DOI: 10.20472/IAC.2015.017.027

JAMES FOYE
University of Ljubljana, Slovenia

A NEW PERSPECTIVE ON THE SIZE, VALUE, AND MOMENTUM EFFECTS: BROAD SAMPLE EVIDENCE FROM EUROPE

Abstract:

This paper provides a comprehensive analysis of whether stock returns in Europe are best characterized by country-specific or Europe-wide versions of widely used factor models. The paper offers an explanation to the puzzle of why Fama and French (2012) detect value and momentum premiums but no size premium in Europe. Furthermore, my findings shed new light on these premiums as well as presenting a challenge to existing applications of widely used factor models as I show that although the value and momentum premiums exist at a Europe-wide level, the size premium is country-specific – a finding which is unique to this paper.

Keywords:

capital asset pricing, four-factor model, momentum premium, three-factor model, size premium, value premium

JEL Classification: G12

1. Introduction

Estimating accurate discount rates is an essential aspect of financial management and the finding that the Fama and French (1993) three-factor and Carhart (1997) four-factor models offer a better empirical explanation of equity returns than CAPM has led to the widespread adoption of the models by academics and practitioners for estimating cost of equity. Because both models are motivated by empirical patterns in equity returns, the economic interpretation of the factors remains unclear. Fama and French (2012) (hereafter FF12) applied the three- and four-factor models internationally to help identify the underlying economic process governing the factors and also to examine the extent to which asset pricing is integrated across regions. They report that although regional versions of the factor models have substantially better explanatory ability than the poorly-performing global models, there is no evidence of a size effect in any of the regions. I reexamine the findings from the European part of FF12's sample – unlike FF12, I examine both region-wide and country-specific data, this approach allows me to offer new insights and explain why FF12 are unable to detect a size premium.

The paper is motivated by FF12's (p5) justification for examining Europe as whole and not at an individual country level: "the countries of Europe are almost all members of the European Union (EU), and those that are not formal members (e.g. Switzerland) participate in most of the EU's open market provisions". I find this justification questionable for a number of reasons. Firstly, Griffin (2002) already showed that the three-factor model works better on a country-specific level. Secondly, the ongoing European sovereign debt crisis and the associated political and economic divergences make FF12's assumption of market integration in Europe particularly questionable. In addition to this, Devalle et al. (2010) report only mixed evidence of an increase in the value relevance of accounting data since the implementation of International Financial Reporting Standards in Europe – the value relevance of earnings increased, but the value relevance of book value of equity decreased – as one of the factors in the three- and four-factor models is based on the B/P ratio, this finding has important implications for the application of factor models in Europe. Therefore, I extend Fama and French's (2012) work and examine the application of factor models both at a Europe-wide and individual-country level.

The main contribution of this paper is to explain why FF12 find value and momentum premiums but no size premium in Europe. I show that while the value and momentum premiums are present on a Europe-wide basis, the size premium only exists at a national level. As no research that I am aware of considers the possibility that the size, value, and momentum premiums may not all exist at the same geographic level – i.e. some are region-wide while others are country-specific – the paper uncovers unique evidence and features of the premiums in Europe.

The paper proceeds as follows. The next section discusses the previous literature on the momentum, size, and value effects. Sections three and four provide a description of the sample and summary statistics respectively. Results are presented in section five, followed by a discussion of the results in section six. Section seven concludes.

2. Value, Size, and Momentum Premiums

The value premium is the tendency of stocks with high book-to-price (B/P) ratios (value stocks) to outperform stocks with low B/P ratios (growth stocks). In academic research, the anomaly was first detected by Stattman (1980) and Rosenberg et al. (1985). The value effect has proved to be a very robust phenomenon internationally, as Fama French (1998) showed by examining 12 countries from Australasia, Europe, and the Far East, and finding that value outperforms growth in 11 of the markets[1].

The size premium – the empirical regularity that equity returns are higher for smaller companies than for their larger counterparts – was first documented by Banz (1981) and then confirmed by Reinganum (1981). Although the value premium has been consistently reported across both different time periods and regions, the size premium has proved to be less robust and more recent papers such as Amihud (2002), Horowitz et al. (2000), and Schwert (2003) indicate that the size effect may have disappeared in the years following its detection. Schwert (2003) attributes the size premium's disappearance to practitioners exploiting it following its discovery. Although the majority of the empirical research has focused on the USA, the size effect has also returned mixed results when studied in Europe. Heston et al. (1999) examine the size effect in 12 European countries between 1978 and 1995 and report a negative relationship between size and average returns in 11 countries, with the relationship being statistically significant in five countries. In contrast, Dimson and Marsh (1999) examine the size premium in the United Kingdom and report that it actually reversed over their sample period and small stocks actually underperformed. Dimson et al. (2002) extend their earlier study to a broader sample and find the same size premium reversal in 18 out of the 19 countries investigated. Foye et al. (2013) conduct an out-of-sample test of the three-factor model and examine the countries that joined the EU in 2004. They find a value premium, but no size premium. However, van Dijk (2011) cautions that it may be premature to conclude that the size and premium has gone away and stresses the need for more empirical research.

The momentum premium refers to the continuing outperformance (underperformance) of stocks that have performed well (poorly). The phenomenon was first documented by Debondt and Thaler (1985, 1987) who find that stock returns exhibit momentum and reversal patterns. Building on this work, Jegadeesh and Titman (2001) report that the strategy of buying winner portfolios and shorting loser portfolios outperforms. Hwang and Rubesam (2013) examine the momentum premium and find that it only exists over certain periods and has disappeared completely since the late 1990s.

In a seminal paper, Fama and French (1993) propose incorporating two new risk factors into CAPM: high minus low (HML [the difference between returns on high B/P stocks and low B/P stocks]) and small minus big (SMB [the difference between returns on small and large stocks]). Carhart (1997) augmented the three-factor model with a fourth factor, winners minus losers (WML), in order to incorporate momentum. Foye et al. (2013)

[1] Like this paper, Fama and French (1998) examine the value effect at an individual country level. However, I extend their work in numerous ways. Firstly, I use a broader sample, Fama and French (1998)'s sample consists of eight European countries, my sample has 18. Secondly, Fama and French (1998) do not examine the size and momentum premiums. Thirdly, Fama and French (1998)'s sample runs until 1994, I offer evidence based on a more up-to-date sample.

respecified the three-factor model and replaced the size factor with a term which they believe captures accounting manipulation.

Fama and French (1993) consider CAPM to be misspecified and believe that by extending the model with premiums for size and value, their three-factor model provides a risk-based explanation for the size and value premiums. However, Fama and French's (1993) interpretation of their results is controversial. In terms of the B/P component, Lakonishok et al. (1994) oppose Fama French's (1993) risk-based explanation and propose that the value effect is attributable to investors acting irrationally, which eventually leads to the outperformance of value and underperformance of growth stocks. Lakonishok et al. (1994) find no evidence that value stocks underperform in "bad states of the world", indicating that the value premium should not be considered to be compensation for risk. In contrast, Chen et al. (2008), Gulen et al. (2010), and Petkova and Zhang (2005) all find that the value premium varies counter-cyclically – findings which are consistent with a risk-based explanation. Turning to the size component, Campbell et al. (2008) report that although companies with a high probability of bankruptcy also have a high loading on the SMB factor, these firms do not earn higher returns – this is inconsistent with a risk-based explanation. One explanation for the size premium is that it represents compensation for illiquidity. Stoll and Whaley (1983) show that the size premium disappears after the bid-ask spread is taken into account. However, Schultz (1983) finds that the size premium still exists even after transaction costs. Merton (1987) hypothesizes that investors are more likely to have incomplete information about smaller companies and this may result in a size premium. Just as Lakonishok et al. (1994) explain the value premium through investor behavior, the same explanation could be offered for the size premium, however van Dijk (2011) reports that this argument is underexplored in the literature.

3. Data and variables

Accounting data and stock returns are taken from Datastream. The sample period is June 1997 to June 2013. One year of data is lost forming the momentum factors, therefore our HML, SMB, and WML portfolio returns start in June 1998. The objective of this paper is to extend the international evidence on the momentum, size, and value premiums to a large sample of European countries; the necessary cost of this is a short sample period. Although much of the data is available earlier, the June 1997 start date ensures broad coverage in the countries I examine. Returns are adjusted for dividends and stock splits and are specified in Euros. Monthly excess returns are returns in excess of the one-month German Bund rate.

For both aggregate Europe and individual countries, I sort stocks on size (measured by market value of equity in Euros), momentum, and B/P (as measured by the ratio of book value of equity divided by market value of equity). I form portfolios constructed from sorts on size, B/P, and momentum. For the explanatory variables used in the asset pricing tests, at the end of June of each year *t* I sort stocks in both aggregate Europe and individual countries by size, B/P, and momentum. For the size factor (SMB) the breakpoints are bottom 10% (S) and top 10% (B). For the value factor (HML) the breakpoints are top 30% (H) and bottom 30% (L). I construct sorts on momentum using a similar procedure to the B/P sorts; the only difference being that I form momentum portfolios on a monthly basis using lagged momentum returns. For example, a portfolio formed at the end of month *t* will have a lagged momentum return calculated over period t-11 to t-1.

For the LHS variables, for both aggregate Europe and individual countries, I construct 25 size-B/P portfolios at the end of June of each year *t*. The size and B/P breakpoints are the quintiles of the country's (or aggregate Europe's) total market capitalization or B/P.

4. Summary Statistics

I begin by examining the geographic breakdown of the sample (Table 1), followed by the summary statistics for the explanatory variables (Table 2). I then examine the 25 portfolios formed on size and B/P (Table 3).

4.1. Geographic breakdown

<TABLE 1 HERE>

The aim of this paper is to offer an as comprehensive as possible study into the size, value, and momentum effects in Europe. However, some countries had to be excluded as they lacked the requisite data[2]. This leaves 18 countries in the sample. The United Kingdom (646 stocks) has the largest number of stocks in the sample, followed by Germany (373 stocks), and France (348 stocks). Austria (33 stocks), Portugal (32 stocks), and Turkey (39 stocks) have the lowest number of stocks in the sample. The total across the 18 countries is 2,688 stocks.

4.2. Explanatory returns

<TABLE 2 HERE>

Equity premiums for 1998 to 2013 – calculated as the mean of the monthly market return minus the one month German Bund rate – are positive for every country except Greece in the sample. The average return for aggregate Europe is 0.2% per month, returns range from -0.28% per month for Greece to 7.12% per month for Russia. Echoing previous research, market risk premiums are very imprecise. In fact, the market risk premium is distinguishable from zero only in Greece[3].

During the sample period, SMB returns are positive for aggregate Europe, but not statistically significant. In contrast, SMB returns are frequently statistically significant for individual countries. This suggests that the size premium is only a local phenomenon in my sample. As FF12 only calculate SMB on an aggregate Europe level, and not for individual countries, this explains why they find no evidence of a size premium.

Unlike the size premium, the value and momentum premiums are present at the Europe-wide level. The premiums also exist for individual countries. Average HML returns range from Greece's 0.02% per month (t-stat 0.1214) to Poland's 0.068% per month (t-stat 5.9987). The value premium is persistently non-zero across the individual countries over the sample period. Out of the sample of 18 European countries, 10 exhibit a statistically significant momentum premium. Average WML returns range from Sweden's -2.57% per month to Russia's 1.61% per month.

[2] We removed countries with too few stocks listed to form 25 size-B/P portfolios in 1997. The following countries were removed: Bulgaria, Czech Republic, Estonia, Hungary, Ireland, Latvia, Lithuania, Luxembourg, Romania, Slovakia, and Slovenia

[3] I use 5% for the level of statistical significance throughout the paper

Summing up, echoing FF12, I find strong value and momentum premiums throughout Europe and no evidence of a Europe-wide size premium. Interestingly, although the size premium is not present at a Europe-wide level, it is frequently statistically significant at a national level. This finding calls into question FF12's approach of forming factor models based on Europe-wide data.

4.3. Size-B/P excess returns

<TABLE 3 HERE>

Table 3 shows matrices of average excess returns for the 25 size-B/P portfolios for both aggregate Europe and individual countries. In the Europe-wide portfolios, there are value premiums in all size groups – this corroborates the findings of FF12, who report a strong value premium in Europe. This pattern persists at an individual country level for 16 out of the 18 nations in our sample, Italy and Turkey being the exceptions.

Echoing the findings of FF12, there is no evidence of a Europe-wide size premium during the sample period. However, there is a strong size premium in 11 countries[4].

Thus, although the value premium is present at both a Europe-wide and a national level, the size premium is entirely country-specific. My results indicate that FF12's approach of forming portfolios by region, rather than by country, explains why they fail to detect a size premium in Europe. Therefore, in the next section of the paper, I conduct asset pricing tests using both Europe-wide and individual country data.

5. Asset Pricing Tests for Size-B/P Sorted Portfolios

The results from the regressions to explain excess returns on the 25 size-B/P sorted portfolios are shown in Tables 4 to 7. Table 4 contains the Gibbons et al. (GRS, 1989) F-test and regression intercepts along with associated summary statistics. Tables 5, 6, and 7 contain the intercepts and associated summary statistics for the CAPM, three-factor, and four-factor models, respectively. I examine results both Europe-wide and also at a national level for each of the 18 countries in the sample.

<TABLE 4 HERE>

<TABLE 5 HERE>

The Europe-wide CAPM performs poorly in the tests. The GRS statistic for the CAPM regressions (6.87, Table 4) is deep into the right of the F-distribution. The CAPM intercepts (Table 5) are always negative for the extreme growth groups, but there is no evidence of a size premium. Predictably, a strong value premium is present in the locally-sorted portfolios for many countries in the sample. Interestingly, although there is little evidence of a size premium in the aggregate Europe tests, a size premium exists at a national level for many countries in the sample. The size premium is particularly pronounced in Italy, Netherlands, Sweden, Switzerland, and the United Kingdom; in these countries all five of the small-size portfolios have positive intercepts and all five of the large-size portfolios have negative intercepts. The size premium can also be detected in the intercepts of the regressions for Denmark, Finland, Germany, Norway, and Poland, which have mostly

[4] Denmark, Finland, Germany, Netherlands, Norway, Portugal, Russia, Sweden, Switzerland, Turkey, and the United Kingdom all exhibit a size premium

positive intercepts for the small-size groups and mostly negative intercepts for the large-size groups.

<TABLE 6 HERE>

The three-factor model has an improved ability to explain returns in both the Europe-wide and locally-sorted size-B/P portfolios. The Europe-wide GRS statistic (Table 4) falls from 6.87 to 5.41 and the average absolute intercept falls from 0.29 to 0.16; however it is still above the 1% threshold, leading to a rejection of the Europe-wide three-factor model.

The Europe-wide value pattern present in Table 5 is no longer present in Table 6. Applying the three-factor model to locally-sorted portfolios, the GRS statistic is lower than for the CAPM regressions in all but three (Finland, Greece, and Russia) of the 18 countries in the sample. From examining the intercepts in Table 6, it can be seen that for aggregate Europe, even after applying the three-factor model, there is still a value premium in the intercepts, albeit with lower t-stats. Turning to the locally-sorted portfolios, there is little evidence of a size premium in the intercepts – even for Italy, Netherlands, Sweden, Switzerland, and the United Kingdom, the five countries for which the size effect was most pronounced in Table 5.

<TABLE 7 HERE>

Applying the Europe-wide version of the four-factor model reduces the GRS statistic (Table 4), lowering it from the three-factor model's 5.41 down to 4.81. The four-factor model is rejected and its intercepts are similar to those from the three-factor model. Likewise, applying the four-factor model on an individual country basis reduces the GRS statistic for many countries in the sample. The GRS statistics for Denmark, Finland, Germany, Greece, Norway, Russia, Switzerland, and the United Kingdom are all substantially lowered by the addition of a momentum factor.

6. Discussion of Results

When conducting asset pricing tests it is preferable to have a large number stocks when forming portfolios for the regression's RHS variables. This lends support to FF12's approach of forming portfolios on region-wide, rather than country-specific, factors. However, my findings indicate that although the size and momentum premiums are not present at a Europe-wide level, they can be detected at a national level – challenging the practice of forming portfolios on a region-wide basis. Forming portfolios only for the wider region means that any local factors that influence equity returns have been overlooked. As detailed in section 2, the determinants of the size, value, and momentum premiums are controversial and complex and the debate cannot be easily resolved. However, my findings go some way to helping identify the underlying process.

The locally-sorted portfolios in my sample have ample stocks with which to form RHS portfolios for France (348), Germany (373), Italy (196), Sweden (205), and the United Kingdom (646). There are sufficient stocks in the sample to form portfolios for, Norway (109), and Switzerland (123). The portfolios formed for Belgium (69), Denmark (79), Finland (79), Greece (88), Netherlands (67), Poland (68), Spain (89) have a minimal number of stocks. The portfolios formed for Austria (33), Portugal (32), Russia (45), and Turkey (39) are somewhat suspect. This is clearly a limitation to my approach of forming

locally-sorted portfolios; however, the alternative of forming Europe-wide portfolios fails to capture the size premium.

7. Conclusions

The three-factor model of Fama and French (1993) and the four-factor model of Carhart (1997) are the dominant models for estimating equity returns. However, the economic interpretation of the factors remains unclear and empirical evidence from non-US markets has returned mixed results. This has created a requirement for studies which test these models in different contexts. I go some way to addressing this requirement by offering a comprehensive study using very recent data from a broad sample of countries and finding unique results that offer new insights about the size, value, and momentum premiums in Europe.

The paper's main contribution is to extend the work of FF12 and offer an explanation as to why they find value and momentum premiums, but no size premium in Europe. This paper fills an important gap in the literature as it uncovers unique evidence by showing that whilst the value and momentum premiums exist at a Europe-wide level, the size premium can only be detected at a national level. My findings also have important implications for financial management practitioners when estimating discount rates in different countries. For example, Holmén and Pramborg (2009) survey Swedish firms about the capital budgeting techniques they employ and find that managers avoid the theoretically correct net present value approach in favor of the payback method because of the difficulties associated with estimating discount rates when faced with country-specific political risks – this paper shows how managers can estimate discount rates using local factors.

Although I am unable to offer a definitive explanation as to why all three factors exist at a national level, but only two can be detected for portfolios formed on a Europe-wide basis; my findings indicate that future research should concentrate on country-specific factors when trying to explain the size effect, whilst focusing on region-wide factors when examining the momentum and value premiums. Although the paper's main findings may be sample-specific, however as a minimum I believe that I have shed new light on a contentious issue as prior studies have not considered the possibility that the size, value, and momentum premiums may not exist at the same geographic level – i.e. some factors may be region-wide, but others are only country-specific. In addition to this, the paper offers guidance for future researchers whom I would advise to exercise caution both when selecting countries for forming portfolios to explain returns in a region and also when assuming integration of stock market returns in Europe.

References

Amihud, Yakov. "Illiquidity and stock returns: cross-section and time-series effects." *Journal of financial markets* 5, no. 1 (2002): 31-56.

Banz, Rolf W. "The relationship between return and market value of common stocks." *Journal of financial economics* 9, no. 1 (1981): 3-18.

Carhart, Mark M. "On persistence in mutual fund performance." *The Journal of finance* 52, no. 1 (1997): 57-82.

Chen, Long, Ralitsa Petkova, and Lu Zhang. "The expected value premium." *Journal of Financial Economics* 87, no. 2 (2008): 269-280.

De Bondt, Werner FM, and Richard Thaler. "Does the stock market overreact?." *The Journal of finance* 40, no. 3 (1985): 793-805.

De Bondt, Werner FM, and Richard H. Thaler. "Further evidence on investor overreaction and stock market seasonality." *The Journal of Finance* 42, no. 3 (1987): 557-581.

Devalle, Alain, Enrico Onali, and Riccardo Magarini. "Assessing the value relevance of accounting data after the introduction of IFRS in Europe." *Journal of international financial management & accounting* 21, no. 2 (2010): 85-119.

Dimson, Elroy, and Paul Marsh. *Financial Market Returns 1955-1999'*. Working paper, London Business School, 1999.

Dimson, Elroy, Paul Marsh, and Mike Staunton. "Long-Run Global Capital Market Returns and Risk Premia." *London Business School Accounting Subject Area* 035 (2002).

Fama, Eugene F., and Kenneth R. French. "Common risk factors in the returns on stocks and bonds." *Journal of financial economics* 33, no. 1 (1993): 3-56.

Fama, Eugene F., and Kenneth R. French. "Value versus growth: The international evidence." *The Journal of Finance* 53, no. 6 (1998): 1975-1999.

Fama, Eugene F., and Kenneth R. French. "Size, value, and momentum in international stock returns." *Journal of financial economics* 105, no. 3 (2012): 457-472.

Foye, James, Dušan Mramor, and Marko Pahor. "A Respecified Fama French Three-Factor Model for the New European Union Member States." *Journal of International Financial Management & Accounting* 24, no. 1 (2013): 3-25.

Gibbons, Michael R., Stephen A. Ross, and Jay Shanken. "A test of the efficiency of a given portfolio." *Econometrica: Journal of the Econometric Society* (1989): 1121-1152.

Griffin, John M. "Are the Fama and French factors global or country specific?." *Review of Financial Studies* 15, no. 3 (2002): 783-803.

Gulen, Huseyin, Yuhang Xing, and Lu Zhang. *Value versus growth: Time-varying expected stock returns*. No. w15993. National Bureau of Economic Research, 2010.

Heston, Steven L., K. Geert Rouwenhorst, and Roberto E. Wessels. "The Role of Beta and Size in the Cross-Section of European Stock Returns." *European Financial Management* 5, no. 1 (1999): 9-27.

Holmén, Martin, and Bengt Pramborg. "Capital budgeting and political risk: Empirical evidence." *Journal of International Financial Management & Accounting* 20, no. 2 (2009): 105-134.

Horowitz, Joel L., Tim Loughran, and N. E. Savin. "The disappearing size effect." *Research in Economics* 54, no. 1 (2000): 83-100.

Hwang, Soosung, and Alexandre Rubesam. "The disappearance of momentum." *The European Journal of Finance* ahead-of-print (2013): 1-24.

Jegadeesh, Narasimhan, and Sheridan Titman. "Profitability of momentum strategies: An evaluation of alternative explanations." *The Journal of Finance*56, no. 2 (2001): 699-720.

Lakonishok, Josef, Andrei Shleifer, and Robert W. Vishny. "Contrarian investment, extrapolation, and risk." *The journal of finance* 49, no. 5 (1994): 1541-1578.

Merton, Robert C. "A simple model of capital market equilibrium with incomplete information." *The journal of finance* 42, no. 3 (1987): 483-510.

Petkova, Ralitsa, and Lu Zhang. "Is value riskier than growth?." *Journal of Financial Economics* 78, no. 1 (2005): 187-202.

Reinganum, Marc R. "Misspecification of capital asset pricing: Empirical anomalies based on earnings' yields and market values." *Journal of financial Economics* 9, no. 1 (1981): 19-46.

Rosenberg, Barr, Kenneth Reid, and Ronald Lanstein. "Persuasive evidence of market inefficiency." *The Journal of Portfolio Management* 11, no. 3 (1985): 9-16.

Schultz, Paul. "Transaction costs and the small firm effect: A comment."*Journal of Financial Economics* 12, no. 1 (1983): 81-88.

Schwert, G. William. "Anomalies and market efficiency." *Handbook of the Economics of Finance* 1 (2003): 939-974.

Stattman, Dennis. "Book values and stock returns." *The Chicago MBA: A journal of selected papers* 4, no. 1 (1980): 25-45.

Stoll, Hans R., and Robert E. Whaley. "Transaction costs and the small firm effect." *Journal of Financial Economics* 12, no. 1 (1983): 57-79.

Van Dijk, Mathijs A. "Is size dead? A review of the size effect in equity returns." *Journal of Banking & Finance* 35, no. 12 (2011): 3263-3274.

Table 1

Geographic breakdown of stocks in the sample

The sample consists of stocks that had a European listing as of 1.1.1997. Stocks from the following countries had to be removed due to having an insufficient number of stocks with which to form size-B/P portfolios: Bulgaria, Czech Republic, Estonia, Hungary, Ireland, Latvia, Lithuania, Luxembourg, Romania, Slovakia, and Slovenia.

	Number of Companies
All Europe	2688
Austria	33
Belgium	69
Denmark	79
Finland	79
France	348
Germany	373
Greece	88
Italy	196
Netherlands	67
Norway	109
Poland	68
Portugal	32
Russia	45
Spain	89
Sweden	205
Switzerland	123
Turkey	39
United Kingdom	646

Table 2

Summary statistics for explanatory returns: June 1998 – June 2013

We examine portfolios formed for aggregate Europe as well as for the 18 individual countries in the sample. We form portfolios at the end of June of each year t by sorting stocks by size, book-price, and momentum groups. For the size factor, small minus big (SMB), the breakpoints are bottom 10% (S) and top 10% (B). For the value factor, high minus low (HML), the breakpoints are top 30% (H) and bottom 30% (L). For the momentum factor, winners minus losers (WML), we form portfolios on a monthly basis using lagged momentum returns calculated over period t-11 to t-1. All returns are in Euros. Market risk premiums are calculated as a region's market portfolio minus the one-month German bund rate.

	Market Risk Premium	SMB	HML	WML
All Europe				
Mean	0.1981	0.0119	0.2099	0.2394
t-Mean	0.7445	0.9203	2.1790	1.9826
Austria				
Mean	0.7218	0.0122	0.3535	-0.5942
t-Mean	0.7503	0.4213	4.9429	-2.8947
Belgium				
Mean	0.6237	0.0165	0.3566	-0.5939
t-Mean	0.1421	0.8701	6.2522	-2.7396
Denmark				
Mean	2.9110	0.0811	0.2534	-1.3477
t-Mean	0.0697	2.4158	3.2600	-3.0175
Finland				
Mean	0.7473	0.0180	0.2430	-0.6327
t-Mean	0.1359	1.6580	4.2558	-1.8862
France				
Mean	0.9108	0.0358	0.1301	0.4347
t-Mean	0.3020	1.3232	1.9739	1.1131
Germany				
Mean	0.9158	0.0601	0.3746	1.5972
t-Mean	0.6918	1.8352	8.4021	3.3961
Greece				

Mean	-0.2756	-0.4424	0.0211	0.1364
t-Mean	-1.6552	-4.2657	0.1214	0.3887
Italy				
Mean	0.7636	0.0338	0.0555	0.3004
t-Mean	1.3510	2.2945	0.7391	0.9812
Netherlands				
Mean	0.7266	0.0534	0.2757	0.4050
t-Mean	0.2164	1.7235	3.1936	1.4216
Norway				
Mean	0.6048	0.2866	0.1376	0.3089
t-Mean	0.8468	3.4933	1.6722	0.6731
Poland				
Mean	1.0314	0.0994	0.6833	-0.4534
t-Mean	0.5927	2.1709	5.9987	-1.5322
Portugal				
Mean	0.5072	0.0401	0.0670	-0.0752
t-Mean	1.0402	1.9788	0.7348	-0.2453
Russia				
Mean	7.1185	0.2054	1.3436	1.6064
t-Mean	0.8437	1.2168	4.9466	2.6769
Spain				
Mean	0.6480	0.0261	0.2236	1.3064
t-Mean	0.8306	0.4116	2.6458	1.9716
Sweden				
Mean	2.0400	0.1888	0.4699	-2.5710
t-Mean	0.1890	4.5023	5.2094	-11.3913
Switzerland				
Mean	1.3989	0.0893	0.4373	-2.1137
t-Mean	0.0714	2.7245	5.0475	-6.1173
Turkey				
Mean	1.0876	0.0261	0.0870	0.8899
t-Mean	0.8126	0.2216	0.6895	1.2871

United Kingdom				
Mean	1.2640	0.0579	0.1977	1.1955
t-Mean	0.3077	2.4636	3.4583	3.1866

Table 3

Monthly excess returns for the 25 size-B/P portfolios for June 1998 – June 2013.

At the end of June each year, we construct 25 portfolios for aggregate Europe as well as for the 18 individual countries in the sample. The size and B/P breakpoints are quintiles of aggregate Europe (or individual country) total market capitalization or B/P of total market capitalization.

Europe	Low	2	3	4	High
Small	0.15	0.17	0.20	0.21	0.24
2	0.18	0.17	0.20	0.23	0.30
3	0.18	0.20	0.20	0.24	0.28
4	0.15	0.18	0.18	0.20	0.22
Big	0.13	0.16	0.18	0.19	0.21

Austria	Low	2	3	4	High
Small	0.43	0.19	0.25	0.46	0.75
2	-0.57	0.20	0.36	0.98	1.79
3	0.90	0.72	1.03	0.72	0.90
4	0.44	0.62	0.83	0.76	0.72
Big	0.44	0.36	1.21	0.36	0.75

Belgium	Low	2	3	4	High
Small	0.01	0.52	0.65	0.42	0.46
2	0.24	0.64	0.50	0.96	0.84
3	0.50	0.53	0.55	0.67	0.64
4	0.50	0.52	0.66	0.50	0.95
Big	0.10	0.04	0.62	1.94	1.65

Denmark	Low	2	3	4	High
Small	0.98	3.80	3.45	2.25	4.35

Finland	Low	2	3	4	High
Small	0.80	0.52	0.96	1.12	1.40

	2	-0.37	6.68	4.35	3.36	5.59		2	0.56	0.63	0.78	0.84	1.08
	3	2.96	3.08	2.37	2.28	4.17		3	0.59	0.14	0.73	0.99	1.33
	4	2.94	3.26	2.68	2.59	1.21		4	0.41	0.84	0.77	0.70	0.80
	Big	2.33	2.90	2.97	1.48	2.10		Big	0.31	0.62	0.58	0.63	0.86
France		Low	2	3	4	High	Germany		Low	2	3	4	High
	Small	1.28	0.54	0.94	0.76	0.60		Small	0.81	0.88	1.11	1.01	1.45
	2	1.08	1.01	0.90	0.74	1.41		2	0.76	0.91	0.83	0.83	1.21
	3	0.83	1.01	0.93	0.91	1.12		3	0.77	0.85	0.82	1.03	1.07
	4	0.85	0.86	0.95	1.30	1.05		4	0.53	0.88	0.77	0.74	1.38
	Big	0.96	1.10	0.88	1.02	1.04		Big	0.68	0.75	0.89	0.88	1.04
Greece		Low	2	3	4	High	Italy		Low	2	3	4	High
	Small	-0.50	-0.30	-0.39	-0.28	-0.27		Small	1.09	1.02	0.95	0.72	0.67
	2	-0.43	-0.35	-0.45	-0.33	-0.24		2	0.67	0.84	0.72	0.69	0.70
	3	-0.22	-0.32	-0.18	-0.24	-0.28		3	0.76	0.82	0.64	0.67	0.68
	4	-0.21	-0.27	-0.22	-0.12	-0.23		4	0.83	0.69	0.64	0.63	0.24
	Big	-0.25	-0.19	-0.19	-0.17	-0.23		Big	1.27	0.61	0.63	0.54	1.36
Netherlands		Low	2	3	4	High	Norway		Low	2	3	4	High
	Small	0.87	0.79	0.84	0.86	1.12		Small	1.01	0.58	0.68	0.50	1.17
	2	0.69	0.81	0.61	0.97	1.79		2	0.70	0.47	0.46	0.56	1.81

3	0.52	0.44	0.69	0.81	0.98
4	0.64	0.40	0.41	1.34	0.55
Big	0.15	0.43	0.60	0.29	0.57

3	0.84	0.44	0.62	0.55	0.62
4	0.98	0.42	0.43	0.53	0.77
Big	0.53	0.21	0.42	0.43	0.40

Poland	Low	2	3	4	High
Small	1.67	-5.83	-1.07	0.13	0.37
2	2.01	1.76	2.51	3.92	3.09
3	1.07	1.22	1.82	0.95	1.64
4	1.17	1.62	2.02	1.14	2.22
Big	0.53	0.97	0.37	0.78	1.38

Portugal	Low	2	3	4	High
Small	0.86	0.73	0.58	0.74	0.87
2	0.54	0.55	0.55	0.44	0.53
3	0.67	0.41	0.47	0.68	0.64
4	0.24	0.49	0.24	0.43	0.35
Big	0.36	0.31	0.42	0.32	0.25

Russia	Low	2	3	4	High
Small	5.10	14.54	5.92	10.89	18.23
2	0.14	3.84	6.85	8.19	10.78
3	-8.71	4.11	-0.01	3.21	18.90
4	-0.67	22.25	36.18	7.26	0.44
Big	-9.39	3.75	6.99	3.63	5.56

Spain	Low	2	3	4	High
Small	0.35	0.44	0.51	0.47	0.56
2	0.60	0.54	0.51	1.11	0.43
3	0.43	0.65	0.68	0.83	0.92
4	0.56	0.52	0.56	0.86	0.84
Big	0.05	0.03	0.21	2.50	1.04

Sweden	Low	2	3	4	High
Small	1.87	2.30	2.13	2.90	4.23
2	1.37	1.55	1.64	2.04	3.91
3	0.69	0.99	1.73	2.32	2.53

Switzerland	Low	2.00	3.00	4.00	High
Small	0.51	1.82	1.70	2.71	1.09
2	1.11	0.87	1.52	2.06	1.53
3	1.08	1.06	1.53	2.03	1.53

	4	1.27	1.52	1.56	2.04	2.72		4	0.96	0.54	1.50	2.08	1.17
	Big	0.82	1.99	1.69	2.07	3.15		Big	0.74	1.22	1.57	2.15	0.87
Turkey		Low	2	3	4	High	United Kingdom		Low	2	3	4	High
	Small	-0.22	1.00	1.98	2.96	5.15		Small	1.04	0.97	1.08	1.14	1.62
	2	4.96	0.13	1.24	2.71	2.55		2	0.91	0.79	1.19	1.20	1.35
	3	5.71	-7.30	1.16	2.41	1.52		3	0.96	0.89	0.84	0.89	1.38
	4	1.56	0.28	1.83	0.19	-0.34		4	7.48	0.76	1.04	0.98	1.01
	Big	0.07	0.24	1.69	-2.13	-0.58		Big	0.62	0.75	0.72	0.86	1.14

Table 4

Summary statistics for regressions to explain monthly excess returns on portfolios formed on size and B/P: June 1998 – June 2013.

The regressions use CAPM, three-factor, and four-factor models with local factors to explain returns on aggregate Europe and individual country portfolios. The GRS statistic is used to test whether the intercepts of the set of 5x5 regressions are zero. IaI is the average absolute intercept for the set of 5x5 regressions. R^2 is the average adjusted R^2.

	CAPM			3 Factor			4 Factor		
	GRS Statistic	IaI	R^2	GRS Statistic	IaI	R^2	GRS Statistic	IaI	R^2
Europe	6.87	0.29	0.71	5.41	0.16	0.79	4.81	0.08	0.86
Austria	3.24	0.57	0.78	2.27	0.33	0.96	2.14	0.17	0.87
Belgium	4.27	0.67	0.84	1.38	0.18	0.97	1.13	0.06	0.91
Denmark	3.01	0.49	0.83	1.35	0.21	0.95	1.14	0.08	0.88
Finland	2.00	0.58	0.92	2.92	0.12	0.88	2.27	0.07	0.89
France	1.51	0.29	0.87	1.21	0.11	0.89	1.19	0.05	0.92
Germany	3.64	0.48	0.82	2.13	0.27	0.91	1.67	0.08	0.90
Greece	4.41	0.94	0.88	6.67	0.58	0.97	4.38	0.25	0.90
Italy	1.95	0.46	0.86	1.87	0.24	0.87	2.68	0.15	0.98
Netherlands	1.78	0.59	0.89	1.13	0.20	0.95	2.24	0.09	0.98

Norway	3.15	0.46	0.82	2.63	0.20	0.91	2.19	0.07	0.98
Poland	3.26	0.88	0.83	2.59	0.24	0.88	2.79	0.11	0.96
Portugal	1.89	0.41	0.92	1.45	0.06	0.86	2.32	0.03	0.93
Russia	1.23	0.81	0.78	2.24	0.22	0.95	1.10	0.09	0.95
Spain	2.55	0.61	0.77	1.43	0.25	0.88	1.53	0.17	0.87
Sweden	1.63	0.61	0.80	1.61	0.08	0.87	1.54	0.04	0.94
Switzerland	2.07	0.51	0.84	1.54	0.21	0.95	1.14	0.10	0.99
Turkey	2.78	0.56	0.93	1.58	0.18	0.86	1.80	0.11	0.90
United Kingdom	2.72	0.43	0.78	1.95	0.05	0.90	1.44	0.02	0.93

Table 5

Intercepts and t-statistics (shown in brackets) from the CAPM regressions to explain monthly returns on the 25 size-B/P sorted portfolios: June 1998 – June 2013.

Europe

	Low	2	3	4	High
Sma	-0.26	-0.27	-0.19	0.21	0.34
	(-2.5)	(-3)	(-	(1.32	(3.42
2	-0.20	0.11	-0.12	0.23	0.24
	(-	(0.66	(-	(2.28	(2.49
3	-0.23	-0.03	-0.14	0.34	1.11
	(-	(-	(-	(3.05	(5.3)
4	-0.64	-0.18	0.27	0.22	0.14
	(-	(-	(1.22	(1.58	(0.94
Big	-0.12	-0.43	0.42	-0.01	0.80
	(-	(-	(1.15	(-	(4.13

Austria

	Low	2	3	4	High
Sma	-0.86	-0.29	-0.21	0.15	0.42
	(-	(-	(-	(0.57	(1.44
2	-0.83	-0.71	-0.39	-0.17	1.22
	(-	(-	(-	(-	(2.61
3	-0.88	-1.02	0.00	1.05	0.62
	(-	(-	(0)	(3.65	(2.4)
4	-0.10	0.11	-0.33	0.10	2.08
	(-	(0.46	(-	(0.41	(4.19
Big	-0.36	-1.05	-0.72	-0.23	0.21
	(-	(-	(-	(-	(0.67

Belgium

	Low	2	3	4	High
Sma	-1.46	-0.09	0.12	1.99	3.72
	(-4.6)	(-	(0.29	(3.43	(3.76
2	-0.15	-0.65	-1.20	1.19	0.37
	(-0.4)	(-2.7)	(-	(4.11	(0)
3	-0.26	0.01	0.35	0.07	0.43
	(0)	(0)	(0)	(0.12	(0.94
4	-0.01	-0.09	0.21	0.20	1.42
	(0)	(-	(0)	(0)	(5.61
Big	-0.30	-0.27	0.63	0.35	1.04
	(0)	(0)	(0.01	(0)	(0.01

Denmark

	Low	2	3	4	High
Sma	-0.14	-0.27	0.94	1.19	2.22
	(-	(-	(2.26	(2.98	(4.16
2	-0.02	-0.26	0.24	0.35	0.74
	(-	(-	(0.7)	(0.75	(2.2)
3	-0.42	-0.33	-0.24	-0.23	0.46
	(-	(-	(-	(-	(1.13
4	-0.25	-0.02	-0.16	-0.29	0.65
	(-	(-	(-	(-	(1.64
Big	-0.30	-0.70	-0.60	-0.77	-0.27
	(-	(-	(-	(-	(-

Finland

	Low	2	3	4	High
Sma	-0.45	-0.16	0.83	1.88	1.11
	(-	(-	(2.47	(3.22	(6.54
2	-0.08	0.31	0.02	1.18	1.13
	(-	(0.79	(0)	(2.67	(2.88
3	-1.74	-0.25	-0.16	0.58	0.18
	(-	(0)	(-	(0)	(0.69
4	-0.23	-0.34	-0.79	0.33	0.48
	(0)	(0)	(0)	(0)	(1.42
Big	-0.60	-0.53	-0.46	0.11	0.55
	(0)	(0)	(-	(0)	(0)

France

	Low	2	3	4	High
Sma	0.91	-0.42	-0.32	0.60	0.01
	(2.55	(-1.7)	(-	(1.77	(0.05
2	-0.11	-0.37	0.18	0.00	0.54
	(-	(-	(1.35	(0.02	(2.13
3	-0.22	-0.44	-0.18	0.20	0.02
	(-	(-	(-	(1.25	(0.07
4	-0.19	0.17	0.29	0.09	0.36
	(-1.2)	(0.69	(1.68	(0.41	(1.87
Big	-0.74	0.12	0.15	0.26	0.31
	(-	(0.83	(1.14	(1.15	(1.03

Germany

	Low	2	3	4	High
Sma	-0.25	0.16	0.27	0.00	0.00
	(-1.6)	(0.68	(0.69	(0.02	(1.62
2	-0.51	-0.29	0.39	0.64	1.53
	(-	(-	(0.92	(3.31	(4.21
3	-0.69	-0.26	0.00	0.43	1.10
	(-	(-	(0.01	(1.82	(2.76
4	-1.72	-0.37	-0.32	-0.15	0.31
	(-	(0)	(0)	(0)	(1.01
Big	-1.34	-0.34	0.34	0.00	0.04
	(-	(0)	(0)	(-	(1.6)

Greece

	Low	2	3	4	High
Sma	-0.80	-1.44	0.31	2.60	-1.83
	(-	(-	(0.81	(6.26	(-
2	0.93	0.73	2.15	0.90	3.66
	(2.14	(1.9)	(3.97	(1.37	(6.7)

Italy

	Low	2	3	4	High
Sma	0.31	0.70	0.24	0.50	0.12
	(1.06	(2.2)	(0.97	(1.99	(0.44
2	0.50	0.19	0.12	0.60	1.13
	(1.73	(0.4)	(0.41	(1.56	(2.13

Netherlands

	Low	2	3	4	High
Sma	1.22	0.43	0.40	0.78	0.99
	(2.25)	(1.18	(0.76	(1.82	(2.11
2	-0.36	0.76	0.70	0.07	1.15
	(-	(1.14	(1.05	(0.23	(2.2)

3	-1.36	0.10	0.14	0.51	0.45	3	2.12	0.29	0.98	-0.32	-0.32	3	0.92	0.01	0.91	1.33	0.76
	(2.89	(0.28	(0.37	(-	(1.23		(0.03	(0)	(1.51	(-	(-		(-	(-	(1.32	(4.42	(1.36
4	-0.08	0.11	-1.36	0.72	0.35	4	-0.40	-0.60	-0.36	0.01	-0.47	4	-0.36	-0.11	-0.41	-0.52	0.08
	(-	(0.23	(-	(2.15	(1.37		(-	(-	(0)	(0)	(0)		(-	(-	(-	(-	(0.27
Big	-0.94	-0.30	-0.17	-0.57	-0.75	Big	-0.41	-0.22	-0.28	-0.01	-0.71	Big	-0.35	-0.20	1.51	-0.15	0.85
	(-	(-	(-0.5)	(-	(-		(0)	(-0.8)	(0)	(0)	(0)		(-	(-	(5.47	(-	(1.59

Norway

	Low	2	3	4	High
Sma	-0.24	-0.59	0.40	0.23	0.72
	(-	(-	(1.06	(0.53	(1.61
2	-1.31	0.58	0.71	0.42	0.64
	(-3.2)	(0)	(6.27	(0.78	(1.09
3	-0.48	0.22	-0.26	0.14	0.85
	(0)	(0.54	(0)	(0.43	(1.48
4	-1.53	-0.23	-0.08	0.09	0.23
	(-	(0)	(0)	(0)	(0)
Big	-0.25	-0.41	-0.48	0.07	0.29
	(0)	(0)	(0)	(0)	(0.86

Poland

	Low	2	3	4	High
Sma	-1.80	1.16	2.24	2.59	0.26
	(-2.3)	(1.86	(3.2)	(4.54	(0.5)
2	-1.37	-1.59	-1.87	0.24	1.95
	(-	(-	(-	(0.35	(2.77
3	-0.52	-0.54	1.22	0.19	0.79
	(-	(-	(3.26	(0.45	(2.44
4	-0.46	-0.32	0.12	0.32	1.21
	(-	(-	(0.25	(0.78	(3.04
Big	-0.20	-0.08	-0.15	0.06	0.68
	(-	(-	(-	(0.31	(2.09

Portugal

	Low	2	3	4	High
Sma	0.59	-1.33	-0.18	0.00	0.29
	(1.84)	(-	(-	(1.84	(0.5)
2	0.29	0.06	-1.19	0.74	0.29
	(3.09)	(0.41	(-	(1.4)	(2.06
3	-0.34	-0.69	2.57	0.96	0.08
	(-	(0)	(1.38	(1.39	(1.02
4	1.17	0.10	0.80	0.68	0.25
	(1.05)	(8.39	(0)	(0)	(0)
Big	-0.19	-0.08	-0.09	-0.78	0.44
	(0)	(-	(0)	(0)	(0)

Russia

	Low	2	3	4	High
Sma	0.09	0.57	0.34	1.17	3.26
	(1.25	(0.72	(2.06	(4.04	(7.36
2	0.00	-1.11	-2.60	0.19	0.80
	(-	(-	(0)	(2.53	(2.99
3	-2.41	-0.22	0.25	0.86	2.48
	(-	(0)	(0.4)	(0)	(0.48
4	-0.25	-0.24	-0.22	0.40	0.98
	(0)	(0)	(-	(0)	(0.97
Big	-0.91	0.00	-0.43	1.33	0.46
	(0)	(0.01	(-	(0)	(0)

Spain

	Low	2	3	4	High
Sma	1.39	-1.62	0.93	0.36	0.07
	(1.78	(-	(1.49	(0.62	(0.27
2	-0.43	-0.77	-0.09	0.13	0.02
	(-	(-	(-	(0.61	(0)
3	-0.25	-0.15	0.03	1.87	0.69
	(-	(-	(0.09	(2.8)	(2.41
4	-0.67	-0.69	0.00	-0.50	1.18
	(-	(-	(0)	(-	(2.59
Big	-0.62	-0.12	-0.09	1.33	1.24
	(0)	(0)	(0)	(0.01	(7.2)

Sweden

	Low	2	3	4	High
Sma	1.22	-1.28	1.08	0.84	0.56
	(3.91)	(-	(2.58	(2.77	(1.6)
2	-1.93	-0.73	0.46	0.58	0.39
	(-	(-	(1.54	(1.76	(1.15
3	-0.61	1.03	-0.04	0.08	0.33
	(-	(2.75	(-	(0.26	(0.65
4	-0.61	-0.52	0.31	-0.61	0.11
	(-	(-	(1.14	(-	(0.34
Big	-0.61	-0.55	-0.45	-0.21	-0.04
	(-	(-	(-	(-	(-

Switzerland

	Low	2	3	4	High
Sma	-0.10	-0.87	0.29	1.12	1.76
	(0)	(-	(0.01	(0)	(0)
2	0.58	-0.11	-0.09	0.26	1.07
	(0.02	(0)	(0)	(0)	(0)
3	-0.34	-0.07	0.13	0.22	0.67
	(0)	(-	(0)	(0)	(0)
4	-0.60	-0.18	-0.46	2.06	0.34
	(0)	(0)	(0)	(0)	(0)
Big	-0.40	-0.12	-0.27	0.19	0.26
	(0)	(0)	(0)	(0)	(0)

Turkey

	Low	2	3	4	High
Sma	0.30	1.25	0.90	-0.33	-0.96
	(0.19	(1.12	(0.15	(-	(-
2	0.56	-0.91	0.20	0.50	0.08
	(0.49	(-	(1.03	(0.27	(2.23
3	-0.57	-0.83	-0.33	-0.11	0.19
	(-0.6)	(-	(-	(-	(2.03
4	0.03	-1.14	-0.51	-0.56	-1.43
	(1.33	(-	(-	(-	(-
Big	1.25	0.08	-0.33	0.59	-0.76
	(0.32	(0.97	(-	(0)	(-

United

	Low	2	3	4	High
Sma	0.87	0.49	0.84	0.58	0.70
	(2.98)	(2.02	(2.33	(2.74	(3.16
2	-0.74	-0.15	0.04	0.12	0.45
	(-	(-	(0.2)	(0.57	(2.44
3	-0.74	-0.73	-0.36	0.27	0.47
	(-3)	(-	(0)	(1.48	(1.61
4	-0.02	-0.18	0.50	0.73	0.42
	(0)	(-	(2.01	(0)	(0)
Big	-0.30	-0.24	-0.24	0.19	0.10
	(0)	(0)	(0)	(0)	(0)

Table 6

Intercepts and t-statistics (shown in brackets) from the three-factor regressions to explain monthly returns on the 25 size-B/P sorted portfolios: June 1998 – June 2013.

Europe

	Low	2	3	4	High
Smal	-0.21	0.07	-0.07	0.15	0.17
	(-	(0.73)	(-	(0.53)	(1.65)
2	-0.16	0.00	-0.10	0.13	0.14
	(-	(1.82)	(-	(2.22)	(1.56)
3	0.11	-0.03	-0.11	0.24	0.63
	(1.32)	(-	(-	(1.65)	(0.84)
4	0.39	0.05	0.03	0.22	-0.10
	(1.96)	(1.04)	(0)	(1.94)	(-
Big	-0.09	-0.06	0.00	0.00	0.67
	(-	(-	(0.05)	(-	(2.14)

Austria

	Low	2	3	4	High
Smal	0.19	0.20	0.06	0.17	0.22
	(1.59)	(0.44)	(1.55)	(1.78)	(0.69)
2	0.05	0.03	0.06	0.16	0.16
	(2.13)	(0.55)	(0.52)	(0.77)	(0.08)
3	0.00	0.10	0.08	0.04	0.10
	(1.87)	(2.43)	(0.21)	(2.53)	(1.7)
4	1.56	0.65	1.64	0.76	-1.79
	(0.1)	(0.64)	(0.17)	(1.17)	(-
Big	0.00	0.00	0.00	0.00	0.00
	(0.26)	(0.93)	(0.77)	(0.24)	(1.77)

Belgium

	Low	2	3	4	High
Smal	0.72	0.04	0.29	0.20	0.85
	(2.5)	(1.54	(0.7)	(0.12	(0.58)
2	0.22	0.07	0.23	0.02	0.27
	(3.12	(0.68	(0.71	(0.21	(0.23)
3	0.11	0.05	0.00	0.16	0.24
	(0.21	(0.38	(0.78	(0.31	(0.78)
4	0.02	0.02	0.02	0.00	0.03
	(0.35	(2.28	(2.32	(2.18	(0.75)
Big	0.09	0.06	0.09	0.26	0.26
	(2.32	(2.78	(0.22	(0.12	(1.16)

Denmark

	Low	2	3	4	High
Small	0.24	0.14	0.39	0.25	0.44
	(0.2)	(0.88	(0.84	(0.95	(0.54)
2	0.66	0.38	0.35	0.09	0.68
	(0.19)	(0.93	(1.7)	(0.27	(0)
3	0.00	0.11	0.10	0.00	0.23
	(0.12)	(0.05	(0.36	(0.84	(0.28)
4	0.08	0.11	0.22	0.04	0.24
	(0.65)	(0.33	(0.69	(1.27	(0.41)
Big	0.04	0.06	0.03	0.06	-0.08
	(2.69)	(1.59	(1.05	(0.51	(-

Finland

	Low	2	3	4	High
Smal	0.03	0.01	0.03	0.02	0.03
	(2.55)	(0.47)	(0.06)	(0.74)	(0.61)
2	0.04	0.01	0.02	0.05	0.23
	(0.5)	(0.41)	(2.27)	(0.08)	(1.6)
3	0.02	0.17	0.07	0.07	0.17
	(0.13)	(0.64)	(0.64)	(0.07)	(1.58)
4	0.08	0.08	0.06	0.02	-0.17
	(0.45)	(1.07)	(1.3)	(0.98)	(-
Big	0.35	0.26	0.27	0.22	-0.50
	(0.4)	(1.22)	(0.16)	(0.52)	(-

France

	Low	2	3	4	High
Smal	0.00	0.00	0.00	0.00	0.00
	(0.22	(0.17	(1.11	(0.91	(-
2	0.21	0.21	0.25	0.17	-0.29
	(0.17	(0.31	(1.33	(0.53	(-
3	0.00	0.01	0.00	0.01	0.01
	(0.56	(0.45	(0.14	(1.09	(1.49)
4	0.00	0.01	0.07	0.12	0.13
	(1.21	(0.05	(0.32	(2.39	(0.73)
Big	0.24	0.23	0.15	0.24	0.24
	(0.06	(1.58	(1.2)	(0.29	(1.14)

Germany

	Low	2	3	4	High
Small	0.00	0.00	0.00	0.00	0.00
	(0.01)	(0.01	(0.02	(0)	(0.75)
2	0.76	0.39	0.46	0.46	0.82
	(1.72)	(0.22	(0.01	(0.31	(1.69)
3	0.90	0.01	0.38	0.86	0.95
	(2.14)	(0.38	(0.08	(0.99	(0.68)
4	0.12	0.18	0.01	0.01	-0.22
	(0.83)	(0.45	(2.1)	(1.84	(-
Big	0.01	0.01	0.01	0.00	-0.02
	(1.51)	(0.7)	(0.75	(0.57	(-

Greece

	Low	2	3	4	High
Smal	0.77	0.70	0.62	0.65	0.89
	(0.79)	(0.44)	(0.91)	(0.24)	(1.64)
2	1.41	0.48	0.52	2.67	2.67
	(0.9)	(2.03)	(1.51)	(0.09)	(0.17)

Italy

	Low	2	3	4	High
Smal	0.02	0.05	0.02	0.00	0.06
	(2.99	(0.15	(1.17	(0.32	(0.31)
2	0.28	0.01	0.71	0.86	0.95
	(0.62	(0.02	(0.94	(1.83	(1.11)

Netherlands

	Low	2	3	4	High
Small	0.00	0.13	0.12	0.08	0.13
	(2.9)	(0.22	(1.4)	(0.01	(0.05)
2	0.03	0.42	0.42	0.06	0.51
	(0.07)	(1.58	(1.26	(0.37	(1.38)

3	0.19	0.22	0.09	0.11	0.25	3	0.03	0.20	0.12	0.12	-0.21	3	0.37	0.08	0.14	0.05	-0.70
	(0.38)	(0.35)	(0.03)	(0.41)	(-		(1.21	(0.97	(1.52	(0.97	(-		(0.68)	(2.82	(0.98	(0.32	(-
4	0.04	0.02	0.03	0.02	-0.08	4	0.14	0.05	0.07	0.03	-0.15	4	0.07	0.06	0.03	0.03	-0.08
	(2.47)	(1.25)	(2.03)	(2.06)	(-		(0.63	(0.92	(0.63	(0.59	(-		(0.93)	(0.18	(1.3)	(0.9)	(-
Big	0.07	0.50	0.47	0.28	-0.61	Big	0.42	0.21	0.13	0.45	-0.66	Big	0.38	0.14	0.02	0.32	-0.42
	(2.71)	(0.38)	(0.27)	(1.7)	(-		(0.45	(1.02	(0.13	(0.94	(-		(0.02)	(0.58	(0.72	(0.63	(-

Norway						Poland						Portugal					
	Low	2	3	4	High		Low	2	3	4	High		Low	2	3	4	High
Smal	0.31	0.10	0.10	0.08	0.36	Smal	0.06	0.03	0.03	0.05	-0.07	Small	0.11	0.12	0.03	0.13	0.16
	(0.07)	(0.51)	(1.28)	(1.34)	(1.27)		(2.42	(1.29	(0.19	(0.91	(-		(0.48)	(1.04	(0.59	(0.53	(0.92)
2	0.00	0.00	0.00	0.01	0.01	2	0.00	0.30	0.11	0.00	-0.54	2	0.14	0.06	0.24	0.05	0.29
	(0.09)	(0.45)	(0.35)	(0.96)	(1.13)		(1.69	(0.07)	(0.06	(0)	(-		(1.03)	(1.25	(1.45	(0.42	(1.1)
3	0.04	0.58	0.48	0.55	-0.58	3	0.07	0.17	0.08	0.22	0.23	3	0.02	0.04	0.01	0.04	-0.04
	(0.46)	(0.06)	(0.3)	(0.46)	(-		(0.36	(0.4)	(1.1)	(1.23	(1.64)		(0.65)	(0.57	(2.42	(1.69	(-
4	0.13	0.12	0.12	0.13	-0.20	4	0.30	0.61	0.49	0.42	0.86	4	0.01	0.02	0.02	0.01	-0.05
	(0.88)	(0.61)	(1.12)	(1.27)	(-		(0.61	(1.24	(2.39	(1.02	(0.62)		(0.9)	(0.79	(2.21	(0.04	(-
Big	0.11	0.24	0.21	0.17	-0.29	Big	0.11	0.17	0.32	0.19	0.46	Big	0.15	0.02	0.13	0.02	-0.19
	(0.57)	(0.52)	(0.67)	(0.82)	(-0.2)		(0.69	(3.67	(1.26	(0.79	(1.2)		(0.02)	(0.7)	(0.09	(3.01	(-

Russia						Spain						Sweden					
	Low	2	3	4	High		Low	2	3	4	High		Low	2	3	4	High
Smal	0.20	0.15	0.09	0.07	0.27	Smal	0.00	0.00	0.00	0.00	0.00	Small	0.12	0.02	0.09	0.13	0.29
	(1.24)	(2)	(0.85)	(0.04)	(0.37)		(0.91	(0.83	(0.41	(0.24	(0.92)		(2.19)	(2.17	(1.08	(1.55	(1.06)
2	0.27	0.07	0.23	0.07	0.32	2	0.00	0.00	0.00	0.00	0.00	2	0.16	0.14	0.03	0.27	0.29
	(0.11)	(0.48)	(0.28)	(0.52)	(1.18)		(0.82	(0.88	(0.01	(0.86	(1.09)		(0.23)	(1.08	(0.24	(0.26	(0.59)
3	0.52	0.09	0.56	0.06	0.76	3	0.36	0.52	0.11	0.53	-0.65	3	0.04	0.02	0.03	0.03	-0.07
	(2.16)	(1.2)	(0.44)	(0.31)	(2.17)		(1.53	(1.87	(0.41	(0.31	(-		(0.04)	(0.63	(0.67	(1.56	(-
4	0.12	0.29	0.10	0.06	0.35	4	0.51	0.17	0.12	0.05	-0.75	4	0.01	0.01	0.01	0.02	-0.02
	(0.02)	(3.59)	(0.6)	(2.83)	(0.56)		(1.28	(0.06	(0.33	(1.08	(-		(1.97)	(2.13	(0.55	(1.07	(-0.3)
Big	0.23	0.01	0.10	0.20	0.26	Big	0.75	0.41	0.16	0.09	-0.90	Big	0.01	0.00	0.03	0.01	-0.04
	(1.44)	(1.28)	(0.48)	(0.51)	(1.24)		(0.11	(0.73	(1.11	(1.47	(-		(0.22)	(2.05	(2)	(2.28	(-2.6)

Switzerland						Turkey						United					
	Low	2	3	4	High		Low	2	3	4	High		Low	2	3	4	High
Smal	0.57	0.12	0.48	0.64	0.94	Smal	0.15	0.02	0.16	0.04	-0.37	Small	0.02	0.06	0.03	0.05	0.09
	(0.69)	(0.75)	(0.52)	(0.32)	(1.49)		(1.18	(0.68	(0.73	(0.12	(-		(0.01)	(0.01	(0)	(0.02	(0.07)
2	0.04	0.26	0.20	0.09	0.65	2	0.06	0.03	0.00	0.02	0.07	2	0.10	0.18	0.04	0.09	-0.19
	(0.45)	(0.82)	(1.12)	(0.07)	(1.39)		(2.06	(0.77	(0.86	(2.88	(0.09)		(0.22)	(0.07	(0.21	(0.1)	(-
3	0.08	0.11	0.04	0.10	0.14	3	0.02	0.02	0.03	0.03	0.03	3	0.01	0.02	0.00	0.00	-0.03
	(0.51)	(2.3)	(0.85)	(0.94)	(0.05)		(0.39	(0.19	(0.31	(1.18	(1.65)		(0.16)	(0.09	(0.05	(0.02	(-0.2)
4	0.00	0.01	0.01	0.02	-0.04	4	0.02	0.27	0.31	0.16	-0.52	4	0.00	0.00	0.00	0.00	0.00
	(1.04)	(0.01)	(0.35)	(1.16)	(-		(0.46	(1.11	(0.15	(0.95	(-		(0.07)	(0.12	(0.07	(0.13	(0.14)
Big	0.04	0.08	0.19	0.03	-0.23	Big	0.58	0.37	0.43	0.11	-0.63	Big	0.02	0.04	0.04	0.03	-0.04
	(1.27)	(1.38)	(0.56)	(1.25)	(-		(1.07	(0.95	(0.14	(1.32	(-		(0.68)	(0.23	(0.71	(0.11	(-

Table 7

Intercepts and t-statistics (shown in brackets) from the four-factor regressions to explain monthly returns on the 25 size-B/P sorted portfolios: June 1998 – June 2013.

Europe

	Low	2	3	4	High
Sma	-0.24	0.03	-0.03	0.02	0.15
	(-	(0.56)	(-1.9)	(0.12)	(0.4)
2	-0.13	0.00	0.00	0.07	0.09
	(-	(1.79)	(-	(0.43)	(1.21)
3	0.08	-0.01	-0.10	0.21	0.38
	(0.88)	(-	(-	(1.36)	(0.23)
4	0.06	0.05	0.02	0.13	-0.01
	(1.44)	(0.6)	(0)	(0.87)	(-
Big	-0.02	-0.05	0.00	0.00	0.05
	(-	(-	(0)	(-	(0.99)

Austria

	Low	2	3	4	High
Sma	0.06	0.03	0.03	0.11	0.11
	(0.11)	(0.15)	(1.18)	(0.38)	(0.53)
2	0.05	0.02	0.02	0.15	0.04
	(0.93)	(0.27)	(0.43)	(0.6)	(0)
3	0.00	0.02	0.03	0.02	0.05
	(0.59)	(1.66)	(0.09)	(0.16)	(0.29)
4	0.30	0.16	1.29	0.67	-0.87
	(0.08)	(0.25)	(0.12)	(0.61)	(-
Big	0.00	0.00	0.00	0.00	0.00
	(0.04)	(0.57)	(0.75)	(0.17)	(1.02)

Belgium

	Low	2	3	4	High
Sma	0.06	0.01	0.11	0.08	0.01
	(0.31	(0.66	(0.11	(0.03	(0.23)
2	0.21	0.06	0.10	0.00	0.25
	(1.66	(0.37	(0.29	(0.11	(0.09)
3	0.08	0.00	0.00	0.02	0.15
	(0.17	(0.23	(0.15	(0.06	(0.68)
4	0.00	0.01	0.01	0.00	0.02
	(0.05	(1.1)	(0.63	(0.34	(0.74)
Big	0.01	0.00	0.06	0.10	0.05
	(1.87	(1)	(0.15	(0.12	(1.04)

Denmark

	Low	2	3	4	High
Smal	0.03	0.01	0.17	0.22	0.35
	(0.07)	(0.35)	(0.71)	(0.01)	(0.34)
2	0.12	0.11	0.30	0.01	0.13
	(0.02)	(0.06)	(1.01)	(0.03)	(0)
3	0.00	0.03	0.04	0.00	0.06
	(0.07)	(0.03)	(0.22)	(0.82)	(0.16)
4	0.04	0.02	0.13	0.00	0.12
	(0.63)	(0.26)	(0.19)	(0.16)	(0.39)
Big	0.01	0.01	0.00	0.00	-0.07
	(0.58)	(0.59)	(0.76)	(0.05)	(-

Finland

	Low	2	3	4	High
Sma	0.00	0.00	0.00	0.00	0.00
	(1.02)	(0.19)	(0.06)	(0.37)	(0.55)
2	0.04	0.01	0.01	0.04	0.16
	(0.03)	(0.1)	(0.82)	(0.01)	(0.89)
3	0.00	0.07	0.04	0.01	0.09
	(0.05)	(0.01)	(0.46)	(0.04)	(1.24)
4	0.06	0.08	0.00	0.01	-0.10
	(0.29)	(0.31)	(0.67)	(0.25)	(-
Big	0.20	0.23	0.15	0.08	-0.12
	(0.27)	(1.13)	(0.13)	(0.22)	(-

France

	Low	2	3	4	High
Sma	0.00	0.00	0.00	0.00	0.00
	(0.21	(0.08	(0.81	(0.77	(-
2	0.18	0.04	0.13	0.00	-0.21
	(0.09	(0.02	(0.65	(0.2)	(-
3	0.00	0.00	0.00	0.00	0.00
	(0.2)	(0.14	(0.01	(1.07	(0.96)
4	0.00	0.01	0.00	0.00	0.00
	(0.44	(0.02	(0.11	(1.47	(0.67)
Big	0.13	0.07	0.09	0.03	0.14
	(0.05	(0.46	(0.69	(0.02	(1.1)

Germany

	Low	2	3	4	High
Smal	0.00	0.00	0.00	0.00	0.00
	(0)	(0)	(0)	(0)	(0.61)
2	0.17	0.14	0.26	0.19	0.51
	(0.5)	(0.12)	(0)	(0.28)	(0.26)
3	0.15	0.01	0.01	0.00	0.18
	(0.11)	(0)	(0.05)	(0.15)	(0.07)
4	0.05	0.18	0.01	0.01	-0.09
	(0.15)	(0.08)	(0.1)	(0.17)	(-
Big	0.00	0.00	0.00	0.00	-0.01
	(0.19)	(0.38)	(0.2)	(0.37)	(-

Greece

	Low	2	3	4	High
Sma	0.15	0.38	0.31	0.14	0.46
	(0.54)	(0.37)	(0.71)	(0.03)	(0.2)
2	0.98	0.46	0.29	1.40	0.01
	(0.07)	(1.27)	(1.36)	(0.02)	(0.04)

Italy

	Low	2	3	4	High
Sma	0.01	0.04	0.00	0.00	0.00
	(0.3)	(0.06	(0.78	(0.28	(0.13)
2	0.21	0.00	0.07	0.45	0.81
	(0.09	(0.01	(0.4)	(1.61	(0.76)

Netherlands

	Low	2	3	4	High
Smal	0.00	0.02	0.10	0.03	0.12
	(2.44)	(0.14)	(0.41)	(0)	(0.03)
2	0.01	0.41	0.07	0.03	0.07
	(0.05)	(0.02)	(0)	(0.35)	(0.27)

3	0.18	0.18	0.03	0.09	0.14
	(0.1)	(0.18)	(0)	(0.25)	(-
4	0.03	0.00	0.00	0.01	0.00
	(0.86)	(0.48)	(1.41)	(1.11)	(-
Big	0.02	0.18	0.39	0.19	-0.04
	(1.43)	(0.13)	(0.17)	(0.91)	(0)

3	0.02	0.19	0.00	0.09	-0.03
	(1)	(0.12	(0.71	(0.15	(-
4	0.06	0.01	0.03	0.00	-0.06
	(0.31	(0.45	(0.33	(0.07	(-0.8)
Big	0.38	0.20	0.07	0.30	-0.60
	(0.05	(0.28	(0.12	(0.05	(-

3	0.29	0.06	0.00	0.02	-0.13
	(0.14)	(0.06)	(0.69)	(0.3)	(-
4	0.06	0.00	0.00	0.02	-0.04
	(0.41)	(0.18)	(0.43)	(0.77)	(-
Big	0.24	0.02	0.01	0.16	-0.21
	(0)	(0.31)	(0.41)	(0.47)	(-

Norway

	Low	2	3	4	High
Sma	0.18	0.00	0.08	0.03	0.06
	(0.04)	(0.46)	(0.22)	(0.41)	(0.99)
2	0.00	0.00	0.00	0.01	0.00
	(0.07)	(0.39)	(0.12)	(0.07)	(0.57)
3	0.04	0.15	0.39	0.12	-0.05
	(0.22)	(0.02)	(0.08)	(0.44)	(-
4	0.01	0.06	0.05	0.08	-0.01
	(0.76)	(0.43)	(0.95)	(1)	(-
Big	0.01	0.18	0.13	0.00	-0.06
	(0.12)	(0.17)	(0.54)	(0.07)	(-

Poland

	Low	2	3	4	High
Sma	0.02	0.01	0.03	0.05	-0.05
	(0.98	(0.14	(0.08	(0.24	(0)
2	0.00	0.12	0.06	0.00	-0.21
	(0.54	(0.02	(0)	(0)	(-
3	0.06	0.03	0.05	0.09	0.01
	(0.03	(0.02	(1.06	(1.04	(1.62)
4	0.02	0.09	0.34	0.36	0.54
	(0.01	(1.09	(1.97	(0.72	(0.4)
Big	0.02	0.08	0.23	0.18	0.00
	(0.14	(2.07	(0.07	(0.21	(0.9)

Portugal

	Low	2	3	4	High
Smal	0.08	0.01	0.00	0.11	0.07
	(0.42)	(0.49)	(0.42)	(0.44)	(0.71)
2	0.03	0.05	0.15	0.01	0.16
	(1.03)	(0.43)	(0.51)	(0.27)	(1)
3	0.02	0.01	0.00	0.03	-0.04
	(0.6)	(0.5)	(0.3)	(1.58)	(-
4	0.01	0.01	0.01	0.01	-0.04
	(0.31)	(0.5)	(0.36)	(0)	(-
Big	0.01	0.00	0.05	0.01	-0.17
	(0)	(0.49)	(0.08)	(2.41)	(-1.3)

Russia

	Low	2	3	4	High
Sma	0.12	0.00	0.06	0.01	0.11
	(0.38)	(1.29)	(0.66)	(0.03)	(0.27)
2	0.23	0.03	0.08	0.01	0.22
	(0)	(0.08)	(0.26)	(0.36)	(0.14)
3	0.32	0.09	0.10	0.01	0.00
	(0.39)	(0.66)	(0.31)	(0.12)	(2.13)
4	0.08	0.07	0.04	0.04	0.23
	(0.01)	(3.52)	(0.29)	(2.82)	(0.48)
Big	0.09	0.01	0.09	0.09	0.12
	(0.13)	(1.61)	(0.87)	(0.22)	(0.23)

Spain

	Low	2	3	4	High
Sma	0.00	0.00	0.00	0.00	0.00
	(0.71	(0.54	(0.29	(0.1)	(0.84)
2	0.00	0.00	0.00	0.00	0.00
	(0.66	(0.3)	(0.01	(0.78	(0.25)
3	0.04	0.04	0.06	0.45	-0.52
	(1.37	(0.53	(0.01	(0.24	(-
4	0.40	0.16	0.10	0.03	-0.61
	(0.3)	(0.04	(0)	(0.22	(-
Big	0.62	0.30	0.10	0.00	-0.81
	(0.04	(0.66	(0.29	(0.8)	(-

Sweden

	Low	2	3	4	High
Smal	0.00	0.00	0.04	0.11	0.16
	(0.05)	(0.43)	(1.02)	(0.73)	(0.36)
2	0.11	0.01	0.02	0.08	0.18
	(0.22)	(0.16)	(0.03)	(0.02)	(0.2)
3	0.03	0.01	0.02	0.00	-0.02
	(0.03)	(0.05)	(0.43)	(0.04)	(-
4	0.00	0.01	0.00	0.00	0.00
	(1.69)	(0.88)	(0.14)	(0.59)	(-
Big	0.00	0.00	0.00	0.00	-0.04
	(0.09)	(0.7)	(0.41)	(2.11)	(-

Switzerland

	Low	2	3	4	High
Sma	0.07	0.06	0.32	0.50	0.40
	(0.43)	(0.73)	(0.33)	(0.23)	(0.03)
2	0.02	0.03	0.05	0.05	0.51
	(0.31)	(0.79)	(0.44)	(0.02)	(1.3)
3	0.04	0.05	0.04	0.06	0.05
	(0.41)	(2.1)	(0.61)	(0.63)	(0.04)
4	0.00	0.00	0.00	0.01	0.00
	(0.51)	(0)	(0.34)	(0.94)	(-
Big	0.02	0.03	0.00	0.00	0.00
	(0.05)	(1.18)	(0.43)	(0.8)	(-

Turkey

	Low	2	3	4	High
Sma	0.02	0.00	0.07	0.03	-0.24
	(0.65	(0.14	(0.51	(0.08	(-1.2)
2	0.01	0.02	0.00	0.00	0.01
	(0.83	(0.33	(0.65	(2.31	(0.05)
3	0.01	0.00	0.00	0.02	0.00
	(0.1)	(0.03	(0.05	(0.99	(0.22)
4	0.02	0.15	0.19	0.10	-0.14
	(0.31	(0.58	(0.13	(0.27	(-
Big	0.40	0.34	0.26	0.04	-0.56
	(0.77	(0.5)	(0.05	(0.21	(-

United

	Low	2	3	4	High
Smal	0.00	0.05	0.02	0.04	0.01
	(-	(0.56)	(-1.9)	(0.12)	(0.4)
2	0.03	0.00	0.04	0.00	-0.01
	(-	(1.79)	(-	(0.43)	(1.21)
3	0.00	0.02	0.00	0.00	-0.02
	(0.88)	(-	(-	(1.36)	(0.23)
4	0.00	0.00	0.00	0.00	0.00
	(1.44)	(0.6)	(0)	(0.87)	(-
Big	0.02	0.02	0.00	0.02	-0.04
	(-	(-	(0)	(-	(0.99)