Aalto University
School of Business

Fundamental Trading Strategies in Frontier Markets

Finance

Master's thesis

Anton Jantunen

2014

Department of Finance
Aalto University
School of Business

Aalto University
School of Business

Fundamental Trading Strategies in Frontier Markets

Master's Thesis
Anton Jantunen
Spring 2014
Finance

Approved in the Department of Finance __ /__20__ and awarded the grade

_____

Author Anton Jantunen

Title of thesis Fundamental Trading Strategies in Frontier Markets

Degree Master of Science in Business Administration

Degree programme Finance

Thesis advisor(s) Professor Sami Torstila

Year of approval 2014 Number of pages 80 Language English

PURPOSE OF THE STUDY

This thesis aims to be the first paper to study non-normalized and industry normalized fundamental trading strategies in the frontier markets. Specifically, I test whether book-to-market (B/M), earnings-to-price (E/P), dividend-to-price (D/P), and EBITDA-to-enterprise value (E/E) strategies can create constant abnormal returns in the frontier markets.

DATA

This study targets common shares that are traded in the stock exchanges of 44 frontier countries during the period between 2003 and 2013. This is the first thesis to include entire investible frontier markets' stocks. The market and financial data are obtained from Bloomberg and Datastream databases. The initial sample consists of 9043 unique stocks and the final sample consists of 6890 unique stocks.

FINDINGS OF THE STUDY

This thesis documents significant unexplained returns showing that with 6- and 12-month holding periods, book/market, earnings/price and EBITDA/enterprise value strategies lead to statistically significant excess and abnormal returns. This thesis documents that industry normalization has statistically significant negative impact on the returns with book/market, earnings/price and EBITDA/enterprise value strategies. This thesis documents that small cap stocks offer greater mispricing compared to micro or large cap stocks. Finally, this thesis documents that the abnormal returns have started to significantly diminish in the second half (2008 – 2013) of the testing period compared to the first half (2003 – 2008) of the testing period.

Keywords Frontier markets, portfolio strategy, industry normalization, fundamental valuation, alpha, value strategy

Tekijä Anton Jantunen

Työn nimi Fundamentaaliset sijoitusstrategiat raja-alueiden markkinoilla

Tutkinto Kauppatieteiden maisteri

Koulutusohjelma Rahoitus

Työn ohjaaja Professori Sami Torstila

Hyväksymisvuosi 2014 | Sivumäärä 80 | Kieli Englanti

TUTKIELMAN TAVOITTEET

Pro gradu-tutkielmani tutkii ei-normalisoituja ja toimialanormalisoituja fundamentaalisia sijoitusstrategioita raja-alueiden markkinoilla. Testaan, voiko kirja-arvo/markkina-arvo (B/M), tulos/hinta (E/P), osingot/hinta (D/P) ja käyttökate/yrityksen kokonaisarvo (E/E) strategioilla saavuttaa jatkuvia epänormaaleja tuottoja raja-alueiden markkinoilla.

DATA

Tutkielmani data sisältää osakkeita 44 raja-aluemaan osakemarkkinoilta vuosilta 2003 – 2013. Tämä on ensimmäinen tutkimus, joka sisältää niin sanotun “laajennetun” raja-alueen kaikki markkinat. Yritys- ja osakedata on otettu Bloomberg ja Datastream tietokannoista. Alustava otos sisältää 9043 uniikkia osaketta ja lopullinen otos sisältää uniikkia 6890 osaketta.

TULOKSET

Tutkielmani dokumentoi tilastollisesti merkitseviä yli- sekä epänormaaleja tuottoja B/M, E/P ja E/E strategioilla. Tutkielmani dokumentoi, että toimialanormalisoinnilla on tilastollisesti merkittävä negatiivinen vaikutus B/M, E/P ja E/E strategioiden tuottoihin. Tutkielmani dokumentoi, että pienet ja keskisuuret yritykset tarjoavat paremman hinnoitteluvirhemahdollisuuden verrattuna mikro- ja suuriin yrityksiin. Lopuksi, tutkielmani dokumentoi, että epänormaalit tuotot ovat pienentyneet testijakson toisella puoliskolla 2008-2013 verrattuna testijakson ensimmäiseen puoliskoon 2003 – 2008.

Avainsanat Raja-alue, portfolio strategia, toimialanormalisointi, fundamentaalinen arvonmääritys, alpha, arvostrategia

Contents

List of Figures

List of Tables

1. Introduction

1.1 Background and motivation

Frontier markets, also known as emerging emerging markets, frontier emerging markets and new frontier markets, are defined as markets that are not part of emerging markets or developed markets, but "demonstrate a relative openness to and accessibility for foreign investors" and are "not undergoing a period of extreme economic or political instability", as MSCI (2013) describes. Therefore, relatively small market size, low liquidity, and unreliable trading infrastructure are basic characteristics of frontier markets (ibid.).

Currently, frontier markets (e.g. Argentina, Nigeria, Jordan, Romania and Vietnam) capture only 1.9 % of the world free float market capitalization, but even 4.4 % of the world's GDP and as much as 14.7 % of the world's population (The World Bank, 2013). In addition, considering that 15 out of 20 world's fastest growing economies belong to frontier markets, it is no wonder that frontier markets are expected to be tomorrow's emerging markets in terms of growth and returns. The growth potential of frontier markets lies within the same factors as it did for emerging markets two decades ago: young population, growing middle-class, strong expected GDP growth, low labor costs, and continuous increase in economic freedom (Quisenberry, 2010; Stocker, 2005).

Cross-correlations between frontier markets and developed equity markets as well as cross-correlations within frontier markets are historically very low (Berger, 2011; Quisenberry, 2010). Therefore, investors are being attracted by excellent diversification benefits and low volatilities of returns (Goetzmann et al., 2005; Speidell and Krohne, 2007; Javasuriya and Shambora, 2009; Quisenberry, 2010). In addition, it is argued that the diversification benefits for frontier markets hold even after incorporating the most conservative transaction costs (Marshall et al., 2011).

Unlike the original efficient market hypothesis by Fama (1965) suggests, numerous studies have indicated that abnormal returns can be achieved with technical or fundamental trading strategies by analyzing historical stock and accounting data (see e.g. (Fama 1970; Fama and French, 1998; Rouwenhorst, 1999; Griffin et al. 2003)). Even though many trading strategies

are widely studied in emerging and developed markets, the academic research for frontier markets is very limited. One reason could be that frontier markets are expected to behave as emerging markets did in the past. However, more plausible reason could be that these markets are still fairly new and therefore studying these markets have been possible only for past few years. Even though MSCI created frontier index already in 2002, more common public discussion of the subject seem to have started in the past few years.

By personally studying the investment strategies of approximately 50 existing frontier funds, I have concluded that one of the more common approaches with frontier markets fund strategies is to invest in certain 'hot' countries, instead of using stock-specific fundamental trading strategies across the frontier markets. However, by studying cross-sectional stock returns across the frontier markets, new characteristics of the frontier markets can be revealed, as the study of De Groot et al. suggests (2012).

I study whether certain trading strategies lead to abnormal returns in frontier markets. This study closely studies four carefully selected fundamental trading strategies, which are earnings/price (E/P), book/market (B/M), dividend/price (D/P) and EBITDA/enterprise value (E/E). I selected these strategies due to a limited amount of available data on these particular markets and because these strategies have been widely tested (excluding EBITDA/enterprise value) across the global stock markets and abnormal returns have been recorded in many markets (see e.g. (De Groot et al., 2012; Fama and French, 1992; Fama and French, 1998, 2011; Blitz and Vliet, 2008; Lakonishok et al., 1994, Barber and Lyon, 1997)).

I conduct my research in a co-operation with a Finnish fund that recently launched a public equity fund investing in frontier and emerging markets. When appropriate, the frontier aspects of this study follow the methodology used in the research conducted by De Groot et al. (2012). To my knowledge, this particular research by De Groot et al. is the only study that focuses on cross-sectional stock returns across the frontier markets. As De Groot et al. research also takes into account real life market imperfections such as high transaction costs, its methods are appropriate for this study as I aim to find real life trading strategies for a frontier fund.

1.2 Objectives and Contribution

As mentioned before, even though various active portfolio strategies have been widely studied before, to my knowledge there exists only one study that focuses on some of these strategies across frontier markets in stock level. The study by De Groot et al. (2012) found statistically significant value, momentum, and size effects on stock returns across the frontier markets even after transaction costs. The study used Standard & Poor's Frontier Broad Market Index (S&P Frontier BMI) that consisted of more than 1400 unique stocks from 24 countries in the period of 1997 – 2008.

This study contributes to the literature on at least four dimensions. First, this study aims to be the first paper to study industry normalized value effects in frontier markets with individual stocks. By taking into account the industry effects, I aim to eliminate the possibility that one industry dominates the investible portfolio as the levels of book/market, earnings/price, dividend/price, and EBITDA/enterprise value can vary significantly between industries (White, 2000; Beaver and Morse, 1978; Fitch, 2002). Additionally, this study is the first to study EBITDA/enterprise value strategy for these markets.

Second, De Groot et al. included only 24 countries (included in S&P Frontier BMI) in their study. However, this can be seen as a limited view of the whole frontier (Quisenberry, 2010; Russell, 2013; MSCI, 2013, FTSE, 2013). According to Quisenberry, 85 countries can be currently seen as frontier. The extended view of the frontier is called the "exotic frontier" (ibid.). However, many of these of these 85 countries are not investible for foreign investor. By using standards set by MSCI, S&P, Russell and FTSE, I include 44 countries (e.g. Argentina, Nigeria, Jordan, Romania and Vietnam) in the investible frontier markets. I include the stock markets of all of these 44 countries in this study. Therefore, this paper aims to be the first paper to study trading strategies in the somewhat extended frontier markets.

Third, this study includes stocks outside the index, which are stocks with lower market capitalization. Therefore, this paper aims to be the first study to research trading strategies for micro- and small cap frontier market stocks. Additionally, this research aims to study the effects of small and large cap stocks in frontier markets to see if stock's market capitalization is an explaining factor of abnormal returns between trading strategies.

Fourth, by conducting time analysis, I also study whether the potential anomalies have disappeared over time in these constantly changing frontier markets.

My initial sample consists of 9043 publicly traded unique stocks in 44 frontier countries. After filtering out non-tradable stocks and stocks without sufficient data, the final sample size consists of 6890 unique stocks in 40 frontier countries. Since the frontier markets are constantly facing changes and the historical data is not as widely available as for more developed markets, I only include past ten years (2003– 2013) in my sample period.

As discussed earlier in the introduction, I consider my contribution important from the point of view of active portfolio management since frontier markets are an opportunity to invest in growth markets that offer diversification benefits for investments in developed markets. In addition, it can be meaningful from the academic point of view as the behavior of individual stocks in frontier markets is previously very limitedly studied in the academic world.

1.3 Limitations

As the financial markets in frontier countries are still very much in development phase, the amount of available data is limited. Additionally, when collecting the data from two sources, I noticed data inconsistencies between these two sources. My assumption is that especially the data from the start of the period includes more mistakes compared to similar data from developed markets. For many companies the data was either partially available or not available at all (e.g. B/M data exists, E/P does not exist). Therefore, the amount of data varies for each variable. The findings of Speidell (2009) support the findings of this study. Speidell checked the data availability from Bloomberg database for several common data items in frontier markets and found that even for the largest 316 frontier stocks the data coverage is very poor.

1.4 Main Results

The results show statistically significant abnormal returns for book/market, earnings/price, and EBITDA/enterprise value strategies across the frontier markets with 6- and 12-month

holding periods. From fundamental valuation strategies, B/M strategy offers the highest returns. The only variable that cannot predict statistically significant future returns across the markets is dividend/price. The results hold for region neutral portfolios. Industry normalization decreases the returns. Small cap stocks offer greater mispricing with book/market, earnings/price, and EBITDA/enterprise value strategies compared micro and large cap stocks. Finally, the results have started to systematically diminish later in the period.

1.5 Structure

The rest of the paper is organized as follows. Section 2 presents the related literature surrounding frontier markets, active portfolio management and efficient market hypothesis. Section 3 discusses the hypotheses, which after section 4 concentrates on data and methodology. Sections 5 presents empirical results, and finally, section 6 concludes and gives suggestions for further research. References are listed in section 7.

2. Related Literature

2.1 Studies about Frontier Markets

2.1.1 Definition and countries

Frontier markets are defined as markets that are not part of emerging markets or developed markets, but "demonstrate a relative openness to and accessibility for foreign investors" and are "not undergoing a period of extreme economic or political instability" (MSCI, 2013). Therefore, relatively small market size, low liquidity, and unreliable trading infrastructure are basic characteristics of frontier markets (ibid.). Frontier markets can be called "emerging emerging markets", because eventually it is expected that these markets transform into emerging markets (Quisenberry, 2010). As the country list indicates, there are various reasons why a country is not classified as emerging economy. The classifications somewhat depends on the classifier (e.g. MSCI, S&P, Russell), but general guidelines can be understood from MSCI classification table.

Table 1: List of "exotic" frontier countries (Source: Quisenberry, 2010)

Europe	Latin America	Sub-Saharan Africa	Middle East and North Africa	Asia
Armenia	Argentina	Benin	Bahrain	Bangladesh
Azerbaijan	Barbados	Botswana	Iran	Fiji
Belarus	Bolivia	Burkina Faso	Iraq	Kazakhstan
Bosnia	Colombia	Cameroon	Jordan	Kyrgyz Republic
Bulgaria	Costa Rica	Cape Verde	Kuwait	Maldives
Croatia	Dominica	Cote d'Ivoire	Lebanon	Mongolia
Estonia	Ecuador	Ghana	Libya	Nepal
Georgia	El Salvador	Kenya	Oman	Pakistan
Latvia	Grenada	Malawi	Palestine	Papua New Guinea
Lithuania	Guyana	Mauritius	Qatar	Sri Lanka
Macedonia	Jamaica	Mozambique	Saudi Arabia	Uzbekistan
Malta	Panama	Namibia	Sudan	Vietnam
Moldova	Saint Kitts and Nevis	Niger	Syria	
Montenegro	Saint Lucia	Nigeria	Tunisia	
Republika Srpska	Trinidad and Tobago	Senegal	United Arab Emirates	
Romania	Uruguay	Swaziland		
Serbia	Venezuela	Tanzania		
Slovakia		Togo		
Slovenia		Uganda		
Ukraine		Zambia		
		Zimbabwe		

Table 2: Classification of countries into Frontier, Emerging or Developed (Source[1]: MSCI Global Market Accessibility Review, 2013)

	Criteria	Frontier	Emerging	Developed
A	Economic Development			
A.1	Sustainability of economic development	No requirement	No requirement	Country GNI per capita 25% above the World Bank high income threshold* for 3 consecutive years
B	Size and Liquidity Requirements			
B.1	Number of companies meeting the following Standard Index criteria	2	3	5
	Company size (full market cap) **	USD 516 mm	USD 1032 mm	USD 2065 mm
	Security size (float market cap) **	USD 37 mm	USD 516 mm	USD 1032 mm
	Security liquidity	2.5% ATVR	15% ATVR	20% ATVR
C	Market Accessibility Criteria			
C.1	Openness to foreign ownership	At least some	Significant	Very high
C.2	Ease of capital inflows / outflows	At least partial	Significant	Very high
C.3	Efficiency of the operational framework	Modest	Good and tested	Very high
C.4	Stability of the institutional framework	Modest	Modest	Very high

[1] This table is copied from MSCI Global Market Accessibility Review (2013)

2.1.2 Diversification benefits and transaction costs

The studies regarding the international diversification benefits are contradictive. Odier and Solnik (1993) argue that despite the increasing global informational integration and correlation between markets international diversification offers still benefits. Driessen and Laeven (2007) find that emerging market investors can benefit the most from diversification. However, by focusing on downside risk and allowing for conditional correlations, You and Daigler (2010) argue against the international diversification benefits.

Frontier market diversification benefit studies show quite consistently that there are significant benefits to be achieved (Berger et al., 2011; Quisenberry, 2010b, Speidell and Krohne, 2007). As Table 3 indicates, Berger et al. (2011) show that frontier markets have very low correlation to both emerging and developed markets. Berger et al. have also shown that the correlation of individual frontier countries to emerging and developed markets is very low. Additionally, Quisenberry (2010b) argues that the cross-correlations between frontier countries are very low. Moreover, benefits are not driven by small, illiquid markets, but can be rather seen all over the frontier markets (Marshall et al., 2011). The studies show that increasing world market integration seem not to apply to frontier markets just yet (Berger et al., 2011).

Table 3: Correlations across market classification indexes between 2000 and 2009 (Berger et al., 2011)

Index	MSCI All country	MSCI Developed	MSCI Emerging	Value-weighted frontier index
MSCI Developed	0.9854			
MSCI Emerging	0.7063	0.6682		
Value-weighted frontier index	0.0679	0.0688	0.1159	
Equal-weighted frontier index	0.0889	0.0860	0.1840	0.6152

Speidell (2009) points out that many of the frontier markets are controlled by local investors. This could partially explain the low correlation to international markets and therefore the significant diversification benefits. Based on the information from local investors, Speidell (ibid.) estimates that for example in Bangladesh and Kenya, the local retail investors account for 95% and 90% of the total trading activity, respectively.

Study of De Roon et al. (2001) indicates how significant impact the transaction costs can have. Their study showed that diversification benefits of emerging markets disappear after the incorporation of transaction costs. Furthermore, Balduzzi and Lynch (1999) showed that by ignoring the transaction costs in the asset allocation process, the investor can experience a wealth loss of 16.9%.

Marshall et al. (2011) conducted a research about the transaction costs of the stocks in 19 frontier markets using Thomson Reuters Tick History data from 2002 to 2010. By using tick data they were able to calculate effective spread, quoted spread, and price impact. According to their results, the average value-weighted effective spread is 0.95 % and market impact cost is 0.45 %. Commission cost (1.09%) in their study was based on Quisenberry's (2010) figures from 2007. Adding these three figures together, the total actual transaction costs are 2.49 % (28 times larger than the US estimates and 10 times larger than the European estimates (De Groot et al., 2012)). By using these transaction costs, Marshall et al. (2011) studied the impact of transaction costs on the diversification benefits in frontier markets. Contrary to the study of De Roon et al. (2001) for emerging markets, they found that US investors can benefit from frontier markets diversification withstand even the most conservative transaction cost estimates.

2.1.3 Investor behavior

Speidell (2009) reports of a broker in Bangladesh that explained how investor behavior in Bangladesh works: "Our retail investors are just trying to follow the others, keen to know what so-called 'gamblers' are going to buy. They say, 'I heard this share's price will jump, because some gambler is going to buy it".

Furthermore, Speidell reports of repeated accounts in many countries that local investors calculate the value of shares based on the amount of the shares, i.e. investors tend to buy low-priced stocks. Additionally, instead of calculating the price/earnings ratio, local investors compare the stock price relative to par value. Local investors also view stock dividends and "bonus shares" as additional benefits that provide more money in general (instead of understanding that the pie is just in smaller pieces now). Furthermore, in general, insider

information is not seen illegal in the same way by retail investors as in many developed countries. (Speidell, 2009.)

Another influential aspect in frontier markets is optimism - that is, according to Pew Research Center (2007), inversely correlated to income. Investor ethics and optimism are found (Statman, 2008) to increase the propensity for risk. This indicates that there are likely more gamblers in the frontier markets compared to developed markets.

2.1.4 Investability and practicalities of frontier countries

In addition to high transaction costs and low liquidity, the typical challenges in frontier markets for investors include high custody costs, lengthy country registration, and limited brokerage and research coverage. In some markets, front running[2] may not be illegal and can be a source of profit for locals. Hence, building good relationships with local brokers is critical. (Quisenberry, 2010.) However, building personal relationships across frontier countries is typically possible only for large international banks (e.g. Goldman Sachs, JPMorgan Chase, Morgan Stanley) as it requires extensive amount of resources and scalability to become profitable (Kemppainen interview, 2013). Therefore, deal execution typically happens through large international bank (e.g. Morgan Stanley). These banks have existing relationships with the local brokers (who then execute the actual deal) in frontier countries. In addition, a custodian bank with presence in local markets is typically needed to hold the securities (e.g. JPMorgan Chase) and collect the dividends.

Another typical frontier market characteristic is prohibition of short-selling. A study by Daouk and Charoenrook (2009) indicates that short-selling is neither legal nor feasible in any of the current frontier countries[3]. MSCI Global Market Accessibility Review (2013) confirms that full-fledged short-selling is not possible in any of the 25 MSCI frontier countries (See Appendix 5 for details). Short-selling is one of the key issues why countries are not classified as emerging countries as it enhances the liquidity of the local capital markets. However, as Emerging market status is likely to increase global capital inflows into the country, many

[2] Illegal practice of a stockbroker executing orders on a security for its own account while taking advantage of advance knowledge of pending orders from its customers

[3] No later studies exist. Since then, short-selling restrictions have been loosened in UAE in possible also in other frontier countries.

local regulators seek to loosen short-selling restrictions (Citi Bank, 2012). It is an interesting development considering that EU countries are banning short-selling in the aftermath of the global financial crisis.

The country specific characteristics may vary substantially between frontier countries. To summarize, the issues that foreign investors must deal with in frontier countries are numerous. First, there can be limitations to foreign ownership. Second, investors may need to register and setup an account. Third, in worst case, transparency can be almost non-existent. Fourth, due to lack of competition among brokers, transaction costs tend to be high. Finally, in some countries, the needed information may not be available in English.

I selected few major frontier countries, of which key characteristics I report in somewhat more detail. MSCI Global Market Accessibility Review (2013) and U.S. Department of state (2013) are the main sources of the information.

United Arab Emirates (UAE)

Most of the listed companies in Abu Dhabi and Dubai stock exchanges may choose to allow investors from outside the UAE or GCC (Gulf Co-operation Council[4]) to buy maximum of 49% of their shares. However, it is up to companies to decide whether they want to allow even lower foreign ownership. As a result, some companies do not allow foreign ownership at all and many limit the ownership even at a lower level from 49%.

In January 2014, the Dubai Financial Market (DFM), issued rules that allow lending and borrowing of securities. However, these rules state that approved agents have to be involved in the short selling which eventually limits full scale short selling. Local traders and fund managers estimate that new trading rules will allow full-fledged short selling by the end of 2014. (Reuters, 2014.)

Additionally, in order to get allowance for investing, it is mandatory for the investors to register for Dubai Financial Services Authority. The study by Marshall et al. (2011) indicates that the average value weighted effective spread was 2.2% and price impact 1.2% between 2004 and 2010 in UAE.

[4] Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates

Nigeria

Financial markets environment in Nigeria is somewhat hazardous in developed markets standards. Firstly, local accounting standards are said to lack robustness, which leads to scarcity of relevant and trustworthy information. This is a clear disadvantage for foreign investors holding minority position. Secondly, there are frequently changing trading limits as well as daily price movement limits. The large issue is that the information regarding the changes in trading limits is not readily available for foreign investors. As a positive aspect, the daily price movement limit was recently increased from 5% to 10%. Finally, due to a lack of competition among brokers, the transaction costs are seemingly high. (MSCI Global Market Accessibility Review, 2013.)

A quite recent positive development is that short-selling is now allowed through Market Making Program (launched in 9/2012). However, the efficiency of this program is still under assessment. Additionally, there is no upper limit for foreign ownership percentage for individual company's shares. (ibid.)

Despite all the negative characteristics of the Nigerian financial markets environment, the foreign capital inflows have been increasing recently (Business Day, 2013).

Vietnam

Foreign ownership limits are similar to UAE. In general, foreign ownership of a listed company cannot exceed 49%. In the banking industry the foreign ownership limit is only 30%. Furthermore, similar to UAE, investors must register and get approval from Vietnamese Securities Depositary for Securities (VSD). In Vietnam, the language adds an additional challenge. The registration forms as well some of the market regulations, stock market information, and company related information are sometimes readily available only in Vietnamese. (MSCI Global Market Accessibility Review, 2013.)

One of the larger issues in the financial markets is the poor level of general regulation. Financial transparency issues as well as non-compliance with international standards are typical challenges in Vietnam (U.S. Department of state, 2013).

Transaction costs in Vietnam are estimated to be at somewhat average level compared to other frontier countries. The study by Marshall et al. (2011) indicates that the average value weighted effective spread was 1.3% and price impact 1.0% between 2006 and 2010.

Croatia

Financial markets in Croatia boast similar aspects as other presented countries. Investors need to register (can take up to 5 days) and they are required to open segregated accounts for trading and taxation. Due to a lack of competition among brokers, the transaction costs are high (effective spread of 3.1% and price impact of 0.7% (Marshall et al., 2011)). (MSCI Global Market Accessibility Review, 2013.)

On the other hand, Croatian government has put strong efforts to enhance foreign investments in recent years. They have ensured that foreign and local investors are guaranteed equal treatment by law[5]. As an example of this, there are no restrictions in public equity foreign ownership. Foreign brokerage companies may even establish a branch in Croatia to handle securities transactions. Naturally, as Croatia belongs to European Union, the disclosure standards for listed companies comply with EU law and are quite well in line with developed countries. (U.S. Department of State, 2013.)

Argentina

In Argentina, the language barrier is even worse than in Vietnam. The material related to company specific information, stock markets, market regulations and investor registration forms can be found mostly only in Spanish. Registration is mandatory for all investors and it can take up to ten days. (MSCI Global Market Accessibility Review, 2013.)

The positive aspect is that securities and accounting standards follow the international standards and are transparent. Additionally, foreign banks are allowed to setup a branch in Argentina, and therefore for example U.S banks are well represented. (U.S. Department of State, 2013.)

[5] Croatian legal system is very slow to resolve cases (842,740 pending cases in 4/2013), which causes issues when problems arise.

2.2 Modern Portfolio Theory (MPT) and its applications

Modern portfolio theory originates from Markowitz's paper "Portfolio Selection" published in the Journal of Finance in 1952. Even though of its critics, it is still widely in use among investors. In this chapter, I first cover the original hypothesis created by Markowitz, which after I discuss some extensions to his theory created by Tobin (1958) and Sharpe (1964).

2.2.1 Mean-variance Portfolio Selection Model

Markowitz's (1952) mean-variance portfolio selection model is one of the most influential and important theories in modern investment theory. First, his theory states that investors want to maximize their discounted expected returns. Secondly, he states that return is a desirable and variance for returns is not desirable for investors. Thus, the first hypothesis, that the investors only want to maximize their discounted returns, must be rejected, as in reality investors also consider the risk aspect. He measured risk by the standard deviation of the expected returns and returns by the discounted value of uncertain future returns. Analytically, the discounted expected return of a portfolio is shown as following:

$$R = \sum_{t=1}^{\infty}\sum_{i=1}^{N} d_{it} r_{it} X <=> \sum_{i=1}^{N} X_i \left(\sum_{t=1}^{\infty} d_{it} r_{it}\right) <=> R_i = \sum_{t=1}^{\infty} d_{it} r_{it}$$

Where N is number of securities, r_{it} is expected return of security i at time t, d_{it} is the discount rate, X_i is the relative amount invested in security i. Short sales being excluded, $X_i \geq 0$.

Furthermore, as return maximization is not alone sufficient to satisfy investor needs, Markowitz created "expected returns – variance of returns" (E-V) rule. According to this rule, "investors should diversify their funds among those securities which give maximum expected return". Large number of securities ensures that effectively the spread between expected and actual yield of the portfolio decreases to minimum. This is called diversification effect. However, since returns from securities are not independent, but rather inter-correlated, the diversification effect cannot eliminate all of the variance. Analytically, Markowitz showed that the expected return E and variance V of the portfolio are calculated as following:

$$E = \sum_{i=1}^{N} X_i \mu_i$$

Where X_i is the relative amount invested in security i and μ_i is the expected return of a security i. Short sales being excluded, $X_i \geq 0$.

$$V = \sum_{i=1}^{N} \sum_{j=1}^{N} \sigma_{ij} X_i X_j$$

Where σ_{ij} ($\sigma_{ij} = \rho_{ij}\sigma_i\sigma_j$, $where$ $(-1 \leq \rho_{ij} \leq 1)$ is the covariance between securities i and j and X_i and X_j are the relative amounts invested in securities i and j.

The above formula proves the diversification effect, because the correlation coefficient is $-1 \leq \rho_{ij} \leq 1$, and therefore the standard deviation of the portfolio must always be less than the simple weighted average standard deviation of the securities. With E and V, Markowitz showed how to decide the efficient combinations i.e. efficient frontier (See Figure 1)

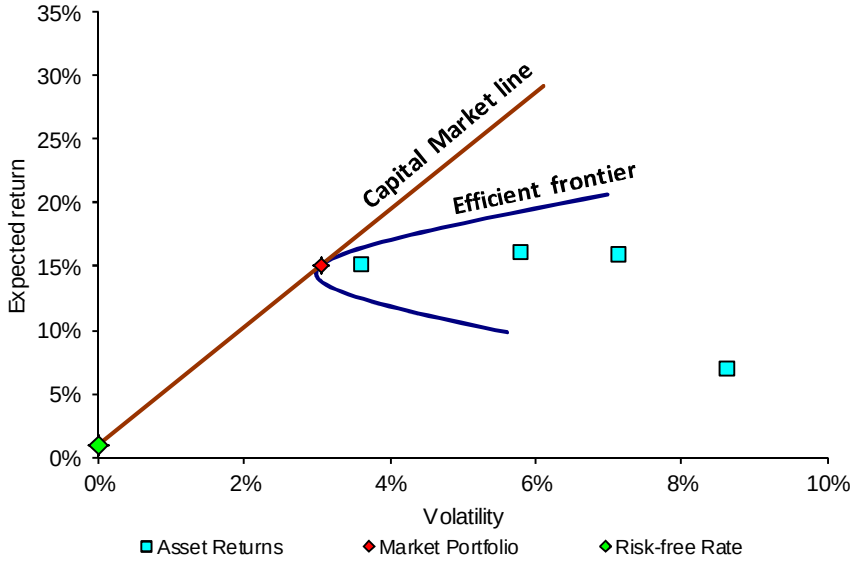
According to the E-V rule, investor should choose one of the portfolios on efficient frontier, i.e. either a portfolio with maximum expected return for given level of risk or minimum risk for given level of expected return. Effectively, the theory argues that portfolios on the efficient frontier dominate all the other portfolios.

After the development of MPT in 1950s, there have been multiple theoretical criticisms towards it. Some of the main criticism is focused on the asymmetric form of financial returns, irrationality of investors, inefficiency of markets, and actual relation between beta and return. For example, Black-Litterman (Black and Litterman, 1992) model was developed to overcome the practical issues of MPT.

2.2.2 Tobin's Separation Theorem and Sharpe's Capital Market Line

In 1958, Nobel-prize winning economist James Tobin (1958) published an academic paper 'Liquidity Preference as Behavior Towards Risk' that has become known as 'The Separation Theorem'.

Figure 1: Efficient Frontier and Capital Market Line (Source: Markowitz, 1952; Tobin, 1958; Sharpe, 1964)



Tobin suggests that by modulating portfolio risk by either borrowing at risk-free rate and leveraging the portfolio or lending at risk-free rate and tempering the risk, an investor can create a portfolio of which risk-return profile is superior to the efficient frontier. This is a two-step process: (1) determine the risky portion of the portfolio; (2) leverage or de-leverage the portfolio to achieve the desired risk level. These two steps and decisions are independent of each other and they have absolutely no effect on each other. That is why the theory is called 'The Separation Theorem'.

William Sharpe (1964) argues that the first step creates a market portfolio, which is then leveraged or de-leveraged to achieve the desired risk level. This creates a Capital Market Line that is the tangent line of the efficient frontier passing the risk-free rate at expected return axis. Slope of the Capital Market Line is the Sharpe Ratio of the market portfolio.

2.2.3 Efficient Market Hypothesis (EMH)

Academically, the theory of Efficient Market Hypothesis dates back to 1965, as Fama published his Ph.D. "The Behavior of Stock Market Prices", which was later in the same year published as a simplified article "Random Walks in Stock Market Prices" (Fama, 1965). The original hypothesis states that a price of a security reflects all information available i.e. future price of a security is based on random walk and cannot be predicted by any means. EMH is consistent with CAPM since according to it, higher return can only be achieved with higher risk.

After the publication of the original theory, empirical tests were run, and Fama (1970) extended his theory to include three forms of market efficiency, which are discussed in the following.

In the weak form, prices reflect only historical information of the stock price. Thus, technical analysis conducted alone with historical stock price cannot create higher risk-adjusted returns. In the semi-strong form of the EMH prices reflect all generally available public information such as financial statements and stock splits. In this form, fundamental analysis i.e. analysis of publicly available financial statements cannot create higher risk-adjusted returns. In the strong form of the EMH prices reflect public and private information. In this form, investors cannot create higher risk-adjusted returns with any information.

2.2.4 Capital Asset Pricing Model (CAPM)

Despite its weak empirical evidence, the Capital Asset Pricing Model created by Sharpe (1964) and Lintner (1965) is still widely used in estimating the cost of capital and evaluating the performance of portfolio management (Fama & French, 2004).

Sharpe (1964) created a market equilibrium theory of asset prices under conditions of risk. This theory is known today as Capital Asset Pricing Model. According to this model, individual asset's rate of return is divided into two parts: (1) the perfectly correlated return on the market portfolio and (2) the uncorrelated return on the market portfolio. Analytically, the correlation between the individual security and the market portfolio β_p can be calculated as following:

$$\beta_p = \frac{Cov(r_{p,} r_m)}{Var(r_m)}$$

Where $Cov(r_{p,} r_m)$ is the covariance between the return r_p of an individual security and market return r_m, and $Var(r_m)$ is the variance of market return. The return on an individual security p is then:

$$R_p = R_f + (R_m - R_f)\beta_p + \alpha_p + \epsilon_p$$

Finally, CAPM having the assumption that the expected residual return on the security p is zero, the CAPM formula is stated as following:

$$E(R_p) = R_f + (E(R_m) - R_f)\beta_p$$

Where $E(R_{p)}$ is the expected rate of return of a security p, R_f is the risk-free rate, and $E(R_m)$ is the expected rate of return of market.

As the formula suggests, CAPM holds under the assumption that the markets are perfectly efficient i.e. the market portfolio is an efficient portfolio (See Figure 1) and thus there is no residual return. However, this assumption creates major issues on its applicability in frontier markets as discussed in the following chapter.

2.2.5 CAPM and EMH in frontier markets

It is decisive to study the status of EMH in frontier markets as well as the suitability of CAPM since through this, it can be decided if active portfolio management can create abnormal returns in frontier markets. Simply, if empirical evidence shows that frontier markets do not possess strong form of efficient market hypothesis, security returns cannot be explained by CAPM, and the existence of abnormal returns is confirmed.

In general, CAPM criticism is focused on its weakness to only include systematic risk, which is measured by BETA in fully diversified portfolio. Empirical study by Dowen (1988) shows that even large diversified portfolios cannot fully eliminate non-systematic risk meaning that this portfolio would be riskier than estimated by CAPM. As the empirical studies presented in following paragraphs indicate, on average for the studied frontier markets, maximum of weak-form efficiency can be accepted. Therefore, asset prices cannot be explained only by the market risk. This indicates that CAPM is not applicable in frontier markets and active portfolio management can lead to abnormal returns.

In the past two decades, EMH has been widely criticized and empirically tested. In the following I present empirical results of EMH studies in frontier market countries and make an estimate of EMH's the current status in the these markets.

The paper of Majumder (2012) indicates that a market that once was efficient will not necessarily remain efficient and vice versa. It is has also been argued that anomalies disappear over time (Mehdian and Perry, 2001; Wong et al., 2007). Therefore, it is important to give more value on the most recent researches to form an appropriate judgment of the status of EMH in frontier markets.

Rehman et al. (2012) tested the weak form of efficiency in Karachi (Pakistan) and Colombo (Sri Lanka) stock exchanges between 1998 and 2011 by using autocorrelation, Q-statistics, unit root and descriptive analysis. The results of tests indicated that Karachi stock exchange is inefficient i.e. even weak form of efficiency does not exist and Colombo stock exchange is efficient in weak form of EMH. Tests concluded by Abeysekera (2001) eleven years earlier indicated that Colombo stock exchange would not be efficient in weak form. However, as indicated previously, things change over time as markets develop.

Magnusson and Wydick (2001) conducted EMH efficiency tests with similar methods as Rehman et al. (2012) in African economies. The results showed that Botswana, Cote d'Ivoire, Kenya, Mauritius and Nigeria have statistically significant weak form of EMH. However, in the same tests Ghana and Zimbabwe did not pass the weak form test indicating that abnormal returns can be achieved with historical information of stock price in these two countries.

Table 4: Form of EMH in selected countries

"x" indicates that the particular form has been found in studies. "-" indicates that the particular form has not been found in studies, i.e. a "-" in weak form indicates that not even weak form of EMH is found.

	Weak form	Semi-strong form	Strong form
Pakistan	-	-	-
Sri Lanka	x / -	-	-
Botswana	x	-	-
Cote d'Ivoire	x	-	-
Kenya	x	-	-
Mauritius	x	-	-
Nigeria	x	-	-
Ghana	-	-	-
Zimbabwe	-	-	-
Kuwait	x / -	-	-
Bahrain	x	-	-
Jordan	-	-	-

Al-Jafari (2011), Jaradat and Al-Zeaud (2011), and Seyyed et al. (2002) have tested EMH on Gulf Markets. Research made by Al-Jafari showed that Kuwait equity markets do not fill the criteria for weak form of EMH. However, tests made Seyyed at al. (2002) indicate the opposite, i.e. weak form EMH is accepted for Kuwait after the correction for infrequent trading. El Seyyed et al. showed similar results for Bahrain as for Kuwait. Jaradat and Al Zeaud (2011) tests indicated that Amman stock exchange (Jordan) is not even weak form efficient.

It is also good to understand, that when testing EMH, it should be noted that the source of anomalies may be micro and small firms, which are more likely traded by individual investors instead of institutions.

2.3 Fundamental Valuation Strategies

Investors are constantly seeking alpha by using various valuation strategies. As this chapter concludes, by selecting stocks that constantly offer higher risk-adjusted returns than the

expected returns according to CAPM, investors are generating alpha returns i.e. dominating the benchmark index return.

Fundamental valuation strategy is one of the more common methods in the field of active portfolio management. In short, investors run valuation models by using the firm's accounting data to find out if the firm's public market value is over- or undervalued. There are multiple empirical and academic researches that argue whether for example book value, earnings and cash flows of the firm can be used to identify misvaluation (see e.g. (De Groot et al., 2012; Fama and French, 1992; Fama and French, 1998, 2011; Blitz and Vliet, 2008; Lakonishok et al., 1994, Barber and Lyon, 1997)).

2.3.1 Traditional value strategies in general

Since Benjamin Graham (Graham and Dodd, 1934), who is known as the father of fundamental valuation analysis, introduced value portfolio strategy, value and growth strategies that are based on accounting data have been widely studied and tested by academics and practitioners.

Empirical studies have tested whether value stock portfolio can create unexplained abnormal returns and if these returns can be predicted. The relationship between individual stock returns and variables such as earnings-per-share, cash-flow-per-share, book-value-per-share, and dividends-per-share have been tested to separate value and growth stocks. Value stocks are typically defined as stocks with high earnings-to-price ratio and high book-to-market ratio and growth stocks vice versa. In many empirical researches value stocks have outperformed growth stocks (See e.g. (De Groot et al., 2012; Fama and French, 1992; Fama and French, 1998, 2011; Lakonishok et al., 1994, Barber and Lyon, 1997; Blitz and Vliet, 2008)).

CAPM formula's explanation for this anomaly is that value stocks are fundamentally riskier and thus offer higher expected return. The famous three-factor model (FF3) by Fama and French adds size and value factors as explaining factors for higher returns. FF3 suggests that size and value factors are proxies for distress, and thus the higher returns are eventually explained by higher risk. The risk explanation is based on evidence about

unexplained common variation that exists in the earnings and returns of a distressed company. (Fama and French, 1996.)

However, other academics argue that value stocks appear not to be any riskier than growth stocks (Lakonishok et al., 1994; Daniel and Titman, 1997). Lakonishok et al. (1994) suggest reasons why value stocks outperform growth stocks: (1) value strategies are contrarian to 'naïve' strategies followed by typical investors; (2) contrarian strategies work because they exploit erroneousness contained in stock prices (e.g. future growth rates of earnings and cash flows is not as high as expected for growth stocks relative to value stocks, and investor expectations of future growth seem to be tied to past growth despite the fact that future growth rates are highly mean reverting); (3) investors focus on growth stocks because: they extrapolate past returns, they connect well-run firm with good investment (no matter the price of the stock), growth stocks are easy to justify to sponsors, and most investors have shorter investment horizons than required for value strategies. The focus on growth stocks can be assumed to push up the stock prices, which then in long-term leads to underperformance compared to value stocks (ibid.). The findings of Daniel and Titman (1997) support the view of Lakonishok et al. (1994). They found that there is no return premium associated with any of the FF3 factors. This suggests that the high returns cannot be viewed as compensation for factor risk.

2.3.2 Book-to-market (B/M)

Book-to-market is one of the most common strategies in stock valuation. It is calculated by dividing the book value of the shares with the market value of the shares. Its use has been decreasing among investors due to some fundamental problems that it contains. One of the larger issues is that it does not typically include things such as knowledge, goodwill or brand value, of which all are significantly important with valuation for many companies. (Dow Theory Forecast, 2008.)

2.3.3 Earnings-to-price (E/P)

Due to its simplicity, E/P is one of the most common strategies in stock valuation. The figure is simply created by dividing the earnings with the price of the share. Based on previous

research (e.g. Nicholson, 1968; Athanassakos, 2009; De Groot et al., 2012), the most typical approach is to use the latest reported earnings figure. There are also other approaches such as using the next estimated earnings figure or some sort of average figure from few previous financial periods (Anderson & Brooks, 2006).

On the global and local market level, there are several factors that have an impact on the general E/P level. Inflation and long-term interest rate level have been argued to have the largest impact, but also for example dividend ratio, GDP growth, short-term interest rate level, and market volatility have been argued to have an impact on it (Kane et al., 1996; White, 2000). Due to these reasons, E/P figures vary between markets and industries (White, 2000). Therefore, it is reasonable to assume that E/P figure of an individual company should be compared to companies from the same market and industry. In some cases, the difference of E/P figures between companies can be due to financial reporting differences (Beaver and Morse, 1978). This is of course problematic for E/P valuation strategy as then the E/P difference does not reflect the difference of the fundamental value.

2.3.4 Dividend-to-price (D/P)

It is calculated by dividing the amount of dividend per share with the price of the share. The positive aspect of D/P is that companies cannot influence it with financial reporting or manipulation in the same way as for example E/P (e.g. depreciations and amortization have an impact on E/P). This is why many investors tend to place D/P strategy higher in valuation than E/P strategy. (Campbell and Shiller, 1989.)

2.3.5 EBITDA-to-enterprise value (E/E)

It is calculated by dividing the EBITDA (earnings before interest, taxes, depreciation and amortization) with the company's enterprise value. Positive aspects of E/E are that it does not include taxes (comparable between countries) and it does include debt. The E/E valuation levels vary substantially between industries, which should be taken into consideration (Fitch, 2002). Unlike the other strategies presented, to my knowledge, E/E has not been widely studied as the Table 5 indicates.

Table 5: Summary of abnormal returns with trading strategies in selected markets

"+" indicates that abnormal positive returns were found and "-" indicates that no abnormal positive returns were found.

Area / Country	B/M	E/P	D/P	E/E	Size	Study (e.g.)
Area						
Asia Pacific	+					Fama and French (2012)
Continental Europe	+					Asness et al. (2009)
Europe	+					Fama and French (2012)
North America	+					Fama and French (2012)
S&P Frontier BMI index	+	+	+		+	De Groot et al. (2012)
Country						
Argentina	-	+			+	Fama and French (1998), Rouwenhorst (1999)
Australia	+	+	+			Fama and French (1998)
Belgium	+	+	+			Fama and French (1998)
Brazil	+	+	-		+	Rouwenhorst (1999)
Canada	+					Griffin (2002)
Chile	+	+			+	Fama and French (1998), Rouwenhorst (1999)
Colombia	-	-			-	Fama and French (1998), Rouwenhorst (1999)
France	+	+	+			Fama and French (1998)
Germany	+	+	+			Fama and French (1998)
Greece	+	+			-	Fama and French (1998), Rouwenhorst (1999)
Hong Kong	+	+	+			Fama and French (1998), Cheung et al. (1997)
India	+	-	-		-	Fama and French (1998), Rouwenhorst (1999)
Indonesia	+					Rouwenhorst (1999)
Italy	-	-	+			Fama and French (1998)
Japan	+	+	+			Chan et. Al. (1991), Asness et al. (2009). Fama and French (1998), Griffin (2002)
Jordan	+	+			+	Fama and French (1998), Rouwenhorst (1999)
Korea	+	+			+	Fama and French (1998), Rouwenhorst (1999)
Malaysia	+	-			+	Fama and French (1998), Rouwenhorst (1999)
Mexico	-	+			+	Fama and French (1998), Rouwenhorst (1999)
Netherlands	+	+	+			Fama and French (1998)
Nigeria	+	+			+	Fama and French (1998), Rouwenhorst (1999)
Pakistan	-	+			-	Fama and French (1998), Rouwenhorst (1999)
Philippines	+	-			-	Fama and French (1998), Rouwenhorst (1999)
Singapore	+	+	+			Fama and French (1998)
Sweden	+	+	+			Fama and French (1998)
Switzerland	+	+	+			Fama and French (1998)
Taiwan	+	-			+	Fama and French (1998), Rouwenhorst (1999)
Thailand	-					Rouwenhorst (1999)
Turkey	+					Rouwenhorst (1999)
U.K.	+	+	+			Fama and French (1998), Asness et al. (2009), Griffin (2002)
U.S.	+	+	+			Ross (1976), Fama and French (1992, 1996, 1998), Lakonishok et al. (1994), Asness et al. (2009), Griffin (2002)
Venezuela	+	+			+	Fama and French (1998), Rouwenhorst (1999)
Zimbabwe	+	+			+	Fama and French (1998), Rouwenhorst (1999)

3. Hypotheses

This section presents the hypotheses of this study. My hypotheses are based on the review of the existing literature, my own interests, and the needs of the fund that I cooperate. I created three main research questions and five hypotheses.

My first two research questions are connected to hypotheses 1, 2, 3 and 4.

1 Can active portfolio management lead to abnormal returns in frontier markets?

2 Which trading strategies create the largest abnormal returns in frontier markets?

H1*: Fundamental trading strategies lead to abnormal returns before transaction costs in frontier markets*

H2*: By normalizing industry figures, higher abnormal returns can be achieved*

My first hypothesis partially re-examines the findings of previous literature (De Groot et al., 2012) by testing whether fundamental trading strategies lead to abnormal returns in frontier markets. The difference to De Groot et al. is that I include the stocks of 44 frontier countries and small-cap stocks. Similar to De Groot et al., my strategies include book-to-market, earnings-to-price, dividend-to-price. Additionally, my tests include previously untested EBITDA/enterprise value strategy. I have also added Size strategy (not a fundamental trading strategy), to see whether small cap stocks offer larger returns. Furthermore, an addition to the study of De Groot et al. is the 6-month holding period that I have tested. As frontier markets are shown to be less effective than developed markets and following the results of De Groot et al., I expect that the abnormal returns are to be found.

My second hypothesis is based on intuition. By normalizing industry figures, I eliminate the factor that one industry would alone dominate the top portfolio 1, because of higher industry variables (B/M, E/P, D/P or E/E). As discussed in Chapter 2.3, the levels of the variables depend not only on individual company characteristics, but also on many other factors and thus can vary substantially between markets and industries (Dow Theory Forecast, 2008; Kane et al., 1996; White, 2000; Fitch, 2002). Intuitively, even though one industry systematically has higher B/M, E/P, E/E, or D/P, it does not necessarily create higher

abnormal returns, but rather by normalization the high return firms can be found from each industry. Studies about industry normalized trading strategies appear to be non-existent.

***H3**: Fundamental trading strategies lead to abnormal returns after transaction costs in frontier markets*

To make the results more plausible from the point of view of actual investors, I decrease an estimate of the actual transaction costs from the returns. The actual transaction costs include bid-ask spread, market impact costs and commissions (Speidell and Krohne, 2007). To my knowledge, the research of frontier markets transaction costs is limited to very few studies. Marshall et al. (2011) estimated the transaction costs for 19 frontier countries between 2002 and 2010 from Thomson Reuters Tick History database. According to their results, the average value-weighted effective spread is 0.95% and market impact cost is 0.45%. Commission cost in their study was based on Quisenberry's (2010) figures from 2007. The average commission in 2007 was 1.09%. Adding these three figures together, the total actual transaction costs are 2.49%. Due to a lack of better information, I use 2.5 % transaction cost estimate. However, I study the transaction cost impact only for the biggest third of stocks (by market cap), because micro and small cap stocks have likely significantly higher transaction costs (Baldwin, 2014).

De Groot et al. (2012b) estimated that the transaction costs are 0.09% for S&P 500 stocks and 0.26 % for the largest 600 European stocks. Thus, the estimated transaction costs for frontier markets are 29 times larger than US estimates and 10 times larger than European estimates.

***H4**: Micro and Small cap companies offer greater mispricing compared to large cap stocks in frontier markets*

To my knowledge, fundamental trading strategies have not been previously tested on micro and small cap stocks in the frontier markets. Studies indicate that financial analysts are less willing to follow poor-performing, low-volume, or small firms, because analysts tend to follow firms that are more likely to produce income for analyst's employer, i.e. produce higher brokerage or investment banking fees (Hayes, 1998; McNichols and O'Brien, 1997; Fortin and Roth, 2010). Intuitively, micro and small cap stocks offer greater mispricing due to

lower analyst following. I divide my stocks into three sets by market cap and study the value strategies in each of the three datasets.

Research question 3 is connected to hypothesis 5:

3 Have anomalies already started to disappear in frontier markets?

***H5**: Abnormal returns have started to diminish later in the sample period in frontier markets*

As suggested by Mehdian and Perry (2001) and Wong et al. (2007), anomalies may disappear over time. Intuitively, this happens as the market develops and becomes more efficient. As I aim to find anomalies that will work in the coming years, it is in my interest to study whether some of the anomalies I am studying have started to weaken in certain markets.

Table 6: Summary of hypotheses

H1	Fundamental trading strategies lead to abnormal returns before transaction costs in frontier markets
H2	By normalizing industry figures, higher abnormal returns can be achieved
H3	Fundamental trading strategies lead to abnormal returns after transaction costs in frontier markets
H4	Micro and small cap companies offer greater mispricing compared to large cap stocks in frontier markets
H5	Abnormal returns have started to diminish later in the sample period in frontier markets

4. Data and Methodology

4.1 Sample selection

4.1.1 Country selection

My country selection is based on the criteria of four largest (MSCI, Standard and Poor's, FTSE and Russell) providers of stock market indices. Therefore, I have only one country selection criteria: is the country currently included in the frontier index of MSCI, S&P, FTSE or Russell? If yes, it is included in my country set. If not, it is not included in my country set. As my criteria are based on the criteria of these four providers, I collected some guidelines on which the selection is based. However, as each provider has different filters in selection, the following only indicates on what the selection is based:

1) Does the country belong to emerging or developed markets?
2) Are the limitations for foreign investors too strict?
3) Is the free-float market capital percent more than 20%?
4) Is the country undergoing extreme economic or political instability?

I want to include more markets compared to De Groot et al. (2012) to be able to cover also countries that are not favored by investors and thus may have lower valuations. According to Quisenberry (2010), due to the low amount of information, herding behavior is typical for frontier markets, indicating that investors tend to jump into certain markets as a group and exit with everyone else together.

Table 2 and Appendix 5 present frontier country selection criteria and characteristics by MSCI standards.

Table 7: Statistics of selected frontier countries

Countries that are included in the particular Frontier index are marked with "+" and countries that are under consideration for the index are marked with "U". Population, Market Cap, and GDP data are from Worldbank database (2012 data). Economic freedom (scale 0 worst – 100 best) data are from Heritage database.

Country	S&P Frontier BMI	MSCI Frontier	Russell Frontier	FTSE Frontier	Population (mill.)	Market Cap (billion US$)	GDP (billion US$)	GDP per capita (US$)	Annual expected GDP growth (2013-2017)	Economic Freedom (2013)	Change in Economic freedom points (2012-2013)
Argentina	+	+	+	+	41	34	474	11829	4.3 %	47	-1.3
Bahrain	+	+	+	+	1	16	29	24910	2.3 %	76	0.3
Bangladesh	+	+	+	+	169	17	116	724	8.5 %	53	-0.6
Botswana	+	U	+	+	2	5	14	9160	5.5 %	71	1
Bulgaria	+	+	+	+	7	7	51	7133	6.4 %	65	0.3
Côte d'Ivoire	+			+	23	8	25	1117	8.5 %	54	-0.2
Croatia	+	+	+	+	4	22	56	14454	4.6 %	61	0.4
Cyprus	+		+	+	1	2	23	29854	3.5 %	69	-2.8
Ecuador	+				15	6	85	4713	6.5 %	47	-1.4
Estonia	+	+	+	+	1	2	22	17158	5.7 %	75	2.1
Gabon			+		1	N/A	19	11430	0.7 %	58	1.4
Ghana	+	U	+	+	25	3	41	1742	10.0 %	61	0.6
Jamaica	+	U	+		3	6	15	5848	2.6 %	67	1.7
Jordan	+	+	+	+	6	27	31	5074	6.8 %	70	0.5
Kazakhstan	+	+	+		17	23	202	12308	12.0 %	63	-0.6
Kenya	+	+	+	+	42	15	37	1041	13.1 %	56	-1.6
Kuwait	+	+	+		4	97	161	55168	1.6 %	63	0.6
Kyrgyzstan			+		6	0	6	1160	8.3 %	60	-0.6
Latvia	+				2	1	28	12776	5.0 %	67	1.3
Lebanon	+	+			4	10	43	10758	6.4 %	60	-0.6
Lithuania	+	+	+	+	3	4	42	13494	6.7 %	72	0.6
Macedonia			+	+	2	1	10	4589	5.8 %	68	-0.3
Malta			+	+	0	4	9	20848	4.6 %	68	0.5
Mauritius	+	+	+	+	1	7	10	8968	5.8 %	77	-0.1
Morocco		+			33	53	97	2925	7.6 %	60	-0.6
Namibia	+		+		2	1	13	6084	6.4 %	60	-1.6
Nigeria	+	+	+	+	165	56	263	1712	7.0 %	55	-1.2
Oman	+	+	+	+	3	20	70	25602	1.9 %	68	0.2
Pakistan	+	+	+		179	44	231	1348	5.1 %	55	0.4
Panama	+				4	13	36	9768	8.0 %	63	-2.7
Papua New Guinea			+		7	11	16	2184	11.7 %	54	-0.2
Qatar	+	+	+	+	2	126	173	10987	4.7 %	71	0
Romania	+	+	+	+	21	16	169	9010	8.7 %	65	0.7
Serbia		+	+	+	7	7	37	6010	7.4 %	59	0.6
Slovakia	+		+	+	5	5	92	17910	5.4 %	69	1.7
Slovenia	+	+	+	+	2	6	45	23944	3.1 %	62	-1.2
Sri Lanka	+	+	+	+	21	17	59	3243	8.8 %	61	2.4
Tanzania			+		45	2	28	609	9.4 %	58	0.9
Trinidad and Tobago	+	U	+		1	15	24	19131	7.9 %	62	-2.1
Tunisia	+	+	+	+	11	9	56	442	5.8 %	57	-1.6
Ukraine	+	+	+		45	21	176	4178	8.0 %	46	0.2
United Arab Emirates	+	+			6	68	349	72091	3.0 %	71	1.8
Vietnam	+	+	+	+	90	33	156	1547	8.8 %	51	-0.3
Zambia	+		+		14	3	21	1505	10.6 %	59	0.4
Frontier (median)					6	10	42	8050	6.4 %	62	0.2
Frontier (average)					24	20	83	11511	6.5 %	62	0.0
Frontier (sum)					1043	843	3660				
Global (average)					36	230	424	12500	3.1 %	60	0.1
Global (sum)					7079	45083	83120				
% of global					14.7 %	1.9 %	4.4 %	92.1 %			

4.1.2 Stock selection

This study targets common shares that are traded in the stock exchanges of 44 frontier countries during the period between 2003 and 2013. The initial sample consists of 9043 unique stocks in 44 countries and the final sample consists of 6890 unique stocks in 40 countries. Non-investable and non-testable stocks are filtered out with simple metrics:

(1) Liquidity measure – monthly median daily dollar trading volume must be over 10 000 USD

(2) Companies with corrupted or missing data are excluded

4.1.3 Industry Normalization

Industry normalization is made with SIC (Standard Industrial Classification) main groups (0-9) by first calculating current average for each industry in each data point. Total sample average is then divided with the industry averages to gain the multiple for each industry. Each firm's figures (B/M, E/P, E/E, D/P and size) are then multiplied with the industry multiply. This way the variance in industry figures is neutralized and each portfolio likely contains companies from more industries than without normalization.

E.g. with three industries in the universe, if the average B/M figure is 1 for financial industry, 2 for consumer stables, and 3 for energy industry, the sample average is 2 ((1+2+3)/3). Sample average is then divided with each industry average to gain the industry multiple. In this example the industry multiples are the following:

Financials: 2 (2/1)

Consumer stables: 1 (2/2)

Energy: 0.66 (2/3)

4.2 Data collection

4.2.1 Return data

The stock-specific monthly information is collected from Bloomberg and Datastream databases. Stock returns are calculated as annual total returns. Majority of the return data is collected from Bloomberg. However, as Bloomberg database is not comprehensive, missing and additional data, such as data of delisted and bankrupted companies (to tackle survivorship bias) were collected from Datastream. In case of extreme observations, an additional check with Datastream database was executed for the stock. If the return data is not found or it seems corrupt, the stock is excluded from the sample. In addition, to avoid influence of outliers, the largest 0.5% of observations was excluded.

4.2.2 Accounting data

The primary source for the accounting data is Datastream database. If the data is not available in Datastream or if it seems to be extreme, it is collected and checked from Bloomberg database. To avoid influence of outliers, the smallest and largest 0.5% of observations are excluded. Following the method of De Groot et al. (2012), the quality of the data is checked during the sample period by using various statistics that include coverage, median, maximum, and minimum.

By using historical information, the results are in danger of information bias as the accounting data for a given year is typically published in March or April, but when looking at historical figures it is effective in January. This is simply tackled by using the fundamental information with six months lag from historical data (excluding dividend data).

Table 8: Descriptive statistics for variable and return data (all stocks)

Count is the count of stocks with the given variable or return data. Beginning of period is 12/2003 and end of period is 12/2012. Average per data point for the whole period is the average per data point between 12/2003 and 12/2012. Coverage is estimated based on the amount of return data, i.e. it is assumed that return data is available for all the existing stocks. However, there can also be stocks that existed for which the return data was not available at Datastream or Bloomberg.

		Beginning of period	End of period	Average per data point for whole period
Return (monthly)	Count	1200	3010	2506
	Median	1.8 %	0.7 %	0.0 %
	Average	3 %	2 %	1 %
	Minimum	-17 %	-16 %	-17 %
	Maximum	72 %	314 %	331 %
Market cap (mUSD)	Count	1120	3001	2291
	Estimated coverage	93 %	100 %	91 %
	Median	17	28	33
	Average	208	284	335
	Minimum	0.0	0.0	0.0
	Maximum	13386	34344	258412
Dividend yield	Count	1198	2987	2341
	Estimated coverage	100 %	99 %	93 %
	Median	1 %	2 %	1 %
	Average	3 %	5 %	3 %
	Minimum	0 %	0 %	0 %
	Maximum	80 %	119 %	157 %
Price-to-earnings	Count	664	2007	1597
	Estimated coverage	55 %	67 %	64 %
	Median	11.2	10.0	12.1
	Average	22.1	22.3	26.7
	Minimum	0.4	0.1	0.0
	Maximum	506.3	1338.5	2999.8
Book-to-price	Count	291	2499	1801
	Estimated coverage	24 %	83 %	72 %
	Median	1.5	0.8	1.2
	Average	2.2	1.6	1.9
	Minimum	-4.0	-120.8	-176.2
	Maximum	38.4	746.1	746.1
EV / EBITDA	Count	255	2087	1373
	Estimated coverage	21 %	69 %	55 %
	Median	6.9	6.5	7.4
	Average	12.5	16.0	21.0
	Minimum	-1.0	-170.2	-1681.7
	Maximum	845.9	5960.4	18601.0

Table 9: Descriptive statistics for variable and return data (country level)[6]

Begin is the beginning of period (12/2003). End is the end of period (12/2012). Index weight is the value weighted market cap percentage of the total market cap (of all the countries).

		Index weights		Number of firms			Median			
Country	**Region**	**Begin**	**End**	**Begin**	**End**	**Market cap (mUSD)**	**Price-to-book**	**Price-to-earnings**	**Dividend yield (%)**	**EV / EBITDA**
Argentina	America	6.0 %	2.4 %	56	61	58	1.1	10.5	0.0	5.0
Bahrain	Asia	3.3 %	2.2 %	18	37	161	1.2	10.1	4.4	7.0
Bangladesh	Asia	0.5 %	2.9 %	163	261	13	2.8	19.4	1.3	10.7
Botswana	Africa	0.0 %	0.4 %	0	20	63	1.9	9.7	4.3	7.0
Bulgaria	Europe	0.3 %	0.6 %	19	95	23	1.0	14.5	0.0	9.1
Croatia	Europe	15.8 %	2.5 %	66	138	38	0.8	18.7	0.0	7.4
Cyprus	Europe	2.1 %	1.0 %	100	65	17	0.5	9.0	0.0	7.3
Ecuador	America	1.9 %	1.3 %	14	25	48	1.0	12.2	0.0	N/A
Estonia	Europe	1.8 %	0.3 %	12	15	86	1.4	14.3	0.0	8.5
Gabon	Africa	0.0 %	0.0 %	0	0	0	N/A	N/A	N/A	N/A
Ghana	Africa	0.0 %	0.3 %	11	18	45	2.4	10.4	0.0	6.2
Ivory Coast	Africa	0.0 %	0.9 %	0	24	111	1.9	10.0	3.1	4.3
Jamaica	America	0.0 %	0.0 %	0	0	0	N/A	N/A	N/A	N/A
Jordan	Asia	0.0 %	3.1 %	0	218	21	1.2	17.5	0.0	12.2
Kazakhstan	Asia	0.0 %	2.0 %	0	20	101	0.9	9.8	0.0	4.9
Kenya	Africa	1.6 %	1.9 %	41	52	59	1.6	13.4	2.5	6.5
Kuwait	Asia	21.5 %	11.5 %	61	191	187	1.3	13.1	0.0	10.5
Kyrgyzstan	Asia	0.0 %	0.0 %	0	0	0	N/A	N/A	N/A	N/A
Latvia	Europe	0.4 %	0.1 %	11	11	42	0.5	10.5	0.0	5.2
Lebanon	Asia	0.4 %	0.8 %	7	9	183	1.2	11.0	4.0	7.7
Lithuania	Europe	1.8 %	0.4 %	37	28	67	1.1	14.7	0.0	6.7
Macedonia	Europe	0.0 %	0.2 %	0	10	28	0.6	9.5	1.7	4.1
Malta	Europe	0.8 %	0.4 %	10	17	115	1.7	15.8	2.7	10.3
Mauritius	Africa	0.0 %	0.8 %	0	50	54	1.1	11.0	2.9	6.0
Morocco	Africa	6.3 %	6.5 %	49	76	119	2.2	16.0	3.2	8.8
Namibia	Africa	0.0 %	0.1 %	2	6	58	1.7	8.4	5.0	4.3
Nigeria	Africa	0.0 %	6.5 %	35	99	52	1.5	10.3	0.0	7.3
Oman	Asia	0.0 %	2.8 %	0	92	41	1.3	10.6	3.7	7.7
Pakistan	Asia	3.7 %	4.6 %	175	179	31	1.2	9.1	2.5	5.5
Panama	America	0.0 %	0.0 %	0	0	0	N/A	N/A	N/A	N/A
Papua New Guinea	Oceania	0.1 %	0.3 %	2	3	322	2.0	13.3	1.4	7.3
Qatar	Asia	10.3 %	14.9 %	16	42	943	1.8	13.1	3.0	12.0
Romania	Europe	0.0 %	0.0 %	0	0	0	N/A	N/A	N/A	N/A
Serbia	Europe	0.0 %	0.4 %	0	31	21	0.6	8.0	0.0	3.3
Slovakia	Europe	0.4 %	0.2 %	5	6	357	1.0	14.0	1.9	7.1
Slovenia	Europe	2.9 %	0.8 %	38	33	67	0.8	16.0	1.0	8.0
Sri Lanka	Asia	0.8 %	1.8 %	187	231	9	1.2	12.3	1.5	7.0
Tanzania	Africa	0.0 %	0.2 %	0	7	198	1.6	6.0	5.6	2.1
Trinidad and Tobago	America	0.0 %	0.0 %	0	0	0	N/A	N/A	N/A	N/A
Tunisia	Africa	0.4 %	1.0 %	28	55	50	1.6	15.3	2.4	11.2
United Arab Emirates	Asia	17.0 %	13.1 %	36	94	404	1.4	11.7	1.8	9.8
Ukraine	Europe	0.0 %	2.4 %	0	62	106	1.6	9.9	0.0	8.1
Vietnam	Asia	0.0 %	4.5 %	0	613	8	0.9	7.2	5.2	5.3
Zambia	Africa	0.0 %	4.4 %	1	16	121	0.9	11.6	2.4	5.0
Total		100 %	100 %	1200	3010	4423				
Average						101	1.3	12.0	1.8	7.2
Median						53	1.2	11.3	1.6	7.1

[6] As the tests are made with equal weighting of stocks, the amount of stocks in the country is more relevant than the country's total index weight

4.3 Research Design

4.3.1 Portfolio sorting method

The investment portfolio is constructed by following the principles used by Jegadeesh and Titman (1993) (Similar method was also used by De Groot et al. (2012)). Each month, stocks are ranked in an order based on the applicable strategy used. Then, based on the rankings, ten equally-weighted decile portfolios are formed. The first portfolio (P1) includes the top decile of the stocks, and the last portfolio (P10) includes the bottom decile of the stocks. For example with earnings/price (E/P) strategy, the stock with the highest E/P value is be ranked 1st and the stock with the lowest E/P value is be ranked last. On any given month, the strategy holds multiple portfolios (amounting to number of holding period in months) depending on the holding period (6/12 months).

The top portfolio (P1) is the one expected (according to the hypothesis) to produce excess and abnormal returns. Thus, my focus remains in the top portfolio. Top portfolio returns are compared to index returns. However, I also conducted some additional top-minus-bottom portfolio return analysis even though short-selling of stocks is nearly impossible in frontier markets (De Groot et al., 2012)

In practice, the first portfolio is formed on 31st of December 2003, the next on the 31st of January 2004 and then one being formed monthly until November of 2004 (6-month holding period: May 2004). The portfolios are then rebalanced until the end of period (last rebalancing on the June 30th, 2013) on semi-annual and annual basis as the 6- and 12-month holding periods suggest.

This method offers a simple and transparent way to measure stock returns without linear restrictions. However, the method is not totally comprehensive as it does not reveal the relation between the variable and stock return i.e. does not provide estimates of the marginal effects (subject for future studies). The method also limits the number of variables being tested simultaneously and hence the possibility of adding potential explanatory variables to tests is excluded.

Furthermore, it is also a challenge to decide how to weigh the stocks in the portfolio. Typical weighting methods are equal weighting (EW) and value weighting (VW). As the name suggests, with EW weighting there is a risk that micro-cap stocks dominate the portfolio. The issue with micro-caps is that on average they capture only few percent (e.g. 3 % in NYSE-Amex-NASDAQ universe) of the market cap, but they account for about 60 % of the stocks in extreme sort portfolios. With VW weighting there is a risk that few large capital stocks dominate the whole portfolio. Potentially, either of the methods may bias the results. (Fama and French, 2008.)

For the purpose of this study, I use the EW method. As indicated earlier, large companies have likely larger analyst coverage and thus less mispricing compared to smaller companies. To tackle the issue of micro-caps dominating the portfolio, I divided the stocks in three groups based on the market cap and tested the strategies in each group to discover whether there is a difference between groups.

I have three ways to measure the excess returns and alphas of the portfolios. First, I calculated simple raw excess returns over the market portfolio i.e. return of top portfolio minus the return of index (top-minus-index = TMI). Second, I calculated Jensen's alpha with CAPM. Third, potential priced risk premium is controlled by calculating the abnormal annual returns for the portfolios by regressing the raw portfolio returns to Fama-French (1993) three-factor model. The formula is the following:

$$r_{jt} - r_{ft} = \alpha_j + \beta_j(r_{mt} - r_{ft}) + s_j SMB_t + h_j HML_t + \varepsilon_{jt}$$

where r_{jt} is the annual return of the portfolio, r_{ft} is the risk-free rate, r_{mt} is market return, SMB_t is the difference of returns between small and large firms, HML_t is the difference of returns between low and high market-to-book firms and ε_{jt} is the average monthly abnormal return of portfolio j.

Transaction costs are incorporated into annual returns based on turnover ratio of stocks between periods. Transaction costs are likely significantly higher for micro-cap stocks compared to large cap stocks (Baldwin, 2014). Therefore, the analysis for post-transaction cost returns is conducted only for the largest third of the stocks ('Size high' stocks).

4.3.2 Time Analysis

I conducted time analysis by dividing the whole period into two periods (12/2003 – 6/2008 and 7/2008-12/2013) and I analyzed whether the portfolio return patterns have been constant during the sample period i.e. whether the anomalies have disappeared over-time as the hypothesis 4 suggests. This is simply done by comparing the difference of returns and alphas (first period return minus second period return) and comparing it to 0, when calculating t-Values.

4.3.3 Downside risks

I tested downside risk by calculating volatility, skewness and kurtosis for different data sets. This was done to see whether the trading strategies tend to create more extreme observations than can be expected based on normality.

5. Results

In this chapter I examine the portfolio sorting method return characteristics based on 6- and 12-month holding periods without and with industry normalized strategies for various datasets. The five strategies being tested are book/market (B/M), earnings/price (E/P), dividend/price (D/P), EBITDA/enterprise value (E/E), and market capitalization (Size). Additionally, I analyze how the incorporation of transaction costs affects the return characteristics as well as the time characteristics. All the returns in this chapter are expressed as annual returns.

5.1 Portfolio sorting method

5.1.1 Non-normalized strategies

Table 10 presents the results for non-normalized and industry normalized strategies with 6-month holding period and Table 11 presents the results for non-normalized and industry normalized strategies with 12-month holding period. Fama-French three factor coefficients are presented in Appendix 1.

Table 10 shows statistically significant mean excess returns for B/M, E/P, E/E and Size factors compared to index portfolio. The only variable that cannot predict statistically significant future returns is D/P. The impact of region neutrality is very insignificant i.e. the results also hold even though region neutrality is applied. Region neutrality has marginal positive impact on Size strategy returns and marginal negative impact on E/E strategy returns.

With 6-month holding period, similar to mean excess returns, Jensen's Alpha shows statistically significant positive alpha values for all the strategies except D/P. However, Fama-French 3-factor model alphas are statistically significant only for D/P (negative alpha of -4.93%*) and Size (6.39%**), indicating that Fama French factors largely explain the abnormal returns of B/M, E/P and E/E strategies.

The returns with 12-month holding period (Table 11) are very similar to 6-month holding period returns. However, there are some significant differences. Even though D/P strategy now records negative mean excess return (-2.37%), it also records significantly positive Jensen's alpha of 5.16%**. This is not surprising taken into account that most of the stocks do not pay dividends and the ones that do are likely large stocks with lower risk. Furthermore, the largest differences are that D/P strategy records statistically significant returns in America (25.78%***, 6-month holding period return -0.10%) and that Fama-French 3 factor alpha is statistically significant for E/E strategy (6.91%**).

5.1.2 Industry normalized strategies

In large part, results are very similar as with non-normalized strategies with the exception that the excess returns and alphas are in general somewhat lower.

Industry normalized strategies show statistically significant mean excess returns for B/M, E/P, E/E and Size strategies compared to index. The only strategy that cannot predict statistically significant future returns is D/P. The highest annual excess returns are recorded for Size (24.46%***) and B/M (11.88%***) strategies with 6-month holding period.

The impact of region neutrality varies by variable. Region neutrality has marginal positive impact for Size strategy. However, in contrary to non-normalized strategies, region neutrality has marginal positive impact on E/E strategy returns and marginal negative impact on B/M strategy returns. The results for different regions are statistically significant for B/M, E/P, E/E and Size strategies.

The highest Jensen's alpha returns are recorded for size (24.75%***), B/M (12.68%***), and E/E (10.30%***). 3-factor alpha is significant only for E/E (0.56%**) and size (0.44%*).

One surprising finding is that with Fama-French 3-factor model, the alpha for D/P shows statistically significant positive value (3.58%**), even though the TMI mean excess return with D/P strategy is negative (-0.96%).

Table 10: Returns, alphas and t-values for 6-month holding period with non-normalized and industry normalized strategies

Table below presents an overview of the return characteristics of the top portfolio compared to index, bottom portfolio, CAPM, and 3-factor-model for non-normalized (above) and industry normalized (below) strategies. At the end of each month between December 2003 and June 2013, all the stocks with available information on the selected markets are ranked in descending order (excluding size). B/M is the book-to-market ratio; E/P is the earnings-to-price ratio; D/P is the dividend-to-price ratio; E/E is the EBITDA-to-enterprise value ratio; and Size is the market capitalization of the company (ranked in ascending order). The holding period is 6 months. Top-Minus-Index is the average annual excess return of the equally weighted top 10% portfolio minus the average returns of equally-weighted universe (index). Jensen's Alpha is the annual alpha return of the top 10% portfolio with CAPM. 3-factor alpha is the annual alpha return of the top 10% portfolio regressed to Fama and French three-factor model. T-Values are calculated in relative to 0% excess return/alpha. T-Value stars represent 90% (*), 95% (**), and 99% (***) significance levels. Region neutral portfolio has the same relative amount of stocks in top 10% and bottom 10% portfolios from each continent (America, Europe, Africa, Asia).

Non-normalized

Panel A: Portfolio raw returns (EW)

	B/M		E/P		D/P		E/E		Size	
	Return	t-Value	Return	t-Value	Return	t-Value	Return	t-Value	Return	t-Value
Top-Minus-Index										
Mean excess return	18.02 %	10.32 ***	9.25 %	6.66 ***	0.00 %	-0.03	12.42 %	8.66 ***	24.60 %	9.41 ***
Region neutral	17.88 %	15.18 ***	9.12 %	6.92 ***	-0.24 %	-0.14	10.69 %	8.18 ***	26.82 %	11.71 ***
America	11.22 %	3.62 ***	8.60 %	2.97 ***	-1.19 %	-0.57	13.35 %	4.69 ***	14.98 %	2.56 ***
Europe	23.58 %	5.45 ***	10.43 %	4.17 ***	-7.19 %	-3.86 ***	11.88 %	3.01 ***	44.41 %	9.28 ***
Africa	21.13 %	7.25 ***	12.01 %	6.54 ***	5.91 %	3.46 ***	13.76 %	5.24 ***	7.70 %	4.79 ***
Asia	17.46 %	9.70 ***	8.08 %	5.19 ***	1.45 %	0.86	10.03 %	5.53 ***	23.29 %	7.92 ***

Panel B: Portfolio alphas (EW)

	B/M		E/P		D/P		E/E		Size	
	Alpha	t-Value	Alpha	t-Value	Alpha	t-Value	Alpha	t-Value	Alpha	t-Value
CAPM (Jensen)	17.18 %	4.72 ***	6.42 %	1.76 **	-0.12 %	-0.04	11.22 %	3.05 ***	25.34 %	6.50 ***
3-factor	0.84 %	0.24	0.96 %	0.27	-4.94 %	-1.52 *	4.31 %	1.20	6.39 %	1.71 **

Industry-normalized

Panel A: Portfolio raw returns (EW)

	B/M		E/P		D/P		E/E		Size	
	Return	t-Value	Return	t-Value	Return	t-Value	Return	t-Value	Return	t-Value
Top-Minus-Index										
Mean excess return	11.88 %	7.44 ***	7.44 %	5.33 ***	0.00 %	0.01	11.09 %	8.53 ***	24.46 %	9.33 ***
Region neutral	9.25 %	7.63 ***	8.34 %	6.87 ***	0.24 %	0.15	12.55 %	9.23 ***	27.57 %	11.90 ***
America	11.62 %	4.12 ***	4.66 %	1.81 **	-0.72 %	-0.32	8.08 %	2.65 ***	14.03 %	2.50 ***
Europe	16.21 %	3.62 ***	11.09 %	4.51 ***	-8.08 %	-4.27 ***	4.16 %	1.99 **	44.41 %	8.81 ***
Africa	18.44 %	5.97 ***	10.56 %	6.52 ***	5.41 %	3.68 ***	10.03 %	4.07 ***	11.35 %	7.22 ***
Asia	6.80 %	4.42 ***	7.19 %	5.02 ***	2.67 %	1.74 **	14.16 %	8.43 ***	23.58 %	8.38 ***

Panel B: Portfolio alphas (EW)

	B/M		E/P		D/P		E/E		Size	
	Alpha	t-Value	Alpha	t-Value	Alpha	t-Value	Alpha	t-Value	Alpha	t-Value
CAPM (Jensen)	12.68 %	3.97 ***	4.78 %	1.33 *	0.48 %	0.18	10.30 %	2.96 ***	24.75 %	6.23 ***
3-factor	1.05 %	0.34	-0.72 %	-0.20	-0.62 %	-0.21	6.92 %	1.99 **	5.41 %	1.43 *

Table 11: Returns, alphas and t-values for 12-month holding period with non-normalized and industry normalized strategies

Table below presents the same results as Table 10 with the exception that the stock holding period is **12 months** instead of 6 months. Table below presents an overview of the return characteristics of the top portfolio compared to index, bottom portfolio, CAPM, and 3-factor-model for non-normalized (above) and industry normalized (below) strategies. At the end of each month between December 2003 and June 2013, all the stocks with available information on the selected markets are ranked in descending order (excluding size). B/M is the book-to-market ratio; E/P is the earnings-to-price ratio; D/P is the dividend-to-price ratio; E/E is the EBITDA-to-enterprise value ratio; and Size is the market capitalization of the company (ranked in ascending order). The holding period is 12 months. Top-Minus-Index is the average annual excess return of the equally weighted top 10% portfolio minus the average returns of equally-weighted universe (index). Jensen's Alpha is the annual alpha return of the top 10% portfolio with CAPM. 3-factor alpha is the annual alpha return of the top 10% portfolio regressed to Fama and French three-factor model. T-Values are calculated in relative to 0% excess return/alpha. T-Value stars represent 90% (*), 95% (**), and 99% (***) significance levels. Region neutral portfolio has the same relative amount of stocks in top 10% and bottom 10% portfolios from each continent (America, Europe, Africa, Asia).

Non-normalized

Panel A: Portfolio raw returns (EW)

	B/M		E/P		D/P		E/E		Size	
	Return	t-Value	Return	t-Value	Return	t-Value	Return	t-Value	Return	t-Value
Top-Minus-Index										
Mean excess return	18.02 %	11.20 ***	8.73 %	9.98 ***	-2.37 %	-1.24	10.43 %	11.32 ***	26.23 %	11.47 ***
Region neutral	17.04 %	18.06 ***	9.51 %	9.29 ***	0.84 %	0.83	9.38 %	10.79 ***	27.42 %	15.34 ***
America	4.03 %	2.22 **	14.44 %	2.86 ***	25.78 %	3.83 ***	12.55 %	5.49 ***	36.55 %	4.66 ***
Europe	14.44 %	4.99 ***	9.51 %	5.26 ***	-8.64 %	-4.58 ***	5.79 %	2.24 **	33.86 %	11.11 ***
Africa	20.13 %	9.42 ***	13.89 %	6.98 ***	7.44 %	5.04 ***	12.42 %	6.10 ***	7.96 %	6.14 ***
Asia	18.72 %	11.29 ***	8.08 %	7.88 ***	1.45 %	1.24	8.99 %	6.34 ***	26.53 %	10.68 ***

Panel B: Portfolio alphas (EW)

	B/M		E/P		D/P		E/E		Size	
	Alpha	t-Value	Alpha	t-Value	Alpha	t-Value	Alpha	t-Value	Alpha	t-Value
CAPM (Jensen)	15.53 %	4.79 ***	5.03 %	1.76 **	5.16 %	2.34 **	7.83 %	2.66 ***	26.53 %	8.22 ***
3-factor	0.19 %	0.06	2.11 %	0.73	1.25 %	0.56	6.91 %	2.34 **	7.25 %	2.24 **

Industry-normalized

Panel A: Portfolio raw returns (EW)

	B/M		E/P		D/P		E/E		Size	
	Return	t-Value	Return	t-Value	Return	t-Value	Return	t-Value	Return	t-Value
Top-Minus-Index										
Mean excess return	13.22 %	8.22 ***	7.83 %	7.39 ***	-0.96 %	-0.93	9.77 %	9.09 ***	25.49 %	11.46 ***
Region neutral	9.38 %	8.19 ***	8.34 %	8.80 ***	1.09 %	1.21	13.62 %	12.09 ***	27.72 %	13.98 ***
America	5.41 %	3.35 ***	11.35 %	2.35 **	26.38 %	3.92 ***	8.86 %	3.72 ***	35.91 %	4.42 ***
Europe	9.77 %	3.18 ***	8.99 %	4.93 ***	-9.41 %	-4.95 ***	3.78 %	2.24 **	32.77 %	8.77 ***
Africa	18.16 %	6.79 ***	13.62 %	6.65 ***	8.08 %	6.31 ***	7.70 %	4.09 ***	12.68 %	10.67 ***
Asia	8.60 %	5.91 ***	6.80 %	6.97 ***	2.18 %	1.98 **	16.08 %	9.90 ***	26.08 %	10.31 ***

Panel B: Portfolio alphas (EW)

	B/M		E/P		D/P		E/E		Size	
	Alpha	t-Value	Alpha	t-Value	Alpha	t-Value	Alpha	t-Value	Alpha	t-Value
CAPM (Jensen)	12.82 %	4.38 ***	3.91 %	1.32 *	2.30 %	1.07	7.57 %	2.57 ***	24.46 %	7.39 ***
3-factor	0.10 %	0.03	0.05 %	0.02	3.58 %	1.70 **	6.22 %	2.10 **	4.49 %	1.35 *

5.1.3 The difference of returns for non-normalized and industry normalized returns

In contrary to my expectations, industry normalization has mostly statistically significant negative impact on returns with 6-month holding period (See Table 12). The clearest difference can be found with B/M mean excess return difference (industry normalized return minus non-normalized return) which is -6.13%***. Mean excess return difference is negative also for E/P (-1.81%*), E/E (-1.33%), and Size (-0.15%). Similar results hold for most of the region neutral and regional portfolios. However, there are some exceptions to the rule: E/E strategy records positive industry normalization impact for region neutral portfolio (1.86%*) and Asia (4.13%***), and Size strategy records positive impact in Africa (3.65%**).

12-month holding period results are mostly similar to the results with 6-month holding period. Industry normalization has statistically significant negative impact on B/M (-4.80%***) mean excess returns. E/E factor records positive normalization impact for region neutral portfolio (4.24%***) and Asia (7.08%***).

Results indicate that the industry normalization does not work across markets, but in certain areas it can produce higher returns. One explanation for this could be that country level figures for a certain industry may vary and thus the normalization does not actually normalize the figures in an expected way.

Table 12: Difference of returns and alphas for industry normalized and non-normalized strategies (6- and 12-month holding periods)

Table below presents the difference of annual returns and alphas for industry normalized and non-normalized strategies for 6-month (above) and 12-month (below) holding periods. E.g. the Top-Minus-Index (TMI) mean excess return with 6-month holding period for B/M strategy (-6.13%) equals the annual industry normalized TMI mean excess B/M return (11.88%) minus the annual non-normalized TMI mean excess B/M return (18.02%) (See Table 10). Hence, negative percentage indicates that non-normalized strategy has higher return than the respective industry normalized strategy. B/M is the book-to-market ratio; E/P is the earnings-to-price ratio; D/P is the dividend-to-price ratio; E/E is the EBITDA-to-enterprise value ratio; and Size is the market capitalization of the company (ranked in ascending order). T-Values are calculated in relative to 0% excess return/alpha. T-Value stars represent 90% (*), 95% (**), and 99% (***) significance levels.

6-month holding

Panel A: Portfolio raw returns (EW)

	B/M		E/P		D/P		E/E		Size	
	Return	t-Value	Return	t-Value	Return	t-Value	Return	t-Value	Return	t-Value
Top-Minus-Index										
Mean excess return	-6.13 %	-3.74 ***	-1.81 %	-1.32 *	0.00 %	0.05	-1.33 %	-0.97	-0.15 %	-0.04
Region neutral	-8.63 %	-6.87 ***	-0.78 %	-0.65	0.48 %	0.31	1.86 %	1.37 *	0.75 %	0.33
America	0.40 %	0.14	-3.95 %	-1.46 *	0.48 %	0.25	-5.27 %	-1.69 **	-0.95 %	-0.16
Europe	-7.37 %	-1.57 *	0.66 %	0.27	-0.89 %	-0.48	-7.72 %	-3.62 ***	0.00 %	0.02
Africa	-2.69 %	-0.79	-1.46 %	-0.91	-0.50 %	-0.35	-3.72 %	-1.45 *	3.65 %	2.30 **
Asia	-10.66 %	-6.63 ***	-0.90 %	-0.67	1.22 %	0.76	4.13 %	2.42 ***	0.29 %	0.11

Panel B: Portfolio alpha difference (EW)

	B/M		E/P		D/P		E/E		Size	
	Alpha	t-Value	Alpha	t-Value	Alpha	t-Value	Alpha	t-Value	Alpha	t-Value
CAPM (Jensen)	-4.50 %	-1.37 *	-1.64 %	-0.45	0.60 %	0.22	-0.92 %	-0.23	-0.59 %	-0.14
3-factor	0.02 %	0.01	-0.14 %	-0.08	0.37 %	0.24	0.21 %	0.12	-0.08 %	-0.04

12-month holding

Panel A: Portfolio raw returns (EW)

	B/M		E/P		D/P		E/E		Size	
	Return	t-Value	Return	t-Value	Return	t-Value	Return	t-Value	Return	t-Value
Top-Minus-Index										
Mean excess return	-4.80 %	-3.05 ***	-0.90 %	-0.84	1.42 %	1.25	-0.66 %	-0.55	-0.74 %	-0.35
Region neutral	-7.66 %	-6.72 ***	-1.17 %	-1.26	0.24 %	0.34	4.24 %	3.75 ***	0.30 %	0.10
America	1.38 %	0.84	-3.08 %	-0.66	0.59 %	0.08	-3.69 %	-1.56 *	-0.64 %	-0.07
Europe	-4.66 %	-1.51 *	-0.52 %	-0.29	-0.77 %	-0.40	-2.00 %	-1.14	-1.09 %	-0.28
Africa	-1.97 %	-0.74	-0.27 %	-0.16	0.64 %	0.46	-4.72 %	-2.45 ***	4.73 %	3.95 ***
Asia	-10.11 %	-6.96 ***	-1.28 %	-1.19	0.73 %	0.68	7.08 %	4.37 ***	-0.45 %	-0.20

Panel B: Portfolio alpha difference (EW)

	B/M		E/P		D/P		E/E		Size	
	Alpha	t-Value	Alpha	t-Value	Alpha	t-Value	Alpha	t-Value	Alpha	t-Value
CAPM (Jensen)	-2.71 %	-0.91	-1.12 %	-0.38	-2.85 %	-1.41 *	-0.26 %	-0.09	-2.07 %	-0.62
3-factor	-0.09 %	0.00	-2.06 %	-0.06	2.33 %	0.09	-0.69 %	-0.02	-2.76 %	-0.07

5.1.4 Comparison to De Groot et al. (2012) results

De Groot et al. (2012) conducted a study and researched the return characteristics of S&P Frontier BMI index stocks between 1997 and 2008. As mentioned earlier in this study, their study included only limited amount of markets and only fairly large stocks (market cap), because they did not include stocks from outside the index. Thus, it is interesting to compare their results to mine to see how the return characteristics change when more markets and stocks are included. However, there is only a limited amount of comparison to be done due to the differences in the studies.

At the Table 13 shows, there are major differences in returns between the studies. B/M returns are clearly higher in this study compared to De Groot et Al (mean excess return: 18.02% vs 9.25%). However, it should be noted that in America the B/M returns are contrary to the rest of the results, i.e. this study shows a return of 4.03% and the study of De Groot et al. shows a return of 15.12%. Furthermore, size returns are clearly higher in this study for each region as well as for the whole area (mean excess return: 26.23% vs 2.80%). Size return difference can likely be largely explained by the fact that my data set included also smaller market capitalization stocks. E/P returns are lower in this study excluding America and Asia. Lastly, the returns with D/P factor have a significant difference. My assumption is that the D/P data was more complete and comprehensive (large cap stocks included in the index) in the study of De Groot et al. which could explain the differences.

Table 13: Comparison of results to the study of De Groot et al. (2012)

Table below presents the annual returns of B/M (book/market), E/P (earnings/price), D/P (dividend/price) and Size strategies with 12-month holding period. The returns in the columns "my study" are copied from Table 11 and the returns in the columns "De Groot et al." are copied (and annualized) from the study of De Groot et al. (2012). In 'This study' Top-Minus-Index is the average annual excess return of the equally weighted top 10% portfolio minus the average returns of equally-weighted universe (index). In the study of 'De Groot et Al.' Top-Minus-Index is the average annual excess return of the equally weighted top 20% portfolio minus the average returns of equally-weighted universe (index). Region neutral portfolio has the same relative amount of stocks in top 10% (20%) portfolios from each continent (America, Europe, Africa, Asia) as the rest of the stocks.

Panel A: Portfolio raw returns (EW)

	B/M return		E/P return		D/P return		Size return	
	My study	De Groot et Al.	My study	De Groot et Al.	My study	De Groot et Al.	My study	De Groot et Al.
Top-Minus-Index								
Mean excess return	18.02 %	9.25 %	8.73 %	16.21 %	-2.37 %	5.03 %	26.23 %	2.80 %
Region neutral	17.04 %	9.12 %	9.51 %	13.76 %	0.84 %	6.93 %	27.42 %	10.16 %
America	4.03 %	15.12 %	14.44 %	7.83 %	25.78 %	9.77 %	36.55 %	8.99 %
Europe	14.44 %	12.95 %	9.51 %	11.62 %	-8.64 %	-5.04 %	33.86 %	15.12 %
Africa	20.13 %	3.29 %	13.89 %	14.30 %	7.44 %	11.22 %	7.96 %	8.99 %
Asia	18.72 %	-2.96 %	8.08 %	6.17 %	1.45 %	-3.66 %	26.53 %	-3.89 %

5.1.5 Total returns graphs

The figures indicate that during a bearish stock market, the top portfolios for B/M, E/P and E/E do not seem to perform any better than the index. On the other hand, during a bullish stock market, the same top portfolio returns are systematically higher compared to index. For D/P strategy, there are no major conclusions to be presented based on the figure. Size strategy behaves very differently compared to the rest. Size strategy returns do not seem to be much affected by the financial crisis. This could be due to the fact that these small stocks (10% smallest stocks in the top portfolio) are likely very local and owned by local investors and thus not as badly affected as large international companies.

Figure 2: Total return of top and index portfolios with B/M (book/market) strategy (equally weighted portfolios)

Figures 2-6 show the total cumulative returns of the top portfolios (with non-normalized and industry normalized strategies) and index (average cumulative return with equal weighting) for each strategy with 12-month holding period for the investment period (12/2003 – 12/2013). Due to 6-month lag used with accounting data and 12-month holding period, the first annual returns are recorded in 6/2005.

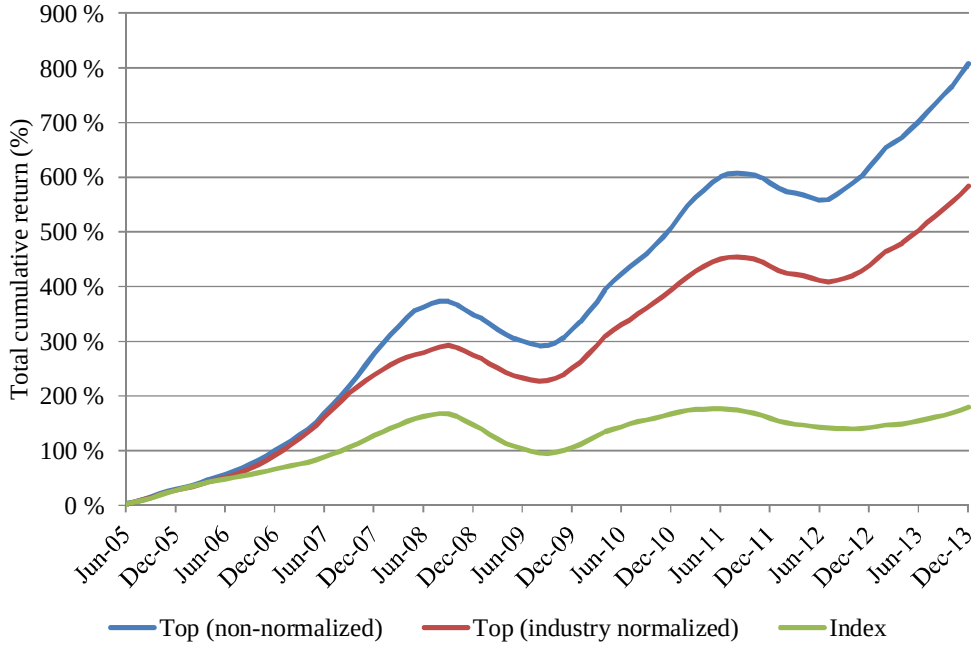


Figure 3: Total return of top and index portfolios with E/P (earnings/price) strategy (equally weighted portfolios)

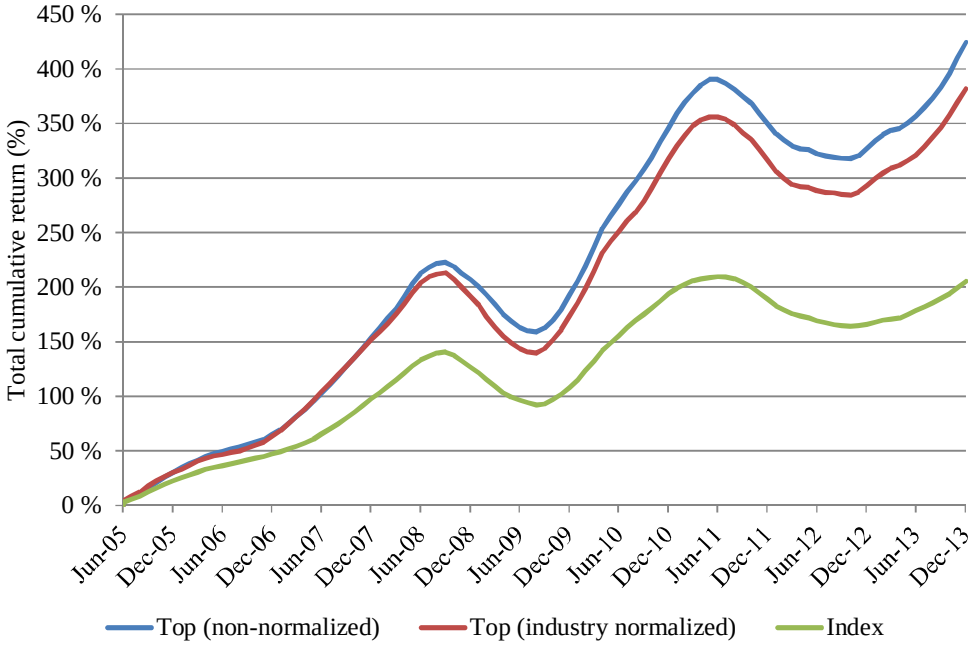


Figure 4: Total return of top and index portfolios with D/P (dividend/price) strategy (equally weighted portfolios)

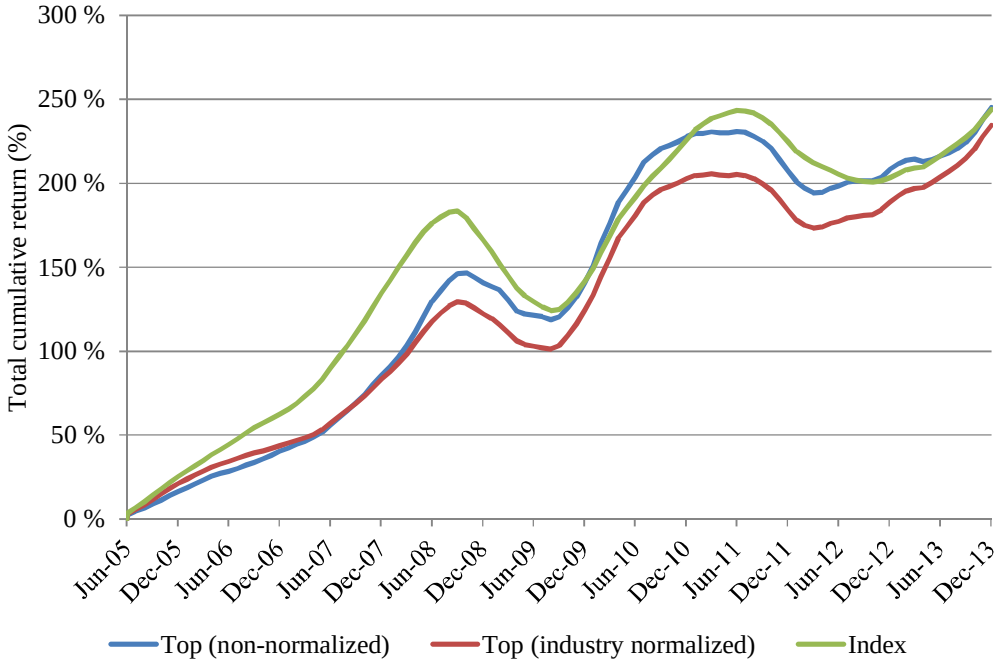


Figure 5: Total return of top and index portfolios with E/E (EBITDA/enterprise value) strategy (equally weighted portfolios)

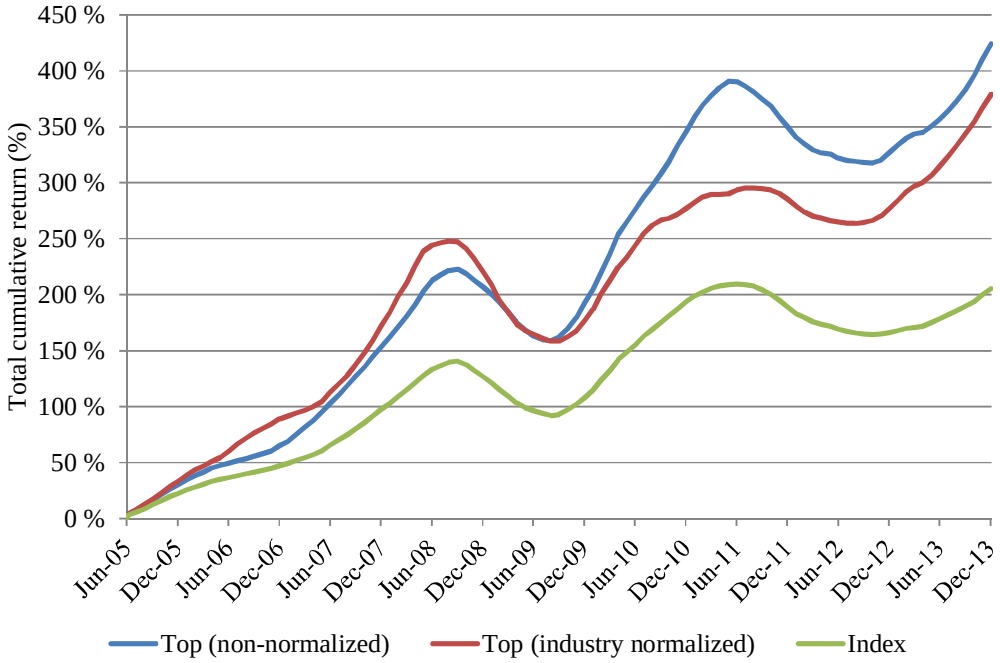
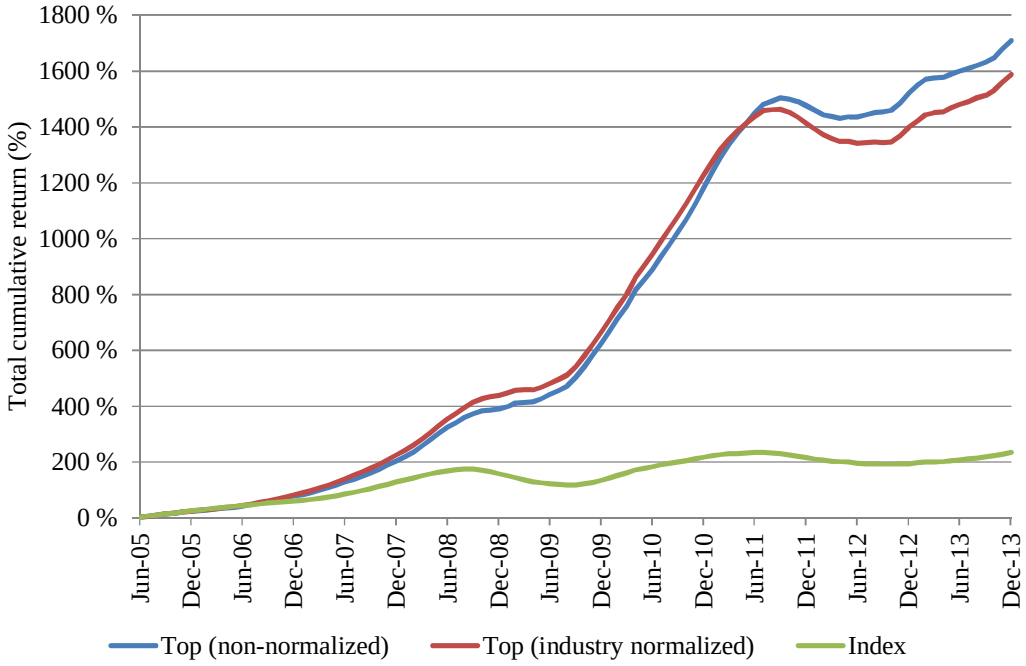


Figure 6: Total return of top and index portfolios with Size (market cap) strategy (equally weighted portfolios)



5.2 Stocks divided by market cap into three data sets

This chapter presents the results of portfolio sorting method with three different data sets. The stocks are equally divided into three data sets by market cap.

Table 14: Descriptive statistics for size portfolios

Size high includes the largest (market cap) third of stocks. Size middle includes the middle third of the stocks by market cap. Size low includes the smallest (market cap) third of the stocks. Beginning of the period is 12/2003 and end of the period is 12/2013. Average for the whole period is the average between 12/2003 and 12/2013.

Market cap (mUSD)	Size high		Size middle		Size low	
	Average	Median	Average	Median	Average	Median
Beginning of the period	547	118	18	11	4	2
End of the period	816	234	45	28	8	5
Average for the whole period	821	216	36	26	7	5

As the table above presents, the market cap difference between the Size middle and Size high data sets are much larger (in dollar terms) than between Size low and Size middle data sets. Size low data set companies are indeed micro-cap stocks.

The returns achieved with the strategies vary significantly between datasets. Even though the strategies create abnormal returns in each data set with almost all of the strategies, by far the highest excess returns and alphas are recorded in the Size middle data set. Surprisingly, Size high data set excess returns are much higher than Size low data set returns. The results are very similar with both 6- and 12-month holding periods.

The Size middle data set TMI mean excess returns are extremely high with 6-month holding period for B/M (26.59%***), E/P (15.52%***) and E/E (17.93%***). Jensen's Alphas are also very high for B/M (21.47%***) as well as for E/P (11.18%***) and E/E (16.54%***) strategies in Size middle data set. Even the D/P strategy creates statistically significant TMI returns in the Size middle data set.

The results indicate that Size middle (median size $26m) data set stocks offer great mispricing opportunities for investors.

Table 15: Returns of Size high, Size middle and Size low portfolios with non-normalized strategies[7] (6- and 12-month holding periods)

Table below presents an overview of the return characteristics of the top portfolios in each market cap category (high, middle, low) compared to index, CAPM, and Fama-French 3-factor-model. At the end of each month between December 2003 and June 2013, all the stocks with available information on the selected markets are ranked in descending order. B/M is the book-to-market ratio; E/P is the earnings-to-price ratio; D/P is the dividend-to-price ratio; and E/E is the EBITDA-to-enterprise value ratio. Size high includes the largest (market cap) third of stocks. Size middle includes the middle third of the stocks by market cap. Size low includes the smallest (by market cap) third of the stocks. Top-Minus-Index is the average annual excess return of the equally weighted top 10% portfolio minus the average returns of equally-weighted universe (index) in the particular market cap class (high, middle, low). Jensen's Alpha is the annual alpha return of the top 10% portfolio with Capital Asset Pricing Model. 3-factor alpha is the annual alpha return of the top 10% portfolio regressed to Fama French three-factor model. T-Values are calculated in relative to 0% excess return/alpha. T-Value stars represent 90% (*), 95% (**), and 99% (***) significance levels. Strategies are non-normalized.

6-months holding period — **Panel A: Portfolio raw returns (EW)**

	B/M		E/P		D/P		E/E	
	Return	t-Value	Return	t-Value	Return	t-Value	Return	t-Value
Top-Minus-Index								
Size high	16.89 %	8.14 ***	8.47 %	5.97 ***	-0.44 %	-0.32	10.40 %	7.12 ***
Size middle	26.59 %	9.02 ***	15.52 %	8.61 ***	5.56 %	2.69 ***	17.93 %	8.79 ***
Size low	9.63 %	2.66 ***	6.41 %	2.23 **	1.10 %	0.43	1.71 %	0.62

Panel B: Portfolio alphas (EW)

	B/M		E/P		D/P		E/E	
	Alpha	t-Value	Alpha	t-Value	Alpha	t-Value	Alpha	t-Value
Size high								
CAPM (Jensen)	14.53 %	3.47 ***	5.33 %	1.38 *	1.90 %	0.66	9.37 %	2.55 ***
3-factor	2.15 %	0.53	-1.31 %	-0.35	5.26 %	1.81 **	2.96 %	0.82
Size middle								
CAPM (Jensen)	21.47 %	4.52 ***	11.18 %	2.85 ***	4.71 %	1.32 *	16.54 %	4.30 ***
3-factor	-5.07 %	-1.14	3.31 %	0.86	-4.84 %	-1.39 *	11.36 %	2.99 ***
Size low								
CAPM (Jensen)	12.31 %	3.27 ***	5.78 %	1.28	-0.73 %	-0.18	2.47 %	0.62
3-factor	-9.46 %	-2.65 ***	-6.70 %	-1.53 *	-5.20 %	-1.26	1.30 %	0.33

12-months holding period — **Panel A: Portfolio raw returns (EW)**

	B/M		E/P		D/P		E/E	
	Return	t-Value	Return	t-Value	Return	t-Value	Return	t-Value
Top-Minus-Index								
Size high	14.91 %	8.67 ***	7.20 %	6.18 ***	-1.50 %	-1.27	9.39 %	8.56 ***
Size middle	24.88 %	9.98 ***	16.28 %	10.65 ***	4.86 %	3.00 ***	15.01 %	9.86 ***
Size low	10.16 %	5.22 ***	5.05 %	1.96 **	1.28 %	0.57	3.02 %	1.16

Panel B: Portfolio alphas (EW)

	B/M		E/P		D/P		E/E	
	Alpha	t-Value	Alpha	t-Value	Alpha	t-Value	Alpha	t-Value
Size high								
CAPM (Jensen)	11.39 %	3.25 ***	3.38 %	1.06	2.79 %	1.33 *	7.86 %	2.71 ***
3-factor	-1.13 %	-0.32	-0.29 %	-0.09	8.84 %	4.22 ***	0.39 %	0.14
Size middle								
CAPM (Jensen)	14.97 %	3.52 ***	10.21 %	3.09 ***	6.51 %	2.46 ***	11.02 %	3.42 ***
3-factor	-6.19 %	-1.46 *	8.06 %	2.44 ***	1.94 %	0.73	16.95 %	5.26 ***
Size low								
CAPM (Jensen)	11.53 %	4.31 ***	3.86 %	1.00	2.31 %	0.74	3.06 %	0.84
3-factor	-5.52 %	-2.06 **	-8.28 %	-2.14 **	1.60 %	0.51	17.34 %	4.75 ***

[7] The results for industry normalized strategies can be found from Appendix 3 and Appendix 4. Fama-French 3-factor coefficients can be found from Appendix 2.

5.3 Transaction cost incorporation

As hypothesized, most of the strategies were able to create abnormal returns with both 6- and 12-month holding periods. Not surprisingly, the highest returns (B/M and Size) can be found with the same strategies as with other tests. However, size returns seem to be extremely large in the Size high data set even after the transaction costs, the annual excess return is 36.28%***. This is somewhat surprising, as there are no micro-cap stocks in the data set. Excess returns for E/P and E/E are more conservative, 5.45%*** and 7.64%, respectively.

Moreover, unlike without transaction costs, D/P strategy actually now creates statistically significant negative mean excess returns (-3.25%***), but statistically significant positive 3-factor alpha (7.09%***). Excluding D/P, Fama-French three factor alphas are not statistically significant which indicates that the returns are largely explained by the HML, SMB and MKT-rf factors

Table 16: Portfolio sorting method: transaction cost incorporation (non-normalized variables)

Data set used is the Size high data set (largest third of the stocks by market cap). Results are presented for 6- and 12-month holding periods. Returns are presented as net returns (transaction costs deducted). Transaction costs per transaction are 2.5%. At the end of each month between December 2003 and June 2013, all the stocks with available information on the selected markets are ranked in descending order (excluding size, ascending order). B/M is the book-to-market ratio; E/P is the earnings-to-price ratio; D/P is the dividend-to-price ratio; E/E is the EBITDA-to-enterprise value ratio; and Size is the market capitalization of the company (ranked in ascending order). Top-Minus-Index is the average annual excess return of the equally weighted top 10% portfolio minus the average returns of equally-weighted universe (index). Jensen's Alpha is the annual alpha return of the top 10% portfolio with CAPM. 3-factor alpha is the annual alpha return of the top 10% portfolio regressed to Fama and French three-factor model. T-Values are calculated in relative to 0% excess return/alpha. T-Value stars represent 90% (*), 95% (**), and 99% (***) significance levels. All the strategies are non-normalized.

Panel A: Portfolio raw returns (EW)

	B/M		E/P		D/P		E/E		Size	
	Return	t-Value	Return	t-Value	Return	t-Value	Return	t-Value	Return	t-Value
Top-Minus-Index										
12-month	13.16 %	7.65 ***	5.45 %	4.68 ***	-3.25 %	-2.75 ***	7.64 %	6.97 ***	36.28 %	14.95 ***
6-month	13.14 %	6.38 ***	4.85 %	3.45 ***	-3.90 %	-2.84 ***	6.76 %	4.67 ***	27.84 %	9.61 ***

Panel B: Portfolio alphas (EW)

	B/M		E/P		D/P		E/E		Size	
	Alpha	t-Value	Alpha	t-Value	Alpha	t-Value	Alpha	t-Value	Alpha	t-Value
CAPM (Jensen)										
12-month	9.64 %	2.75 ***	1.63 %	0.51	1.04 %	0.50	6.11 %	2.10 **	32.40 %	8.07 ***
6-month	10.82 %	2.60 ***	1.77 %	0.46	-1.61 %	-0.56	5.74 %	1.57 *	25.75 %	5.45 ***
3-factor										
12-month	-2.88 %	-0.82	-2.04 %	-0.64	7.09 %	3.38 ***	-1.36 %	-0.47	1.90 %	0.47
6-month	-1.36 %	-0.34	-4.76 %	-1.27	1.70 %	0.59	-0.56 %	-0.16	-2.85 %	-0.64

5.4 Time Analysis

Portfolio time analysis shows clearly how the anomalies have in most part started to weaken over time as some previous studies have suggested (Mehdian and Perry, 2001; Wong et al., 2007).

The returns have statistically significant difference between the periods for each strategy excluding industry normalized E/P with 12-month holding period (TMI difference 1.05%). With B/M, E/P, E/E and Size strategies, the TMI returns have started to diminish in the second period (2008 – 2013) compared to the first period (2003 – 2008). However, with D/P, the returns have significantly increased in the second period (e.g. non-normalized D/P with 6-month holding period: TMI difference -5.39%***).

The largest differences are recorded for B/M and Size. TMI difference for B/M with 6-month holding period is 13.6%** and with 12-month holding period 10.50%***. TMI differences with size strategies are even larger. Industry-normalized size strategy records 16.83%*** TMI difference with 6-month holding period.

Table 17: TMI returns 2003 - 2008 and 2008 - 2013

Table presents an overview of the return characteristics of the top portfolio compared to index in two periods (31.12.2003 – 30.6.2008 and 31.7.2008 – 31.12.2013). Top-Minus-Index is the average annual excess return of the equally weighted top 10% portfolio minus the average returns of equally-weighted universe (index). "Difference" is the average TMI 2003-2008 return minus the average TMI 2008-2013 return. T-Values are calculated in relative to 0% excess return. B/M is the book-to-market ratio; E/P is the earnings-to-price ratio; D/P is the dividend-to-price ratio; E/E is the EBITDA-to-enterprise value ratio; and Size is the market capitalization of the company (ranked in ascending order). T-Value stars represent 90% (*), 95% (**), and 99% (***) significance levels.

6-month holding period - annual return - non-normalized

Portfolio raw returns (EW)

	B/M		E/P		D/P		E/E		Size	
	Return	t-Value	Return	t-Value	Return	t-Value	Return	t-Value	Return	t-Value
Top-Minus-Index										
2003 - 2008	25.57 %	8.84 ***	12.07 %	5.89 ***	-2.24 %	-1.13	15.96 %	6.35 ***	34.87 %	7.91 ***
2008 - 2013	10.65 %	6.95 ***	6.51 %	3.47 ***	3.31 %	1.27	8.77 %	6.95 ***	19.66 %	6.05 ***
Difference	13.60 %	5.03 ***	5.24 %	2.67 ***	-5.39 %	-2.78 ***	6.66 %	2.80 ***	12.91 %	3.31 ***

6-month holding period - annual return - industry normalized

Portfolio raw returns (EW)

	B/M		E/P		D/P		E/E		Size	
	Return	t-Value	Return	t-Value	Return	t-Value	Return	t-Value	Return	t-Value
Top-Minus-Index										
2003 - 2008	15.02 %	5.25 ***	9.20 %	4.22 ***	-3.53 %	-2.36 **	15.96 %	7.67 ***	36.53 %	8.29 ***
2008 - 2013	8.69 %	6.35 ***	5.62 %	3.21 ***	3.86 %	1.86 **	6.21 %	4.69 ***	17.10 %	5.70 ***
Difference	5.87 %	2.17 **	3.40 %	1.62 *	-7.14 %	-4.90 ***	9.22 %	4.61 ***	16.83 %	4.25 ***

12-month holding period - annual return - non-normalized

Portfolio raw returns (EW)

	B/M		E/P		D/P		E/E		Size	
	Return	t-Value	Return	t-Value	Return	t-Value	Return	t-Value	Return	t-Value
Top-Minus-Index										
2003 - 2008	23.57 %	7.85 ***	10.22 %	7.51 ***	-2.86 %	-1.43 *	13.60 %	9.17 ***	30.05 %	10.02 ***
2008 - 2013	13.08 %	11.30 ***	7.37 %	6.55 ***	1.51 %	1.12	7.52 %	7.45 ***	24.30 %	7.31 ***
Difference	10.50 %	3.50 ***	2.85 %	2.09 **	-4.38 %	-2.19 **	6.08 %	4.10 ***	5.76 %	1.92 **

12-month holding period - annual return - industry normalized

Portfolio raw returns (EW)

	B/M		E/P		D/P		E/E		Size	
	Return	t-Value	Return	t-Value	Return	t-Value	Return	t-Value	Return	t-Value
Top-Minus-Index										
2003 - 2008	16.35 %	5.05 ***	8.38 %	4.73 ***	-5.60 %	-3.76 ***	14.86 %	8.10 ***	32.00 %	10.99 ***
2008 - 2013	10.30 %	12.39 ***	7.33 %	5.78 ***	2.79 %	2.19 **	5.24 %	6.04 ***	20.14 %	6.60 ***
Difference	6.05 %	1.87 **	1.05 %	0.59	-8.39 %	-5.64 ***	9.61 %	5.24 ***	11.86 %	4.07 ***

5.5 Portfolio Sharpe ratios

As Table 18 presents, top portfolios are systematically able to create higher Sharpe ratios than index portfolios with each variable excluding D/P. Highest differences between index and top portfolio Sharpe ratios tend to be found with the same strategies and datasets as the highest excess returns i.e. B/M and Size.

Furthermore, following the previous results, Size middle Sharpe ratios are much higher than with all the strategies than Size high or Size low Sharpe ratios. Finally, Sharpe ratios are much higher in the first period (2003 – 2008) than in the second period (2008 – 2013).

As expected, Sharpe ratios do not reveal any surprising facts, but rather the Sharpe ratio results follow the other results presented in this Chapter for all the datasets and strategies.

Table 18: Sharpe ratios for top and index portfolios with 12-month holding period

Table presents the Sharpe ratios for each strategy with the tested datasets. B/M is the book-to-market ratio; E/P is the earnings-to-price ratio; D/P is the dividend-to-price ratio; E/E is the EBITDA-to-enterprise value ratio; and Size is the market capitalization of the company (ranked in ascending order). 'Top' is the top decile (10%) portfolio (when stocks are ranked on descending order with B/M, E/P, D/P, and E/E and on ascending order with Size). Index is the average equally weighted return with the strategy. 'Mean return' includes all the stocks. Region neutral portfolio has the same relative amount of stocks in top 10% from each continent (America, Europe, Africa, Asia) as in the rest of the dataset. America, Europe, Africa and Asia include only the stocks form the respective continent. Size high includes the largest (market cap) third of stocks. Size middle includes the middle third of the stocks by market cap. Size low includes the smallest (by market cap) third of the stocks. '2003-2008' and '2008-2013' indicate of the period when the strategies are tested (with all the stocks as with 'mean return').

	B/M		E/P		D/P		E/E		Size	
	Index	Top	Index	Top	Index	Top	Index	Top	Index	Top
Non-normalized (EW)										
Mean return	0.62	0.99	0.70	0.84	0.69	0.76	0.58	0.80	0.73	1.31
Region neutral	0.62	1.18	0.70	0.84	0.74	0.86	0.58	0.79	0.73	1.40
America	0.58	0.56	0.68	0.51	0.73	0.60	0.60	0.82	0.73	0.67
Europe	0.39	0.48	0.28	0.42	0.50	0.42	0.34	0.38	0.49	0.88
Africa	0.97	1.11	0.89	0.89	0.97	1.20	0.94	1.10	0.91	0.98
Asia	0.57	1.16	0.71	0.83	0.68	0.68	0.58	0.70	0.68	1.11
Size high	0.60	0.83	0.67	0.73	0.71	0.80	0.57	0.78	-	-
Size middle	0.70	0.94	0.75	0.98	0.86	0.93	0.68	0.94	-	-
Size low	0.39	0.70	0.55	0.51	0.75	0.61	0.32	0.31	-	-
2003 - 2008	0.80	1.17	0.86	1.01	1.07	1.19	0.64	0.89	1.03	1.97
2008 - 2013	0.47	1.00	0.56	0.70	0.56	0.52	0.52	0.76	0.56	0.94
Industry normalized (EW)										
Mean return	0.62	0.94	0.70	0.79	0.74	0.78	0.58	0.78	0.73	1.24
Region neutral	0.62	1.01	0.70	0.87	0.74	0.92	0.58	0.88	0.73	1.26
America	0.58	0.62	0.68	0.48	0.72	0.61	0.60	0.71	0.73	0.64
Europe	0.39	0.43	0.28	0.41	0.50	0.41	0.34	0.38	0.49	0.74
Africa	0.97	0.92	0.89	0.87	0.97	1.22	0.94	1.00	0.91	1.18
Asia	0.57	1.07	0.71	0.87	0.68	0.76	0.58	0.84	0.68	1.05
Size high	0.60	0.75	0.67	0.68	0.71	0.84	0.57	0.73	-	-
Size middle	0.70	0.97	0.75	0.94	0.86	0.99	0.68	0.94	-	-
Size low	0.39	0.71	0.55	0.48	0.75	0.64	0.32	0.26	-	-
2003 - 2008	0.80	1.09	0.86	0.91	1.07	1.13	0.64	0.90	1.03	2.04
2008 - 2013	0.47	0.92	0.56	0.68	0.56	0.60	0.52	0.74	0.56	0.85

5.6 Robustness discussion

5.6.1 Missing data and investability of the stocks

There are some issues with the robustness of the results from investor's point of view. First, the data coverage is very low due to missing data especially compared to developed markets. Second, historical capital constrain – the tested markets have most likely not always been as open for foreign investors as they currently are (e.g. UAE stock markets have been constantly changing into more foreign investor friendly). The second issue suggests that some of the stocks in the top decile portfolio (where the money is invested) may not have been investible at the time of the investment.

5.6.2 Downside risk and potential heteroscedasticity

Downside risk analysis shows that 85% of all the skewness values are positive and 15% negative. From the kurtosis values 69% are positive and 31% negative. Positive kurtosis indicates of more variance in the returns as mean and variance can capture. Positive skewness indicates of a fatter right side tail i.e. deviation from normality is due to large upward potential. Therefore, the downside risk analysis indicates that instead of increased downside risk, there is actually excessively large upside potential with the returns.

Heteroscedasticity of the data is not relevant for mean excess returns. Heteroscedasticity does not affect CAPM and Fama-French three factor alphas, but it could potentially affect CAPM and Fama-French three factor regressions t-Values. However, as previous studies have not taken this into account, I will also exclude it as it is does not impact the main results.

Table 19: Downside risk: volatility, skewness, and kurtosis

B/M is the book-to-market ratio; E/P is the earnings-to-price ratio; D/P is the dividend-to-price ratio; E/E is the EBITDA-to-enterprise value ratio; and Size is the market capitalization of the company. 'All stocks' includes all the stocks in the whole period. Size high includes the largest (market cap) third of stocks. Size middle includes the middle third of the stocks by market cap. Size low includes the smallest (by market cap) third of the stocks. '2003-2008' and '2008-2013' sets include only the stocks traded on the particular period. 6m is 6-month holding period. 12m is 12-month holding period.

Data set: All stocks

	B/M		E/P		D/P		E/E		Size	
	6m	12m	6m	12m	6m	12m	6m	12m	6m	12m
Average	19 %	18 %	10 %	7 %	1 %	2 %	13 %	16 %	26 %	26 %
Volatility	20 %	16 %	15 %	10 %	18 %	11 %	16 %	16 %	30 %	26 %
Skewness	1.60	1.05	0.75	0.41	1.46	0.26	1.54	0.97	0.67	0.60
Kurtosis	3.37	0.48	0.12	0.25	2.94	0.96	3.41	1.69	-0.05	-0.23

Data set: Size high stocks

	B/M		E/P		D/P		E/E	
	6m	12m	6m	12m	6m	12m	6m	12m
Average	18 %	15 %	9 %	7 %	0 %	-1 %	11 %	9 %
Volatility	23 %	17 %	15 %	12 %	14 %	12 %	16 %	11 %
Skewness	0.46	0.63	0.90	0.16	-0.39	-0.85	1.12	0.40
Kurtosis	-0.50	-0.54	1.77	0.07	0.98	0.10	3.38	-0.78

Data set: Size middle stocks

	B/M		E/P		D/P		E/E	
	6m	12m	6m	12m	6m	12m	6m	12m
Average	29 %	25 %	16 %	16 %	7 %	5 %	19 %	15 %
Volatility	35 %	25 %	20 %	16 %	23 %	16 %	23 %	15 %
Skewness	1.71	1.28	1.56	0.73	1.24	0.14	1.13	1.03
Kurtosis	3.70	1.62	5.27	0.05	3.08	-0.21	0.69	0.98

Data set: Size low stocks

	B/M		E/P		D/P		E/E	
	6m	12m	6m	12m	6m	12m	6m	12m
Average	13 %	10 %	9 %	5 %	3 %	1 %	4 %	3 %
Volatility	39 %	20 %	36 %	26 %	30 %	23 %	26 %	26 %
Skewness	1.00	0.10	3.68	1.87	1.87	0.82	-1.15	-0.17
Kurtosis	3.22	-0.33	19.41	5.00	3.79	0.33	1.01	2.48

Data set: Time analysis (12-month holding period)

	B/M		E/P		D/P		E/E		Size	
	2003-2008	2008-2013	2003-2008	2008-2013	2003-2008	2008-2013	2003-2008	2008-2013	2003-2008	2008-2013
Average	24 %	29 %	24 %	15 %	24 %	4 %	14 %	16 %	28 %	60 %
Volatility	21 %	19 %	21 %	18 %	21 %	20 %	10 %	16 %	22 %	64 %
Skewness	0.38	0.51	0.38	0.96	0.38	0.59	0.53	-0.43	-0.15	1.05
Kurtosis	-1.12	-0.82	-1.12	1.14	-1.12	0.23	-1.01	-0.64	-0.62	0.64

Data set: Time analysis (6-month holding period)

	B/M		E/P		D/P		E/E		Size	
	2003-2008	2008-2013	2003-2008	2008-2013	2003-2008	2008-2013	2003-2008	2008-2013	2003-2008	2008-2013
Average	12 %	11 %	12 %	9 %	12 %	4 %	8 %	9 %	14 %	21 %
Volatility	10 %	12 %	10 %	17 %	10 %	20 %	9 %	9 %	14 %	26 %
Skewness	0.97	0.53	0.97	1.64	0.97	1.69	0.97	-0.09	-0.01	1.32
Kurtosis	0.80	-0.05	0.80	4.38	0.80	2.98	0.70	-0.93	-0.84	2.04

5.7 Summary of results

Table 20: Summary of results

B/M is the book-to-market ratio; E/P is the earnings-to-price ratio; D/P is the dividend-to-price ratio; and E/E is the EBITDA-to-enterprise value ratio.

H1	Fundamental trading strategies lead to abnormal returns before transaction costs in frontier markets		
	B/M	H_0 Accepted	
	E/P	H_0 Accepted	
	D/P	H_0 *Rejected*	Exception: Africa (6m, 12m), America (12m)
	E/E	H_0 Accepted	
H2	By normalizing industry figures, higher abnormal returns can be achieved		
	B/M	H_0 *Rejected*	
	E/P	H_0 *Rejected*	
	D/P	H_0 *Rejected*	
	E/E	H_0 *Rejected*	Exception: Region neutral (6m, 12m), Asia (6m. 12m)
H3	Fundamental trading strategies lead to abnormal returns after transaction costs in frontier markets		
	B/M	H_0 Accepted	
	E/P	H_0 Accepted	
	D/P	H_0 *Rejected*	
	E/E	H_0 Accepted	
H4	Large cap stock offer less mispricing compared to stocks with lower market cap		
	B/M	H_0 Accepted / *Rejected*	
	E/P	H_0 Accepted / *Rejected*	
	D/P	H_0 Accepted / *Rejected*	
	E/E	H_0 Accepted / *Rejected*	
H5	Abnormal returns have started to diminish later in the sample period in frontier markets		
	B/M	H_0 Accepted	
	E/P	H_0 Accepted	
	D/P	H_0 *Rejected*	
	E/E	H_0 Accepted	

6. Conclusions

Numerous studies have shown that investors can achieve abnormal returns in emerging and developed markets by using fundamental trading strategies (e.g. value strategies such as book/market or earnings/price). Studies argue that value strategies work, because of 'naïve' strategies used by typical investors and extrapolation of past returns. The purpose of this thesis was to find out whether investors could achieve abnormal returns in frontier markets by using four different value strategies, which are book/market (B/M), earnings/price (E/P), dividend/price (D/P), and EBITDA/enterprise value (E/E).

This is the first paper to study value strategies for all investible stocks in extended frontier markets between 2003 and 2013. This study documents significant unexplained returns showing that with 6- and 12-month holding periods, B/M, E/P and E/E strategies lead to statistically significant excess and abnormal returns. This study shows that industry normalization has statistically significant negative impact on the returns with B/M, E/P and E/E strategies. Moreover, this study documents that small cap stocks offer greater mispricing compared to micro or large cap stocks. Finally, this study documents that the abnormal returns have started to significantly diminish later in the sample period.

Where should an investor invest his money today? That is the most crucial question for millions of investors who are seeking abnormal returns across the markets. Frontier markets are extremely challenging market place due to language barriers, foreign ownership limitations, and lack of transparency in accounting standards. In addition, country specific risks are driven by unstable political, economic and regulatory environments. However, as this study shows, frontier markets offer excellent diversification benefits as well as great opportunities to achieve excessive abnormal returns. In the following, I present some key guidelines that investors can take advantage of when investing in frontier markets.

(1) Industry normalization does not work across frontier markets

By normalizing strategies, an investor most likely ends up picking stocks from more industries than without normalization. However, the results across the market indicate that instead of normalization, an investor should pick stocks with the 'best' absolute values (e.g.

top 10% highest book/market stocks) even though this might mean that he ends up having substantial amount of stocks from one industry. The reason why industry normalization does not work as the hypothesis suggests might be that the levels of industry averages may change substantially between countries. As a result the industry figures get mixed across countries and continents and the normalization loses its original impact.

(2) Small cap stocks offer highest abnormal returns

With all the tested strategies, Size middle stock set (end of period median market cap of $28 million) offers most favorable mispricing. Top-minus-index (TMI) mean excess returns as high as 25% (before transaction costs) were achieved with book/market strategy in the Size middle stock set. Therefore, with value strategies, an investor should focus on the stocks with market cap of 15 to 80 million USD.

(3) Book/market is the best value strategy in dollar return terms

From the tested value strategies, book/market strategy offers constantly highest TMI mean excess returns. During the whole period, book/market strategy generated 13.16% annual excess return over the index after the transaction costs. During the later testing period (2008 – 2013), across all of the frontier markets, book/market strategy generated 13.08% annual excess return over the index (before transaction costs). In addition to book/market strategy, earnings/price and EBITDA/enterprise strategies also offer significant excess returns – however, the excess returns are not even close to as large as book/market strategy returns. Finally, dividend/price strategy works well in America, but when all the frontier stocks are included across the continents, it tends to generate negative excess returns.

(4) 12-month holding period is slightly better than 6-month holding period

The returns after transaction costs are somewhat higher with 12-month holding period compared to 6-month holding period. However, there are continent specific variations in the results. As a general rule, taken into account the invested time as well as transaction costs, an investor should in most cases hold onto 12-month holding period when investing in frontier markets.

(5) Choose the right strategy for each continent

There is very large volatility of returns between different strategies and between the continents. African, European and Asian frontier countries tend to offer systematically better mispricing opportunities compared to American frontier countries with book/market strategy. Africa succeeds well with both 6- and 12-month holding periods (TMI annual mean excess returns (before transaction costs) of 21.13% and 20.13%, respectively), but Europe is very strong with 6-month holding period (TMI annual mean excess return (before transaction costs) of 23.58%). Even though majority of the strategies do not generate as high returns in America as in other continents, D/P strategy generates 25.78% top-minus-index mean excess return before transaction costs in America. The results indicate that investor should carefully study the return characteristics of the strategies in each continent and choose the right strategy for the right continent. Diversification is one of the key aspects in frontier markets due to country specific risks.

This study shows that by carefully following these guidelines, an investor would have achieved very excessive abnormal returns in the past ten years. However, there is no certainty that the same strategies and markets that worked yesterday will work tomorrow.

For future studies, it would be interesting to investigate value strategies in individual countries with shorter time periods (e.g. 3-year time periods). That would allow to examine how quickly the market characteristics change and if there are any trends that could be concluded from the strategies across and within the frontier markets. Additionally, as industry normalization decreased the returns across the markets and in most of the individual continents, it would be interesting subject to study whether industry normalization has positive return impact within individual frontier countries. Finally, the relation between the variable and stock returns is an interesting subject to a future study. These marginal effects of value strategies could be revealed by running cross-sectional regressions of stocks and variables hypothesized to explain the returns.

7. References

Abeysekera, Sarath P., 2001, Efficient Markets Hypothesis and the Emerging Capital Market in Sri Lanka: Evidence from the Colombo Stock Exchange - A Note, Journal of Business Finance & Accounting 28, 249-261.

Abraham, A., F. J. Seyyed, and S. A. Alsakran, 2002, Testing the Random Walk Behavior and Efficiency of the Gulf Stock Markets, Financial Review 37, 469-480.

Aga, Mehmet, and Berna Kocaman, 2008, Efficient Market Hypothesis and Emerging Capital Markets: Empirical Evidence from Istanbul Stock Exchange, International Research Journal of Finance & Economics , 131-144.

Al-Ahmad, Zeina, 2012, Testing the Weak Form Efficiency of the Damascus Securities Exchange, International Research Journal of Finance & Economics , 154-165.

Al-Jafari, Mohamed, 2011, Random Walks and Market Efficiency Tests: Evidence from Emerging Equity Market of Kuwait, European Journal of Economics, Finance & Administrative Sciences , 19-28.

Anderson, Keith, and Chris Brooks, 2006, The Long-Term Price-Earnings Ratio, Journal of Business Finance & Accounting 33, 1063-1086.

Asness, Clifford S., Tobias J. Moskowitz, and Lasse H. Pedersen, 2013, Value and Momentum Everywhere, Journal of Finance 68, 929-985.

Athanassakos, George, 2009, Value versus Growth Stock Returns and the Value Premium: The Canadian Experience 1985--2005, Canadian Journal of Administrative Sciences (Canadian Journal of Administrative Sciences) 26, 109-121.

Balduzzi, Pierluigi, and Anthony W. Lynch, 1999, Transaction costs and predictability: some utility cost calculations, Journal of Financial Economics 52, 47-78.

Baldwin, William, 2014, Is Your Fund Trading Too Much? Forbes 193, 64-64.

Barber, Brad M., and John D. Lyon, 1997, Firm Size, Book-to-Market Ratio, and Security Returns: A Holdout Sample of Financial Firms, Journal of Finance 52, 875-883.

Beaver, William, and Dale Morse, 1978, What Determines Price-Earnings Ratios? Financial Analysts Journal 34, 65-76.

Berger, Dave, Kuntara Pukthuanthong, and J. Jimmy Yang, 2011, International diversification with frontier markets, Journal of Financial Economics 101, 227-242.

Black, Fischer, and Robert Litterman, 1992, Global Portfolio Optimization, Financial Analysts Journal 48, 28-43.

Blitz, David C., and VAN VLIET PIM, 2008, Global Tactical Cross-Asset Allocation: Applying Value and Momentum Across Asset Classes, Journal of Portfolio Management 35, 23-38.

Campbell, J. Y., John Y. Campbell, R. J. Shiller, and Robert J. Shiller, 1988, The dividend-price ratio and expectations of future dividends and discount factors, Review of Financial Studies 1.

Chan, Louis K. C., Yasushi Hamao, and Josef Lakonishok, 1991, Fundamentals and Stock Returns in Japan, Journal of Finance 46, 1739-1764.

Cheung, Joseph K., Richard Chung, and Jeong-Bon Kim, 1997, The Profitability of Trading Strategies Based on Book Value and Earnings in Hong Kong: Market Inefficiency vs. Risk Premia, Journal of International Financial Management & Accounting 8, 204-233.

Chien-Ping Chen, and Massoud Metghalchi, 2012, Weak-Form Market Efficiency: Evidence from the Brazilian Stock Market, International Journal of Economics & Finance 4, 22-32.

Cuñat, Javier, 2012, Africa Means Business: Opportunities in Frontier Markets, INSEAD Knowledge Publications , 1-3.

Daouk and Charoenrook, 2009, A Study of Market-Wide Short-Selling Restrictions, Working paper in Cornell University

Daniel, Kent, and Sheridan Titman, 1997, Evidence on the Characteristics of Cross Sectional Variation in Stock Returns, Journal of Finance 52, 1-33.

De Groot, W., Pang, J., Swinkelrs, Laurens, 2012, The Cross Section of Stock Returns in the Frontier Emerging Markets, Journal of Empirical Finance, Vol. 19, Issue 5, 796-818.

De Groot, Wilma, Joop Huij, and Weili Zhou, 2012b, Another look at trading costs and short-term reversal profits, Journal of Banking & Finance 36, 371-382.

De Roon, Frans A., Theo E. Nijman, and Bas J. M. Werker, 2001, Testing for Mean-Variance Spanning with Short Sales Constraints and Transaction Costs: The Case of Emerging Markets, Journal of Finance 56, 721-742.

Dong-Hyun Ahn, Jennifer Conrad, and Robert F. Dittmar, 2003, Risk Adjustment and Trading Strategies, Review of Financial Studies 16, 459-485.

Dowen, Richard J., 1988, Beta, non-systematic risk and portfolio selection, Applied Economics 20, 221.

Driessen, Joost, and Luc Laeven, 2007, International portfolio diversification benefits: Cross-country evidence from a local perspective, Journal of Banking & Finance 31, 1693-1712.

Duc, Khuong N., and Patrice Fontaine, 2006, Stock market liberalization and informational efficiency in emerging markets: new consideration and tests, Banque et Marchés , 6-17.

Fama, Eugene F., and Kenneth F. French, 1995, Size and Book-to-Market Factors in Earnings and Returns, Journal of Finance 50, 131-155.

Fama, Eugene F., and Kenneth R. French, 2007, The Anatomy of Value and Growth Stock Returns, Financial Analysts Journal 63, 44-54.

Fama, Eugene F., and Kenneth R. French, 2004, The Capital Asset Pricing Model: Theory and Evidence, Journal of Economic Perspectives 18, 25-46.

Fama, Eugene F., and Kenneth R. French, 1992, The Cross-Section of Expected Stock Returns, Journal of Finance 47, 427-465.

Fama, Eugene F., and Kenneth R. French, 2008, Dissecting Anomalies, Journal of Finance 63, 1653-1678.

Fama, Eugene F., and Kenneth R. French, 2011, Luck versus Skill in the Cross-Section of Mutual Fund Returns, CFA Digest 41, 57-59.

Fama, Eugene F., and Kenneth R. French, 2012, Size, value, and momentum in international stock returns, Journal of Financial Economics 105, 457-472.

Fama, Eugene F., and Kenneth R. French, 1998, Value versus Growth: The International Evidence, Journal of Finance 53, 1975-1999.

Fama, Eugene F., and James D. MacBeth, 1973, Risk, Return, and Equilibrium: Empirical Tests, Journal of Political Economy 81, 607.

Fama, Eugene F., 1970, Efficient Capital Markets: a Review of Theory and Empirical Work, Journal of Finance 25, 383-417.

Fama, Eugene F., 1991, Efficient Capital Markets: II, Journal of Finance 46, 1575-1617.

Fama, Eugene F., 1996, Multifactor Portfolio Efficiency and Multifactor Asset Pricing, Journal of Financial & Quantitative Analysis 31, 441-465.

Fama, Eugene F., 1965, Random Walks in Stock Market Prices, Financial Analysts Journal 21, 55-59.

Fama, Eugene F., 1968, Risk, Return and Equilibrium: some Clarifying Comments, Journal of Finance 23, 29-40.

Fatnassi, Latifa, and Ezzeddine Abaoub, 2011, An Analysis of the Predictability of Asset Returns: A Case of Six Emerging Stock Markets of Asia, IUP Journal of Applied Finance 17, 57-67.

Fifield, S. G. M., D. M. Power, and D. G. S. Knipe, 2008, The performance of moving average rules in emerging stock markets, Applied Financial Economics 18, 1515-1532.

Financial Markets Efficiency: Empirical Evidence form some Middle East & North Africa Countries (MENA), 2010, International Research Journal of Finance & Economics , 172-184.

Fitch, S., 2002, P/Es for the Smart Money, Forbes 169 (11), 184-186.

Fortin, Rich, and Greg Roth, 2010, Small Firm Governance and Analyst Following, Academy of Accounting & Financial Studies Journal 14, 47-57.

Frontier Market Strategy: Further Downside In Store, 2011, Emerging Markets Monitor 17, 7-7.

Frontier Markets Beckon Investors, 2008, Kiplinger's Personal Finance 62, 15-16.

Goetzmann, William N., Lingfeng Li, and K. G. Rouwenhorst, 2005, Long-Term Global Market Correlations, Journal of Business 78, 1-38.

Graham, B., Dodd, D.L., 1934. Security Analysis,. New York: Whittlesey House, McGraw-Hill Book Co.

Griffin, John M., Xiuqing Ji, and J. S. Martin, 2004, Global Momentum Strategies, Journal of Portfolio Management 31, 23-39.

Griffin, John M., Patrick J. Kelly, and Federico Nardari, 2010, Do Market Efficiency Measures Yield Correct Inferences? A Comparison of Developed and Emerging Markets, Review of Financial Studies 23, 3225-3277.

Griffin, John M., J. I. XIUQING, and J. S. MARTIN, 2003, Momentum Investing and Business Cycle Risk: Evidence from Pole to Pole, Journal of Finance 58, 2515-2547.

Griffin, John M., 2002, Are the Fama and French Factors Global or Country Specific? Review of Financial Studies 15, 783-803.

Hayes, Rachel M., 1998, The Impact of Trading Commission Incentives on Analysts' Stock Coverage Decisions and Earnings Forecasts, Journal of Accounting Research 36, 299-320.

Investing in Africa: The Ultimate Frontier Market, 2010, Wall Street Transcript 186, 2-5.

Jaradat, Mahmoud A., and Hussein Al-Zeaud, 2011, Testing the Weak-Form Efficiency of Amman Stock Exchange, International Research Journal of Finance & Economics , 93-97.

Jayasuriya, Shamila A., and William Shambora, 2009, Oops, we should have diversified! Applied Financial Economics 19, 1779-1785.

Jegadeesh, Narasimhan, and Sheridan Titman, 1993, Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency, Journal of Finance 48, 65-91.

Kane, Alex, Alan J. Marcus, and Jaesun Noh, 1996, The P/E Multiple and Market Volatility, Financial Analysts Journal 52, 16-24.

Kawakatsu, Hiroyuki, and Matthew R. Morey, 1999, An empirical examination of financial liberalization and the efficiency of emerging market stock.. Journal of Financial Research 22, 385.

Kearney, Colm, 2012, Emerging markets research: Trends, issues and future directions, Emerging Markets Review 13, 159-183.

Kumar, Rakesh, and Raj S. Dhankar, 2009, Asymmetric Volatility and Cross Correlations in Stock Returns under Risk and Uncertainty, Vikalpa: The Journal for Decision Makers 34, 25-36.

La Porta, Rafael, Josef Lakonishok, Andrei Shleifer, and Robert Vishny, 1997, Good News for Value Stocks: Further Evidence on Market Efficiency, Journal of Finance 52, 859-874.

Lakonishok, Josef, Andrei Shleifer, and Robert W. Vishny, 1994, Contrarian Investment, Extrapolation, and Risk, Journal of Finance 49, 1541-1578.

Lean, Hooi H., Russell Smyth, and Wing-Keung Wong, 2007, Revisiting calendar anomalies in Asian stock markets using a stochastic dominance approach, Journal of Multinational Financial Management 17, 125-141.

Lintner, John, 1965, Security Prices, Risk, and Maximal Gains from Diversification, Journal of Finance 20, 587-615.

Lintner, John, 1965, The Valuation of Risk Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budgets, Review of Economics & Statistics 47, 13.

Liu, Ming, Qianqiu Liu, and Tongshu Ma, 2011, The 52-week high momentum strategy in international stock markets, Journal of International Money and Finance 30, 180-204.

Lynch, Anthony W., and Pierluigi Balduzzi, 2000, Predictability and Transaction Costs: The Impact on Rebalancing Rules and Behavior, Journal of Finance 55, 2285-2309.

Magnusson, Magnus A., and Bruce Wydick, 2002, How Efficient are Africa's Emerging Stock Markets? Journal of Development Studies 38, 141.

Majumder, Debasish, 2012, When the market becomes inefficient: Comparing BRIC markets with markets in the USA, International Review of Financial Analysis 24, 84-92.

Markowitz, Harry, 1952, Portfolio Selection, Journal of Finance 7, 77-91.

Marshall, B.R., Nguyen, N.H., Visaltanachoti, N., 2011. Frontier Market Diversification and Transaction Costs, working paper available on: http://www.nzfc.ac.nz/archives/2012/papers/updated/11.pdf

McCormick, Ty, 2013, Frontier Markets, Foreign Policy , 24-25.

McNichols, Maureen, and Patricia C. O'Brien, 1997, Self-Selection and Analyst Coverage, Journal of Accounting Research 35, 167-199.

Mehdian, Seyed, and Mark J. Perry, 2001, The Reversal of the Monday Effect: New Evidence from US Equity Markets, Journal of Business Finance & Accounting 28, 1043-1065.

Minović, Jelena Z., and Boško R. Živković, 2010, Open Issues in Testing Liquidity in Frontier Financial Markets: the Case of Serbia, Ekonomski Anali / Economic Annals 55, 33-62.

Mollah, A. S., 2007, Testing Weak-Form Market Efficiency in Emerging Market:: Evidence from Botswana Stock Exchange, International Journal of Theoretical & Applied Finance 10, 1077-1094.

Moskowitz, Tobias J., and Mark Grinblatt, 1999, Do Industries Explain Momentum? Journal of Finance 54, 1249-1290.

Moskowitz, Tobias J., Yao H. Ooi, and Lasse H. Pedersen, 2012, Time series momentum, Journal of Financial Economics 104, 228-250.

Nai-fu Chen, and Feng Zhang, 1998, Risk and Return of Value Stocks, Journal of Business 71, 501-535.

Nicholson, S. F., 1968, Price Ratios in Relation to Investment Results, Financial Analysts Journal 24, 105-109.

Odier, Patrick, and Bruno Solnik, 1993, Lessons for International Asset Allocation, Financial Analysts Journal 49, 63-77.

Ohlson, James A., 1995, Earnings, Book Values, and Dividends in Equity Valuation, Contemporary Accounting Research 11, 661-687.

Ohlson, James A., 2001, Earnings, Book Values, and Dividends in Equity Valuation: An Empirical Perspective, Contemporary Accounting Research 18, 107-120.

Ohlson, James, and Zhan Gao, 2006, Earnings, Earnings Growth and Value, Foundations & Trends in Accounting 1, 1-70.

Olsen, Robert, 2012, Frontier Market Realities: Riotous, Risky And Richly Rewarding, Forbes.com , 35-35.

Petajisto, Antti, 2013, Active Share and Mutual Fund Performance, Financial Analysts Journal 69, 73-93.

Piotroski, Joseph D., 2000, Value Investing: The Use of Historical Financial Statement Information to Separate Winners from Losers, Journal of Accounting Research 38, 1-41.

Quisenberry JR, ,Clifford, and Benjamin Griffith, 2010, Frontier Equity Markets: A Primer on the Next Generation of Emerging Markets, Journal of Wealth Management 13, 50-58.

Quisenberry, C., 2010b. Exploring the Frontier Emerging Equity Markets. CFA Institute, December 2010, www.CFApubs.org

Rehman, Awais U., Mubashar Masood, Saleem Arshed, and Syed Z. A. Shah, 2012, Evaluation of Weak Form of Efficiency: An Empirical Study of Emerging South Asian Stock Markets, International Research Journal of Finance & Economics , 124-131.

Rouwenhorst, K. G., 1999, Local Return Factors and Turnover in Emerging Stock Markets, Journal of Finance 54, 1439-1464.

Rouwenhorst, K. G., 1998, International Momentum Strategies, Journal of Finance 53, 267-284.

Saeed, Syed K., Shahid M. Sargana, and Usman Ayub, 2011, Are Equity markets Efficient? Evidence from Emerging Economy, Interdisciplinary Journal of Contemporary Research in Business 3, 417-428.

Samarakoon, Lalith P., 2011, Stock market interdependence, contagion, and the U.S. financial crisis: The case of emerging and frontier markets, Journal of International Financial Markets, Institutions & Money 21, 724-742.

Sharpe, William F., 1964, Capital Asset Prices: a Theory of Market Equilibrium Under Conditions of Risk, Journal of Finance 19, 425-442.

Speidell, Lawrence S., 2008, Diversification Snapshot: Frontier Markets in a Troubled World, Journal of Investing 17, 7-10.

Speidell, Lawrence S., 2009, Investing in the Unknown and the Unknowable—Behavioral Finance in Frontier Markets, Journal of Behavioral Finance 10, 1-8.

Speidell, Lawrence S., and Axel Krohne, 2007, The Case for Frontier Equity Markets, Journal of Investing 16, 12-22.

Statman, M., Countries and Culture in Behavioral Finance, 2008. CFA Institute, September 2009, www.CFApubs.org

Stocker, Marshall L., 2005, Equity Returns and Economic Freedom, CATO Journal 25, 583-594.

Tobin, J., 1958, Liquidity Preference as Behavior Towards Risk, The Review of Economic Studies 25, 65-86.

White, C. B., 2000, What P/E Will the U.S. Stock Market Support? Financial Analysts Journal 56, 30.

Wójcik, Dariusz, Nicholas Kreston, and Sarah McGill, 2013, Freshwater, saltwater and deepwater: efficient market hypothesis versus behavioural finance, Journal of Economic Geography 13, 257-277.

You, Leyuan, and Robert T. Daigler, 2010, Is international diversification really beneficial? Journal of Banking & Finance 34, 163-173.

Other references

Citi bank, 2012, Securities Lending in the Emerging Markets, Retrieved on 24.5.2014, available on http://www.citibank.com/sfs/docs/09_12_securities_lending_emerging_markets.pdf

Dow Theory Forecasts, 2008, Problems with Price/Book, Dow Theory

FTSE, 2013, Retrieved on 24.5.2014, available on http://www.ftse.co.uk/Indices/FTSE_Frontier_Indices/index.jsp

Kemppainen A. interview, 2013. Interview held on 7th November 2013. Ami Kemppainen, Managing Director of Primus.

Kemppainen A. interview, 2014. Interview held on 15th May 2014. Ami Kemppainen, Managing Director of Primus.

MSCI Global Market Accessibility Review., 2013, Retrieved on 24.5.2014, available on http://www.msci.com/resources/products/indexes/global_equity_indexes/gimi/stdindex/MSCI_Global_Market_Accessibility_Review_June2013.pdf

MSCI, 2013, Retrieved on 24.5.2014, available on http://www.msci.com/products/indexes/country_and_regional/fm/

Pew Research Center. Pew Global Attitudes Project, 2007

Reuters, 2014. "*UAE likely to allow full short selling of stocks as money flows in*", 16th May 2014.

Russell 2013, Retrieved on 24.5.2014, available on http://www.russell.com/indexes/americas/indexes/index-series/russell-frontier-indexes-overview.page

The Evolution of the Nigerian Financial System., 2013, Retrieved on 24.5.2014, available on http://businessdayonline.com/2013/08/the-evolution-of-the-nigerian-financial-system/#.U3y5TfI_t4g 15th Aug, 2013.

U.S. Department of State., 2013, 2013 Investment Climate Statement, Retrieved on 24.5.2014, available on http://www.state.gov/e/eb/rls/othr/ics/2013/index.htm

Worldbank, 2012, Retrieved on 20.4.2013, available on http://data.worldbank.org/topic/financial-sector

8. Appendix

Appendix 1: Fama-French three-factor regression coefficients (See Table 10 and Table 11)

Table presents Fama-French three-factor coefficients related to three-factor alphas presented in Table 10 and Table 11. Three-factor regression coefficients represent market return minus risk-free return (MKT); top 10% size portfolio returns minus bottom 10% size portfolio returns (SMB); top 10% book-to-market portfolio returns minus bottom 10% portfolio returns (HML). B/M is the book-to-market ratio; E/P is the earnings-to-price ratio; D/P is the dividend-to-price ratio; E/E is the EBITDA-to-enterprise value ratio; and Size is the market capitalization of the company (ranked in ascending order). The results are presented for both 6- and 12-month holding periods as well as for both non-normalized and industry normalized strategies.

6-month holding period (non-normalized strategies)

	B/M	E/P	D/P	E/E	Size
MKT	0.9814	1.2207	1.0447	1.0880	1.0451
SMB	-0.0028	0.0511	0.2203	0.0084	0.6267
HML	0.6589	0.1538	-0.0958	0.2576	-0.1131

6-month holding period (industry-normalized strategies)

	B/M	E/P	D/P	E/E	Size
MKT	0.8782	1.2091	1.0008	1.0179	1.0636
SMB	0.0162	0.0922	0.1392	-0.1147	0.5973
HML	0.4469	0.1045	-0.1433	0.2878	-0.0543

12-month holding period (non-normalized strategies)

	B/M	E/P	D/P	E/E	Size
	0.9774	1.2207	0.7676	1.1919	1.0576
SMB	0.0105	0.0153	0.2694	-0.0084	0.6292
HML	0.7056	0.1136	-0.3575	0.0567	-0.1772

12-month holding period (industry-normalized strategies)

	B/M	E/P	D/P	E/E	Size
MKT	0.8236	1.2271	0.9004	1.1429	1.0960
SMB	-0.0261	0.0187	0.1050	-0.0375	0.5876
HML	0.6510	0.1513	-0.2666	0.1258	-0.0643

Appendix 2: Fama-French three-factor regression coefficients for market cap divided data sets (See Table 15)

Table presents Fama-French three-factor coefficients related to three-factor alphas presented in Table 15. Three-factor regression coefficients represent market return minus risk-free return (MKT); top 10% size portfolio returns minus bottom 10% size portfolio returns (SMB); top 10% book-to-market portfolio returns minus bottom 10% portfolio returns (HML). B/M is the book-to-market ratio; E/P is the earnings-to-price ratio; D/P is the dividend-to-price ratio; E/E is the EBITDA-to-enterprise value ratio. Size high includes the largest (market cap) third of stocks. Size middle includes the middle third of the stocks by market cap. Size low includes the smallest (by market cap) third of the stocks. The results are presented for both 6- and 12-month holding periods with non-normalized strategies.

6-month holding period (non-normalized strategies)

	B/M	E/P	D/P	E/E
Size high				
HML	-0.5330	-0.1719	-0.0244	-0.1697
SMB	0.0792	0.0947	-0.1026	0.0857
MKT-rf	1.0464	1.2000	0.8335	1.0575
Size middle				
HML	-0.7790	-0.1768	0.0795	-0.1926
SMB	-0.0796	0.0091	0.2140	-0.0483
MKT-rf	1.0293	1.2538	1.0347	1.0475
Size low				
HML	-0.5986	-0.0313	0.0078	0.1138
SMB	0.0452	0.1774	0.0752	0.0684
MKT-rf	0.6949	1.0152	1.1186	0.8159

12-month holding period (non-normalized strategies)

	B/M	E/P	D/P	E/E
Size high				
HML	0.4932	0.1656	0.0095	0.1521
SMB	0.1498	0.0359	-0.1402	0.1208
MKT-rf	1.0603	1.2028	0.7545	1.0626
Size middle				
HML	0.8032	0.1470	-0.1325	0.0002
SMB	-0.0377	-0.0388	0.1263	-0.0814
MKT-rf	1.0056	1.3269	0.9286	1.3068
Size low				
HML	0.4989	0.1798	-0.0890	-0.2905
SMB	0.0402	0.0990	0.0466	-0.0768
MKT-rf	0.6999	1.0209	0.9134	1.0397

Appendix 3: Returns of size top, size middle and size low portfolios with 6-month holding period and industry-normalized variables

Table below presents an overview of the return characteristics of the top portfolios in each market cap category (top, middle, low) compared to index, bottom portfolio, CAPM, and 3-factor-model. Size top includes the largest (market cap) third of stocks. Size middle includes the middle third of the stocks by market cap. Size low includes the smallest (market cap) third of the stocks. Top-Minus-Index is the average annual excess return of the equally weighted top 10% portfolio minus the average returns of equally-weighted universe (index) in the particular market cap class (top, middle, low). Top-Minus-Bottom is the average annual excess return of the equally weighted top 10% portfolio minus the average returns of equally-weighted bottom 10% portfolio in the particular market cap class (top, middle, low). Jensen's Alpha is the annual alpha return of the top 10% portfolio with Capital Asset Pricing Model. 3-factor alpha is the annual alpha return of the top 10% portfolio regressed to Fama and French three-factor model. T-Values are calculated in relative to 0% excess return/alpha. T-Value stars represent 90% (*), 95% (**), and 99% (***) significance levels. Three-factor regression coefficients are market return minus risk-free return (MKT); top 10% size portfolio returns minus bottom 10% size portfolio returns (SMB); top 10% book-to-market portfolio returns minus bottom 10% portfolio returns (HML).

Panel A: Portfolio raw returns (EW)

	B/M		E/P		D/P		E/E	
	Return	t-Value	Return	t-Value	Return	t-Value	Return	t-Value
Top-Minus-Index								
Size high	8.97 %	4.56 ***	7.39 %	4.56 ***	-0.28 %	-0.21	9.72 %	5.91 ***
Size middle	15.81 %	5.97 ***	12.40 %	6.37 ***	4.29 %	2.44 ***	16.52 %	8.39 ***
Size low	8.34 %	2.36 **	3.81 %	1.43 *	0.36 %	0.16	-4.26 %	-1.64 *
Top-Minus-Bottom								
Size high	10.64 %	3.23 ***	12.86 %	6.02 ***	-3.10 %	-1.37 *	15.43 %	4.63 ***
Size middle	34.82 %	9.79 ***	13.18 %	3.94 ***	3.15 %	1.32 *	25.17 %	10.19 ***
Size low	27.33 %	5.81 ***	5.82 %	1.47 *	-2.07 %	-0.63	-7.49 %	-1.43 *

Panel B: Portfolio alphas (EW)

	B/M		E/P		D/P		E/E	
	Alpha	t-Value	Alpha	t-Value	Alpha	t-Value	Alpha	t-Value
Size high								
CAPM (Jensen)	8.60 %	2.30 **	4.22 %	1.07	2.22 %	0.79	8.43 %	2.21 **
3-factor	-1.12 %	-0.31	-3.42 %	-0.89	5.21 %	1.83 **	3.14 %	0.84
Size middle								
CAPM (Jensen)	14.49 %	3.60 ***	8.10 %	2.04 **	3.55 %	1.06	16.15 %	4.46 ***
3-factor	-5.56 %	-1.45 *	-1.10 %	-0.28	-2.21 %	-0.67	16.09 %	4.45 ***
Size low								
CAPM (Jensen)	11.22 %	3.13 ***	3.92 %	0.93	-1.41 %	-0.35	-3.24 %	-0.89
3-factor	-10.47 %	-3.09 ***	-6.43 %	-1.57 *	-4.24 %	-1.07	-3.43 %	-0.94

Panel C: Three-factor regression coefficients (EW)

	B/M	E/P	D/P	E/E
Size high				
HML	-0.5021	-0.1857	-0.0179	-0.1944
SMB	0.0302	0.1161	-0.0894	0.0455
MKT-rf	0.9012	1.2021	0.8225	1.0737
Size middle				
HML	-0.5884	-0.1154	0.1590	-0.2763
SMB	-0.0548	0.0765	0.1994	-0.1808
MKT-rf	0.8286	1.2524	1.0720	0.9485
Size low				
HML	-0.5186	-0.0514	0.0446	0.0912
SMB	0.0828	0.1355	0.0674	0.0438
MKT-rf	0.6340	0.9582	1.1107	0.7602

Appendix 4: Returns of size top, size middle and size low portfolios with 12-month holding period and industry-normalized variables

Table below presents an overview of the return characteristics of the top portfolios in each market cap category (top, middle, low) compared to index, bottom portfolio, CAPM, and 3-factor-model. Size top includes the largest (market cap) third of stocks. Size middle includes the middle third of the stocks by market cap. Size low includes the smallest (market cap) third of the stocks. Top-Minus-Index is the average annual excess return of the equally weighted top 10% portfolio minus the average returns of equally-weighted universe (index) in the particular market cap class (top, middle, low). Top-Minus-Bottom is the average annual excess return of the equally weighted top 10% portfolio minus the average returns of equally-weighted bottom 10% portfolio in the particular market cap class (top, middle, low). Jensen's Alpha is the annual alpha return of the top 10% portfolio with Capital Asset Pricing Model. 3-factor alpha is the annual alpha return of the top 10% portfolio regressed to Fama and French three-factor model. T-Values are calculated in relative to 0% excess return/alpha. T-Value stars represent 90% (*), 95% (**), and 99% (***) significance levels. Three-factor regression coefficients are market return minus risk-free return (MKT); top 10% size portfolio returns minus bottom 10% size portfolio returns (SMB); top 10% book-to-market portfolio returns minus bottom 10% portfolio returns (HML).

Panel A: Portfolio raw returns (EW)

	B/M		E/P		D/P		E/E	
	Return	t-Value	Return	t-Value	Return	t-Value	Return	t-Value
Top-Minus-Index								
Size high	14.91 %	8.67 ***	7.20 %	6.18 ***	-1.50 %	-1.27	9.39 %	8.56 ***
Size middle	24.88 %	9.98 ***	16.28 %	10.65 ***	4.86 %	3.00 ***	15.01 %	9.86 ***
Size low	10.16 %	5.22 ***	5.05 %	1.96 **	1.28 %	0.57	3.02 %	1.16
Top-Minus-Bottom								
Size high	16.48 %	6.21 ***	11.41 %	7.91 ***	-4.77 %	-2.37 ***	18.23 %	7.54 ***
Size middle	42.21 %	14.08 ***	18.60 %	8.20 ***	3.86 %	1.74 **	25.33 %	10.93 ***
Size low	29.63 %	12.06 ***	5.12 %	1.39 *	-0.38 %	-0.13	-7.90 %	-1.20

Panel B: Portfolio alphas (EW)

	B/M		E/P		D/P		E/E	
	Alpha	t-Value	Alpha	t-Value	Alpha	t-Value	Alpha	t-Value
Size high								
CAPM (Jensen)	11.39 %	3.25 ***	3.38 %	1.06	2.79 %	1.33 *	7.86 %	2.71 ***
3-factor	-1.13 %	-0.32	-0.29 %	-0.09	8.84 %	4.22 ***	0.39 %	0.14
Size middle								
CAPM (Jensen)	14.97 %	3.52 ***	10.21 %	3.09 ***	6.51 %	2.46 ***	11.02 %	3.42 ***
3-factor	-6.19 %	-1.46 *	8.06 %	2.44 ***	1.94 %	0.73	16.95 %	5.26 ***
Size low								
CAPM (Jensen)	11.53 %	4.31 ***	3.86 %	1.00	2.31 %	0.74	3.06 %	0.84
3-factor	-5.52 %	-2.06 **	-8.28 %	-2.14 **	1.60 %	0.51	17.34 %	4.75 ***

Panel C: Three-factor regression coefficients (EW)

	B/M	E/P	D/P	E/E
Size high				
HML	0.4932	0.1656	0.0095	0.1521
SMB	0.1498	0.0359	-0.1402	0.1208
MKT-rf	1.0603	1.2028	0.7545	1.0626
Size middle				
HML	0.8032	0.1470	-0.1325	0.0002
SMB	-0.0377	-0.0388	0.1263	-0.0814
MKT-rf	1.0056	1.3269	0.9286	1.3068
Size low				
HML	0.4989	0.1798	-0.0890	-0.2905
SMB	0.0402	0.0990	0.0466	-0.0768
MKT-rf	0.6999	1.0209	0.9134	1.0397

Appendix 5: Global market accessibility (Source: MSCI Global Market Accessibility Review, 2013[8])

++: no issues; +: no major issues, improvements possible; -/?: improvements needed / extent to be assessed. Expressed number is the number of countries in given category.

	Developed Markets			Emerging Markets			Frontier Markets		
	++	+	-/?	++	+	-/?	++	+	-/?
Openness to foreign ownership									
Investor qualification requirement	24	-	-	19	2	-	23	2	-
Foreign ownership limit (FOL) level	21	3	-	11	2	8	16	-	9
Foreign room level	23	-	1	18	-	3	20	-	5
Equal rights to foreign investors	23	1	-	1	17	3	10	14	1
Ease of capital inflows / outflows									
Capital flow restriction level	24	-	-	18	3	-	20	3	2
Foreign exchange market liberalization level	24	-	-	8	5	8	11	4	10
Efficiency of the operational framework									
Market entry									
Investor registration & account set up	24	-	-	9	5	7	7	9	9
Market organization									
Market regulations	24	-	-	8	13	-	14	9	2
Competitive landscape	24	-	-	17	3	1	12	-	1
Information flow	22	2	-	6	12	3	11	5	9
Market infrastructure									
Clearing and Settlement	22	2	-	5	10	6	4	6	15
Custody	24	-	-	20	-	1	13	3	9
Registry / Depository	24	-	-	17	4	-	16	6	3
Trading	24	-	-	16	5	-	11	6	8
Transferability	23	-	1	8	7	6	6	6	13
Stock lending	22	1	1	7	9	5	-	1	24
Short selling	21	2	1	4	11	6	-	-	25
Stability of institutional framework	19	4	1	4	14	3	-	20	5

[8] This table is copied from MSCI Global Market Accessibility Review