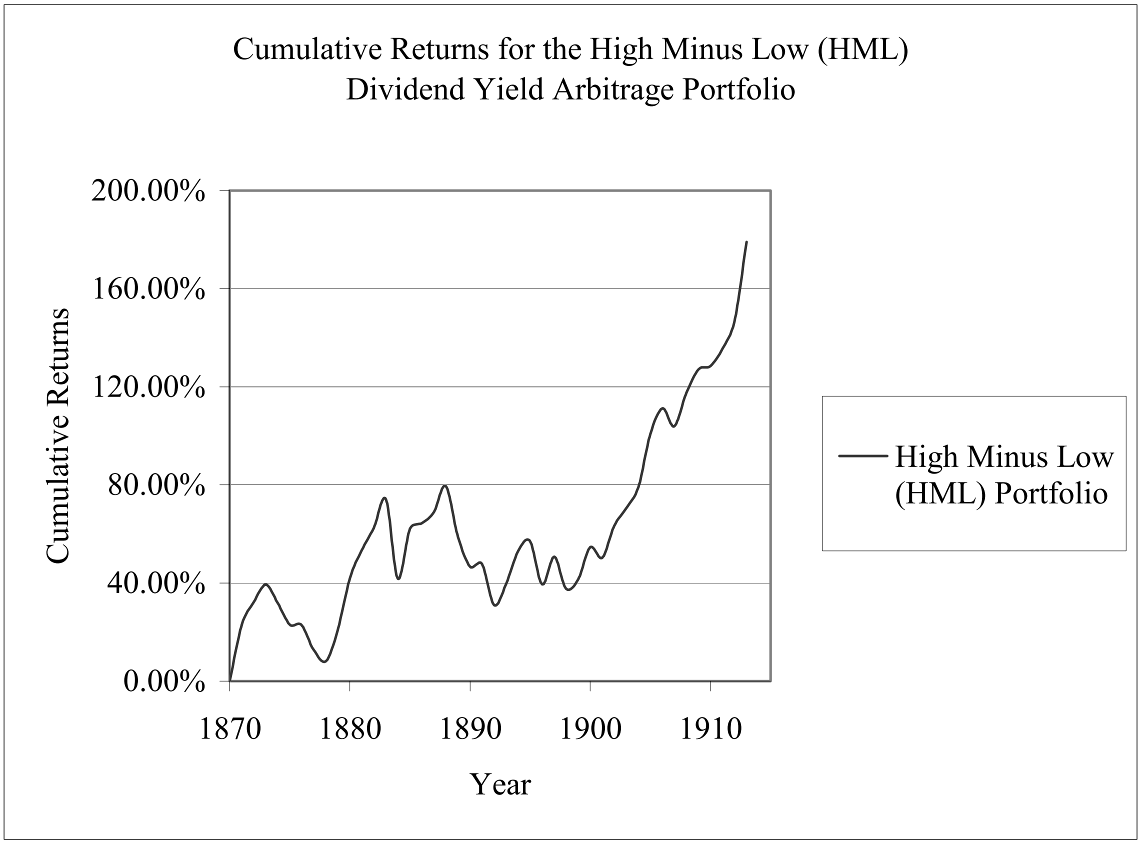
Returns are simple, cumulative returns. The portfolio is an arbitrage portfolio formed by going long small stocks and going short large stocks. The portfolio return in a given period is calculated as R=0.1*R(size1) + 0.1*R(size2) + 0.2*R(size3) + 0.2*R(size4)+0.2*R(size5)- 0.5* R(size11) – 0.4(size12) – 0.1*R(size13). Here, "size'N'" refers to the size-sorted portfolio described in Column N of Table 5.

Figure 5



Returns are simple, cumulative returns. The portfolio is an arbitrage portfolio formed by going long stocks with the highest dividend yields and going short stocks with the lowest non-zero dividend yields. The portfolio return in a given period is calculated as R(BMOK)=0.5 * R(PRet1) +0.5* R(PRet2) + * R(PRet3) - R(PRet6) – R(PRet7). R(GMOK)=0.5 * R(PRet12) + 0.5 * R(PRet11) + R(PRet10) - R(PRet6) - R(PRet7). Here, "PRet'N'" refers to the return-sorted portfolio described in Column N of Table 8. Returns include attrition correction described in the paper.

Figure 6



Returns are simple, cumulative returns. The portfolio is an arbitrage portfolio formed by going long stocks with the highest dividend yields and going short stocks with the lowest non-zero dividend yields. The portfolio return in a given period is calculated as R=R(DP4)+ R(DP5) - R(DP2) - R(DP1). Here, "DP'N'" refers to the dividend yield-sorted portfolio described in Column N of Table 10.

Table 1

Probit Regression Predicing Whether Reason for Attrition was Failure/Unknonwn vs. Merger/Attrition

	Coeff.	z-stat
D/P	-2.29	(-1.08)
Size	1.55	(1.42)
Smallest 5%?	1.56**	(4.55)
Uncalled Liab.	-0.149**	(-2.60)
Past Ret.	-0.017	(-0.08)
Constant	-0.408	(-1.26)
Pseudo R^2	20.9%	
Obs	125	

Results display the probit regression of the reason for attrition on several explanatory variables. The dependent variable is set equal to one if attrition was due to failure or if the reason for attrition was not known and is set to zero if the reason for attrition was merger, acquisition, or name change. "D/P" is the dividend yield of the firm before attrition; "Size" is the fraction of market capitalization comprised by firms no larger than the firm; "Smallest 5%?" is an indicator variable if the firm is in the smallest 5% of firms by market capitalization; "Uncalled Liab." is the ratio of uncalled liability to price in the year before the attrition. "Past Ret." is the return in the year prior to the attion. Data is from the UK and covers the period 1870-1913. "**" indicates significance at the 1% level. "*" indicates significance at the 5% level.

Table 2

Index Returns

		Average (R_f)	Average (R- R_f) with Attrition Adjustment	Average (R- R_f) Without Attrition Adjustment	Standard Deviation (R- R_f)	Sharpe Ratio	Correlation (value-weight, equal weight)
uk	Value-weighted	2.76%	0.27%	2.25%	10.2%	0.03	0.78
	Equal-Weighted		1.72%	3.19%	8.2%	0.33	
crsp	Value-weighted	4.76%	5.18%		20.03%	0.26	0.89
	Equal-weighted		9.38%		29.54%	0.32	

All moments are calculated with simple returns and are annual. The CRSP data covers the period 1926-1999. The UK data covers the period 1870-1913, and includes adjustments for attrition. For each sample, we display the average risk-free rate, R_f. We present the average return over the risk free rate, Avg(R- Rf), its standard deviation, Sd(R- Rf), and the ratio of these, the Sharpe Ratio. Finally, we present the correlation between the equal and value weighted returns (each less the risk-free rate) for each sample. Interest rates are from Homer and Sylla (1996) for the UK and from Shiller (2003) for the US. UK data on standard devation, Sharpe ratio and correlation is for data with attrition adjustment.

Table 3

Size-Sorted Portfolios, Descriptive Statistics
Modern U.S. CRSP Data

	1	2	3	4	5	6	7	8	9	10	11	12	13
%to%	0%-5%	5-10%	10-20%	20-30%	30-40%	40-50%	50-60%	60-70%	70-80%	80-90%	90-95%	95-99%	99+%
Share	0.1%	0.1%	0.3%	0.6%	0.9%	1.4%	2.1%	3.4%	5.9%	12.6%	13.7%	25.8%	33.0%
D/P=0	80.4%	68.2%	57.9%	47.3%	38.5%	32.9%	26.7%	21.8%	16.7%	11.5%	7.0%	3.5%	1.5%
LowD/P	4.9%	6.9%	9.4%	10.8%	13.0%	14.5%	16.8%	19.1%	22.0%	24.6%	27.9%	33.7%	40.4%
MidD/P	3.6%	6.1%	7.8%	10.9%	14.1%	15.6%	17.7%	20.1%	23.3%	25.2%	26.6%	29.0%	26.2%
HighD/P	4.4%	7.0%	9.9%	13.5%	15.6%	17.4%	19.6%	20.1%	20.9%	22.5%	22.3%	21.2%	20.1%
VHighD/P	6.7%	11.8%	15.1%	17.5%	18.8%	19.6%	19.2%	18.9%	17.1%	16.3%	16.2%	12.7%	11.8%
pastR	-5.8%	2.6%	10.0%	14.3%	16.3%	18.0%	19.4%	19.0%	19.3%	17.1%	15.7%	16.0%	16.7%
exit	23.5%	13.1%	9.0%	7.0%	6.7%	5.9%	5.7%	5.4%	5.1%	4.6%	3.4%	2.9%	2.5%
min(N)	25	25	49	50	49	49	50	49	50	49	25	19	5
max(N)	364	363	726	726	726	726	726	726	726	726	363	290	73

See footnote 16 for a more detailed description of portfolio formation. In each year, we group firms by size. We show the average fraction of the market portfolio of each group in the "share" row. Due to attrition, these shares will not sum to one. The row "D/P=0" shows the fraction of firms in each group that pay no dividends. The rows "LowD/P", "MidD/P", "HighD/P", and "VHighD/P" show the fraction of firms in each group that pay dividends and that have dividend yields that are in the lowest, 2nd lowest, 2nd highest, and highest quartile of firms, where quartile breakpoints are formed using only firms that pay a dividend. "AvgPastR" is the mean return in the previous year, averaged over all years. "Fr(Attrit)" is the fraction of firms in the portfolio for which return data is missing. "N(min)" and "N(max) are the smallest and largest number of firms that make a given portfolio over the sample.

Table 4

Size-Sorted Portfolios, Descriptive Statistics
Historical UK data

	1	2	3	4	5	6	7	8	9	10	11	12	13
%to%	0%-5%	5-10%	10-20%	20-30%	30-40%	40-50%	50-60%	60-70%	70-80%	80-90%	90-95%	95-99%	99+%
Share	0.1%	0.1%	0.4%	0.6%	0.8%	1.2%	1.7%	2.6%	4.3%	8.8%	10.5%	26.5%	40.5%
D/P=0	3.4%	10.9%	18.3%	20.4%	20.9%	20.2%	21.3%	22.1%	22.8%	20.8%	18.1%	10.4%	13.1%
LowD/P	11.5%	19.6%	21.9%	21.8%	23.0%	22.7%	18.9%	18.6%	18.0%	14.8%	11.9%	7.8%	3.6%
MidD/P	-18.5%	-4.6%	5.1%	5.4%	8.7%	6.9%	8.5%	10.0%	9.5%	9.4%	9.9%	11.3%	17.8%
HighD/P	0.1%	0.1%	0.4%	0.6%	0.8%	1.2%	1.7%	2.6%	4.3%	8.8%	10.5%	26.5%	40.5%
VHighD/P	75.0%	49.6%	33.9%	26.8%	21.8%	21.5%	17.6%	17.1%	15.0%	14.2%	17.2%	17.1%	10.3%
PastR	5.0%	11.1%	14.3%	16.4%	16.8%	18.7%	24.5%	20.2%	22.3%	23.3%	21.4%	24.0%	29.7%
Fr(Attrit)	20.1%	8.3%	5.3%	3.9%	2.1%	2.6%	2.2%	3.0%	2.8%	3.1%	2.6%	4.5%	9.2%
AttritR	-42.5%	-42.4%	-42.3%	-42.5%	-41.9%	-39.4%	-18.4%	-12.5%	-14.2%	-17.2%	-21.9%	-28.3%	-36.5%
min(N)	8	11	21	21	21	22	22	20	21	20	11	7	2
max(N)	43	43	85	85	85	84	85	84	85	84	43	33	9

See footnote 16 for a more detailed description of portfolio formation. In each year, we group firms by size. We show the average fraction of the market portfolio of each group in the “share” row. Due to attrition, these shares will not sum to one. The row “D/P=0” shows the fraction of firms in each group that pay no dividends. The rows “LowD/P”, “MidD/P”, “HighD/P”, and “VHighD/P” show the fraction of firms in each group that pay dividends and that have dividend yields that are in the lowest, 2nd lowest, 2nd highest, and highest quartile of firms, where quartile breakpoints are formed using only firms that pay a dividend. “AvgPastR” is the mean return in the previous year, averaged over all years. “Fr(Attrit)” is the fraction of firms in the portfolio for which attritted from the sample. “N(min)” and “N(max) are the smallest and largest number of firms that make a given portfolio over the sample period.

Table 5
Size-Sorted Portfolio ReturnsModern U.S. CRSP and Historical UK Data

	1	2	3	4	5	6	7	8	9	10	11	12	13
%to%	0%-5%	5-10%	10-20%	20-30%	30-40%	40-50%	50-60%	60-70%	70-80%	80-90%	90-95%	95-99%	99+%
CRSP													
Avg(R-R_f)	50.2%	18.9%	14.2%	9.5%	9.5%	7.5%	7.8%	6.4%	4.7%	5.4%	4.3%	3.8%	4.8%
S.D.(R-R_f)	200.3%	45.9%	37.3%	31.9%	31.1%	28.5%	28.2%	26.0%	22.5%	21.6%	19.4%	16.8%	17.9%
β – uw	1.965	1.89	1.695	1.494	1.503	1.403	1.415	1.318	1.145	1.121	1.022	0.884	0.919
β –vw	3.675	1.349	1.153	0.987	0.97	0.89	0.866	0.792	0.677	0.64	0.553	0.456	0.461
α-vw	12.1%	4.9%	2.2%	-0.7%	-0.5%	-1.8%	-1.2%	-1.8%	-2.3%	-1.2%	-1.4%	-0.9%	0.0%
t-stat	0.58	1.86	1.3	-0.53	-0.41	-1.52	-0.91	-1.44	-1.95	-1.03	-1.14	-0.77	0.04
UK													
Avg(R-R_f)	13.1%	-0.2%	3.7%	-1.3%	1.1%	-0.5%	1.8%	0.9%	1.8%	1.4%	3.6%	1.4%	-0.9%
Avg(R-R_f)*	21.7%	3.2%	5.6%	0.3%	1.9%	0.7%	2.2%	1.3%	2.2%	1.9%	4.3%	2.9%	2.1%
S.D.(R-R_f)	28.9%	15.0%	23.7%	9.0%	8.6%	7.9%	7.7%	9.7%	7.4%	6.9%	11.5%	13.3%	11.5%
β – uw	0.83	0.82	1.15	0.42	0.50	0.39	0.57	0.54	0.50	0.50	0.68	1.16	0.94
β –vw	1.59	1.08	2.15	0.83	0.89	0.70	0.74	1.00	0.75	0.66	1.01	0.93	1.08
α-vw	10.3%	-2.1%	0.0%	-2.7%	-0.5%	-1.7%	0.5%	-0.8%	0.5%	0.2%	1.9%	-0.2%	-2.8%
(t-stat)	(2.53)*	-1.09	0.01	(2.92)**	-0.66	-1.92	0.67	-0.98	0.79	0.34	1.5	-0.1	(-2.40)*

See footnote 16 for a more detailed data description. In each year, we group the shares by size. "Avg(R)" is the simple average return of each group's portfolio returns. Avg(R-R_f)* returns exclude attrition adjustment. "β-uw" and "β-vw" rows show the covariance of the return (minus the risk free rate) on these size portfolios with unweighted and value weighted index returns (also minus the risk-free rate), respectively. "α-vw" is the excess return of the portfolio, calculated from an OLS regression of the size portfolio's return (less risk-free rate), regressed on the return of the value-weighted index (also less risk-free rate). The t-statatistics are calculated from OLS standard errors.

Table 6

Five-Year Cumulative Performance-Sorted Portfolios, Descriptive Statistics
Modern US CRSP Data

%to%	0%-5%	5-10%	10-20%	20-30%	30-40%	40-50%	50-60%	60-70%	70-80%	80-90%	90-95%	95+%
Share	0.9%	1.8%	4.3%	5.3%	6.7%	6.4%	6.3%	6.7%	7.1%	6.5%	3.4%	2.1%
D/P=0	67.2%	46.9%	34.7%	25.2%	20.0%	17.1%	15.3%	13.7%	13.2%	15.5%	20.3%	29.1%
LowD/P	9.6%	13.1%	13.4%	13.9%	13.8%	14.6%	15.2%	17.7%	17.6%	21.9%	26.1%	31.1%
MidD/P	7.5%	11.2%	14.6%	17.7%	18.9%	19.2%	21.0%	21.5%	23.2%	23.9%	23.6%	17.3%
HighD/P	7.1%	13.0%	17.4%	21.4%	23.0%	24.3%	25.1%	24.0%	23.8%	19.7%	15.9%	10.5%
VHighD/P	8.5%	15.8%	20.0%	21.9%	24.2%	24.8%	23.5%	23.2%	22.3%	19.0%	14.0%	12.1%
pastR	-56.9%	-36.0%	-16.4%	4.6%	23.8%	42.9%	64.0%	89.2%	123.0%	179.0%	262.7%	554.7%
Fr(Attrit)	6.1%	4.6%	3.5%	4.0%	4.4%	4.0%	4.2%	4.5%	5.5%	6.3%	7.0%	8.2%
min(N)	6	8	24	24	23	23	25	26	26	27	14	12
max(N)	116	136	275	276	280	268	272	266	271	260	130	133

All moments are calculated using simple returns and are annual. The data is from CRSP and covers the period 1926-1999. In each year, we sort stocks by their cumulative performance over the past five years, throwing out any securities without five years of data. We form equal-weighted portfolios of stocks with similar past performance. For example, Group 2 constitutes stocks that had cumulative performance among the worst 10% of stocks but not among the worst 5%. The average cumulative five-year performance for firms in each portfolio is shown in the "AvgPastR" row. The row "D/P=0" shows the fraction of firms in each group that pay no dividends. The rows "LowD/P", "MidD/P", "HighD/P", and "VHighD/P" show the fraction of firms in each group that pay dividends and that have dividend yields that are in the lowest, 2nd lowest, 2nd highest, and highest quartile of firms, where quartile breakpoints are formed using only firms that pay a dividend. We show the average fraction of the market portfolio of each group in the "Share" row; shares will some to less than one because of attrition. "Fr(Attrit)" shows the average fraction of firms in the portfolio who drop out of the sample in the year after they are included in the portfolio. "N(min)" and "N(max) are the smallest and largest number of firms that make a given portfolio over the sample. Data excludes the smallest 0.2% of the market by market capitalization.

Table 7

Five-Year Cumulative Performance-Sorted Portfolios, Descriptive Statistics
Historical UK Data

%to%	0%-5%	5-10%	10-20%	20-30%	30-40%	40-50%	50-60%	60-70%	70-80%	80-90%	90-95%	95+%
Share	0.7%	2.5%	4.6%	5.0%	7.9%	6.1%	9.6%	7.6%	8.8%	5.2%	4.2%	2.6%
D/P=0	79.4%	53.4%	31.9%	17.8%	8.9%	5.6%	4.5%	4.9%	4.4%	5.6%	5.7%	10.4%
LowD/P	8.2%	14.0%	20.0%	21.2%	27.5%	28.5%	29.0%	22.3%	23.3%	18.7%	18.0%	22.9%
MidD/P	2.6%	10.1%	15.0%	20.3%	25.2%	27.2%	31.7%	32.1%	29.4%	26.4%	20.0%	11.6%
HighD/P	2.3%	10.7%	15.8%	24.0%	21.2%	24.3%	22.1%	25.3%	26.6%	28.6%	25.1%	22.6%
VHighD/P	7.4%	11.8%	17.3%	16.8%	17.2%	14.3%	12.8%	15.4%	16.2%	20.7%	31.2%	32.5%
pastR	-68.8%	-47.4%	-26.1%	-5.9%	9.1%	22.3%	34.5%	47.8%	65.2%	94.6%	138.6%	341.0%
Fr(Attrit)	8.2%	5.7%	4.1%	2.2%	3.4%	3.9%	2.9%	2.9%	3.6%	3.6%	4.1%	3.7%
AttritR	-31.6%	-34.2%	-26.0%	-28.5%	-25.9%	-21.1%	-28.4%	-24.4%	-28.3%	-30.3%	-25.7%	-31.6%
min(N)	3	4	10	11	11	10	12	12	13	12	6	6
max(N)	19	26	50	53	54	54	55	56	55	55	28	27

All moments are calculated using simple returns and are annual. The UK data covers the period 1870-1919. In each year, we sort stocks by their cumulative performance over the past five years, throwing out any securities without five years of data. We form equal-weighted portfolios of stocks with similar past performance. For example, Group 2 constitutes stocks that had cumulative performance among the worst 10% of stocks but not among the worst 5%. The average cumulative five-year performance for firms in each portfolio is shown in the "AvgPastR" row. The row "D/P=0" shows the fraction of firms in each group that pay no dividends. The rows "LowD/P", "MidD/P", "HighD/P", and "VHighD/P" show the fraction of firms in each group that pay dividends and that have dividend yields that are in the lowest, 2nd lowest, 2nd highest, and highest quartile of firms, where quartile breakpoints are formed using only firms that pay a dividend. We show the average fraction of the market portfolio of each group in the "Share" row; shares will some to less than one because many firms were not in the sample long enough to have a return history. "Fr(Attrit)" shows the average fraction of firms in the portfolio who drop out of the sample in the year after they are included in the portfolio. "N(min)" and "N(max) are the smallest and largest number of firms that make a given portfolio over the sample. Data excludes the smallest 0.2% of the market by market capitalization.

Table 8

Five-Year Cumulative Performance-Sorted Portfolio Returns
Modern U.S. CRSP and Historical UK Data

%to%	0%-5%	5-10%	10-20%	20-30%	30-40%	40-50%	50-60%	60-70%	70-80%	80-90%	90-95%	95+%
CRSP												
Avg($R-R_f$)	22.0%	15.9%	11.7%	12.4%	9.9%	10.1%	9.0%	8.7%	6.6%	5.2%	4.3%	2.1%
S.D.($R-R_f$)	57.7%	33.5%	28.5%	30.0%	24.1%	24.9%	24.1%	24.1%	22.7%	22.0%	22.3%	22.9%
β-uw	1.70	1.05	0.89	0.90	0.74	0.76	0.73	0.73	0.68	0.62	0.59	0.64
β-vw	1.91	1.58	1.43	1.52	1.28	1.32	1.29	1.29	1.21	1.16	1.09	1.16
α-vw	11.4%	7.1%	3.8%	4.0%	2.8%	2.7%	1.9%	1.5%	-0.1%	-1.2%	-1.7%	-4.3%
(t-stat)	1.88	(2.92)**	(2.17)*	(2.24)*	(2.45)*	(2.27)*	1.7	1.36	-0.09	-1.12	-1.15	(-3.1)**
UK												
Avg($R-R_f$)	5.0%	1.9%	1.2%	-0.2%	1.0%	0.1%	2.3%	2.0%	2.1%	4.0%	1.5%	2.0%
Avg($R-R_f$)*	6.3%	3.9%	2.2%	1.1%	1.6%	1.6%	3.0%	3.5%	2.7%	5.2%	2.6%	2.7%
S.D.($R-R_f$)	38.7%	25.6%	17.2%	11.2%	7.5%	8.2%	7.3%	8.0%	9.3%	14.0%	12.4%	15.5%
β-uw	2.82	1.77	1.19	0.80	0.56	0.61	0.56	0.44	0.58	0.76	0.63	0.80
β-vw	1.59	0.74	0.52	0.50	0.28	0.35	0.30	0.20	0.30	0.77	0.30	0.50
α-vw	5.1%	2.0%	1.2%	-0.2%	1.0%	0.1%	2.3%	2.0%	2.2%	4.0%	1.5%	2.0%
(t-stat)	1.42	0.74	0.7	-0.18	1.44	0.09	(3.40)**	(2.35)*	(2.29)*	(4.08)**	1.12	1.28

All moments are calculated using simple returns and are annual. The US data is from CRSP and covers the period 1926-1999. The UK data covers the period 1870-1919. We report the average return and standard deviation of these portfolios (less the risk free rate) as well as their β, the coefficient on the excess market return in a regression of excess portfolio returns, computed relative both to the equal weighted and value weighted portfolio. Avg($R-R_f$)* excludes attrition adjustment. Then, we compute the portfolios' α, the excess return of the portfolio, which is merely the intercept in an OLS regression of returns on the value weighted index returns (both less the risk-free rate). The t-statistic of this α is computed from the OLS standard error. Data excludes the smallest 0.2% of the market by market capitalization.

Table 9

Dividend Yield-Sorted Portfolios, Descriptive Statistics
Modern U.S. CRSP and Historical UK

%to%	0 D/P	1-25%	25-50%	50-75%	75-100%
CRSP					
Share	6.4%	30.7%	25.8%	21.9%	15.3%
Avg(D/P)	0.0%	2.3%	4.1%	5.7%	13.3%
PastR	22.3%	27.3%	16.9%	10.8%	7.0%
Fr(Attrit)	7.5%	5.8%	5.1%	3.4%	2.8%
min(N)	48	60	59	60	59
max(N)	3164	752	745	744	747
UK					
Share	13.3%	37.5%	25.6%	12.9%	8.7%
Avg(D/P)	0.0%	3.7%	5.3%	6.6%	11.0%
AvgPastR	4.0%	11.8%	9.1%	8.1	7.6%
Fr(Attrit)	5.4%	4.1%	2.7%	2.0%	2.2%
AttritR	-35.4%	-25.3%	-27.7%	-25.5%	-27.1%
min(N)	27	38	37	35	36
max(N)	157	161	163	157	160

In each year, we group the shares by dividend yield. The first group is comprised of all stocks that did not pay a dividend in the previous year. The remaining stocks are sorted in each year by their dividend yield, where dividends are defined as the total dividend paid in the last year. Stocks are separated into four groups with a roughly equal number of securities in each group. The groups with higher percentiles correspond to portfolios comprised of stocks with higher dividend yields. For each, we calculate "Avg(D/P)", the mean dividend yield for the firms in the portfolio, averaging across years. "AvgPastR" is the average return in the last year of firms in a given portfolio. "Share" denotes the fraction of overall market capitalization contained in each portfolio. "Fr(Attrit)" shows the average fraction of firms in the portfolio who are not in the sample in the year after they are included in the portfolio. "N(min)" and "N(max) are the smallest and largest number of firms that make a given portfolio over the sample. Data excludes the smallest 0.2% of the market by market capitalization.

Table 10

Dividend Yield-Sorted Portfolios, Descriptive Statistics
Modern U.S. CRSP and Historical UK Data

%to%	0 D/P	1-25%	25-50%	50-75%	75-100%
CRSP					
Avg($R-R_f$)	9.8%	4.2%	6.0%	8.5%	8.0%
S.D.($R-R_f$)	39.6%	23.6%	21.8%	23.2%	23.6%
β - uw	1.19	0.72	0.66	0.70	0.71
β –vw	1.88	1.21	1.12	1.16	1.18
α-vw	1.1%	-1.4%	0.9%	3.1%	2.5%
(t-stat)	0.5	1.64	1.15	(2.99)**	(2.53)*
UK					
Avg($R-R_f$)	-2.1%	0.5%	1.3%	2.6%	2.0%
Avg($R-R_f$)*	-0.4%	1.6%	2.2%	3.1%	2.6%
S.D.($R-R_f$)	15.6%	6.2%	5.0%	5.9%	8.4%
β - uw	1.68	0.58	0.47	0.58	0.86
β –vw	1.05	0.50	0.28	0.36	0.52
α-vw	-2.4%	0.4%	1.2%	2.5%	1.9%
(t-stat)	-1.39	0.71	1.9	(3.45)**	1.85

We report the average return and standard deviation of these portfolios (less the risk free rate) as well as their β, the coefficient on the excess market return in a regression of excess portfolio returns, computed relative both to the equal weighted and value weighted portfolio. Avg($R-R_f$)* returns exclude attrition adjustment. Then, we compute the portfolios' α, the excess return of the portfolio, which is merely the intercept in an OLS regression of returns on the value weighted index returns (both less the risk-free rate). The t-statistic of this α is computed from the OLS standard error. Data excludes the smallest 0.2% of the market by market capitalization.

Table 11

Dividend Yield and Past Return Double-Sorted Portfolios, Excess Returns
Modern U.S. CRSP and Historical UK Data

CRSP	worst	2nd worst	middle ret	2nd best	best
D/P=0	20.57%	16.77%	12.87%	9.19%	5.56%
D/P low	11.67%	7.70%	6.55%	4.24%	3.42%
D/P high	12.75%	11.91%	10.22%	8.14%	7.94%
UK	worst	2nd worst	middle ret	2nd best	best
D/P=0	5.18%	4.94%	-4.23%	-2.46%	-4.49%
D/P low	0.80%	-0.72%	1.36%	1.13%	1.97%
D/P high	2.80%	1.16%	2.95%	4.49%	4.52%

We report the average return of these portfolios (less the risk free rate). Portfolios are first sorted by dividend yield, with an equal number of firms in the low and high yield portfolios in each year. Then, these firms are sorted based on their 5-year cumulative return. UK portfolios include adjustment for attrition. Data excludes the smallest 0.2% of the market by market capitalization.

Table 12

Impact of Past Returns and Past Dividend Changes
on Current Dividend Changes

	US	UK
R(t-1)	0.0042** (5.23)	0.0204** (14.55)
R(t-2)	-0.0007 (-0.91)	0.0079** (5.68)
R(t-3)	-0.0009 (-1.19)	-0.0032* (-2.31)
Δ(t-1)	-0.1938** (-58.22)	-0.3049** (-30.49)
Δ(t-2)	0.0003 (0.08)	-0.1099** (-10.61)
Δ(t-3)	-0.0038** (-6.81)	-0.0625** (-6.41)
R^2	3.16%	6.58%
Obs	104,663	14,784

Results display the OLS regression of Δ(t) on the variables shown. Δ(t)≡(D(t)-D(t-1))/P(t-1); R(t)≡(P(t)-P(t-1))/P(t-1), All moments are calculated using simple returns and are annual. The CRSP data covers the period 1926-1999. The UK data covers the period 1870-1913. "**" indicates significance at the 1% level. "*" indicates significance at the 5% level. OLS t-statistics are in parentheses.

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