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 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. 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. However, portfolios sorted on dividend yield have similar return dynamics in both samples. Stocks paying no dividends have higher returns; among stocks paying dividends, returns increase with the dividend yield. The historical data have the same return pattern as modern data for portfolios sorted on dividend yield, but not for portfolios sorted on past performance. The presence of one anomaly but not the other in historical data can be reconciled by the high degree of responsiveness of dividends to returns during this period.

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1. Introduction

1.A. Review of Asset Pricing Anomalies

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, while the value anomaly (documented using dividend yield) is present in this data. The presence of the dividend yield anomaly but not the reversal anomaly in the historical UK data can be understood in light of differences in

[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 is too coarse to pick it up.

dividend policy between the historical UK data and modern CRSP data. Here, we briefly discuss the three anomalies that we look for.

One often-studied anomaly is the *size effect,* documented by Banz (1981). He found that small (large) stocks have higher (lower) returns than their betas would suggest in modern US data. This effect seems to be confined to the month of January (Keim (1983)) and has gone away since it was documented. We do not find evidence of this anomaly in historical UK data.

Another anomaly is the *value effect*, the tendency of stocks with a high ratio of firm value (e.g. book value, earnings) to price to outperform those with a lower ratio (Basu (1983), Rosenberg, Reid, and Lanstein (1985)). Unfortunately, we do not have data on book value or earnings during this period, so we cannot test for anomalies using these measures. Instead, we look at dividend yield as a potential measure of value. Litzenberger and Ramaswamy (1979) document that stocks with high dividend yields outperform stocks with low dividend yields. We find that the historical UK data presents the same return pattern for stocks sorted on dividend yield as modern CRSP data. In both samples, stocks that pay no dividends have high returns while returns are increasing in dividend yield for firms that pay dividends.

A third anomaly is *reversal* (DeBondt and Thaler (1985)), the tendency of stocks that have done badly (well) over the past three to five years to do relatively well (badly). In modern data, this finding is related to the value effect since stocks that have had large price increases tend to increase their book value, earnings, or dividends only slowly. Therefore, stocks that have done badly over the past few years are often value stocks. We do not find evidence of reversal in the historical UK data. This lack of a reversal effect can be reconciled with the presence of a dividend yield anomaly by noting that past losers are not value stocks in the historical UK data. During this period, firms changed dividends quickly and substantially in response to changes in price so that stocks with high past returns often had higher dividend yields than stocks with average past returns.

1.B. 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.[4] 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 billion. The total amount of British government debt alone ranged from £760 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.

[4] 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.

In comparison, from 1926 through 1995, the total market capitalization of the US market as measured by the CRSP data set ranges from about 20 percent (in 1942) to almost 89 percent (1995). From 1996 through the end of our sample period (1999), the market capitalization of CRSP stocks has exceeded 100 % 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).[5] The industry composition of firms by market capitalization and number in 1870 is illustrated in Figure 1. Although railroads were the largest stocks and consequently made up a large fraction of market capitalization, these firms made up only 10% of the number of firms traded. The remaining 90% of firms were small and represented a variety of industries including banking, insurance, mining, and utilities. Consequently, while railroad stocks dominated the value-weighted index, 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 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.

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

2. Description of 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.[6] 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.[7] The complete sample contains more than 40,500 observations on some 3,100 equity securities issued by approximately 2,700 companies.[8]

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.[9]

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

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

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. Firms with 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 analysis.

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 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.[10] In addition, shares issued in foreign currencies are excluded.[11]

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[8] 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).

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

[10] 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

Dividend data presents several difficulties. For each share, the IMM reported the last four dividend payments, usually expressed as a percent of the share's par value.[12] 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 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.

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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).

[11] 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.

[12] 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.

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. These deficiencies in the data make delisting bias, where firms' performance is correlated with the probability that they will disappear from the sample, a potential problem. To make results from historical and modern data more comparable, we adopt the approach of Romer (1986). We use only those components of the CRSP data that were available in the earlier data set. Specifically, since the UK data is annual 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 treat returns as missing if price data are not available in two consecutive Decembers. Also, if the number of shares outstanding has changed substantially, we treat returns as missing since it is not clear whether or not a stock split took place.

3. Procedure

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: a security's market capitalization, its dividend yield (D/P), and its 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. Also, we show only results for portfolios sorted on a single criterion. Results for double-sorted portfolios are not included only because their results mirror those comparing single-sorted portfolios.

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 with stocks of similar size going into the same group. For each group, we form an equal-weighted portfolio consisting of all the stocks in that group. We then track the performance of that portfolio in the following year, treating as missing all stocks in the portfolio that disappeared from the sample in the next period. 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. Sorting on three-year cumulative returns yields similar results. First, in each year for each stock, we calculate a measure of past returns. If a security does not have five years of past returns, we do not include it. In each year, we sort stocks with sufficiently long return histories based on their cumulative returns. We form equal-weighted portfolios of stocks with similar cumulative returns and calculate their returns, averaging over shares that did not disappear from the sample after the portfolios were formed.

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, taking the average return for stocks in the portfolio that were not missing in the following year.

Excluding delisted firms, which have missing data in their final year could potentially introduce bias to our estimates of returns. Delisted firms could be missing because they went bankrupt and had negative returns, introducing an upward bias, or because they have been acquired and had positive returns, leading to large positive a downward bias. This potential for bias is unlikely to have a large impact on our results for several reasons. First, we use the same procedure to form portfolios in both samples, ignoring information about delisting returns in the CRSP data. Therefore, we should only be concerned if the pattern of delisting returns is quite different in the two periods. Second, 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. Finally, the cross-sectional patterns we document are not changed substantially when we assume that missing observations suffered a negative 100% return. To understand the importance of missing observations for different portfolios, we show the fraction of firms in a portfolio that have missing observations in the tables that follow.

4. Results

4.A. Market Returns and Volatility

We present summary statistics on market returns for the historical UK data and the transformed CRSP market data in Table 1. 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. Both returns and standard errors in the historical UK data are between one half and one third of those in the CRSP data. However, Sharpe Ratios, the ratio of average excess return to standard deviation of excess return, are quite similar. This suggests that the price of risk was not dramatically different in the two periods. Both sets of indices have a positive autocorrelation at a lag of one year and negative autocorrelations at higher lags. Long-term negative autocorrelation is more pronounced in the historical UK 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.

Although the level of market risk was dramatically lower in the historical UK indices, the amount of idiosyncratic risk is only somewhat lower during this period. To measure idiosyncratic risk, we look at the cross-sectional standard deviation of returns in each sample, shown in Table 2. The average of this measure is 48% in the CRSP data but 31% in the historical UK data. Differences in this average could be generated by differences in idiosyncratic risk or by heterogeneity in beta coupled with differences in the quantity of market risk. To differentiate these stories, we regress the cross-sectional variance of excess returns in a given year on the squared excess equal-weighted market return in that year. Under certain restrictive assumptions, the intercept of this regression measures the variance of idiosyncratic risk. [13] The results are shown in Table 3; the intercept for the CRSP data is 0.21 while the intercept for the historical UK data is 0.13. This difference is marginally significant. When normalized by the variance of market returns, idiosyncratic variance was relatively large in the historical UK data.

[13] If the CAPM holds, then the return for any asset, R_i, can be expressed as a function of the risk-free interest rate, R_f, the asset's normalized covariance with the market, β_i, the market return, R_m, and an error term, ε_i. If (R_m-R_f) is known and all stocks are assumed to have the i.i.d. ε_i, then the cross-sectional variance of asset returns in a given year will be $V(R_i-R_f| R_m-R_f)=V(\beta_i)\,(R_m-R_f)^2+V(\varepsilon_i)$. We can estimate $V(\beta_i)$ and $V(\varepsilon_i)$ by regressing the cross-sectional variance of excess returns, $V(R_i-R_f| R_m-R_f)$, on the squared market excess return, $(R_m-R_f)^2$. Unfortunately, the annual frequency of the data does not permit a less restrictive measurement of idiosyncratic risk like that of Campbell et al (2001).

A chart of cumulative returns for the equal-weighted and value-weighted indexes is shown in Figure 3. The higher return for the equal-weighted portfolio in the second-half of the sample must be explained by higher returns for small stocks during this period.

4.B. Size, Past Performance, and Dividend-Yield Sorted-Portfolios

To examine the impact of size on stock returns, we look at equal-weighted portfolios formed on size. Table 4 and Table 5 present descriptive statistics for these portfolios, which are formed annually based on the size percentile in the previous year.[14] Since the 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 34% and 41% of the CRSP and UK value-weighted indices, respectively. Similarly, the smallest 10% of stocks average just 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. Furthermore, large firms that do pay dividends are less likely to pay relatively large ones in the historical UK sample.

[14] 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.

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. This potentially introduces 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 very small stocks, the rate of attrition is about 10% for all portfolios in the historical UK data and about 20% for all portfolios in the CRSP data. Putting aside the problem that the direction of the delisting bias may vary for different portfolios or in different samples, the lower attrition rate in the historical UK data suggests that delisting bias is a smaller problem in the historical UK data than the CRSP data. Also, the relatively constant level of attrition among all but the smallest portfolios suggest that attrition should not impact the relative returns of portfolios containing large versus medium-size stocks.

Table 6 shows the returns of the size-sorted portfolios. The CRSP data show a smooth and relatively monotonic relationship between size and average returns. Larger stocks have lower returns than smaller ones. The portfolio of the largest 1% of CRSP stocks has returns that are slightly higher than the returns of the portfolio of the next largest group. This feature is not present in standard CRSP data, which contains more detailed information about splits and delisting returns. We omit this detailed information to maintain parity with the historical data.

By contrast, there is no clear relationship between size and returns in the UK data. The smallest two portfolios of UK stocks, which make up under 0.2% of stocks by market capitalization but 10% 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. Among portfolios that make up 99.8% of the value-weighted index, we can see no clear pattern in their returns. Figure 4 shows the returns of an arbitrage portfolio that buys small stocks and sells large ones short. Since the very smallest stocks have dramatically higher returns than all other portfolios and since these returns may well result from delisting bias and illiquidity, we exclude them from the small minus big portfolio. The value of this portfolio declines dramatically between the early 1870s and early 1880s but is otherwise fairly constant.

Next, we examine the properties of portfolios sorted on cumulative past returns over the previous five years, shown in Table 7 and Table 8. The first two rows show the group identification number and percentile from which the portfolio was formed. For example, Group 2 includes stocks that were among the worst 10% of stocks but not among the worst 5% based on cumulative returns over the past five years. 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 are more likely to pay relatively high dividends as there past performance improves, 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 9 shows the returns of portfolios sorted on past performance. 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 decile (groups 1 and 2) has higher returns than the all other stocks, there is no clear relationship between past performance and current returns outside of these portfolios. The worst performing stocks (groups 4 through 6) are those whose returns have been closest to zero over the previous five years. Extremely good and bad past returns (groups 1 through 3 and 7 through 12) predict good future returns in the UK data. In other words, while the pattern of returns is similar in the two samples for portfolios with relatively poor past returns (groups 1 through 4), the patterns is reversed for portfolios with relatively good past returns (groups 5 through 12). Among firms with better than average past performance (groups 5 through 12), better past performance implies better future performance in the UK data but worse future performance in the CRSP data. 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 the underperformace of past average performing stocks is confined to the 1890s.

Finally, we examine portfolios sorted on dividend yield. Ideally we would like to have formed portfolios sorted on the price-earnings ratio or the book-to-market ratio. 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." Portfolios sorted on dividend yield are somewhat similar in composition for the two data sets. A much larger fraction of stocks in the US data do not pay any dividends. As shown in the "share" column of Table 10, in the US data, these no-dividend stocks tend to have much lower market capitalization. In the UK data, stocks that do not pay dividends have only slightly lower market capitalizations. 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 both samples, stocks that do not pay dividends have high average returns, even when adjusting for their high betas. Among stocks that do pay dividends, stocks with a high dividend yield have higher returns than stocks with a low dividend yield. This is true for both the CRSP data and the UK data. Excluding the smallest stocks from both samples does not change the results substantially. 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 return of this portfolio is positive throughout the sample, indicating that high dividend yield stocks outperform low but non-zero dividend yield stocks consistently.

4.C. 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 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. Therefore, there must be a difference in dividend policy between the two samples among firms that performed relatively well over the last five years (where there is a difference between the two samples in portfolio returns). This is, in fact, the case. Among firms that did relatively well in the CRSP sample (Table 9, 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.

5. Conclusion

The behavior of UK stock markets before World War I is similar in many ways to that of modern US markets. The Sharpe Ratios of the indices are similar, as are the pattern of autocorrelations in the indices. The relative numbers of large and small stocks are similar in the two samples. Also, portfolios sorted on dividend yield have quite similar relative returns in the two samples.

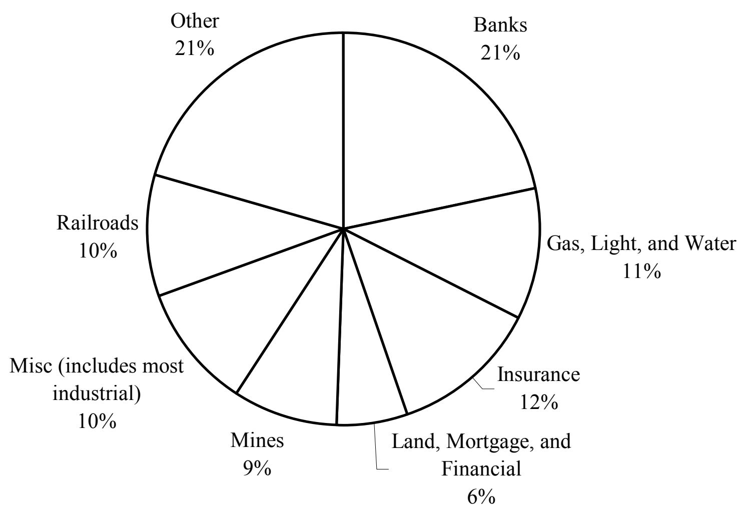
However, other elements of cross-sectional performance of stock returns look quite different in the two samples. In the historical UK sample, small stocks do not outperform large stocks as they do in CRSP data. Among firms with relatively poor past performance, higher past returns tend to be followed by low future returns in both samples. However, among firms with relatively good past performance, higher past returns tend to be followed by low future returns in the CRSP sample but by high future returns in the historical UK sample.

The similarity of return patterns based on dividend yield alongside the dissimilarity of return patterns based on past performance can be understood in light of differences in dividend policies among firms with good returns. In the historical UK sample, high returns were reflected in increased dividends; in the CRSP sample, high returns led cash to be reinvested in the firm and not paid out to shareholders.

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. In this case, while we find support for the existence of dividend yield-based anomalies, we find no support for the existence of size or reversal anomalies.

Figure 1

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



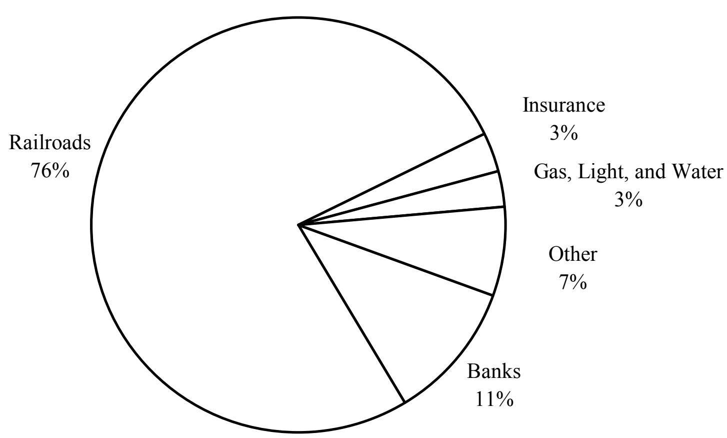
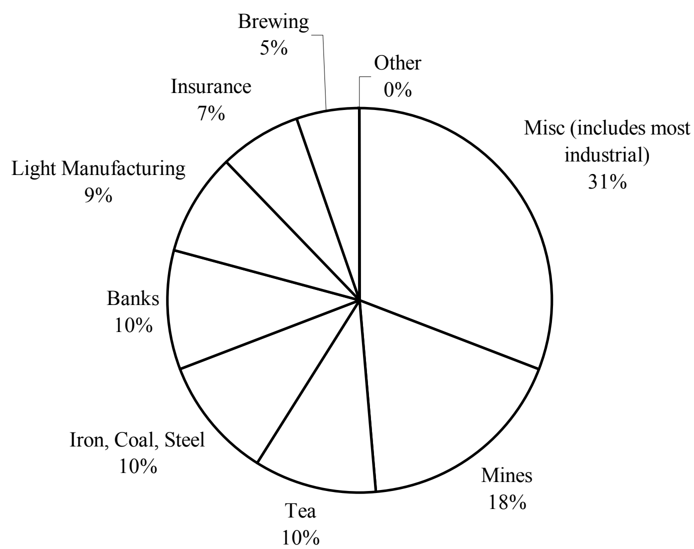


Figure 2

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



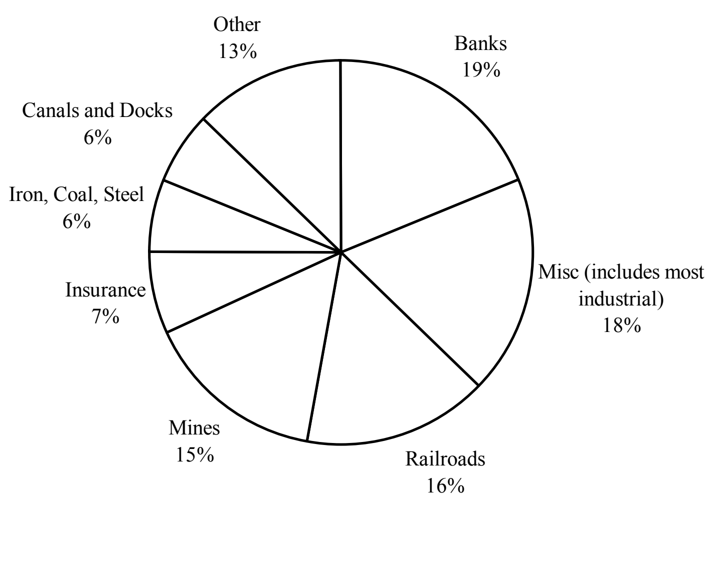
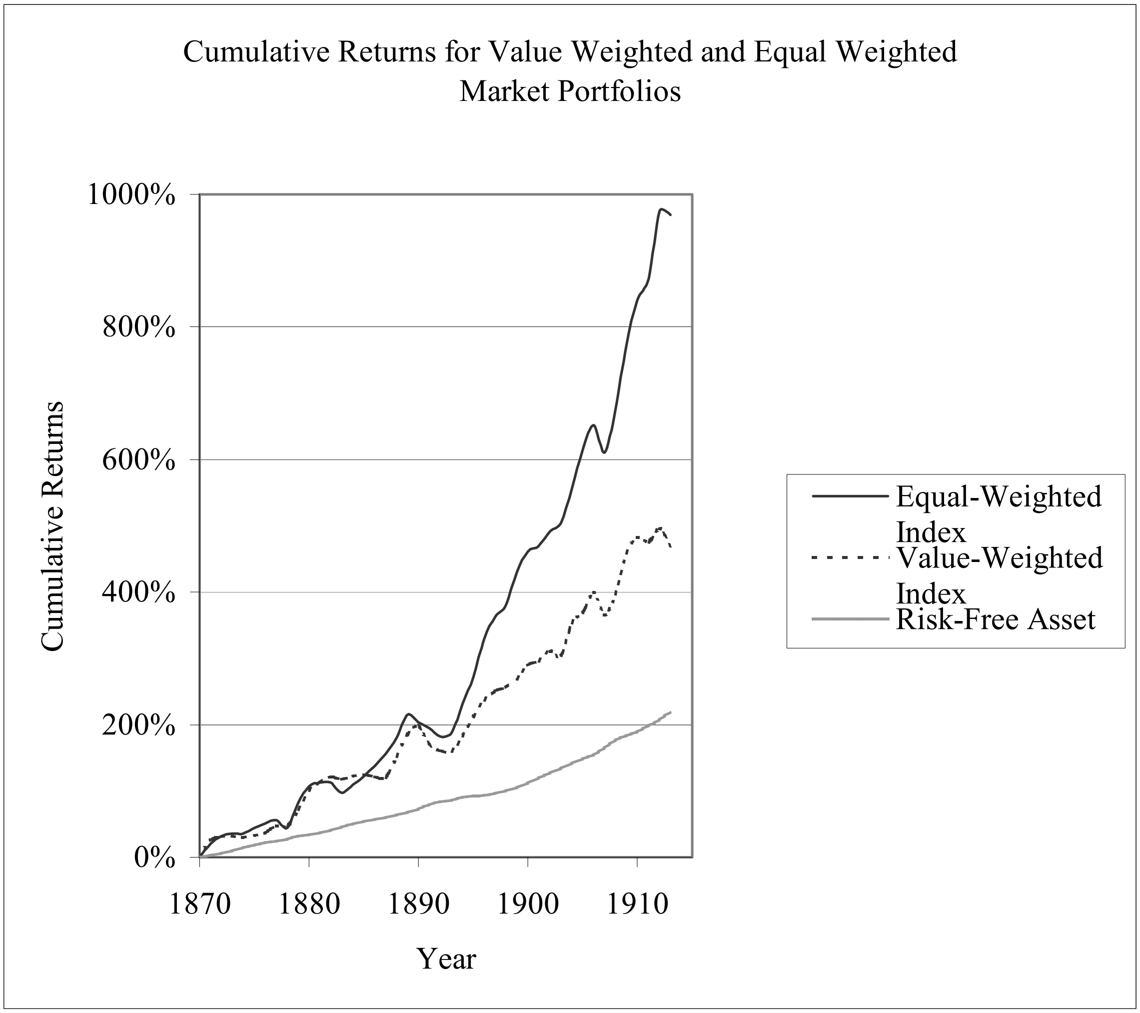
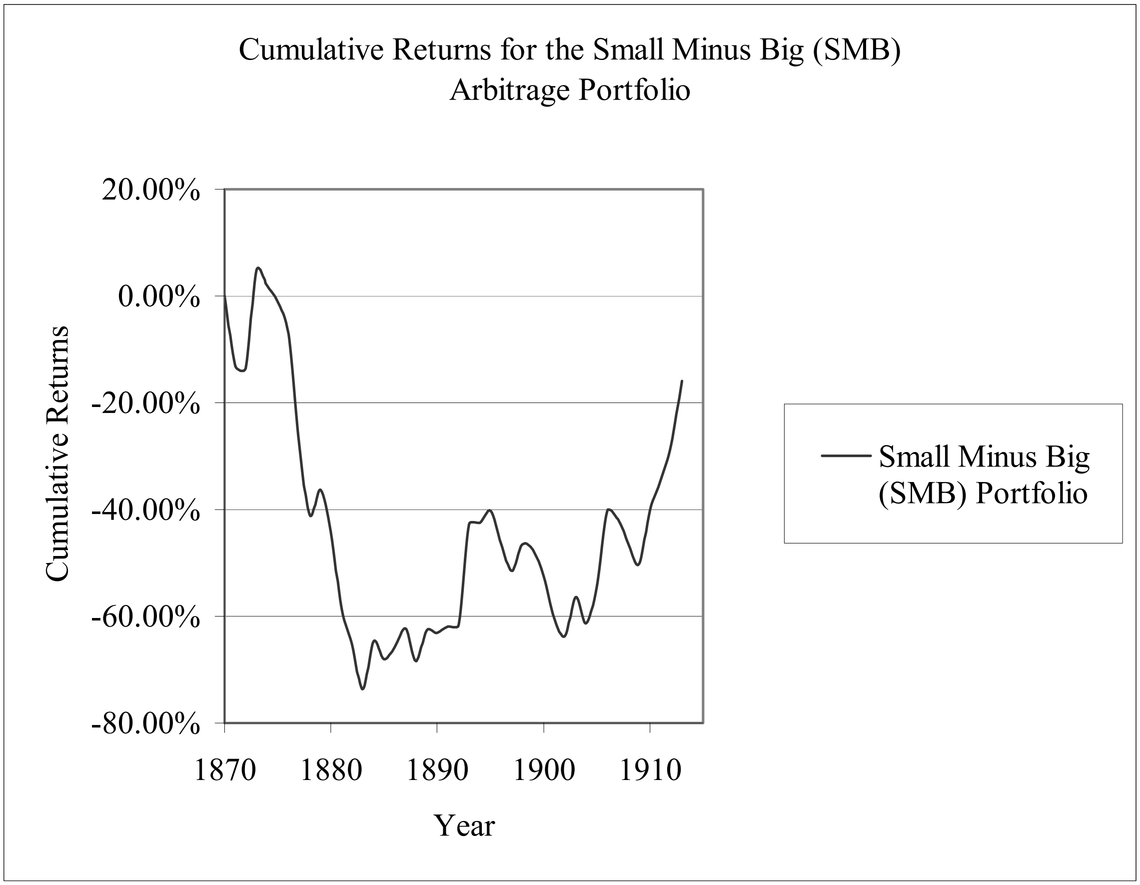


Figure 3



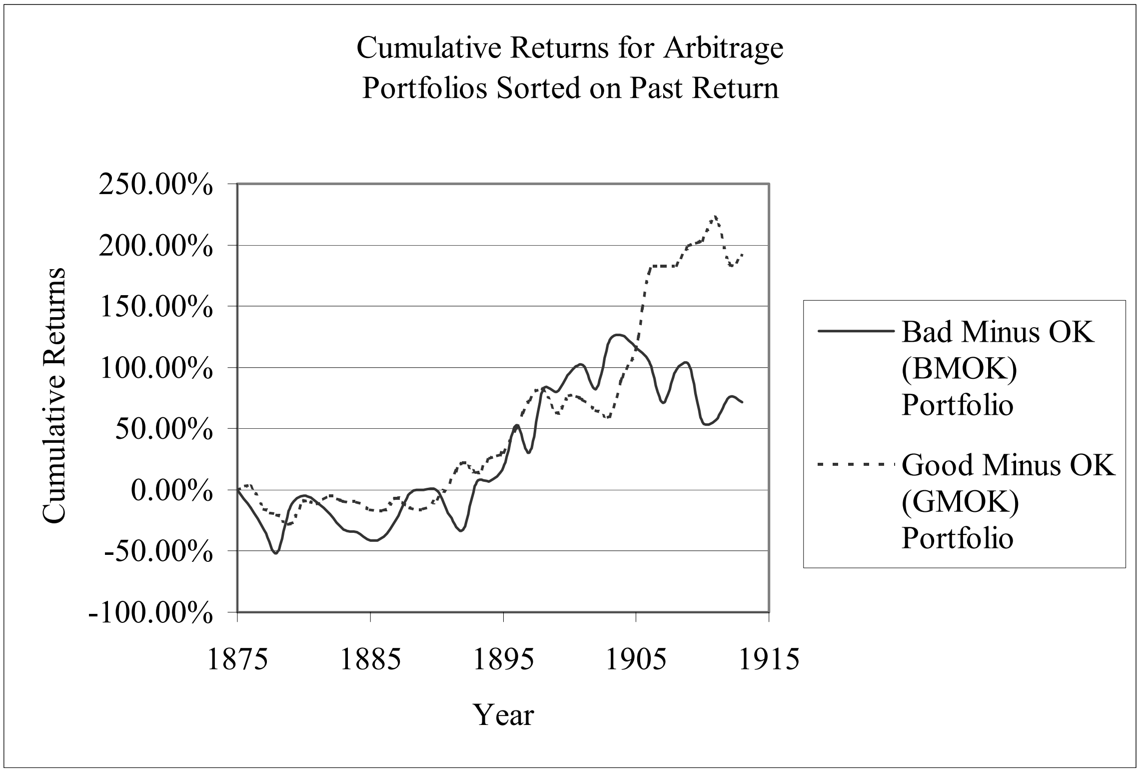
Returns are simple, cumulative returns for the equal-weighted and value-weighted market portfolios. The return on the risk-free asset is also included.

Figure 4



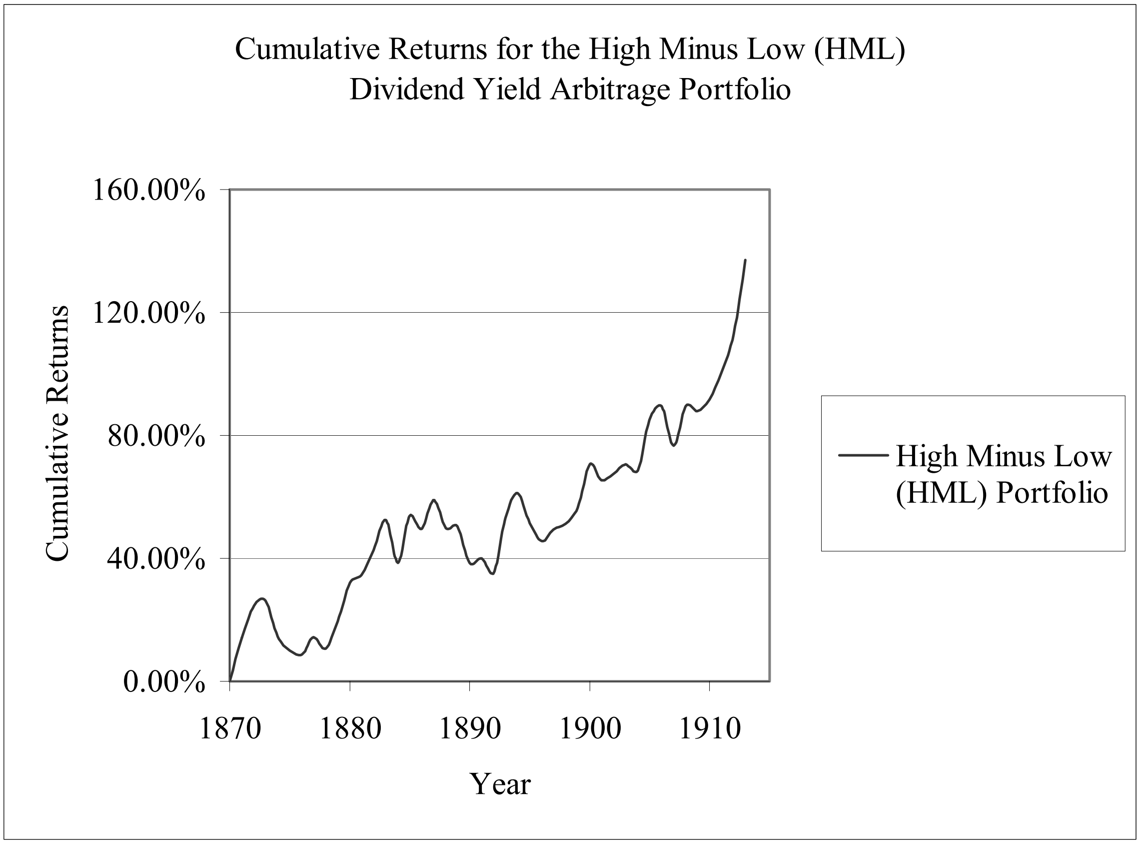
Returns are simple, cumulative returns. The portfolio is an arbitrage portfolio formed by going long small stocks and going short large stocks. The very smallest 5% of stocks, making up on average 0.6% of market capitalization are excluded from the portfolio. The portfolio return in a given period is calculated as R=0.5*R(size2) + R(size3)- 0.75* R(size10) – 0.375(size11) – 0.3*R(size12) - 0.075*R(size13). Here, "size'N'" refers to the size-sorted portfolio described in Column N of Table 6.

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) + R(PRet2) - 0.75 * R(PRet6) – 0.75 * R(PRet7). R(GMOK)=0.5 * R(PRet12) + 0.5 * R(PRet11) + R(PRet10) - R(PRet6) - R(PRet7). Here, “PRet‘N’” refers to the dividend yield-sorted portfolio described in Column N of Table 9.

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(DP5) - R(DP2). Here, "DP'N'" refers to the dividend yield-sorted portfolio described in Column N of Table 11.

Table 1

Index Returns

		Average (R_f)	Average ($R- R_f$)	Standard Deviation ($R- R_f$)	Sharpe Ratio	rho(1)	rho(2)	rho(3)	rho(4)	rho(5)	Q B-P stat (5)	Q B-P stat (5) probability	Correlation (value-weight, equal weight)
uk	Value-weighted	2.76%	1.57%	7.06%	0.22	0.18	-0.17	-0.34	-0.15	-0.07	9.84	0.08	0.81
	Equal-Weighted		3.12%	7.42%	0.42	0.15	-0.18	-0.27	-0.19	-0.06	8.09	0.15	
crsp	Value-weighted	4.76%	5.18%	20.03%	0.26	0.04	-0.16	-0.03	-0.11	-0.04	2.97	0.71	0.89
	Equal-weighted		9.38%	29.54%	0.32	0.07	-0.12	-0.07	-0.19	-0.10	5.02	0.41	

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. 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. Next, we present the autocorrelation coefficients at lags of one through five years. The Q statistics are from Box-Pierce (1970) with 5 lags. 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.

Table 2

Properties of the Cross-Sectional Standard Deviation of Returns

	US	UK
Mean(c.s. s.d.(R))	48.5%	38.6%
s.d.(c.s. s.d.(R))	27.1%	11.9%
Min.(c.s. s.d.(R))	19.1% (1937)	23.1% (1878)
Max(c.s. s.d.(R))	137.3% (1967)	78.8% (1884)

Table 3

Idiosyncratic Risk
Regression of Cross-Sectional Variance of Excess Returns

	US	UK
$(R_m-R_f)^2$	1.01** (0.2492)	4.98** (1.47)
constant	0.212** (0.048)	0.131** (0.0183)
R^2	18.8%	22.0%
Obs	73	43

Results display the regression of $Var(R_i(t))$ on $(R_m(t)-R_f(t))^2$, the equal-weighted excess market return squared. 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.

Table 4

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	0.05%	0.10%	0.3%	0.6%	0.9%	1.3%	2.0%	3.2%	5.6%	12.3%	13.5%	26.2%	34.0%
D/P=0	81.7%	69.3%	58.6%	48.6%	39.3%	34.2%	27.6%	22.2%	17.2%	11.8%	6.8%	3.3%	1.3%
LowD/P	4.6%	7.2%	9.2%	10.5%	13.1%	14.0%	16.2%	18.2%	21.3%	25.1%	27.8%	35.0%	42.9%
MidD/P	3.3%	5.7%	7.7%	10.6%	13.4%	14.9%	17.1%	19.7%	23.2%	25.0%	28.1%	30.2%	27.0%
HighD/P	4.2%	6.6%	9.7%	13.4%	15.0%	17.2%	19.9%	20.1%	20.9%	22.0%	22.6%	21.1%	19.8%
VHighD/P	6.1%	11.2%	14.8%	16.9%	19.2%	19.7%	19.2%	19.9%	17.3%	16.1%	14.7%	10.4%	9.0%
AvgPastR	-5.9%	2.5%	8.8%	13.6%	14.9%	16.3%	18.8%	17.8%	17.9%	17.2%	15.7%	16.2%	17.2%
Fr(Attrit)	28.5%	23.1%	20.8%	20.5%	20.7%	21.4%	21.8%	23.2%	23.9%	23.6%	22.1%	22.0%	19.9%
N(min)	1	3	9	33	34	29	29	27	22	32	14	7	2
N(max)	228	224	435	425	429	439	442	442	445	452	226	176	45

See footnote 14 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 5

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	0.05%	0.11%	0.4%	0.6%	0.9%	1.2%	1.8%	2.7%	4.5%	9.0%	10.8%	27.5%	40.5%
D/P=0	75.2%	48.6%	34.0%	26.9%	22.1%	21.3%	17.7%	17.8%	14.7%	14.6%	17.1%	17.4%	9.4%
LowD/P	4.6%	8.8%	11.7%	14.3%	16.9%	16.7%	17.4%	22.3%	22.6%	26.8%	30.5%	41.2%	44.2%
MidD/P	4.8%	11.4%	14.3%	16.3%	17.2%	19.8%	24.2%	19.4%	22.3%	23.1%	21.9%	23.0%	30.5%
HighD/P	3.4%	11.3%	18.2%	20.3%	21.0%	20.2%	21.4%	21.8%	22.8%	20.2%	18.0%	10.0%	12.7%
VHighD/P	12.0%	19.9%	21.9%	22.2%	22.9%	22.0%	19.3%	18.7%	17.5%	15.2%	12.5%	8.4%	3.1%
AvgPastR	-18.8%	-5.0%	5.3%	5.1%	8.4%	6.6%	7.8%	10.1%	9.2%	9.2%	10.7%	12.0%	10.1%
Fr(Attrit)	30.4%	15.4%	12.0%	11.5%	8.5%	8.6%	8.2%	9.6%	8.0%	8.5%	9.4%	9.5%	11.2%
N(min)	7	9	19	18	17	19	17	16	14	13	7	6	2
N(max)	41	40	77	75	78	74	72	68	67	70	36	28	8

See footnote 14 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 6

Size-Sorted Portfolio Returns
Modern 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($R-R_f$)	33.8%	19.5%	13.4%	9.98%	9.08%	7.62%	8.58%	7.74%	6.57%	6.60%	5.74%	5.56%	6.93%
S.D.($R-R_f$)	58.5%	47.9%	39.0%	33.8%	32.0%	29.3%	28.9%	27.4%	23.7%	22.8%	20.7%	18.1%	20.2%
β - uw	1.70	1.50	1.28	1.12	1.07	0.98	0.96	0.91	0.77	0.73	0.63	0.53	0.53
β –vw	1.96	1.76	1.57	1.40	1.38	1.29	1.29	1.24	1.09	1.09	1.00	0.87	0.95
α-vw	23.6%	10.3%	5.31%	2.73%	1.93%	0.92%	1.89%	1.32%	0.91%	0.97%	0.54%	1.03%	2.00%
t-stat	4.48	2.62	1.88	1.18	0.98	0.55	1.21	0.93	0.81	1.13	0.91	1.94	2.47
UK													
Avg($R-R_f$)	28.6%	5.18%	3.01%	0.72%	2.10%	1.02%	3.04%	1.39%	2.56%	2.52%	5.40%	2.19%	2.81%
S.D.($R-R_f$)	41.4%	19.3%	10.32%	9.45%	8.58%	7.89%	8.73%	8.56%	7.71%	7.36%	12.38%	9.98%	9.34%
β - uw	2.45	1.21	0.91	1.04	0.81	0.81	0.90	0.93	0.88	0.77	1.23	0.98	0.90
β –vw	1.62	0.75	0.65	0.70	0.69	0.61	0.82	0.89	0.90	0.82	1.28	1.20	1.16
α-vw	26.0%	4.02%	2.00%	-0.38%	1.02%	0.07%	1.77%	0.00%	1.15%	1.22%	3.39%	0.32%	0.99%
(t-stat)	4.14	1.37	1.37	-0.30	0.92	0.06	1.70	-0.01	1.67	1.72	2.54	0.38	1.40

See footnote 14 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. “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 7

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

	1	2	3	4	5	6	7	8	9	10	11	12
%to%	0%-5%	5-10%	10-20%	20-30%	30-40%	40-50%	50-60%	60-70%	70-80%	80-90%	90-95%	95+%
AvgPastR	-63.5%	-44.1%	-25.7%	-5.34%	13.24%	32.12%	51.87%	75.65%	107.1%	157.6%	229.6%	468.5%
D/P=0	79.03%	64.50%	51.20%	37.57%	29.33%	23.50%	20.12%	17.91%	15.45%	16.04%	19.49%	26.32%
LowD/P	5.85%	9.73%	9.94%	11.77%	11.49%	12.94%	12.68%	13.68%	15.47%	18.63%	23.89%	29.76%
MidD/P	4.58%	7.01%	10.51%	13.14%	16.68%	16.66%	17.54%	19.91%	20.51%	22.74%	22.47%	18.43%
HighD/P	4.84%	8.01%	12.38%	17.20%	20.38%	21.76%	24.42%	24.63%	25.40%	21.73%	17.89%	11.43%
VHighD/P	5.70%	10.75%	15.97%	20.31%	22.12%	25.14%	25.23%	23.88%	23.17%	20.86%	16.25%	14.06%
Share	0.46%	1.07%	3.13%	2.86%	3.74%	4.30%	4.56%	5.12%	5.76%	6.01%	2.76%	1.93%
Fr(Attrit)	23.92%	18.22%	15.52%	14.46%	16.31%	15.67%	17.12%	18.84%	20.78%	24.27%	27.58%	30.22%
N(min)	7	8	20	21	21	21	21	18	19	17	8	5
N(max)	53	58	117	118	121	116	113	105	104	98	44	41

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.

Table 8

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

	1	2	3	4	5	6	7	8	9	10	11	12
%to%	0%-5%	5-10%	10-20%	20-30%	30-40%	40-50%	50-60%	60-70%	70-80%	80-90%	90-95%	95+%
AvgPastR	-74.8%	-50.7%	-29.0%	-7.7%	8.2%	21.5%	33.8%	47.1%	64.4%	92.7%	137.0%	313.7%
D/P=0	88.7%	65.2%	40.6%	20.7%	12.3%	6.4%	4.6%	6.3%	4.8%	5.1%	6.8%	13.1%
LowD/P	2.1%	8.6%	18.1%	21.4%	27.0%	30.3%	29.1%	24.9%	22.3%	18.0%	18.4%	18.3%
MidD/P	0.2%	5.6%	10.2%	19.1%	23.5%	29.2%	31.1%	30.4%	29.2%	26.0%	17.6%	12.8%
HighD/P	1.8%	7.0%	13.3%	19.2%	21.4%	21.0%	22.7%	24.4%	28.1%	29.5%	26.3%	21.9%
VHighD/P	7.2%	13.6%	17.8%	19.6%	15.7%	13.2%	12.5%	14.1%	15.7%	21.4%	30.9%	33.9%
Share	0.2%	1.1%	4.0%	5.3%	4.8%	5.3%	7.8%	6.2%	6.2%	3.9%	2.4%	1.4%
Fr(Attrit)	22.5%	14.8%	10.6%	8.3%	9.3%	8.4%	7.9%	8.0%	8.2%	7.6%	10.2%	10.1%
N(min)	2	5	9	9	9	10	10	10	11	10	4	5
N(max)	23	23	44	45	45	45	44	45	44	44	22	22

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 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.

Table 9

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

	1	2	3	4	5	6	7	8	9	10	11	12
%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($R-R_f$)	30.44%	19.53%	15.09%	13.05%	12.58%	11.36%	10.81%	10.10%	8.54%	7.71%	7.06%	6.75%
S.D.($R-R_f$)	61.22%	36.45%	33.39%	28.58%	28.35%	26.26%	24.68%	27.31%	24.04%	24.35%	24.72%	27.21%
β-uw	1.45	1.10	1.08	0.94	0.93	0.85	0.81	0.87	0.78	0.76	0.74	0.80
β-vw	2.07	1.50	1.52	1.39	1.39	1.26	1.23	1.33	1.19	1.22	1.14	1.24
α-vw	16.87%	9.69%	5.09%	3.94%	3.44%	3.08%	2.74%	1.36%	0.73%	-0.27%	-0.41%	-1.40%
(t-stat)	2.67	3.05	2.07	2.20	2.01	1.81	1.95	0.81	0.52	-0.20	-0.23	-0.70
UK												
Avg($R-R_f$)	16.17%	5.43%	5.63%	1.09%	2.44%	2.83%	3.77%	3.40%	3.21%	5.48%	3.94%	5.01%
S.D.($R-R_f$)	40.33%	24.09%	14.92%	10.04%	6.10%	5.33%	5.90%	5.24%	6.37%	7.29%	10.39%	14.41%
β-uw	3.66	1.77	1.54	0.89	0.52	0.51	0.54	0.33	0.65	0.41	0.74	0.64
β-vw	3.08	1.37	1.34	0.71	0.47	0.44	0.52	0.31	0.54	0.42	0.42	0.95
α-vw	11.84%	3.50%	3.74%	0.09%	1.77%	2.20%	3.03%	2.96%	2.44%	4.89%	3.35%	3.67%
(t-stat)	2.01	0.93	1.84	0.06	2.00	2.93	3.76	3.64	2.75	4.30	1.99	1.68

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. 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.

Table 10

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

		2	3	4	5
%to%	0 D/P	1-25%	25-50%	50-75%	75-100%
CRSP					
Avg(D/P)	0.0%	2.3%	4.1%	5.8%	15.1%
AvgPastR	14.4%	25.5%	16.2%	10.3%	5.9%
Share	6.2%	32.2%	26.9%	21.8%	12.9%
Fr(Attrit)	23.0%	27.2%	23.9%	19.2%	15.5%
N(min)	50	42	37	50	50
N(max)	2436	488	491	513	508
UK					
Avg(D/P)	0.0%	3.7%	5.4%	6.7%	11.9%
AvgPastR	-3.3%	10.7%	9.0%	7.7%	6.5%
Share	13.9%	38.9%	25.1%	13.4%	8.7%
Fr(Attrit)	18.2%	10.0%	8.4%	7.4%	8.6%
N(min)	29	40	33	34	27
N(max)	154	146	158	149	149

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.

Table 11

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

		2	3	4	5
%to%	0 D/P	1-25%	25-50%	50-75%	75-100%
CRSP					
Avg($R-R_f$)	13.06%	6.19%	7.47%	9.39%	9.08%
S.D.($R-R_f$)	43.59%	25.62%	23.16%	24.64%	24.48%
β - uw	1.43	0.85	0.75	0.81	0.79
β –vw	1.77	1.18	1.07	1.10	1.12
α-vw	3.88%	0.06%	1.90%	3.66%	3.28%
(t-stat)	1.26	0.05	1.83	2.77	2.73
UK					
Avg($R-R_f$)	3.96%	1.82%	2.56%	3.91%	4.03%
S.D.($R-R_f$)	14.72%	5.66%	5.32%	6.16%	8.21%
β - uw	1.81	0.66	0.53	0.71	0.88
β –vw	1.56	0.61	0.47	0.61	0.78
α-vw	1.51%	0.87%	1.82%	2.95%	2.81%
(t-stat)	0.98	1.49	2.78	4.26	2.92

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. 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.

Table 12

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

	US	UK
R(t-1)	0.00339** (0.00080)	0.02016** (0.00132)
R(t-2)	-0.00135 (0.00080)	0.00340** (0.00131)
R(t-3)	-0.00097 (0.00080)	-0.00354** (0.00128)
Δ(t-1)	-0.02909** (0.00137)	-0.20327** (0.01024)
Δ(t-2)	-0.02139** (0.00328)	-0.11860 (0.00903)
Δ(t-3)	-0.00674 (0.00355)	-0.04045** (0.00834)
R^2	0.0054	0.0455
Obs	91,686	13,029

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 standard errors are in parentheses.

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