Value, Size, and Momentum across Countries

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Abstract

The study investigated the characteristics of inter-country value, size, and momentum premiums. We have contributed to the asset-pricing literature in three ways. First, we have provided fresh evidence for value, size, and momentum premiums in country returns. Second, we showed that these premiums are robust to the changes of functional currencies or countries' representative indices. Third, we demonstrated that the country-level value, size, and momentum premiums tend to strengthen each other in double-sorted portfolios. We examined listings of stocks in 66 countries between the time period from 2000 and 2013.

Keywords: **value premium, size premium, momentum effect, cross-section of inter-country returns, global asset allocation**

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Value, size, and momentum effects are extensively documented in both developed and emerging markets (Asness, Moskowitz, & Pedersen, 2013; Fama & French, 2012). Although their sources are still under discussion, the fact that they exist is currently undisputable. The value, size, and momentum premiums became an integral part of many commonly accepted modern pricing models, like the Fama-French three-factor model or Carhart's four-factor model (Carhart 1997; Fama & French, 1993). They are currently often employed in portfolio management, investment performance evaluation, or even in legal practice for assessing damages in lawsuits (Mitchell & Netter, 1994) or by competition authorities to evaluate the mergers (Beverley, 2007). The value, size, and momentum factors are usually used as an explanation of cross-sectional variation in individual stock returns. However, can we also find any parallels at the macro level? Can the three described factors be used to forecast country returns and explain the inter-county return variation? This manuscript targets to give a convincing answer to these questions.

This study investigates the characteristics of inter-country value, size, and momentum premiums. We contribute to the academic literature in three ways. First, we deliver fresh out-of-sample evidence for value, size, and momentum premiums in inter-country returns. Second, we show that these premiums are robust to the changes of functional currency or are representative country benchmarks. Third, we demonstrate that the country-level value, size, and momentum premiums tend to strengthen each other in double-sorted portfolios. We examined the listings of stocks in 66 countries between 2000 and 2013.

Theoretical Basis

The neoclassical portfolio theory proposed by Markowitz (1952) formed the theoretical basis for development of the capital asset pricing model (CAPM) by Sharpe (1964), Lintner (1965), and Mossin (1966). However, some

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later empirical tests did not give an unambiguous answer on the model's validity. Since the close of the 1970s, a series of papers have provided observations that called the effectiveness of CAPM into question. The first article of the series was published by Basu (1977). The author conducted an empirical test in which company stocks were sorted according to the earnings per share to price (E/P) ratio. Basu (1977) demonstrated that future returns from stocks with a high E/P ratio are higher, and returns from stocks with a low E/P ratio are lower than estimated by CAPM. Banz (1981) and Reinganum (1981) sorted company stocks by their capitalization and noted that small company stocks brought returns that were, on an average, higher than estimated by CAPM. Fama and French (1992) confirmed the dependencies documented by Banz (1981) and Reinganum (1981). Basu (1983) documented that stocks with a low price-to-earnings-per-share (P/E) ratio brought higher returns than stocks with a high P/E. Rosenberg, Reid, and Lanstein (1985) demonstrated the interdependence between returns and the cash flows to market value (CF/MV) ratio. Stattman (1980), Rosenberg et al. (1985), and Fama and French (1992) noted the interdependence between returns and the book to market (B/M) ratio. Stocks with a high B/M ratio brought higher returns, and stocks with a low B/M ratio brought lower returns than their betas would allow. On the other hand, Jegadeesh and Titman (1993) observed that winners (stocks with high historical returns) generated better returns in successive periods than losers (stocks with low historical returns). They observed that interdependence was dubbed as the momentum factor.

The aforesaid deviations from the CAPM model are just some of the capital market anomalies noted during the years. Fama and French (1992, 1996) brought these anomalies together and noted that they can be reduced to two most important ones, that is, the size effect and the value effect. Fama and French believed that factors linked with these effects affected returns due to additional, non-diversifiable risk factors that were not accounted for in the traditional beta. According to Banz (1981) and Reinganum (1981), the size factor was related to the small cap stocks effect. Banz (1981) researched U.S. company stocks quoted on NYSE between 1936 and 1975. According to his findings, the bottom 20% of the quoted companies by size generated returns that were, on an average, 5% higher than returns generated by other companies. In other words, small cap companies tend to generate higher returns on an average. Even though small caps are usually characterized by high betas, CAPM was unable to account for such high returns. Reinganum (1981) and Cook and Roseff (1982) confirmed the company size effect after using a larger sample and portfolios consisting of company deciles. Identical conclusions were reached by Blume and Stambaugh (1983) and Brown, Keim, Kleidon, and Marsh (1983). Later, the size effect was observed in the U.S. and other stock exchanges by numerous researchers such as Herrera and Lockwood (1994); Heston, Rouwenhorst, and Weessels (1999) ; Rouwenhorst (1999) ; Horowitz, Loughran, and Savin (2000) ; Fama and French (2008), Michou, Mouselli, and, Stark (2010), and Saji, Harikumar, and Kasim (2013) . Most researchers connected the size factor to the presence of additional systemic risk. Some of them, however, posited that the size factor is due to factors other than such systemic risk. For example, Amihud and Mendelson (1986) suggested that higher returns from small caps may compensate for their low liquidity on the stock market and their large bid-ask spreads. Interestingly, some of the recent research seems to suggest that recently, the size effect on developed markets has clearly waned or even disappeared entirely. Fama and French (2012) did not find any evidence that a size premium existed in the 20-year period since 1990. On the other hand, Dimson, Marsh, Staunton, Holland, and Matthews (2011) reached the conclusion that the occurrence of abnormally high returns from small caps cannot be confirmed over longer time spans. Barry, Goldreyer, Lockwood, and Rodriguez (2002) took into account emerging markets, and they did not find any evidence that a size premium has a significant influence on stock returns.

The value factor is related to the so-called value stock effect, also called the value effect. This effect is the tendency of value stocks to generate higher risk-adjusted returns than the growth stocks. Companies are most often divided into value and growth ones based on the B/M ratio. As a rule, if investors are convinced that a company is facing a splendid future, its stocks will be valued high, translating into a low B/M ratio. If, on the other hand, investors assess the company's prospects as gloomy, its stocks will be valued low, causing the B/M ratio to soar. Research shows that low-priced companies are often undervalued and have a higher growth potential. Such growth potential results from, among others, the possibility to restructure the company, which can bring about a higher value of stocks that is foreseen by the investors. Formal statistical proofs have been given, and the presence

of the value effect was confirmed by Stattmann (1980) and Rosenberg et al. (1985). Both authors used the price to book value ratio as a watershed between value and growth stocks. Fama and French (1992) showed that from 1963 to 1990, the B/M ratio was better able to explain returns on the U.S. market than beta and market value. Fama and French (1992, 1993, 1995, 1996) believed that higher returns from stocks with a high B/M ratio are the result of additional systemic risk factor. Davis (1994) confirmed the value effect in the U.S. market, and Chan, Hamao, and Lakonishok (1991) and Capaul, Rowley, and Sharpe (1993) did so for other foreign markets as well. The value effect in returns was also observed by Chan et al. (1991) ; Fama and French (2012) ; Rouwenhorst (1999) ; Chui, Titman, and Wei (2010) ; and Asness et al. (2013). The research conducted so far also suggests that the value factor seems to influence small caps the most. Taking into account the emerging markets, Barry et al. (2002) observed the value effect in stock returns.

Taking into account their observations concerning the size and value factors, Fama and French (1993) demonstrated how to extend the CAPM with two additional risk factors. Their famous three-factor model obtained widespread attention and became commonly used. However, it turned out that it has some drawbacks. Over several years, it has been observed that the Fama and French model does not explain returns if the momentum effect occurs. The momentum effect is mainly related to the occurrence of autocorrelation between short-term returns from stocks. DeBondt and Thaler (1985) conducted a research on autocorrelation of returns. The researchers found strong evidence in support of the tendency of companies achieving good historical results to give poor returns within the next 3-5 years. The analyses conducted by Jegadeesh and Titman (1993, 2001) were similar to those of DeBondt and Thaler (1985), but focused on short-term investment horizon ranging from 3 to 12 months. Jegadeesh and Titman (1993) simulated 32 various investment strategies based on companies quoted on NYSE and AMEX between 1965 and 1989. Their observation was that stocks with high historical returns (winners) generate better results in successive periods than stocks with low historical returns (losers). In their view, a momentum strategy took a long position on the winners' portfolio and a short position on the losers' portfolio. Jegadeesh and Titman (1993) showed that differences between returns from different strategies cannot be explained by the CAPM model. Fama and French (1996) additionally showed that their model was, likewise, unable to explain the returns achieved from a momentum strategy. Evidence for the momentum effect in returns from stocks on international markets was put forward by, among others, Asness (1994), Fama and French (2012), Rouwenhorst (1999), Grinblatt and Moskowitz (2004), Simlai (2009), Chui et al. (2010), Vasantha, Dhanraj, and Varadharajan, (2012), and Asness et al. (2013). There is also evidence in favor of the momentum effect being successfully connected to value and size factors (Asness et al., 2013 ; Fama & French, 2012).

Carhart (1997) took the momentum effect into account and extended the Fama and French model by adding another variable that reflected the momentum factor in returns. Adding another variable to the model allowed it to explain the influence of the momentum effect on returns, something that was not possible under the CAPM and the Fama-French model. The model developed by Carhart (1997) was later tested by Jegadeesh (2000), Liew and Vassalou (2000), L'Her, Masmoudi, and Suret (2004), and Bello (2007).

A major part of research on factor premiums has focused on interdependencies between individual factors. Earlier tests covering the U.S. market and developed markets showed that the size premium (if it was statistically significant) was stronger among small and micro-cap stocks. Fama and French (2012) showed that the value premium was significant for small stocks. A similar dependence was observed for the momentum premium. Hong, Lim, and Stein (2000) and Fama and French (2012) observed that in developed markets, the momentum premium was stronger among small cap stocks. Additionally, Asness et al. (2013) noted the occurrence of negative correlation between the value factor and the momentum factor. For emerging markets, research on interdependencies between factors was carried out by Cakici, Fobozzi, and Tan (2012). The authors tested 18 emerging markets considering the time period from 1990-2011. They observed that the value premium was present both among small and large cap stocks. The evidence thus gathered for emerging markets differs in part from interdependencies observed in developed markets. Cakici, Fabozzi, and Tan (2013) demonstrated that the momentum premium is larger in case of small cap stocks and decreases when the size is increased. They also confirmed the negative correlation between the value factor and momentum factor already observed by Asness et al. (2013) in developed markets.

The value, size, and momentum factors are traditionally used to explain cross-sectional variation in their returns. However, we can observe some parallels at the macro level, as it turns out that the inter-country stock market returns can be forecasted based on cross-country value factors. Although the evidence is not particularly abundant, the existing papers rather confirm the described phenomenon (Bhojraj & Swaminathan, 2006 ; Kim, 2012 ; Kouwenberg & Salomons, 2005) . Garff (2013) analyzed a sample of 18 to 41 countries and found evidence of country-level value effect; however, the research lacked formal statistical inferences. Ansess et al. (2013), on the contrary, also found convincing statistical evidence, but included evidence only from 8 to 18 countries in their sample.

Research Methods and Data Sources

We investigated the issue of returns to momentum, value, and size factors in as an explanation for variation in cross-sectional country returns using data from 66 different countries using two types of indices. First, we used the MSCI indices, which guarantee identical computational methodology along all the markets. Unfortunately, MSCI indices are not always easily replicable, which may seem not very practical from an investor's perspective. Therefore, we performed another parallel research based on local indices, which in each case can be replicated at a low cost with a passive ETF or in the futures market. In other words, we actually performed two similar analyses based on slightly different basic data. In case there was no data for one type of index in a given country, we used the index from the other group. The full list of country portfolios and benchmarks analyzed in the present study is given in the Appendix 1. The data on prices and fundamental factors were taken from Bloomberg.

First, we analyzed the factor returns in international returns. We sorted all the stocks in a given time on the basis of three factors: value, size, and momentum. We used two types of momentum: long-term (12 months) and short term (1 month) ; so, we can say that we actually employed four factors: value factor *(V)* – the book value to market value ratio *(BM/VM)* of the country portfolio computed according to the specific index weighing methodology; size factor *(S)* – the market capitalization of all the companies in the country portfolio; long-term momentum factor *(LTM)* – 12-month realized rate of return in the year preceding the portfolio formation; and short-term momentum factor *(STM)* – 1-month realized rate of return in the month preceding the portfolio formation.

We included a market into the sample at a given point of time only when we had all four data pieces indicated above. Therefore, the number of stocks in the sample grew along with the development of worldwide capital markets: From 47 in the beginning of the research period to 66 in the end in case of the MSCI indices, and from 24 to 66 in case of local indices. We used complete time-series data (encompassing all the factors described above) for the period from May 31, 2000 - November 29, 2013. We did not analyze the data for the earlier period because we felt that a small number of various countries in the sample could disturb the results. We performed all the computations on monthly data. The detailed description of the time-series used is exhibited in the Table 1.

Based on the *V, S, LTM*, and *STM* characteristics, we constructed three separate portfolios for each factor, including 30% of the markets with the lowest factor, 30% of the markets with the highest factor, and the remaining 40% of the mid-markets. We used three equal weighting schemes. Along with the factor portfolios, we also calculated the returns on the market portfolio. As the proxy for market portfolio, we used capitalization weighted average of all the markets included in the research in a given period.

We performed all the computations in three distinct currency schemes: U.S. dollar (USD), euro (EUR), and Japanese yen (JPY). In other words, we converted all the data to into USD, EUR, and JPY, and delivered three versions of the results. It is important to note that the choice of basic currency impacts the data in three important ways. First, the currency fluctuations influence the variation in returns and momentum. Second, the size of the market measured with capitalization may change, influencing the construction of size-sorted portfolios. Finally, the composition of the market portfolio can differ slightly in case of each currency convention.

Next, we built fully collateralized market-neutral (MN) long/short portfolios mimicking the behavior of certain factors. The collateralized MN portfolio construction was based on existing theoretical and empirical evidence in the field, so as to make it positively exposed to factor-related premiums. In other words, the portfolios are always

long in 30% of the markets, which are expected to yield the highest risk-adjusted returns, short in 30% of the markets, which yield the lowest risk-adjusted returns, and 100% long in the risk-free assets. Again, as in the previous case, the portfolios were equal weighted. Finally, the performance of the collateralized long/short MN portfolios was tested against four different models: zero model, market model, CAPM, and the Fama-French three factor model [1]. Here, we based our computations on log-returns. The first one basically assumed that the expected return on security was zero, so we tested whether the actual returns were statistically different from zero. The second model is the classical market model, as introduced by Fama et al. (1969):

$$R_{it} \quad \alpha_i \quad \beta_i R_{mt} \quad \varepsilon_{it}, \qquad (1)$$
$$E(\varepsilon_{it}) = 0, \operatorname{var}(\varepsilon_{it}) = \sigma^2_{\varepsilon}$$

where,

R_{it} and R_{mt} are the period-t returns on security and the market portfolio, ε_{it} is the zero mean disturbance term and α_i, β_i , and σ_{ε^2} are the parameters of the market model. Identically, as in the earlier calculations, we used the value-weighted average of all markets.

The other model we employed is the capital asset pricing model (Lintner 1965 ; Mossin 1966 ; Sharpe 1964, 1966). The long/short portfolios' excess returns were regressed on market portfolio's excess returns according to the CAPM equation:

$$R_{it} \quad R_{ft} \quad \alpha_i \quad \beta_i (R_{mt} \quad R_{ft}) \quad \varepsilon_{it} \qquad (2)$$

where,

R_{it}, R_{mt}, and R_{ft} are annual long/short portfolio, market portfolio, and risk-free returns, and α_i and β_i are regression parameters. We used 1-month BBA Libor USD, Euribor, and Tibor to represent the risk-free rate in the USD, EUR, and JPY approaches. The α_i intercept measures the average annual abnormal return (so called Jensen-alpha). Finally, the last model is the Fama-French three factor model (Fama & French, 1993):

$$R_{it} = \alpha + R_f + \beta_{rm} \cdot (Rmt - R_f) \beta_{SMB} \cdot SMB + \beta_{HML} \cdot HML + \varepsilon_{it} \qquad (3)$$

where,

$\beta_{rm}, \beta_{SMB}, \beta_{HML}$, and α ere the estimated parameters of the model. β_{rm} is analogical to the CAPM beta, but it is not equal to it. The β_{SMB}, β_{HML} are exposed to *SMBHML* risk factors, which denote returns from zero-cost arbitrage portfolios, which are long U.S. small-caps and short U.S. large-caps (*SMB*), and long high BV/MV U.S. stocks and short low BV/MV U.S. stocks (*HML*). We used the factors computed by Kenneth French that are available on his website [2]. We used the U.S. stocks-based *SML* and *HML* factors for all the currency approaches, although it may not seem entirely appropriate in cases of EUR and JPY.

In all the models, our zero hypothesis is that the alpha intercept is not statistically different from zero, and the alternative hypothesis states that it actually differs from zero. We found the equation parameters using OLS and tested them in the parametric way.

Having tested the factor performance, we analyzed the interactions between separate factors. First, for the presentational purposes, we computed time-series correlation matrix of MN portfolios. We only used MSCI and USD approach, but the results were robust to changes in the currency or index type. Next, we provided more formal statistical inferences. At this stage, all the computations were based on equal weighted collateralized MN portfolios (the market portfolios and risk-free rate were derived identically as before). In this part of the research, we double-sorted countries based on *V, S, LTM*, and *STM* and used the same 30% cut-off points as before. Next, we constructed market-neutral long/short portfolios for each of the pair combinations. The premises of certain

[1] A more detailed review and description of expected return models can be found for example in Cambell, Lo, &MacKinlay (1997) and Cochrane (2005).

[2] French, K.R. (n.d.). Current research returns. Retrieved from http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

long/short portfolios were based on existing previous theoretical and empirical evidence. The portfolios were in case of each pair long high-value, high-momentum, or small-size markets ; short low-value, low-momentum, and large-size markets; and long risk-free asset. Finally, we tested the described portfolios using identical procedures as described above against the zero, market model, CAPM, and the Fama-French three factor model.

Table 1. Characteristics of Factor Sorted Portfolios : MSCI Indices

Panel A: Data Converted to USD

	Returns			Volatility			Beta		
	low	mid	high	low	mid	high	low	mid	high
V	0,20%	0,57%	0,68%	5,80%	5,79%	6,69%	1,06	1,06	1,18
S	0,75%	0,52%	0,18%	5,76%	6,34%	6,09%	0,93	1,17	1,16
LTM	0,18%	0,39%	0,89%	6,58%	5,94%	5,94%	1,18	1,10	1,01
STM	0,50%	0,45%	0,52%	6,44%	6,00%	5,87%	1,14	1,12	1,02

Panel B: Data Converted to EUR

	Returns			Volatility			Beta		
	low	mid	high	low	mid	high	low	mid	high
V	-0,02%	0,35%	0,43%	5,06%	4,72%	5,61%	1,04	0,95	1,07
S	0,52%	0,26%	-0,01%	4,84%	5,41%	5,06%	0,82	1,11	1,09
LTM	-0,03%	0,13%	0,70%	5,66%	4,88%	5,09%	1,10	1,01	0,94
STM	0,27%	0,20%	0,32%	5,57%	4,89%	4,97%	1,08	1,01	0,96

Panel C: Data Converted to JPY

	Returns			Volatility			Beta		
	low	mid	high	low	mid	high	low	mid	high
V	0,18%	0,55%	0,63%	6,60%	6,55%	7,36%	1,05	1,04	1,14
S	0,72%	0,46%	0,19%	6,58%	7,05%	6,83%	0,95	1,13	1,12
LTM	0,18%	0,32%	0,90%	7,26%	6,75%	6,67%	1,12	1,08	1,01
STM	0,51%	0,39%	0,50%	7,20%	6,78%	6,53%	1,12	1,09	1,00

Source and Description : The Table 1 presents the return characteristics of factor portfolios. Portfolios were sorted according to BV/MV ("V"), capitalization ("S"), long-term momentum ("LTM"), and short-term momentum ("STM"). "Return" is an average monthly log-return, "volatility" is a standard deviation of monthly log-returns, and "beta" is regression coefficient calculated against a market portfolio. The market portfolio was computed as the capitalization weighted average of country portfolio returns. The data source is Bloomberg, and the computations are based on listings from 66 countries during the period from 31/05/2000- 29/11/2013. The MSCI indices were used. The panels A, B, and C exhibit the results of the computations with all the data converted to USD, EUR, and JPY.

Table 2. Characteristics of Factor Sorted Portfolios : Local Indices

Panel A: Data Converted to USD

	Returns			Volatility			Beta		
	low	mid	high	low	mid	high	low	mid	high
V	0,34%	0,59%	0,69%	5,61%	5,75%	6,60%	1,02	1,06	1,17
S	0,79%	0,60%	0,22%	5,88%	6,16%	5,97%	0,97	1,12	1,14
LTM	0,24%	0,42%	1,00%	6,62%	5,90%	5,76%	1,17	1,08	0,98
STM	0,51%	0,39%	0,79%	6,21%	6,03%	5,85%	1,10	1,11	1,02

Panel B: Data Converted to EUR

	Returns			Volatility			Beta		
	low	mid	high	low	mid	high	low	mid	high
V	0,12%	0,36%	0,45%	4,80%	4,75%	5,58%	0,96	0,96	1,05
S	0,56%	0,37%	-0,01%	4,99%	5,19%	5,00%	0,87	1,03	1,06
LTM	0,00%	0,18%	0,78%	5,62%	4,90%	5,02%	1,06	0,98	0,93
STM	0,27%	0,16%	0,57%	5,29%	4,95%	5,05%	1,01	1,00	0,96

Panel C: Data Converted to JPY

	Returns			Volatility			Beta		
	low	mid	high	low	mid	high	low	mid	high
V	0,31%	0,57%	0,65%	6,42%	6,59%	7,31%	1,01	1,05	1,12
S	0,76%	0,57%	0,19%	6,65%	6,95%	6,77%	0,97	1,09	1,10
LTM	0,20%	0,39%	0,96%	7,28%	6,78%	6,55%	1,11	1,07	0,98
STM	0,50%	0,36%	0,73%	6,98%	6,83%	6,61%	1,08	1,08	1,00

Source and Description : The Table 2 presents the return characteristics of factor portfolios. Portfolios were sorted according to BV/MV ("V"), capitalization ("S"), long-term momentum ("LTM"), and short-term momentum ("STM"). "Return" is an average monthly log-return, "volatility" is a standard deviation of monthly log-returns, and "beta" is regression coefficient calculated against a market portfolio. The market portfolio was computed as the capitalization weighted average of country portfolio returns. The data source is Bloomberg, and the computations are based on listings from 66 countries during the period from 31/05/2000- 29/11/2013. The MSCI indices were used. The panels A, B, and C exhibit the results of the computations with all the data converted to USD, EUR, and JPY.

Table 3. Performance of Market- Neutral Factor Mimicking Portfolios : MSCI Indices

Panel A: Data Converted to USD

	Zero model		Market model		CAPM		Fama-French three factor model			
	Return	Volatility	β	α	β	α	HML	SMB	β	α
V	0,64%	2,93%	0,09	0,62%	0,09	0,45%	0,22	0,21	0,01	0,27%
	(2,77)		*(1,99)*	*(2,72)*	*(2,05)*	*(1,99)*	*(3,46)*	*(2,44)*	*(0,24)*	*(1,25)*
S	0,64%	3,36%	-0,23	0,68%	-0,23	0,45%	0,17	0,10	-0,28	0,35%
	(2,43)		*(-4,74)*	*(2,75)*	*(-4,68)*	*(1,83)*	*(2,35)*	*(1,03)*	*(-5,27)*	*(1,39)*
LTM	0,79%	3,84%	-0,16	0,82%	-0,15	0,60%	-0,29	-0,18	-0,06	0,80%
	(2,63)		*(-2,73)*	*(2,77)*	*(-2,63)*	*(2,04)*	*(-3,57)*	*(-1,62)*	*(-1,02)*	*(2,75)*
STM	0,12%	3,27%	-0,10	0,13%	-0,10	-0,07%	-0,11	-0,01	-0,07	-0,02%
	(0,45)		*(-2,03)*	*(0,53)*	*(-1,91)*	*(-0,28)*	*(-1,49)*	*(-0,12)*	*(-1,31)*	*(-0,09)*

Panel B: Data Converted to EUR

	Zero model		Market model		CAPM		Fama-French three factor model			
	Return	Volatility	β	α	β	α	HML	SMB	β	α
V	0,62%	2,96%	0,03	0,63%	0,03	0,44%	0,24	0,24	-0,06	0,21%
	(2,69)		*(0,52)*	*(2,69)*	*(0,66)*	*(1,89)*	*(3,85)*	*(2,87)*	*(-1,18)*	*(0,95)*
S	0,66%	3,31%	-0,27	0,64%	-0,26	0,40%	0,15	0,10	-0,31	0,28%
	(2,53)		*(-4,97)*	*(2,65)*	*(-4,80)*	*(1,65)*	*(2,25)*	*(1,08)*	*(-5,34)*	*(1,15)*
LTM	0,82%	3,83%	-0,16	0,81%	-0,14	0,59%	-0,31	-0,20	-0,04	0,82%
	(2,73)		*(-2,38)*	*(2,74)*	*(-2,19)*	*(1,98)*	*(-3,82)*	*(-1,83)*	*(-0,64)*	*(2,83)*
STM	0,16%	3,27%	-0,12	0,15%	-0,11	-0,06%	-0,12	-0,02	-0,08	0,00%
	(0,61)		*(-2,12)*	*(0,59)*	*(-1,93)*	*(-0,25)*	*(-1,71)*	*(-0,20)*	*(-1,33)*	*(-0,01)*

Panel C: Data Converted to JPY

	Zero model		Market model		CAPM		Fama-French three factor model			
	Return	Volatility	β	α	β	α	HML	SMB	β	α
V	0,48%	2,90%	0,08	0,47%	0,08	0,45%	0,21	0,20	0,02	0,28%
	(2,10)		*(2,18)*	*(2,07)*	*(2,20)*	*(1,98)*	*(3,43)*	*(2,34)*	*(0,46)*	*(1,30)*
S	0,48%	3,33%	-0,17	0,50%	-0,17	0,48%	0,15	0,07	-0,20	0,39%
	(1,82)		*(-3,99)*	*(2,00)*	*(-3,97)*	*(1,90)*	*(2,06)*	*(0,70)*	*(-4,41)*	*(1,56)*
LTM	0,63%	3,85%	-0,10	0,65%	-0,10	0,63%	-0,31	-0,21	-0,02	0,83%
	(2,10)		*(-2,09)*	*(2,17)*	*(-2,07)*	*(2,09)*	*(-3,72)*	*(-1,86)*	*(-0,42)*	*(2,84)*
STM	-0,09%	3,23%	-0,10	-0,07%	-0,10	-0,10%	-0,10	0,01	-0,08	-0,07%
	(-0,35)		*(-2,38)*	*(-0,30)*	*(-2,36)*	*(-0,39)*	*(-1,36)*	*(0,10)*	*(-1,85)*	*(-0,26)*

Source and Description : The Table 3 presents the return characteristics of market-neutral factor mimicking portfolios. Portfolios were created based on BV/MV ("V"), capitalization ("S"), long-term momentum ("LTM"), and short-term momentum ("STM"). "Return" is the average annual geometric rate of return and "volatility" is an annual standard deviation of log-returns. HML, SMB, α, and β are model parameters computed in each case according to the model's specifications. We used log-returns in all computations. Data on HML and SML factors came from Kenneth's R. French website. The market portfolio was computed as the capitalization weighted average of country portfolio returns. As the proxy for the money market returns, we used 1-month bids for BBA Libor USD, Euribor and Tibor for USD, EUR, and JPY approaches. Numbers in brackets denote the statistical significance (*t* -stat). The data source is Bloomberg, and the computations are based on listings from 66 countries during the period from 31/05/2000- 29/11/2013. The MSCI indices were used. The panels A, B, and C exhibit the results of the computations with all the data converted to USD, EUR, and JPY.

Table 4. Performance of Market - Neutral Factor Mimicking Portfolios : Local Indices

Panel A: Data Converted to USD

	Zero model		Market model		CAPM		Fama-French three factor model			
	Return	Volatility	β	α	β	α	HML	SMB	β	α
V	0,55%	2,66%	0,14	0,53%	0,14	0,37%	0,18	0,11	0,09	0,25%
	(2,66)		*(3,55)*	*(2,61)*	*(3,61)*	*(1,83)*	*(3,28)*	*(1,48)*	*(2,13)*	*(1,26)*
S	0,70%	3,13%	-0,18	0,73%	-0,17	0,51%	0,20	0,06	-0,22	0,41%
	(2,84)		*(-3,89)*	*(3,11)*	*(-3,84)*	*(2,19)*	*(3,08)*	*(0,61)*	*(-4,57)*	*(1,77)*
LTM	0,82%	3,89%	-0,18	0,86%	-0,17	0,64%	-0,33	-0,02	-0,11	0,77%
	(2,70)		*(-3,08)*	*(2,89)*	*(-3,00)*	*(2,15)*	*(-4,01)*	*(-0,21)*	*(-1,82)*	*(2,65)*
STM	0,40%	3,31%	-0,06	0,41%	-0,06	0,21%	0,02	0,05	-0,07	0,18%
	(1,53)		*(-1,29)*	*(1,58)*	*(-1,23)*	*(0,82)*	*(0,26)*	*(0,46)*	*(-1,34)*	*(0,69)*

Panel B: Data Converted to EUR

	Zero model		Market model		CAPM		Fama-French three factor model			
	Return	Volatility	β	α	β	α	HML	SMB	β	α
V	0,54%	2,69%	0,08	0,54%	0,08	0,36%	0,22	0,15	0,02	0,20%
	(2,54)		*(1,71)*	*(2,57)*	*(1,85)*	*(1,73)*	*(3,79)*	*(1,90)*	*(0,39)*	*(0,97)*
S	0,72%	3,06%	-0,20	0,71%	-0,19	0,48%	0,19	0,05	-0,23	0,38%
	(2,98)		*(-3,99)*	*(3,09)*	*(-3,80)*	*(2,08)*	*(2,90)*	*(0,58)*	*(-4,39)*	*(1,63)*
LTM	0,87%	3,91%	-0,13	0,87%	-0,12	0,65%	-0,37	-0,08	-0,04	0,84%
	(2,83)		*(-1,96)*	*(2,84)*	*(-1,80)*	*(2,12)*	*(-4,43)*	*(-0,70)*	*(-0,61)*	*(2,83)*
STM	0,43%	3,30%	-0,03	0,43%	-0,03	0,23%	-0,02	0,02	-0,03	0,23%
	(1,66)		*(-0,62)*	*(1,65)*	*(-0,46)*	*(0,88)*	*(-0,31)*	*(0,16)*	*(-0,42)*	*(0,86)*

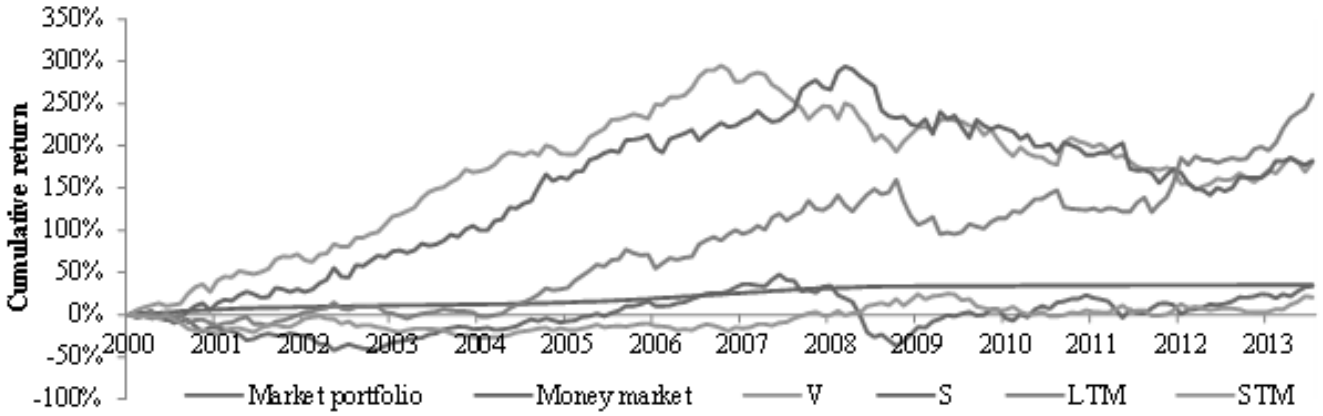
Panel C: Data Converted to JPY

	Zero model		Market model		CAPM		Fama-French three factor model			
	Return	Volatility	β	α	β	α	HML	SMB	β	α
V	0,39%	2,64%	0,10	0,37%	0,10	0,35%	0,19	0,12	0,06	0,23%
	(1,88)		*(3,05)*	*(1,84)*	*(3,06)*	*(1,75)*	*(3,44)*	*(1,57)*	*(1,58)*	*(1,18)*
S	0,53%	3,12%	-0,13	0,56%	-0,13	0,53%	0,19	0,03	-0,17	0,45%
	(2,18)		*(-3,42)*	*(2,34)*	*(-3,40)*	*(2,24)*	*(2,84)*	*(0,35)*	*(-3,97)*	*(1,91)*
LTM	0,66%	3,91%	-0,12	0,68%	-0,11	0,66%	-0,35	-0,05	-0,06	0,80%
	(2,16)		*(-2,31)*	*(2,25)*	*(-2,30)*	*(2,18)*	*(-4,16)*	*(-0,44)*	*(-1,06)*	*(2,72)*
STM	0,18%	3,24%	-0,06	0,19%	-0,05	0,16%	0,03	0,05	-0,07	0,13%
	(0,69)		*(-1,32)*	*(0,73)*	*(-1,31)*	*(0,65)*	*(0,45)*	*(0,49)*	*(-1,47)*	*(0,50)*

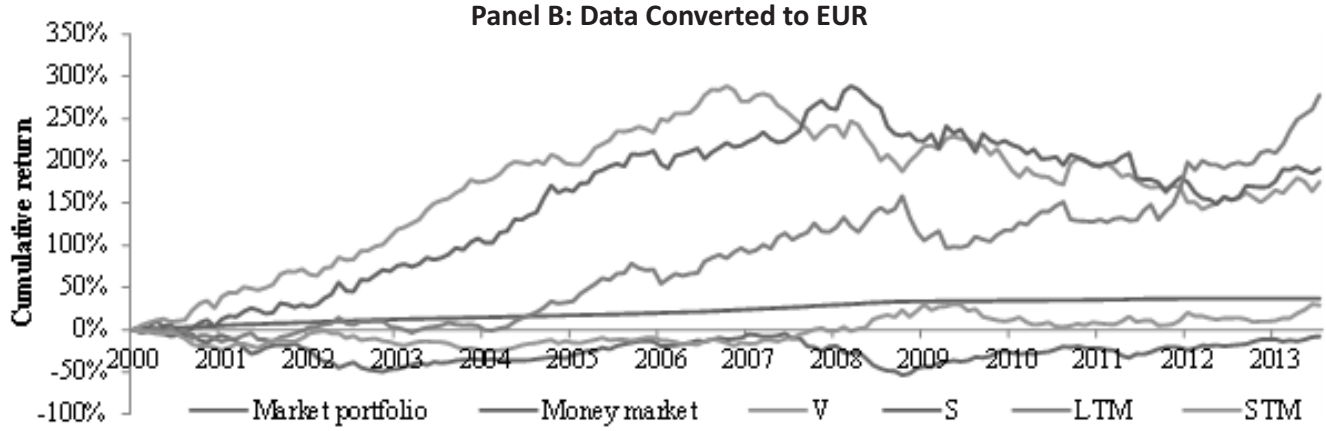
Source and Description : The Table 4 presents the return characteristics of market-neutral factor mimicking portfolios. Portfolios were created based on BV/MV ("V"), capitalization ("S"), long-term momentum ("LTM"), and short-term momentum ("STM"). "Return" is the average annual geometric rate of return and "volatility" is an annual standard deviation of log-returns. HML, SMB, α, and β are model parameters computed in each case according to the model's specifications. We used log-returns in all computations. Data on HML and SML factors came from Kenneth's R. French website. The market portfolio was computed as the capitalization weighted average of country portfolio returns. As the proxy for the money market returns, we used 1-month bids for BBA Libor USD, Euribor and Tibor for USD, EUR, and JPY approaches. Numbers in brackets denote the statistical significance (t -stat). The data source is Bloomberg, and the computations are based on listings from 66 countries during the period from 31/05/2000- 29/11/2013. The MSCI indices were used. The panels A, B, and C exhibit the results of the computations with all the data converted to USD, EUR, and JPY.

Figure 1. Performance of Market Neutral Factor Portfolios : MSCI Indices

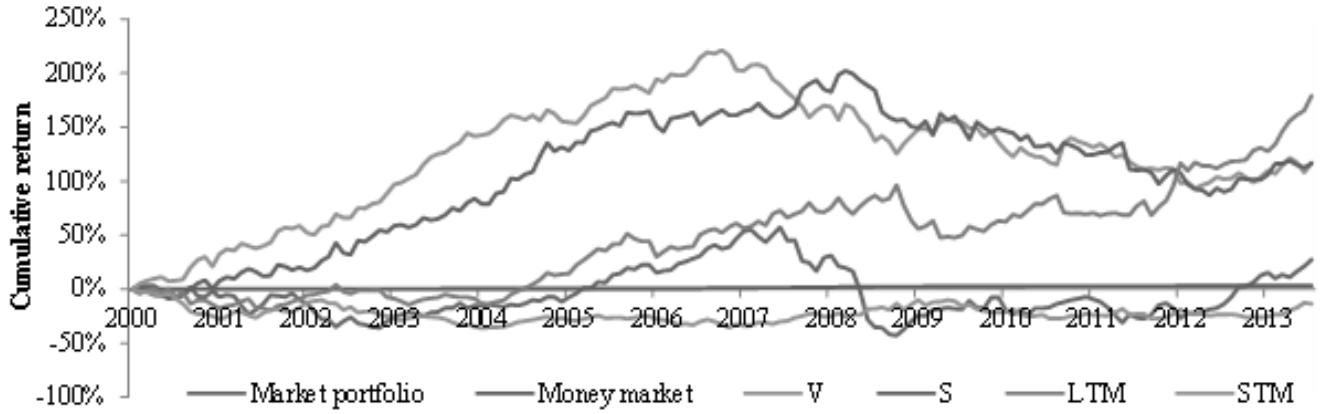
Panel A: Data Converted to USD



Panel B: Data Converted to EUR



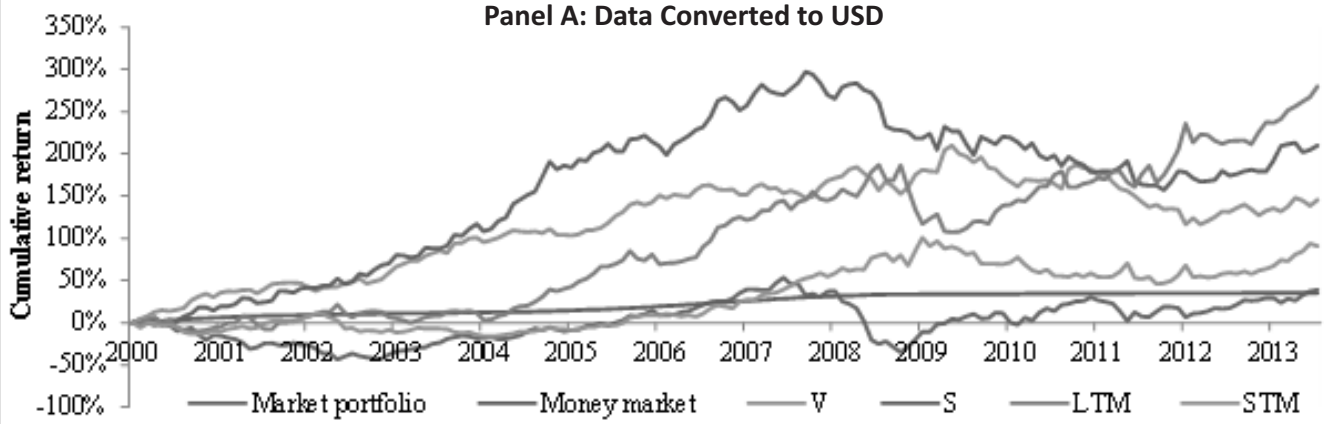
Panel C: Data Converted to JPY



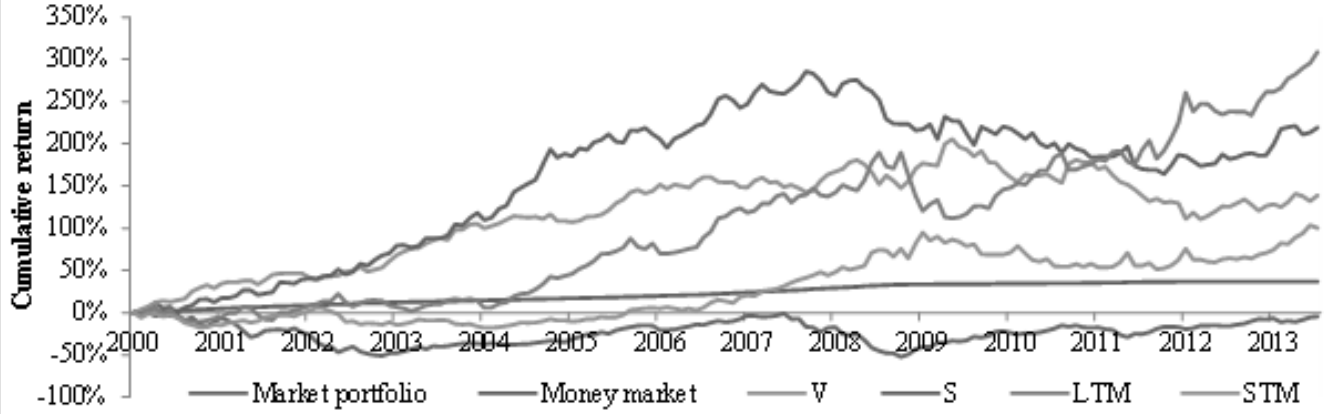
Source and Description : The Figure 1 depicts the cumulative performance of market-neutral factor mimicking portfolios during the entire research period. Portfolios were created based on BV/MV ("V"), capitalization ("S"), long-term momentum ("LTM"), and short-term momentum ("STM"). Standard arithmetic returns were used. The market portfolio was computed as the capitalization weighted average of country portfolio returns. The MSCI indices were used. As the proxy for the money market returns, we used 1-month bids for BBA Libor USD, Euribor and Tibor for USD, EUR, and JPY approaches. The data source is Bloomberg, and the calculations are based on listings from 66 countries during the period from 31/05/2000 - 29/11/2013. The panels A, B, and C exhibit results of computations with all the data converted to USD, EUR, and JPY.

Figure 2. Performance of Market Neutral Factor Portfolios : Local Indices

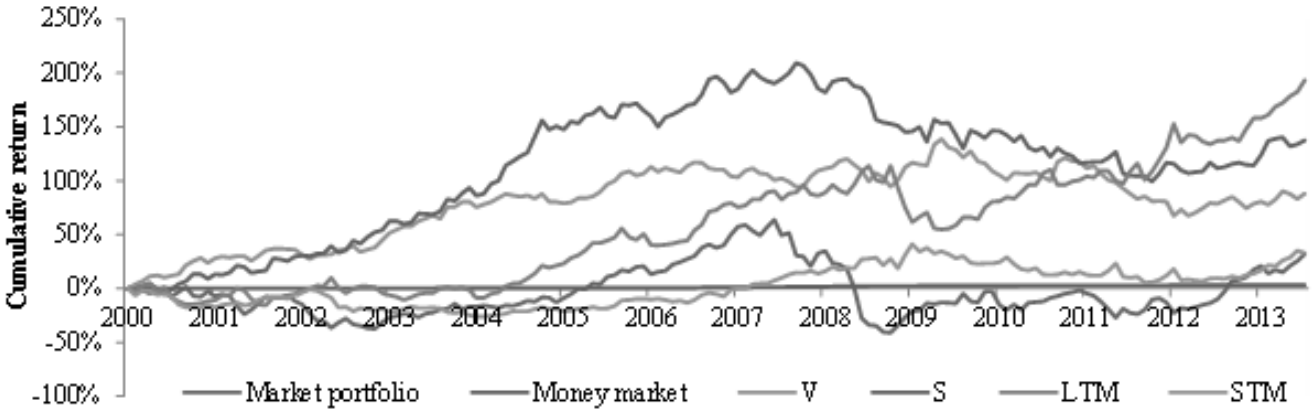
Panel A: Data Converted to USD



Panel B: Data Converted to EUR



Panel C: Data Converted to JPY



Source and Description : The Figure 2 depicts the cumulative performance of market-neutral factor mimicking portfolios during the entire research period. Portfolios were created based on BV/MV ("V"), capitalization ("S"), long-term momentum ("LTM"), and short-term momentum ("STM"). Standard arithmetic returns were used. The market portfolio was computed as the capitalization weighted average of country portfolio returns. The MSCI indices were used. As the proxy for the money market returns, we used 1-month bids for BBA Libor USD, Euribor and Tibor for USD, EUR, and JPY approaches. The data source is Bloomberg, and the calculations are based on listings from 66 countries during the period from 31/05/2000 - 29/11/2013. The panels A, B, and C exhibit results of computations with all the data converted to USD, EUR, and JPY.

Analysis and Results

↳ **Return Characteristics of Various Factor Sorted Portfolios :** Three factors - value, size, and long-term momentum - seem to be important for portfolio formation. First, the markets with high BV/MV ratio delivered, on an average, higher returns than low BV/MV returns. This observation about the country portfolios level is consistent with the previous research on the single companies' level. Second, the small markets (in terms of capitalization) delivered higher returns than large markets. Third, the high cross-sectional historical returns usually imply high returns in the future. However, this observation is only true in case of long-term momentum, while the high-short term momentum markets did not reveal any superb performance. Additionally, all the described observations are robust to the choice of currency or representative index (Tables 1 and 2). Additionally, two factors – size and long term momentum – appear to be especially interesting in terms of risk. The portfolios of high long-term momentum countries and low-size markets not only yielded higher returns, but were also less risky, measured both with beta and standard deviation (Table 1 and Table 2).

The Tables 3 and 4 reveal information about performance and its statistical significance of market neutral long/short factor mimicking portfolios. The three factors – *V, S,* and *LTM* – yielded positive returns, which were significantly different from zero, no matter what currency or type of index we took into account. The last factor *(STM)* – as it can be presumed – did not exhibit high positive returns. Additionally, the Figures 1 and 2 depict the cumulative returns to various factors.

The positive returns remained statistically significant after adjusting for risk in the market model and CAPM. The last model was employed so that some of the variation in returns of the cross-country returns may be explained by the Fama-French factors. For example, the U.S. *HML* and *SMB* factors almost fully explained the global cross-country value factor. What is interesting is that this relationship works in all the currency approaches. Additionally – what may seem quite surprising – the size factor is partly explained by U.S. *HML*. Finally, the only factor, in which case the alpha appears statistically significant after adjusting for Fama-French factors, is the long-term momentum. What is more, it is also the factor which yields the highest raw and market-adjusted returns. Again, it remains true in all currencies and index types. The graphical presentation of returns to *V, S, LTM*, and *STM* provide

Table 5. Factor Correlations : MSCI Indices

	SMB	HML	Market portfolio	Money market	V	S	LTM	STM
SMB	1,00	0,13	0,35	-0,07	0,23	-0,05	-0,20	-0,07
		(1,67)	*(4,70)*	*(-0,88)*	*(3,00)*	*(-0,60)*	*(-2,55)*	*(-0,87)*
HML		1,00	0,27	0,01	0,30	0,07	-0,32	-0,15
			(3,63)	*(0,18)*	*(3,95)*	*(0,94)*	*(-4,23)*	*(-1,97)*
Market portfolio			1,00	-0,11	0,16	-0,35	-0,21	-0,16
				(-1,39)	*(2,00)*	*(-4,77)*	*(-2,74)*	*(-2,05)*
Money market				1,00	0,13	0,11	0,01	-0,03
					(1,70)	*(1,40)*	*(0,10)*	*(-0,36)*
V					1,00	0,43	-0,29	-0,24
						(6,06)	*(-3,80)*	*(-3,12)*
S						1,00	0,14	-0,01
							(1,77)	*(-0,18)*
LTM							1	0,37
								(5,01)
STM								1

Source and Description: The Table 5 depicts Pearson's correlation coefficients of pre-cost log-returns among market neutral factor-mimicking portfolios, market portfolio ("Market portfolio"), yields in the cash market ("Money market") and Fama-French factors ("HML", "SML"). Portfolios were created based on BV/MV ("V"), capitalization ("S"), long-term momentum ("LTM"), and short-term momentum ("STM"). We used log-returns in all computations. Data on HML and SML factors came from Kenneth's R. French website. The market portfolio was computed as the capitalization-weighted average of country portfolio returns. As the proxy for the money market returns, 1-month bids for BBA Libor USD were employed. Numbers in brackets denote the statistical significance (*t-stat*). The data source is Bloomberg, and the calculations are based on listings from 66 countries during the period from 31/05/2000 - 29/11/2013. The MSCI indices were used. All the prices and returns were converted to U. S. dollars.

Table 6. Characteristics of Two- Dimensional Factor Portfolios : MSCI Indices
Panel A: Data Converted to USD

	Return			Volatility			Beta		
	Value and long-term momentum								
	LTM low	LTM mid	LTM high	LTM low	LTM mid	LTM high	LTM low	LTM mid	LTM high
V low	0,04%	0,07%	0,63%	8,32%	6,01%	6,23%	1,13	1,08	1,03
V mid	0,30%	0,57%	0,75%	6,15%	6,04%	6,32%	1,06	1,09	1,03
Vhigh	0,37%	0,23%	1,70%	7,66%	6,50%	6,87%	1,26	1,13	0,91
	Value and short-term momentum								
	STM low	STM mid	STM high	STM low	STM mid	STM high	STM low	STM mid	STM high
V low	-0,02%	0,17%	0,14%	7,06%	6,03%	6,55%	1,18	1,08	1,13
V mid	0,74%	0,61%	0,37%	6,07%	6,22%	6,04%	1,02	1,13	1,03
V high	0,56%	0,66%	0,83%	6,44%	6,91%	6,41%	1,14	1,17	1,00

Value and size

	S low	S mid	S high	S low	S mid	S high	S low	S mid	S high
V low	0,62%	-0,07%	0,20%	7,55%	6,22%	6,21%	0,94	1,09	1,13
V mid	0,68%	0,64%	0,26%	5,84%	6,16%	6,09%	0,88	1,11	1,16
V high	0,64%	0,87%	0,39%	6,59%	8,32%	6,87%	1,02	1,48	1,24

Size and long-term momentum

	LTM low	LTM mid	LTM high	LTM low	LTM mid	LTM high	LTM low	LTM mid	LTM high
S low	0,18%	0,18%	1,42%	6,87%	6,65%	6,47%	0,98	0,98	0,82
S mid	0,27%	0,34%	0,71%	7,43%	6,35%	6,36%	1,31	1,16	1,06
S high	-0,07%	0,33%	0,26%	7,92%	5,83%	6,67%	1,36	1,11	1,18

Size and short-term momentum

	STM low	STM mid	STM high	STM low	STM mid	STM high	STM low	STM mid	STM high
S low	0,27%	0,81%	1,14%	7,12%	6,83%	6,64%	0,97	1,04	0,87
S mid	0,72%	0,45%	0,22%	6,92%	6,48%	6,49%	1,22	1,18	1,12
S high	0,04%	0,26%	-0,15%	6,80%	5,87%	6,64%	1,24	1,12	1,17

Panel B: Data Converted to EUR

	Return			Volatility			Beta		
Value and long-term momentum									
	LTM low	LTM mid	LTM high	LTM low	LTM mid	LTM high	LTM low	LTM mid	LTM high
V low	-0,19%	-0,16%	0,40%	7,91%	5,17%	5,57%	1,16	1,02	0,99
V mid	0,06%	0,34%	0,54%	5,28%	4,94%	5,49%	0,98	0,97	0,94
Vhigh	0,12%	0,02%	1,48%	6,88%	5,56%	6,01%	1,18	1,03	0,82

Value and short-term momentum

	STM low	STM mid	STM high	STM low	STM mid	STM high	STM low	STM mid	STM high
V low	-0,23%	-0,09%	0,04%	6,22%	5,05%	5,46%	1,10	0,98	1,01
V mid	0,50%	0,38%	0,15%	5,22%	5,13%	5,10%	0,94	1,01	0,92
V high	0,30%	0,41%	0,61%	5,55%	5,81%	5,59%	1,07	1,04	0,90

Value and size

	S low	S mid	S high	S low	S mid	S high	S low	S mid	S high
V low	0,39%	-0,30%	-0,03%	7,04%	5,58%	5,42%	0,88	1,08	1,09
V mid	0,46%	0,41%	0,03%	4,91%	5,18%	5,09%	0,74	1,02	1,07
V high	0,41%	0,64%	0,16%	5,74%	7,35%	5,95%	0,90	1,39	1,16

Size and long-term momentum

	LTM low	LTM mid	LTM high	LTM low	LTM mid	LTM high	LTM low	LTM mid	LTM high
S low	-0,05%	-0,03%	1,21%	6,15%	5,67%	5,79%	0,88	0,82	0,70
S mid	0,03%	0,12%	0,48%	6,48%	5,36%	5,76%	1,22	1,07	1,04
S high	-0,30%	0,10%	0,02%	6,77%	4,89%	5,91%	1,20	1,04	1,14

Size and short-term momentum

	STM low	STM mid	STM high	STM low	STM mid	STM high	STM low	STM mid	STM high
S low	-0,03%	0,60%	0,94%	6,63%	5,70%	5,78%	0,90	0,84	0,72
S mid	0,50%	0,19%	0,01%	6,08%	5,48%	5,82%	1,16	1,08	1,10
S high	-0,21%	0,04%	-0,38%	5,87%	4,89%	5,80%	1,16	1,05	1,11

Panel C: Data Converted to JPY

	Return			Volatility			Beta		
Value and long-term momentum									
	LTM low	LTM mid	LTM high	LTM low	LTM mid	LTM high	LTM low	LTM mid	LTM high
V low	0,01%	0,03%	0,61%	8,67%	6,86%	6,98%	1,04	1,07	1,02
V mid	0,27%	0,54%	0,72%	6,87%	6,84%	7,02%	1,04	1,07	1,01
Vhigh	0,33%	0,19%	1,67%	8,40%	7,29%	7,56%	1,21	1,11	0,93
Value and short-term momentum									
	STM low	STM mid	STM high	STM low	STM mid	STM high	STM low	STM mid	STM high
V low	-0,06%	0,12%	0,60%	7,83%	6,83%	8,38%	1,15	1,06	1,17
V mid	0,72%	0,56%	0,33%	6,86%	6,88%	6,84%	1,02	1,07	1,02
V high	0,46%	0,60%	0,78%	7,37%	7,72%	6,98%	1,12	1,15	0,97
Value and size									
	S low	S mid	S high	S low	S mid	S high	S low	S mid	S high
V low	0,59%	-0,10%	0,17%	8,09%	6,94%	7,05%	0,93	1,06	1,11
V mid	0,67%	0,60%	0,24%	6,68%	6,90%	6,77%	0,92	1,08	1,09
V high	0,61%	0,83%	0,36%	7,33%	9,01%	7,69%	1,02	1,37	1,20
Size and long-term momentum									
	LTM low	LTM mid	LTM high	LTM low	LTM mid	LTM high	LTM low	LTM mid	LTM high
S low	0,16%	0,18%	1,39%	7,64%	7,48%	7,35%	1,00	1,01	0,90
S mid	0,23%	0,30%	0,68%	7,97%	7,20%	7,06%	1,20	1,14	1,03
S high	-0,11%	0,31%	0,22%	8,43%	6,66%	7,50%	1,24	1,08	1,15
Size and short-term momentum									
	STM low	STM mid	STM high	STM low	STM mid	STM high	STM low	STM mid	STM high
S low	0,30%	0,72%	1,14%	7,92%	7,55%	7,12%	1,02	1,03	0,88
S mid	0,71%	0,37%	0,22%	7,68%	7,25%	7,11%	1,17	1,13	1,06
S high	-0,02%	0,25%	-0,22%	7,55%	6,68%	7,33%	1,18	1,09	1,11

Source and Description : The Table 6 presents the return characteristics of portfolios constructed based on combinations of factors. Portfolios were sorted in two dimensions according to BV/MV ("V"), capitalization ("S"), long-term momentum ("LTM"), and short-term momentum ("STM"). "Return" is an average monthly log-return, "volatility" is a standard deviation of monthly log-returns, "beta" is regression coefficient calculated against a market portfolio. The market portfolio was computed as the capitalization weighted average of country portfolio returns. The data source is Bloomberg, and the computations are based on listings from 66 countries during the period from 31/05/2000 - 29/11/2013. The MSCI indices were used. The panels A, B, and C exhibit results of computations with all the data converted to USD, EUR, and JPY.

Table 7. Characteristics of Two - Dimensional Factor Portfolios : Local Indices
Panel A: Data Converted to USD

	Return			Volatility			Beta		
Value and long-term momentum									
	LTM low	LTM mid	LTM high	LTM low	LTM mid	LTM high	LTM low	LTM mid	LTM high
V low	-0,30%	0,20%	0,97%	7,31%	5,75%	6,36%	1,09	1,04	0,99
V mid	0,46%	0,48%	0,75%	6,20%	6,01%	6,23%	1,06	1,09	1,03
Vhigh	0,27%	0,53%	1,59%	7,56%	6,73%	7,20%	1,27	1,13	0,92
Value and short-term momentum									
	STM low	STM mid	STM high	STM low	STM mid	STM high	STM low	STM mid	STM high
V low	0,25%	0,09%	0,30%	6,12%	6,11%	7,22%	0,98	1,10	1,13
V mid	0,65%	0,50%	0,52%	6,34%	5,90%	5,91%	1,10	1,05	0,98
V high	0,40%	0,33%	1,05%	6,35%	7,17%	6,82%	1,10	1,19	1,07
Value and size									
	S low	S mid	S high	S low	S mid	S high	S low	S mid	S high
V low	0,68%	0,36%	0,23%	7,24%	5,88%	5,80%	0,97	1,01	1,07
V mid	0,83%	0,60%	0,26%	6,09%	6,18%	6,04%	0,94	1,09	1,13
V high	0,63%	1,11%	-0,09%	6,54%	7,46%	8,29%	1,03	1,29	1,45
Size and long-term momentum									
	LTM low	LTM mid	LTM high	LTM low	LTM mid	LTM high	LTM low	LTM mid	LTM high
S low	0,29%	0,12%	1,44%	7,23%	6,08%	6,04%	1,08	0,93	0,77
S mid	0,34%	0,52%	0,83%	7,10%	6,43%	6,04%	1,21	1,14	1,01
S high	0,17%	0,31%	0,41%	7,14%	5,98%	6,56%	1,25	1,11	1,13
Size and short-term momentum									
	STM low	STM mid	STM high	STM low	STM mid	STM high	STM low	STM mid	STM high
S low	0,12%	0,66%	1,24%	7,95%	6,95%	6,89%	1,06	1,08	0,96
S mid	0,53%	0,36%	0,86%	6,99%	6,35%	6,13%	1,18	1,14	1,02
S high	0,27%	0,18%	0,01%	6,73%	5,92%	6,51%	1,19	1,11	1,15

Panel B: Data Converted to EUR

	Return			Volatility			Beta		
Value and long-term momentum									
	LTM low	LTM mid	LTM high	LTM low	LTM mid	LTM high	LTM low	LTM mid	LTM high
V low	-0,53%	-0,05%	0,74%	6,62%	5,03%	5,63%	1,03	0,99	0,92
V mid	0,23%	0,26%	0,51%	5,21%	4,95%	5,58%	0,95	0,98	0,99
Vhigh	0,01%	0,31%	1,33%	6,70%	5,75%	6,86%	1,17	1,02	0,91

Value and short-term momentum

	STM low	STM mid	STM high	STM low	STM mid	STM high	STM low	STM mid	STM high
V low	-0,09%	-0,12%	0,26%	5,66%	5,12%	5,18%	0,97	1,00	1,00
V mid	0,45%	0,25%	0,28%	5,41%	4,92%	5,28%	1,01	0,95	0,96
V high	0,25%	0,11%	0,80%	5,34%	6,15%	6,16%	1,01	1,06	1,04

Value and size

	S low	S mid	S high	S low	S mid	S high	S low	S mid	S high
V low	0,46%	0,14%	0,00%	6,71%	5,11%	5,02%	0,94	0,95	1,02
V mid	0,60%	0,37%	0,03%	5,33%	5,16%	5,12%	0,86	0,98	1,06
V high	0,40%	0,88%	-0,32%	5,61%	6,56%	7,19%	0,90	1,21	1,32

Size and long-term momentum

	LTM low	LTM mid	LTM high	LTM low	LTM mid	LTM high	LTM low	LTM mid	LTM high
S low	0,04%	-0,11%	1,21%	6,26%	5,34%	5,47%	0,93	0,86	0,70
S mid	0,11%	0,27%	0,62%	6,20%	5,27%	5,45%	1,11	1,00	0,99
S high	-0,06%	0,08%	0,17%	6,14%	4,99%	5,77%	1,15	1,03	1,08

Size and short-term momentum

	STM low	STM mid	STM high	STM low	STM mid	STM high	STM low	STM mid	STM high
S low	-0,08%	0,43%	1,10%	7,31%	5,75%	6,33%	0,91	0,92	0,93
S mid	0,34%	0,14%	0,60%	6,17%	5,35%	5,38%	1,11	1,04	0,97
S high	0,08%	-0,05%	-0,20%	5,76%	5,01%	5,57%	1,11	1,04	1,07

Panel C: Data Converted to JPY

	Return			Volatility			Beta		
	Value and long-term momentum								
	LTM low	LTM mid	LTM high	LTM low	LTM mid	LTM high	LTM low	LTM mid	LTM high
V low	-0,35%	0,16%	0,95%	7,94%	6,70%	7,09%	1,06	1,04	0,99
V mid	0,45%	0,46%	0,72%	6,90%	6,85%	6,97%	1,04	1,08	1,01
Vhigh	0,21%	0,52%	1,52%	8,24%	7,54%	7,96%	1,20	1,11	0,96

Value and short-term momentum

	STM low	STM mid	STM high	STM low	STM mid	STM high	STM low	STM mid	STM high
V low	0,27%	0,11%	0,98%	6,90%	6,82%	8,62%	0,99	1,06	1,13
V mid	0,64%	0,46%	0,49%	7,23%	6,75%	6,62%	1,10	1,04	0,97
V high	0,52%	0,28%	0,96%	6,98%	7,99%	7,63%	1,07	1,16	1,07

Value and size

	S low	S mid	S high	S low	S mid	S high	S low	S mid	S high
V low	0,64%	0,33%	0,20%	8,02%	6,60%	6,65%	1,00	0,99	1,05
V mid	0,82%	0,57%	0,23%	6,97%	6,99%	6,82%	0,97	1,07	1,09
V high	0,60%	1,08%	-0,13%	7,13%	8,30%	8,88%	0,99	1,26	1,33

Size and long-term momentum

	LTM low	LTM mid	LTM high	LTM low	LTM mid	LTM high	LTM low	LTM mid	LTM high
S low	0,25%	0,08%	1,39%	7,82%	7,02%	6,89%	1,04	0,98	0,84
S mid	0,31%	0,50%	0,81%	7,78%	7,30%	6,79%	1,15	1,13	1,00
S high	0,09%	0,29%	0,36%	7,79%	6,75%	7,37%	1,17	1,08	1,11

Size and short-term momentum

	STM low	STM mid	STM high	STM low	STM mid	STM high	STM low	STM mid	STM high
S low	0,29%	0,54%	1,30%	8,13%	7,60%	7,42%	1,02	1,07	0,95
S mid	0,50%	0,40%	0,76%	7,70%	7,09%	6,97%	1,14	1,09	1,03
S high	0,25%	0,15%	-0,03%	7,47%	6,78%	7,10%	1,15	1,09	1,09

Source and Description. The Table 7 presents the return characteristics of portfolios constructed based on combinations of factors. Portfolios were sorted in two dimensions according to BV/MV ("V"), capitalization ("S"), long-term momentum ("LTM"), and short-term momentum ("STM"). "Return" is an average monthly log-return, "volatility" is a standard deviation of monthly log-returns, "beta" is regression coefficient calculated against a market portfolio. The market portfolio was computed as the capitalization weighted average of country portfolio returns. The data source is Bloomberg, and the calculations are based on listings from 66 countries during the period from 31/05/2000 - 29/11/2013. The local indices were used. The panels A, B, and C exhibit results of computations with all the data converted to USD, EUR, and JPY.

some additional interesting insights. In all the currency and index regimes, the LTM factor yielded more or less stable and positive returns during the entire research period. However, the behavior of *V* and *S* factors can be split into two distinct phases. Before the years 2007-2008, the rates of return were systematically positive, while later in years (2008-2013), the rates of return turned negative. What is interesting here is that it is not only the nature and sources of the variation, but also the fact that the pattern may cast some doubt on the issue of sustainability of superior returns. Based on the research conducted in this paper, it cannot be settled whether the strange two-phase pattern is just a coincidence, or does it suggest some structural changes, which made the value and size factors stop working in years 2007-2008 and later on.

The Table 5 exhibits the correlation matrix among the analyzed *V, S, LTM*, and *STM* factors, as well as equity and money market returns and Fama-French U.S. *SMB* and *HML* factors. The correlations provide a few

Table 8. Performance of Market - Neutral Portfolios: Two Dimensional Approach – MSCI Indices
Panel A: Data Converted to USD

	Zero model		Market model		CAPM		Fama-French three factor model			
	Return	Volatility	β	α	β	α	HML	SMB	β	α
V+LTM	1,36%	9,11%	-0,19	1,39%	-0,18	1,17%	-0,34	-0,20	-0,08	1,39%
	(1,90)		*(-1,33)*	*(1,95)*	*(-1,30)*	*(1,64)*	*(-1,63)*	*(-0,71)*	*(-0,53)*	*(1,91)*
V+STM	0,85%	5,40%	-0,15	0,88%	-0,15	0,66%	0,05	0,13	-0,19	0,58%
	(2,00)		*(-1,86)*	*(2,08)*	*(-1,89)*	*(1,58)*	*(0,40)*	*(0,79)*	*(-2,08)*	*(1,36)*
V+S	0,53%	4,75%	-0,13	0,56%	-0,13	0,35%	0,46	0,31	-0,27	0,03%
	(1,43)		*(-1,79)*	*(1,50)*	*(-1,75)*	*(0,94)*	*(4,65)*	*(2,31)*	*(-3,69)*	*(0,08)*
S+LTM	1,34%	6,98%	-0,54	1,44%	-0,53	1,15%	0,02	-0,12	-0,52	1,20%
	(2,44)		*(-5,42)*	*(2,84)*	*(-5,40)*	*(2,28)*	*(0,14)*	*(-0,58)*	*(-4,73)*	*(2,31)*
S+STM	1,12%	5,57%	-0,35	1,19%	-0,34	0,94%	0,17	-0,06	-0,36	0,90%
	(2,57)		*(-4,24)*	*(2,85)*	*(-4,21)*	*(2,25)*	*(1,37)*	*(-0,37)*	*(-4,06)*	*(2,12)*

Panel B: Data Converted to EUR

	Zero model		Market model		CAPM		Fama-French three factor model			
	Return	Volatility	β	α	β	α	HML	SMB	β	α
V+LTM	1,36%	9,04%	-0,34	1,34%	-0,32	1,08%	-0,28	-0,17	-0,23	1,29%
	(1,91)		*(-2,15)*	*(1,91)*	*(-2,06)*	*(1,54)*	*(-1,38)*	*(-0,60)*	*(-1,38)*	*(1,78)*
V+STM	0,86%	5,36%	-0,19	0,85%	-0,18	0,62%	0,03	0,13	-0,22	0,54%
	(2,04)		*(-2,05)*	*(2,04)*	*(-2,00)*	*(1,49)*	*(0,28)*	*(0,78)*	*(-2,15)*	*(1,26)*
V+S	0,53%	4,76%	-0,19	0,52%	-0,18	0,30%	0,47	0,32	-0,33	-0,07%
	(1,43)		*(-2,30)*	*(1,42)*	*(-2,17)*	*(0,80)*	*(4,78)*	*(2,43)*	*(-4,05)*	*(-0,19)*
S+LTM	1,40%	6,90%	-0,49	1,38%	-0,48	1,09%	-0,04	-0,21	-0,43	1,22%
	(2,59)		*(-4,28)*	*(2,68)*	*(-4,19)*	*(2,11)*	*(-0,28)*	*(-1,03)*	*(-3,43)*	*(2,29)*
S+STM	1,19%	5,50%	-0,43	1,17%	-0,41	0,89%	0,13	-0,06	-0,42	0,87%
	(2,75)		*(-4,69)*	*(2,87)*	*(-4,58)*	*(2,20)*	*(1,10)*	*(-0,38)*	*(-4,31)*	*(2,08)*

Panel C: Data Converted to JPY

	Zero model		Market model		CAPM		Fama-French three factor model			
	Return	Volatility	β	α	β	α	HML	SMB	β	α
V+LTM	1,21%	9,06%	-0,07	1,23%	-0,07	1,20%	-0,36	-0,29	0,03	1,46%
	(1,71)		*(-0,62)*	*(1,72)*	*(-0,61)*	*(1,69)*	*(-1,77)*	*(-1,05)*	*(0,24)*	*(2,02)*
V+STM	0,67%	5,15%	-0,15	0,69%	-0,15	0,67%	0,08	0,14	-0,18	0,58%
	(1,66)		*(-2,21)*	*(1,73)*	*(-2,19)*	*(1,67)*	*(0,72)*	*(0,90)*	*(-2,48)*	*(1,41)*
V+S	0,37%	4,74%	-0,10	0,39%	-0,10	0,36%	0,45	0,29	-0,22	0,08%
	(1,00)		*(-1,63)*	*(1,04)*	*(-1,61)*	*(0,98)*	*(4,51)*	*(2,17)*	*(-3,44)*	*(0,21)*
S+LTM	1,20%	6,96%	-0,32	1,25%	-0,32	1,22%	-0,04	-0,24	-0,28	1,34%
	(2,20)		*(-3,68)*	*(2,37)*	*(-3,66)*	*(2,32)*	*(-0,28)*	*(-1,15)*	*(-2,88)*	*(2,50)*
S+STM	1,01%	5,52%	-0,27	1,05%	-0,27	1,02%	0,16	-0,08	-0,29	1,00%
	(2,32)		*(-3,91)*	*(2,52)*	*(-3,90)*	*(2,45)*	*(1,36)*	*(-0,47)*	*(-3,75)*	*(2,35)*

Source and Description : The Table 8 exhibits return characteristics of market-neutral factor mimicking portfolios in the two-dimensional approach. Portfolios were created based on combinations of two of the following factors: BV/MV ("V"), company capitalization ("S"), long-term momentum ("LTM"), or short-term momentum ("STM"). "Return" is the average annual geometric rate of return and "volatility" is an annual standard deviation of log-returns. HML, SMB, α, and β are model parameters computed in each case according to the model's specification. We used log-returns in all computations. Data on HML and SML factors came from Kenneth's R. French website. The market portfolio was computed as the capitalization weighted average of country portfolio returns. As the proxy for the money market returns, we used 1-month bids for BBA Libor USD, Euribor and Tibor for USD, EUR, and JPY approaches. Numbers in brackets denote the statistical significance (*t* - stat). The data source is Bloomberg, and the calculations are based on listings from 66 countries during the period from 31/05/2000 - 29/11/2013. The MSCI indices were used. The panels A, B, and C exhibit results of computations with all the data converted to USD, EUR, and JPY.

Table 9. Performance of Market-Neutral Portfolios: Two - Dimensional Approach – Local Indices

Panel A: Data Converted to USD

	Zero model		Market model		CAPM		Fama-French three factor model			
	Return	Volatility	β	α	β	α	HML	SMB	β	α
V+LTM	1,82%	7,08%	-0,17	1,85%	-0,16	1,63%	-0,38	0,06	-0,10	1,75%
	(3,27)		*(-1,55)*	*(3,34)*	*(-1,52)*	*(2,95)*	*(-2,40)*	*(0,27)*	*(-0,90)*	*(3,13)*
V+STM	0,90%	5,29%	0,10	0,88%	0,10	0,72%	0,15	0,25	0,03	0,54%
	(2,17)		*(1,27)*	*(2,13)*	*(1,26)*	*(1,73)*	*(1,26)*	*(1,55)*	*(0,34)*	*(1,30)*
V+S	0,55%	4,22%	-0,05	0,56%	-0,04	0,36%	0,28	0,21	-0,13	0,16%
	(1,65)		*(-0,75)*	*(1,68)*	*(-0,70)*	*(1,09)*	*(3,01)*	*(1,67)*	*(-1,95)*	*(0,49)*
S+LTM	1,20%	6,32%	-0,49	1,29%	-0,48	1,02%	-0,18	-0,02	-0,45	1,09%
	(2,41)		*(-5,51)*	*(2,83)*	*(-5,47)*	*(2,23)*	*(-1,37)*	*(-0,12)*	*(-4,64)*	*(2,34)*
S+STM	1,01%	5,72%	-0,21	1,05%	-0,21	0,83%	0,25	0,08	-0,27	0,70%
	(2,25)		*(-2,46)*	*(2,38)*	*(-2,46)*	*(1,88)*	*(1,98)*	*(0,46)*	*(-2,91)*	*(1,57)*

Panel B: Data Converted to EUR

	Zero model		Market model		CAPM		Fama-French three factor model			
	Return	Volatility	β	α	β	α	HML	SMB	β	α
V+LTM	1,83%	7,06%	-0,13	1,82%	-0,12	1,60%	-0,41	0,02	-0,05	1,76%
	(3,29)		*(-1,09)*	*(3,29)*	*(-0,99)*	*(2,89)*	*(-2,65)*	*(0,09)*	*(-0,41)*	*(3,15)*
V+STM	0,99%	5,09%	0,08	0,99%	0,09	0,82%	0,12	0,20	0,03	0,67%
	(2,48)		*(0,95)*	*(2,48)*	*(1,02)*	*(2,04)*	*(1,03)*	*(1,27)*	*(0,31)*	*(1,63)*
V+S	0,54%	4,21%	-0,12	0,54%	-0,11	0,32%	0,30	0,24	-0,21	0,08%
	(1,63)		*(-1,70)*	*(1,63)*	*(-1,57)*	*(0,97)*	*(3,29)*	*(1,96)*	*(-2,84)*	*(0,23)*
S+LTM	1,23%	6,25%	-0,46	1,22%	-0,44	0,94%	-0,25	-0,08	-0,38	1,08%
	(2,51)		*(-4,53)*	*(2,63)*	*(-4,41)*	*(2,01)*	*(-1,91)*	*(-0,47)*	*(-3,56)*	*(2,29)*
S+STM	1,10%	5,56%	-0,17	1,10%	-0,16	0,87%	0,22	0,06	-0,21	0,75%
	(2,53)		*(-1,84)*	*(2,53)*	*(-1,74)*	*(2,01)*	*(1,75)*	*(0,36)*	*(-2,10)*	*(1,70)*

Panel C: Data Converted to JPY

	Zero model		Market model		CAPM		Fama-French three factor model			
	Return	Volatility	β	α	β	α	HML	SMB	β	α
V+LTM	1,65%	7,08%	-0,10	1,66%	-0,09	1,64%	-0,39	0,02	-0,04	1,77%
	(2,96)		*(-1,04)*	*(2,99)*	*(-1,03)*	*(2,95)*	*(-2,46)*	*(0,10)*	*(-0,40)*	*(3,15)*
V+STM	0,64%	5,10%	0,09	0,62%	0,09	0,60%	0,20	0,25	0,02	0,42%
	(1,59)		*(1,32)*	*(1,56)*	*(1,33)*	*(1,51)*	*(1,78)*	*(1,61)*	*(0,28)*	*(1,05)*
V+S	0,37%	4,23%	-0,07	0,38%	-0,07	0,36%	0,29	0,22	-0,14	0,16%
	(1,11)		*(-1,25)*	*(1,15)*	*(-1,24)*	*(1,08)*	*(3,14)*	*(1,76)*	*(-2,51)*	*(0,49)*
S+LTM	1,07%	6,36%	-0,31	1,12%	-0,31	1,09%	-0,24	-0,11	-0,26	1,22%
	(2,13)		*(-3,96)*	*(2,34)*	*(-3,95)*	*(2,28)*	*(-1,72)*	*(-0,58)*	*(-3,04)*	*(2,52)*
S+STM	0,92%	5,73%	-0,18	0,95%	-0,17	0,92%	0,26	0,05	-0,22	0,81%
	(2,04)		*(-2,40)*	*(2,14)*	*(-2,39)*	*(2,08)*	*(2,06)*	*(0,28)*	*(-2,80)*	*(1,81)*

Source and Description : The Table 9 exhibits return characteristics of market-neutral factor mimicking portfolios in the two-dimensional approach. Portfolios were created based on combinations of two of the following factors: BV/MV ("V"), company capitalization ("S"), long-term momentum ("LTM"), or short-term momentum ("STM"). "Return" is the average annual geometric rate of return and "volatility" is an annual standard deviation of log-returns. HML, SMB, α, and β are model parameters computed in each case according to the model's specification. We used log-returns in all computations. Data on HML and SML factors came from Kenneth's R. French website. The market portfolio was computed as the capitalization weighted average of country portfolio returns. As the proxy for the money market returns, we used 1-month bids for BBA Libor USD, Euribor and Tibor for USD, EUR, and JPY approaches. Numbers in brackets denote the statistical significance (*t*-stat). The data source is Bloomberg, and the calculations are based on listings from 66 countries during the period from 31/05/2000 - 29/11/2013. The MSCI indices were used. The panels A, B, and C exhibit results of computations with all the data converted to USD, EUR, and JPY.

noteworthy insights. First, the value factor is positively correlated with *SMB*, *HML* factors, with size-based country MN portfolios and with money and equity markets. On the other hand, the *LTM* and *STM* factors are negatively correlated with other factors, particularly with *V*. It can imply that portfolios built on a combination of both the factors may yield superb risk-adjusted returns.

The fact that combinations of certain factors may result in attractive synergies can be observed in Tables 6 and 7. A few pairs are particularly impressive. For instance, the combination of top long-term performance markets and high BV/MV markets yielded average monthly log-return of 1.7% (MSCI USD approach), which translates into 22.6% of standard returns annually. Also, the combinations of momentum and size were extremely profitable. The high long-term momentum small markets yielded 1.42% monthly log-returns on an average (MSCI USD approach, 18.6% standard returns annually). What seems even more interesting, the short-term momentum, which

did not work as a standalone factor, delivered fairly impressive returns in the small markets. The average monthly MSCI USD return was 1.14%, which is equal to 14.7% arithmetic return annually. The results were generally similar across all the currencies and index types (Tables 6 and 7).

The formal statistical analysis yielded results, which varied slightly across the currencies and index types, but which are more or less consistent with each other (Tables 8 and 9). There are generally three combinations that performed particularly well: value and long-term momentum, size and long-term momentum, and size and short-term momentum. Again, probably, the last combination is the most interesting one, as only the short-term momentum did not perform well. The three described combinations generally (with a few exceptions) yielded statistically significant positive risk-adjusted returns, no matter what asset pricing model we used : zero, market, CAPM, or Fama-French. What is more, the returns were higher than in case of standalone factors, which suggests that some synergies were present.

Conclusion and Implications

In this research, we explored the parallels of intra-country size, value, and momentum premiums in the inter-country returns. Our study provides a few interesting insights. We documented statistically significant inter-country value, size, and momentum premiums, which are robust to the changes of fundamental currency or the index representing a country. This observation allowed us to form efficient portfolios, which delivered significant Fama-French adjusted alphas. Additionally, we discovered that the global size, value, and momentum premiums interact with each other. When combined jointly in double sorted portfolios, they amplify each other. Double sorted global portfolios are characterized by significant abnormal returns.

The paper documents that the value, size, and momentum premiums exist not only on the stock-level (intra-market), but also on the country level (inter-market). This observation has a few serious implications for the current state of knowledge, for methodology of social sciences, and for investment practices. First, the observations allow for better understanding of asset pricing in financial markets, and thus expand the current state of academic knowledge. Second, the research results would enable scholars to build new asset pricing models, which could be used for international markets. Such new asset pricing models could be used, for example, for inter-market event studies or for modeling expected returns. Thus, the research results lead to an improvement in the existing methodological tools in financial studies. Lastly, the implication for market practices is probably the most important result of the present study. The inter-market value, size, and momentum premiums may be important for strategic asset and tactical asset allocation and would enable new investment strategies to come up. What is more, they may be a source of a new class of investment products, like ETFs with a global focus, or inter-market factor-based long/short strategies. Additionally, the inter - market premiums allow for more precise investment performance evaluation in case of funds with a global investment mandate. Finally, new observations of inter-market premiums make a path for new ways of cost of capital calculation.

Limitations of the Study and Scope for Further Research

The study has a few limitations, which could be explored in further studies. First, we assumed that the portfolios are equal weighted. Some alternative ways of weighting (capitalization, liquidity) could be tested. Second, we did not consider transaction costs and investment constraints in certain markets. Third, we did not investigate pricing factors other than value, size, and momentum, like for instance, profitability and investment patterns (Fama & French, 2014). Finally, we did not address the most fundamental question: Why the inter-market premiums actually exist? All these issues should be explored in further studies.

Further research should, in our opinion, also focus on three crucial issues. First, our paper creates a paradigm for further studies of asset pricing models, which could consider the global inter-country premiums. Such models could be, for instance, employed to assess funds with global investment mandates. Second, some formal mean-variance spanning tests should be performed to verify the validity of inclusion of country-based quantitative

strategies in the global asset portfolios. Finally, the sources of the inter-country premiums should be examined as the question - why such premiums actually exist remains mostly unanswered.

References

Amihud, Y., & Mendelson, H. (1986). Asset pricing and the bid-ask spread. *Journal of Financial Economics, 17* (2), 223-249.

Asness, C. S., Moskowitz, T. J., & Pedersen L. H. (2013). Value and momentum everywhere. *The Journal of Finance, 68* (3), 929 - 985. DOI: 10.1111/jofi.12021

Asness, C.S. (1994). *Variables that explain stock returns* (Ph.D. Dissertation). University of Chicago, Chicago.

Banz, R.W. (1981). The relation between return and market value of common stocks. *Journal of Financial Economics, 9* (1), 3 - 18.

Barry, C. B., Goldreyer, E., Lockwood L., & Rodriguez, M. (2002). Robustness of size and value effects in emerging equity markets, 1985-2000. *Emerging Markets Review, 3*(1), 1-30.

Basu, S. (1977). Investment performance of common stocks in relation to their price-earnings ratios: A test of the efficient market hypothesis. *The Journal of Finance, 32* (3), 663 - 682.

Basu, S. (1983). The relationship between earnings' yield, market value, and return for NYSE common stocks: Further evidence. *Journal of Financial Economics, 12*(1), 129 -156. DOI: 10.1016/0304-405X(83)90031-4

Bello, Z. (2007). How diversified are equity mutual funds. *North American Journal of Finance and Banking Research, 1*(1), 54-63.

Beverley, L. (2007). *Stock market event studies and competition commission inquiries*. Mimeo, U.K. Competition Commission.

Bhojraj, S., & Swaminathan, B. (2006). Macromomentum: Returns predictability in currencies and international equity indices. *Journal of Business, 79* (1), 429-451.

Blume, M.E., & Stambaugh, R.F. (1983). Biases in computed returns: An application to the size effect. *Journal of Financial Economics, 12* (3), 387-404. DOI: 10.1016/0304-405X(83)90056-9

Brown, P., Keim, D.B., Kleidon, A.W., & Marsh, T.A. (1983). Stock return seasonalities and the tax-loss selling hypothesis: Analysis of the arguments and Australian evidence. *Journal of Financial Economics, 12*(1), 105- 127. DOI: 10.1016/0304-405X(83)90030-2

Cakici, N., Fobozzi, F. J., & Tan, S. (2013). Size, value, and momentum in emerging market stock returns. *Emerging Markets Review, 16*, 46-65. DOI: 10.1016/j.ememar.2013.03.001

Cambell, J.Y., Lo, A.W., & MacKinlay, A.C. (1997). *The econometrics of financial markets*. Princeton, NJ : Princeton University Press.

Capaul, C., Rowley, I., & Sharpe, W. F. (1993). International value and growth stock returns. *Financial Analysts Journal, 49* (1), 27-36. DOI: 10.2469/faj.v49.n1.27

Carhart, M.M. (1997). On persistence in mutual fund performance. *The Journal of Finance, 52* (1), 57- 82. DOI: 10.1111/j.1540-6261.1997.tb03808.x

Chan, L.K.C, Hamao, Y., & Lakonishok, J. (1991). Fundamentals and stock returns in Japan. *The Journal of Finance, 46* (5), 1739-1764. DOI: 10.1111/j.1540-6261.1991.tb04642.x

Chui, A. C.W., Titman, S., & Wei, K.C. J. (2010). Individualism and momentum around the world. *The Journal of Finance, 65* (1), 361 - 392. DOI: 10.1111/j.1540-6261.2009.01532.x

Cochrane, J. H. (2005). *Asset pricing*. Princeton, NJ : Princeton University Press.

Cook T. J., & Roseff, M. (1982). *Size, dividend yield and co-skewness effects on stock returns: Some empirical tests* (Working Paper Series 18, 82-20). Iowa City, University of Iowa.

Davis, J. L. (1994). The cross-section of realized stock returns : The pre-COMPUSTAT evidence. *The Journal of Finance, 49* (5), 1579-1593. DOI: 10.1111/j.1540-6261.1994.tb04773.x

De Bondt, W. F. M., & Thaler, R. (1985). Does the stock market overreact? *The Journal of Finance, 40* (3), 793-805. DOI: 10.1111/j.1540-6261.1985.tb05004.x

Dimson, E., Marsh, P., & Staunton, M., Holland, D., & Matthews, B. (2011). *Investment style, size, value and momentum*. Credit Suisse Global Investment Returns Sourcebook 2011. Credit Suisse Research Institute, Zurich, 4, 1 - 54.

Fama, E.F., Fisher, L., Jensen, M.C., & Roll, R. (1969). The adjustement of stock prices to new information. *International Economic Review, 10* (1), 1-21.

Fama, E. F., & French, K.R. (1992). The cross-section of expected stock returns. *The Journal of Finance, 47* (2), 427-465. DOI: 10.1111/j.1540-6261.1992.tb04398.x

Fama, E. F., & French, K.R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics, 33* (1), 3-56. DOI: 10.1016/0304-405X (93)90023-5

Fama, E. F., & French, K.R. (1995). Size and book-to-market factors in earnings and returns. *The Journal of Finance, 50* (1), 131-155. DOI: 10.1111/j.1540-6261.1995.tb05169.x

Fama, E. F., & French, K.R. (1996). Multifactor explanations of asset pricing anomalies. *The Journal of Finance, 51* (1), 55-84. DOI: 10.1111/j.1540-6261.1996.tb05202.x

Fama, E.F., & French, K. R. (2008). Dissecting anomalies. *The Journal of Finance, 63* (4), 1653-1678. DOI: 10.1111/j.1540-6261.2008.01371.x

Fama, E.F., & French, K.R. (2012). Size, value, and momentum in international stock returns. *Journal of Financial Economics, 105* (3), 457- 472. DOI: 10.1016/j.jfineco.2012.05.011

Fama, E.F. & French, K.R. (2014). *A five-factor asset pricing model*. Fama-Miller Working Paper, pp. 1-53. DOI : http://dx.doi.org/10.2139/ssrn.2287202

French, K.R. (n.d.). *Current research returns*. Retrieved from http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

Garff, D. (2013). *Multi-style global equity investing: A statistical study on combining fundamentals, momentum, risk and valuation for improved performance*. DOI: http://dx.doi.org/10.2139/ssrn.2367400

Grinblatt, M., & Moskowitz, T. J. (2004). Predicting stock price movements from past returns : The role of consistency and tax-loss selling. *Journal of Financial Economics, 71* (3), 541-579. DOI: 10.1016/S0304-405X(03)00176-4

Herrera, M. J., & Lockwood, L.J. (1994). The size effect in the Mexican stock market. *Journal of Banking and Finance, 18* (4), 621-632.

Heston, S. L., Rouwenhorst, K.G., & Weessels, R. E. (1999). The role of beta and size in the cross-section of European stock returns. *European Financial Management, 5* (1), 9 -27. DOI: 10.1111/1468-036X.00077

Hong, H., Lim, T., & Stein, J.C. (2000). Bad news travels slowly: Size, analyst coverage, and the profitability of momentum strategies. *The Journal of Finance, 55* (1), 265-295. DOI: 10.1111/0022-1082.00206

Horowitz, J. L., Loughran, T., & Savin, N.E. (2000). The disappearing size effect. *Research in Economics, 54* (1), 83-100.

Jegadeesh, N. (2000). Long-term performance of seasoned equity offerings: Benchmark errors and biases in expectations. *Financial Management, 29* (3), 5-30.

Jegadeesh, N., & Titman, S. (1993). Returns to buying winners and selling losers: Implications for stock market efficiency. *The Journal of Finance, 48* (1), 65-91. DOI: 10.1111/j.1540-6261.1993.tb04702.x

Jegadeesh, N., & Titman, S. (2001). Profitability of momentum strategies: An evaluation of alternative explanations. *The Journal of Finance, 56* (2), 699 - 720.

Kim, D. (2012). Value premium across countries. *The Journal of Portfolio Management, 38* (4), 75-86. DOI: 10.3905/jpm.2012.38.4.075

Kouwenberg, R., & Salomons, R. (2005). *The value premium in emerging equity markets and local macroeconomic conditions* (Working paper). Retrieved from http://people.few.eur.nl/kouwenberg/Value%20EM%20Paper%20v2.5b.pdf

L'Her, J.F., Masmoudi, T., & Suret, J.- M. (2004). Evidence to support the four-factor pricing model from the Canadian stock market. *Journal of International Financial Markets, Institutions and Money, 14*(4), 313-328. DOI: 10.1016/j.intfin.2003.09.001

Liew, J., & Vassalou, M. (2000). Can book-to-market, size and momentum be risk factors that predict economic growth? *Journal of Financial Economics, 57* (2), 221-245. DOI: 10.1016/S0304-405X(00)00056-8

Lintner, J. (1965). The valuation of risk assets and the selection of risky investments in stock portfolios and capital budgets. *Review of Economics and Statistics, 47* (1), 13-37.

Markowitz, H.M. (1952). Portfolio selection. *The Journal of Finance, 7* (1), 77- 91. DOI: 10.1111/j.1540-6261.1952.tb01525.x

Michou, M., Mouselli, S., & Stark A. W. (2010). *Fundamental analysis and the modelling of normal returns in the UK*. DOI: http://dx.doi.org/10.2139/ssrn.1607759

Mitchell, M.L., & Netter, J.M. (1994). The role of financial economics in securities fraud cases: Applications at the Securities and Exchange Commission. *Business Lawyer, 49* (2), 545-590.

Mossin, J. (1966). Equilibrium in a capital asset market. *Econometrica, 34* (4), 768-783.

Reinganum, M.R (1981). Misspecification of capital asset pricing : Empirical anomalies based on earning' yield and market values. *Journal of Financial Economics, 9* (1), 19-46. DOI: 10.1016/0304-405X(81)90019-2

Rosenberg, B., Reid, K., & Lanstein, R. (1985). Persuasive evidence of market inefficiency. *The Journal of Portfolio Management, 11* (3), 9 - 16. DOI: 10.3905/jpm.1985.409007

Rouwenhorst, K. G. (1999). Local returns factors and turnover in emerging stock market. *Journal of Finance, 54* (4), 1439-1464. DOI: 10.1111/0022-1082.00151

Saji, T.G., Harikumar, S., & Kasim M.C. (2013). Size and returns: A Study of the Indian stock market. *Indian Journal of Finance, 7* (5), 14-23.

Sharpe, W.F. (1964). Capital asset prices: A theory of market equilibrium under conditions of risk. *The Journal of Finance, 19* (3), 425 - 442.

Sharpe, W.F. (1966). Mutual fund performance. *Journal of Business, 39* (S1), 119-138.

Simlai, P. (2009). Evaluating momentum and contrarian strategies for technology speculation. *Indian Journal of Finance, 3* (1), 3-9, 21.

Stattman, D. (1980). Book values and stock returns. *Chicago MBA : A Journal of Selected Papers, 4,* 25-45.

Vasantha, S., Dhanraj, V., & Varadharajan, R. (2012). Stock price movement through technical analysis: Empirical evidence from the information technology sector. *Indian Journal of Finance, 6* (10), 4-17.

Appendix

Appendix 1 - Countries and Indices : The Appendix 1 exhibits all 66 country portfolios used in the research. The time span refers to the period during which data on all necessary returns and fundamental factors were available, which implies that we sometimes used older data (for example price data for momentum computation). The panel A presents countries with names beginning with A-J and the panel B presents country names beginning with K-Z.

Panel A: A-J Countries

	MSCI indices		Local indices	
Country	Name	Timespan	Name	Timespan
Argentina	MSCI ARGENTINA	05/31/2000 - 10/31/2013	ARGENTINA MERVAL INDEX	08/29/2003 - 10/31/2013
Australia	MSCI AUSTRALIA	05/31/2000 - 10/31/2013	S&P/ASX 200 INDEX	05/31/2000 - 10/31/2013
Austria	MSCI AUSTRIA	05/31/2000 - 10/31/2013	AUSTRIAN TRADED ATX INDX	05/31/2000 - 10/31/2013
Bahrain	MSCI BAHRAIN	06/30/2006 - 10/31/2013	BB ALL SHARE INDEX	09/30/2005 - 10/31/2013
Belgium	MSCI BELGIUM	05/31/2000 - 10/31/2013	BEL 20 INDEX	05/31/2000 - 10/31/2013
Brazil	MSCI BRAZIL	05/31/2000 - 10/31/2013	BRAZIL IBOVESPA INDEX	05/31/2000 - 10/31/2013
Bulgaria	MSCI BULGARIA	07/31/2008 - 10/31/2013	SOFIX INDEX	01/31/2006 - 10/31/2013
Canada	MSCI CANADA	05/31/2000 - 10/31/2013	S&P/TSX COMPOSITE INDEX	05/31/2000 - 10/31/2013
Chile	MSCI CHILE	05/31/2000 - 10/31/2013	CHILE STOCK MKT SELECT	05/31/2000 - 10/31/2013
China	MSCI CHINA	05/31/2000 - 10/31/2013	CSI 300 INDEX	04/29/2005 - 10/31/2013
Colombia	MSCI COLOMBIA	05/31/2000 - 10/31/2013	IGBC GENERAL INDEX	04/30/2003 - 10/31/2013
Cyprus	GEN. MARKET IND. CSE	11/30/2006 - 10/31/2013	GENERAL MARKET INDEX CSE	11/30/2006 - 10/31/2013
Czech Republic	MSCI CZECH REPUBLIC	05/31/2000 - 10/31/2013	PRAGUE STOCK EXCH INDEX	03/31/2006 - 10/31/2013
Denmark	MSCI DENMARK	05/31/2000 - 10/31/2013	OMX COPENHAGEN INDEX	07/31/2001 - 10/31/2013
Egypt	MSCI EGYPT	05/31/2000 - 10/31/2013	EGX 30 Index	09/30/2003 - 10/31/2013
Estonia	MSCI Estonia	07/31/2008 - 10/31/2013	OMX TALLINN OMXT	02/28/2003 - 10/31/2013
Finland	MSCI FINLAND	05/31/2000 - 10/31/2013	OMX HELSINKI INDEX	04/30/2001 - 10/31/2013
France	MSCI FRANCE	05/31/2000 - 10/31/2013	CAC 40 INDEX	06/29/2001 - 10/31/2013
Germany	MSCI GERMANY	05/31/2000 - 10/31/2013	DAX INDEX	05/31/2000 - 10/31/2013
Great Britain	MSCI UK	05/31/2000 - 10/31/2013	FTSE 100 INDEX	05/31/2001 - 10/31/2013
Greece	MSCI GREECE	05/31/2000 - 10/31/2013	Athex Composite Share Pr	05/31/2000 - 10/31/2013
Hong Kong	MSCI HONG KONG	05/31/2000 - 10/31/2013	HANG SENG INDEX	05/31/2000 - 10/31/2013
Hungary	MSCI HUNGARY	05/31/2000 - 10/31/2013	BUDAPEST STOCK EXCH INDX	05/31/2000 - 10/31/2013
Iceland	OMX Iceland Small Cap Ix	04/30/2008 - 10/31/2013	OMX Iceland Small Cap Ix	04/30/2008 - 10/31/2013
India	MSCI INDIA	05/31/2000 - 10/31/2013	S&P BSE SENSEX INDEX	05/31/2000 - 10/31/2013
Indonesia	MSCI INDONESIA	05/31/2000 - 10/31/2013	JAKARTA COMPOSITE INDEX	09/28/2001 - 10/31/2013
Ireland	MSCI IRELAND	05/31/2000 - 10/31/2013	IRISH OVERALL INDEX	05/31/2000 - 10/31/2013
Italy	MSCI ITALY	05/31/2000 - 10/31/2013	FTSE MIB INDEX	07/31/2003 - 10/31/2013
Japan	MSCI JAPAN	05/31/2000 - 10/31/2013	NIKKEI 225	05/31/2000 - 10/31/2013
Jordan	MSCI JORDAN	05/31/2000 - 10/31/2013	AMMAN SE GENERAL INDEX	09/30/2008 - 10/31/2013

Panel B: K- Z Countries

	MSCI indices		Local indices	
Country	Name	Timespan	Name	Timespan
Kuwait	MSCI KUWAIT	06/30/2006 - 10/31/2013	KUWAIT SE PRICE INDEX	12/29/2006 - 10/31/2013
Latvia	OMX RIGA OMXR	07/29/2005 - 10/31/2013	OMX RIGA OMXR	07/29/2005 - 10/31/2013
Lebanon	MSCI LEBANON	06/30/2008 - 10/31/2013	BLOM STOCK INDEX	04/29/2005 - 10/31/2013
Lithuania	MSCI Lithuania	07/31/2009 - 10/31/2013	OMX VILNIUS OMXV	08/31/2005 - 10/31/2013
Luxemburg	LUXEMBOURG LuxX INDEX	05/31/2000 - 10/31/2013	LUXEMBOURG LuxX INDEX	05/31/2000 - 10/31/2013
Malaysia	MSCI MALAYSIA	05/31/2000 - 10/31/2013	FTSE Bursa Malaysia KLCI	05/31/2000 - 10/31/2013
Mexico	MSCI EM EASTERN EUROPE	05/31/2000 - 10/31/2013	MEXICO IPC INDEX	05/31/2000 - 10/31/2013
Morocco	MSCI MOROCCO	05/31/2000 - 10/31/2013	MADEX Free Float Index	10/31/2006 - 10/31/2013
Netherlands	MSCI NETHERLANDS	05/31/2000 - 10/31/2013	AEX-Index	05/31/2000 - 10/31/2013
New Zealand	MSCI NEW ZEALAND	05/31/2000 - 10/31/2013	NZX ALL INDEX	05/31/2000 - 10/31/2013
Norway	MSCI NORWAY	05/31/2000 - 10/31/2013	OBX PRICE INDEX	05/31/2000 - 10/31/2013
Oman	MSCI OMAN	06/30/2006 - 10/31/2013	MSM30 Index	04/29/2005 - 10/31/2013
Pakistan	MSCI PAKISTAN	05/31/2000 - 10/31/2013	KARACHI 100 INDEX	11/30/2005 - 10/31/2013
Peru	MSCI PERU	05/31/2000 - 10/31/2013	PERU LIMA GENERAL INDEX	01/31/2003 - 10/31/2013
Philippines	MSCI PHILIPPINES	05/31/2000 - 10/31/2013	PSEi - PHILIPPINE SE IDX	05/31/2000 - 10/31/2013
Poland	MSCI POLAND	05/31/2000 - 10/31/2013	WIG 20	01/31/2002 - 10/31/2013
Portugal	MSCI PORTUGAL	05/31/2000 - 10/31/2013	PSI 20 INDEX	05/31/2000 - 10/31/2013
Qatar	MSCI QATAR	06/30/2006 - 10/31/2013	QE Index	06/30/2005 - 10/31/2013
Romania	MSCI Romania	07/31/2008 - 10/31/2013	BUCHAREST BET INDEX	10/31/2006 - 10/31/2013
Russia	MSCI RUSSIA	05/31/2000 - 10/31/2013	MICEX INDEX	07/31/2003 - 10/31/2013
Saudi Arabia	MSCI SAUDI ARABIA	06/30/2006 - 10/31/2013	TADAWUL ALL SHARE INDEX	04/28/2006 - 10/31/2013
Singapore	Straits Times Index STI	01/31/2008 - 10/31/2013	Straits Times Index STI	01/31/2008 - 10/31/2013
Slovenia	MSCI Slovenia	07/31/2008 - 10/31/2013	Slovenian Blue Chip Idx	05/31/2006 - 10/31/2013
South Africa	MSCI SOUTH AFRICA	05/31/2000 - 10/31/2013	FTSE/JSE AFRICA ALL SHR	10/31/2002 - 10/31/2013
South Korea	MSCI KOREA	05/31/2000 - 10/31/2013	KOSPI INDEX	01/31/2002 - 10/31/2013
Spain	MSCI SPAIN	05/31/2000 - 10/31/2013	IBEX 35 INDEX	05/31/2000 - 10/31/2013
Sweden	MSCI SWEDEN	05/31/2000 - 10/31/2013	OMX STOCKHOLM 30 INDEX	05/31/2000 - 10/31/2013
Switzerland	MSCI SWITZERLAND	05/31/2000 - 10/31/2013	SWISS MARKET INDEX	01/31/2002 - 10/31/2013
Taiwan	MSCI TAIWAN	05/31/2000 - 10/31/2013	TAIWAN TAIEX INDEX	01/31/2002 - 10/31/2013
Thailand	MSCI THAILAND	05/31/2000 - 10/31/2013	STOCK EXCH OF THAI INDEX	01/31/2001 - 10/31/2013
Turkey	MSCI TURKEY	05/31/2000 - 10/31/2013	BIST NATIONAL 100 INDEX	01/30/2004 - 10/31/2013
Ukraine	MSCI Ukraine	07/31/2008 - 10/31/2013	PFTS Index	02/28/2005 - 10/31/2013
Un. Arab Emirates	MSCI UN. ARAB EMIRATES	06/30/2006 - 10/31/2013	ADX GENERAL INDEX	01/31/2006 - 10/31/2013
USA	MSCI USA	05/31/2000 - 10/31/2013	S&P 500 INDEX	05/31/2000 - 10/31/2013
Venezuela	VENEZUELA STOCK MKT INDX	05/31/2001 - 10/31/2013	VENEZUELA STOCK MKT INDX	05/31/2001 - 10/31/2013
Vietnam	MSCI Vietnam	07/31/2008 - 10/31/2013	HO CHI MINH STOCK INDEX	01/31/2006 - 10/31/2013