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The cross-section of stock returns in an early stock market

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ABSTRACT

Using a new dataset which contains monthly data on 1015 stocks traded on the London Stock Exchange between 1825 and 1870, we investigate the cross section of stock returns in this early capital market. Unique features of this market allow us to evaluate the veracity of several popular explanations of asset pricing behavior. Using portfolio analysis and Fama–MacBeth regressions, we find that stock characteristics such as beta, illiquidity, dividend yield, and past-year return performance are all positively correlated with stock returns. However, market capitalization and past-three-year return performance have no significant correlation with stock returns.

1. Introduction

The patterns of cross-sectional stock returns (e.g., size effect, value effect, reversal effect, momentum effect etc.) have been documented by many studies of modern financial markets (Banz, 1981; De Bondt & Thaler, 1984; Rosenberg, Reid, & Lanstein, 1985; Fama & French, 1992; Jegadeesh & Titman, 1993). These phenomena are sometimes called "anomalies" because these return patterns appear not to be explained by the classical asset pricing models. Since their discovery, a large strand of theoretical and empirical work has attempted to provide rationalization for these stock market "anomalies". First, several studies have proposed risk-based explanations (Campbell, Polk, & Vuolteenaho, 2010; Hahn & Lee, 2006; Liu, Strong, & Xu, 1999; Xing, 2008; Zhang, 2005). Among these, a well-known risk explanation for the size and value effect is that market capitalization and value indicators (e.g., B/M ratio, dividend yield, price earnings ratio) capture the distress risk omitted by standard asset pricing models (Chan & Chen, 1991; Fama & French, 1993, 1995, 1996; Ferguson & Shockley, 2003). Second, many studies try to explain the anomalies using behavioral biases in individual decision-making. For example, investor overreaction has been proposed as an explanation for the value and the reversal effects (Daniel, Hirshleifer, & Subrahmanyam, 1998; De Bondt & Thaler, 1984; De Bondt & Thaler, 1987; Lakonishok, Shleifer, & Vishny, 1994). Third, some studies argue that the institutional environment, such as tax or the behavior of institutional investors, helps to explain the anomalies (Gompers & Metrick, 2001; Jiang, 2010). One example is the tax-loss selling hypothesis, which has been an important candidate explanation for the January effect and the reversal effect (Reinganum, 1983; George & Hwang, 2007). Fourth, Lo and MacKinlay (1990) and Black (1993) highlight a potential data-snooping bias in the tests for anomalies, thus casting doubt on their very existence in the first place.

As modern global financial markets have become increasingly integrated, Schwert (2003) points out that repeatedly rediscovering similar results from positively correlated samples may not provide much additional evidence in favor of the "anomalies". Therefore asset pricing behavior in a large, non-US market in the nineteenth century may provide strong out-of-sample evidence. Consequently, in this study, using a unique dataset that contains the monthly data on 1015 stocks traded on the London Stock Exchange from 1825 to 1870, we investigate the cross-section of stock returns in this early stock market. We focus on two of the best known stock pricing patterns, namely the size effect and value effect, but we also examine the relation between stock returns and several other stock characteristics, including beta, illiquidity, past one year performance, and past three year performance.

The motivations for this study are threefold. First, apart from the possibility of a data-snooping bias, the recent disappearance of the

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size effect (Amihud, 2002; Dimson & Marsh, 1999; Hirshleifer, 2001) has raised further questions about the robustness of asset pricing anomalies. Alternatively, Schwert (2003) suggests that it is probable that the anomalies were always in existence, but they have been arbitraged away following their discovery. It is also possible, however, that the disappearance of the anomalies may itself be a temporary phenomenon. An investigation of asset pricing behavior in historical financial markets, particularly one from a period long before the discovery of the anomalies, may help to shed some light on these issues as well as indirectly testing the data-snooping hypothesis.

Second, investigating asset pricing behavior in the nineteenth-century London market can be viewed as a natural experiment which allows us to examine asset pricing in the absence of influential factors such as taxes and institutional investors. To begin with, the London market operated in a laissez-faire environment, with zero corporate taxes, capital gain taxes and near-zero income taxes, minimal listing requirements, and very little in the way of statutory investor protection and securities law (Turner, Ye, & Zhan, 2013). Therefore, hypotheses that rely on taxes to explain stock return patterns do not apply in this market. Several studies document the influence of institutional investors upon stock pricing for modern markets (Da & Gao, 2010; Gabaix, Gopikrishnan, Plerou, & Stanley, 2006; Jiang, 2010). Institutional investors' trading activities, however, do not influence stock returns in our sample as they did not invest in the equity market during this era (Turner et al., 2013). In addition, to the extent that individual investors are less rational than professionals, any stock return patterns that arise due to individual investors' behavioral biases should be particularly pronounced in a market where individual investors dominate.

This unique institutional environment in the nineteenth-century London market provides a good opportunity to evaluate two competing theories of the long-term reversal effect: the tax-loss selling hypothesis and the overreaction hypothesis. In particular, in this historical market, we should not observe the reversal effect if the tax-loss selling hypothesis holds and there should be a strong reversal effect if the overreaction hypothesis holds.

Third, although only stocks with limited liability are traded on modern markets, this was not the case in the British stock market over our sample period, since there existed stocks with extended liability (i.e., unlimited liability, double liability or partially-paid stocks) as well as standard limited liability stocks (Acheson, Turner, & Ye, 2012). The coexistence of both types of stocks makes it possible to test the distress-risk explanation of the size and value effects. Stocks with extended liability existed to protect creditors from expropriation because, in the event of bankruptcy, shareholders had to cover the company's debt out of their personal wealth. Therefore, the costs to shareholders related to financial distress or bankruptcy would be larger for stocks with extended liability. Thus, one would expect that the returns of these special stocks should therefore be much more sensitive to distress risk than the returns of standard stocks. In addition, if size or value indicators capture the distress risk of the firm, we should observe a stronger size effect or value effect within the subsample of special stocks than in the subsample of standard limited liability stocks. We exploit this unique feature of this early stock market to test whether this was indeed the case.

This study contributes to the strand of literature that has investigated the pattern of cross-sectional stock returns in the UK market (Dissanaike, 1999; Gregory, Harris, & Michou, 2001; Gwilym, Morgan, & Thomas, 2000; Hon & Tonks, 2003; Levis, 1989; Liu et al., 1999; Morelli, 2007; Morgan & Thomas, 1998; Strong & Xu, 1997). This study also contributes to the literature which has investigated cross-sectional stock returns in historical financial markets. Korolenko and Baten (2005) demonstrate the existence of the size effect in the German stock market in the period 1871 to 1914. However, Bossaerts and Fohlin (2000) find the opposite using annual data on 50 companies from 1881 to 1913. Fohlin and Reinhold (2010) demonstrate a negative book-to-market effect in their sample with the monthly data on 37 firms, covering the period 1904 to 1910. For the UK market, using annual data for 1871 to 1913, Grossman and Shore (2006) find no size effect and some evidence of a value effect.

Our paper, however, represents large improvements over previous studies on historical stock markets. First, we examine stock returns in Britain, which had by far the most developed capital market in the nineteenth century. Second, we use a comprehensive dataset of stocks traded on the London Stock Exchange over a relatively long period (45 years). This dataset covers a broad range of sectors in the economy and is thus free from survivor bias. Third, we address the delisting bias problem in our empirical analysis. Fourth, as well as extending the analysis of Grossman and Shore (2006) further back to a more formative stage of the British stock market, we use the monthly data, which allows us to use Fama and MacBeth (1973) regressions.

Our findings suggest that there is little evidence of a size effect in this early market. On the other hand, using dividend yield as the indicator of value and growth, we find strong evidence of a value effect. Both of these findings are robust to a battery of robustness checks. The cross-sectional regression analysis demonstrates that special stocks (i.e., stocks with extended liability and partially-paid capital) do not seem to have stronger value premiums than standard fully-paid limited liability stocks, suggesting that distress risk is not a plausible explanation for the value effect. The Fama–MacBeth regression analysis also indicates that, similar to the results from modern stock markets, stock returns in this historical market are positively correlated with beta, illiquidity and momentum measures. However, we find that stock returns in our sample are uncorrelated with the reversal variable, which indicates that the reversal effect which exists in modern markets may not exist in our sample.

Our out-of-sample study of the stock pricing behavior in this nascent stock market allows us to evaluate various explanations for the patterns of stock returns. The absence of a size effect in our sample and in Grossman and Shore (2006) corresponds to the evidence that the size effect in the US market disappeared in the post-1980s era. Taken together, this suggests that the size effect may not be a perennial feature of equity markets. It is also consistent with the data-snooping explanation for the size effect. Contrastingly, the value premium tends to be much more persistent as it exists in both historical and modern stock markets, perhaps suggesting that the value effect may not be an "anomaly" after all. However, our evidence provides no support for the distress risk explanation of the value effect, which corresponds to the findings of Dichev (1998) and Campbell, Hilscher, and Szilagyi (2008), who suggested that the distress risk premium in the modern stock market is negative rather than positive. Finally, the absence of a reversal effect in this era is consistent with the tax-loss selling hypothesis rather than the overreaction hypothesis.

This paper is structured as follows. Section two describes the data used in this study. Section three focuses on the performance of size-sorted and dividend-yield-sorted portfolios. We also consider the delisting-bias-adjusted portfolio returns as well as portfolio returns which take into account the influence of market risk as well as *SMB* and *HML* factors. In addition, we discuss the results of several robustness tests within the portfolio framework. In section four, we investigate the relationship between stock returns and stock characteristics using the Fama–MacBeth regression methodology. Section five concludes.

2. Data sources

The stocks employed in this study are the constituents of the nineteenth-century stock indices constructed in Acheson, Hickson, Turner, and Ye (2009). The main data source is the *Course of the Exchange* (*COE*), which from the beginning of the nineteenth century was the official price list for the London Stock Exchange (LSE). Although the LSE at this time did not have any restrictions on securities that could be traded on the floor, not every security obtained a quotation on the market's official list. A company's inclusion on the official list was mainly based on the anticipation of potential trading which generated