Available online at www.sciencedirect.com

ScienceDirect

Explorations in Economic History 52 (2014) 22–43

www.elsevier.com/locate/eeh

Cross-sectional predictability of stock returns, evidence from the 19th century Brussels Stock Exchange (1873–1914)☆

Jan Annaert*, Lord Mensah[1]

Department of Accounting and Finance, University of Antwerp, Prinsstraat 13, Antwerp, Belgium

Received 28 February 2013
Available online 17 October 2013

Abstract

We use pre-World War I Brussels Stock Exchange (BSE) data to investigate the relation between average stock returns and market beta, size, momentum, dividend yield and total risk on the cross-section of stock returns. Based on portfolio sorts and Fama–MacBeth regressions, we find no relationship between market beta, size or total risk and average returns. Momentum is strongly present in the entire data set as well as in subsamples based on size. We also find evidence for a weak value effect as measured by dividend yield. The flat relation between market beta and average return may be due to leverage-constrained investors.

Keywords: CAPM; Size effect; Momentum; Total risk; Dividend yield; Brussels Stock Exchange
JEL classification: G00; G10; G11; G12; G01; G02

1. Introduction

This paper provides a genuine out-of-sample test of some well-documented cross-sectional patterns between average stock returns and stock characteristics. Such an out-of-sample test is important to understand the causes of such patterns. Indeed, as economics in general and finance in particular, is not an experimental science, empirical regularities without theoretical support may simply be a result of (joint) data mining of in-sample data and may not hold out-of-sample. In order to investigate this possibility and to distinguish between alternative interpretations it is useful to consider new independent data (see e.g. Schwert (2003)). Although interesting, looking at other contemporaneous markets does not always add independent information. In an

☆ We wish to thank Frans Buelens, Marc De Ceuster, Patrice Fontaine, Rik Frehen, Kim Oosterlinck, Eugene White and participants of the 4th Eurhistock Conference (Bonn), the Financial History Workshop (ULB, Brussels), the 14th Conference of the Swiss Society for Financial Market Research (Zürich), and the Eastern Finance Association Conference in Atlanta for constructive comments. The insightful comments of two anonymous referees and Hans-Joachim Voth (the editor) have improved the paper noticeably. We acknowledge the financial support from the University of Antwerp for making this research possible. We also want to express our profound gratitude to the University of Antwerp for computerizing the historical data on Belgium Stock Exchange and making it available for this research. All remaining errors are ours.
* Corresponding author at: University of Antwerp and Antwerp Management School.
E-mail addresses: jan.annaert@ua.ac.be (J. Annaert), lord.mensah@ua.ac.be (L. Mensah).
[1] University of Ghana Business School (UGBS), Department of Finance, Ghana.

0014-4983/$ - see front matter © 2013 Elsevier Inc. All rights reserved.
http://dx.doi.org/10.1016/j.eeh.2013.10.002

integrated global market, it is likely that because of common shocks similar patterns are visible across the different markets. Only studying market behavior in other periods provides true independent evidence (see also Goetzmann et al. (2001) and Grossman and Shore (2006)). In this paper, high quality pre-World War I data of common stocks listed on the Brussels Stock Exchange (BSE) are used to provide evidence about the prevalence of the relationship between average returns and market beta, volatility, size, dividend yield and momentum. Finding such relations using a database not contaminated by any data mining exercises and covering an exchange that during the period studied (1873–1914) ranked among the top 10 in the world (see also Cassis (2006)), would make the data mining interpretation more difficult to defend. It would also provide an alternative dataset to test alternative rationalizations for the cross-sectional patterns. By exploiting the historical context of the data we try to differentiate between a rational asset pricing explanation and behavioral finance accounts. More specifically, we use well-documented periods of severe economic and financial distress to study the behavior and the tradability of the cross-sectional patterns found.

We follow two paths to study the impact on average returns: portfolio sorts and cross-sectional regressions. Both methods have advantages and limitations (Fama and French (2008)). Portfolio sorts do not impose any functional relation, whereas the regression approach assumes linearity. In addition, in a regression all observations have equal weight, which may lead to results that are dominated by the majority of small stocks. This effect can to some extent be avoided in portfolios by computing value-weighted returns besides equal-weighted returns. The main advantage of the cross-sectional regression is its possibility to analyze several potential determinants simultaneously, which is impossible with portfolio sorts given the number of stocks available. Once evidence for a pervasive pattern is found we also study the performance of a zero-cost trading strategy based on it in diverse market conditions.

The database contains full information on prices, dividends and market capitalization of all Belgian stocks that traded on the BSE — see Annaert et al. (2012) for a comprehensive description. In this paper, we use more than 11,000 firm-year observations over the period 1868–1914. However, no accounting information is available for most of this period, which restricts our choice of characteristics. Inspired by the Capital Asset Pricing Model (CAPM) (Sharpe (1964), Lintner (1965) and Mossin (1966)), we first test the predictive power of market beta coefficient and find that, similar to the post-1963 US results (see, e.g., Ang and Chen (2007), Campbell and Vuolteenaho (2004), and Fama and French (1992)), the relation in pre-World War I Belgian data is flat. Particular attention to the computation of beta is paid, as 19th century stock markets were less liquid than their modern counterparts, but to no avail. However, beta is related to size: smaller stocks generally have higher beta. But even when size is controlled for, there is no reliable relation between market beta and average return. Interestingly, there is also no evidence of a pervasive size effect. Horowitz et al. (2000) list three potential explanations for the weakening size effect since the publication of Banz (1981) (see Schwert (2003)): (a) data mining; (b) the increased popularity of passive investments, which would have driven up prices of large companies; and (c) the awareness of investors after publication of the research results has eliminated the profit opportunities. As index funds did not exist in the 19th century and explanation (c) obviously is not relevant here, our lack of finding a size effect is most consistent with the data mining argument. Frazzini and Pedersen (2010) extend the CAPM to a situation where some investors are leveraged constrained and are therefore hampered in leveraging the market portfolio. They therefore have to rely on buying high beta shares when they want to increase their portfolio's risk. This leads to higher prices for such assets and relatively lower prices for low beta assets. As a result, the relation between beta and expected return becomes flatter than in the CAPM. Following Frazzini and Pedersen (2010) we explore this explanation by studying the performance of a market-neutral zero cost portfolio, Betting Against Beta (BAB), that buys low beta shares and sells high beta shares. We indeed find that such a portfolio earns a risk premium of similar magnitude of the equity premium observed over the period studied. Moreover, we find that the BAB incurs losses in periods of financial distress, as predicted by the Frazzini and Pedersen (2010) model.

Secondly, we extend the analysis to other characteristics, namely dividend yield, momentum, and total risk (volatility). Fama and French (1992) show that book-to-market is the most important stock characteristic related to average returns. As we do not have accounting information, we follow Grossman and Shore (2006) and Asness (1997) and include the dividend yield as a value proxy in our analysis. When the sample is confined to dividend paying stocks, we find that high dividend yield portfolios outperform low dividend yield portfolios by some 2.9% per year for value-weight returns. This is marginally significant from a statistical perspective. However, this relation is