Digesting anomalies in emerging European markets: A comparison of factor pricing models

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ABSTRACT

This study compares the performance of four popular factor pricing models—the capital asset-pricing model (Sharpe, 1964), the three-factor model of Fama and French (1993), the four-factor model of Carhart (1997), and the five-factor model of Fama and French (2015a)—testing their explanatory power over a broad range of cross-sectional return patterns in emerging European markets. We identify, classify, and replicate 100 anomalies documented in the financial literature. Only 20 (32) of the capitalization-weighted (equal-weighted) anomaly portfolios are significantly profitable. We show that the five-factor model best explains the returns of anomaly portfolios and verify its superiority over the other models.

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1. Introduction

A key characteristic of any effective factor pricing model is its power to explain patterns in the cross section of stock returns. Presenting their empirical three-factor model in 1996, Fama and French demonstrated it could adequately summarize all state-of-the-art cross-sectional patterns known to science at that time. This notion has subsequently been challenged by several researchers, such as Green et al. (2016), Jacobs (2015), Harvey et al. (2016), and Hou et al. (2014), who have discovered dozens of anomalies unexplainable by the Fama-French three-factor framework. This shortcoming has spurred the creation of a new generation of models incorporating an array of new factors related to momentum, investment, and profitability (Carhart, 1997; Fama and French, 2015a).

This study aims to conduct a comprehensive out-of-sample test of each of the most popular factor pricing models[1] to verify their power to explain cross-sectional patterns (anomalies) in emerging European stock markets. We evaluate four popular factor

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pricing models: (a) the capital asset-pricing model (CAPM) (Sharpe, 1964); (b) the Fama and French (1993) three-factor model (FF3) capturing the size and value effects; (c) the four-factor model (C4), following the original idea by Carhart (1997) and extended to take into account the momentum phenomenon; and (d) the new Fama and French (2015a) five-factor model (FF5) in which the momentum effect is replaced with profitability and investment factors.

To evaluate the performance of these factor pricing models, we replicate 100 cross-sectional anomalies in a cross section of returns already identified in developed countries. Using sorting procedures, we form equal-weighted and capitalization-weighted long-short anomaly portfolios and categorize the anomalies into 16 distinct groups, including momentum, value versus growth, quality investing, and seasonal effects. We then apply each multifactor pricing model to the anomalies to examine their power to explain abnormal returns. We supplement these examinations with further validation of model usefulness for asset pricing in emerging European markets.

We chose emerging European markets for a few reasons. First, we intend to make our research largely out-of-sample. Most of the anomalies in this study (including pricing factors, even those underlying the FF5 model) have never been examined in this region. Most stock market anomalies were first discovered in the U.S. market and have yet to be measured in other markets. Interestingly, Dimson and Marsh (1999) and McLean and Pontiff (2016) uncover that various anomalies frequently escape out-of-sample studies (i.e., are not subjected to out-of-sample testing). Importantly, among studies evidencing the failure of even the most prominent anomalies in emerging markets, Cakici et al. (2013) find no evidence of momentum in Eastern Europe. Our sample could also reveal differences in the cross-sectional patterns of returns.

Second, according to widely-accepted belief, anomalies tend to intensify in less efficient markets and, as such, should be relatively robust in emerging economies which are markedly less liquid (Lesmond et al., 2004) and are characterized by distinctly higher trading costs (Investment Technology Group, 2015). The higher liquidity constraints and transactions costs could translate to abnormally elevated returns on stock market anomalies.

Third, whereas anomalies tend to appear particularly strong on the short side (Stambaugh et al., 2012), the short sale in emerging markets is rarely available. Thus, short sale constraints in emerging European markets could contribute to the magnitude of abnormal returns.

Last, but not least, the stock markets in emerging Europe have been growing rapidly, both in terms of market capitalization and the absolute number of stocks. This reflects the increasing importance of international investors who still seek portfolio diversification in emerging markets despite the ongoing integration between the emerging and developed markets in the post-liberalization period (Bekaert and Harvey, 2002).

The principal findings of this study can be summarized as follows: only 32 (20) of the 100 equal-weighted (capitalization-weighted) anomaly portfolios display mean returns that are both positive and significantly different from zero, mostly within the value investing, profitability, and issuance categories. Interestingly, few return patterns specific for mature markets are observed within our sample, including the failure of the most notable momentum anomaly to deliver significant and robust abnormal returns.

Our research also shows the FF5 model clearly outperforms the earlier models in terms of its explanatory power over patterns in the cross section of returns. The CAPM fails to account for the returns on numerous capitalization-weighted anomaly portfolios, and both the FF3 and C4 models turn out to be efficient almost exclusively in value-versus-growth strategies, and small-firm and low-price effects. Against this background, the FF5 model not only delivers a better explanation of value versus growth patterns, but also correctly explains many of the profitability anomalies, making it the model best-suited to the data from emerging European markets. We validate the usefulness of the FF5 model for asset pricing by designing various sets of portfolios from double sorts and confirm its ability to explain the cross section of returns. We also show that all component factors of the model bear significant risk premia, except for the conservative minus aggressive (CMA) factor representing investment patterns.

Our study contributes in several ways. First, we conduct the first comprehensive comparison of performance of factor pricing models—including the recent FF5—not only in Eastern Europe, but in any emerging markets. Earlier studies were focused solely on the performance of these models in developed markets (e.g., Fama and French, 2015a; Chiah et al., 2016). Although Fama and French (2015b) and Cakici (2015) report the results of research in the markets of 23 different countries, none of these samples include any emerging markets. Furthermore, the existing investigations of asset-pricing models in emerging Europe did not consider the five-factor asset-pricing models at all (e.g., Borys, 2011; Foye et al., 2013; Waszczuk, 2013; Zaremba, 2015; Czapkiewicz and Wojtowicz, 2014).

Second, we review and test the broadest possible sample of equity anomalies in the emerging European markets. We conduct these wide-ranging examinations of stock market anomalies in the spirit of Green et al. (2016), Jacobs (2015), and Harvey et al. (2016), although none of these studies that focus on comparable arrays of anomalies include emerging markets in their samples. The articles available to an international audience focus on not more than a few anomalies, particularly those that have included emerging European markets in the research (e.g., Cakici et al., 2013; Waszczuk, 2013). To our knowledge, when general emerging markets are considered, the broadest study ever conducted is by Li et al. (2016), who investigates 16 well-known predictive signals in multiple countries.

Third, by examining these 100 anomalies in the context of emerging European markets, our research also contributes to the fast-growing strain of academic studies tracking commonalities in cross-sectional return patterns in global equity markets (e.g., Asness, Moskowitz, and Pedersen (2013) for value and momentum, Frazzini and Pedersen (2014) for beta, Blackburn and Cakici (2016) for long-term reversal, or Jacobs (2016) for a set of 11 popular anomalies). We document which of the return patterns have their parallels in emerging Europe.